FORBEG

A European comparison of electricity and natural gas prices for residential, small professional and large industrial consumers

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List of acronyms

Acronym	Definition
AMR	Automatic meter reading
BE	Belgium
BT	Basse Tension
CHP	Combined Heat and Power
CU	Consumption unit
CHPC	Combined Heat and Power Certificates
DCM	Distribution Charging Methodology
DE	Germany (abbreviation from ‘Deutschland’)
DSO	Distribution System Operator
EAN	European Article Number
EEAG	Guidelines on State aid for environmental protection and energy 2014-2020
EHV	Extra-High Voltage
FR	France
FPS	Federal Public Service (see FOD in Dutch or SPF in French)
GC	Green Certificates
GRAPA	La Garantie de revenus aux personnes âgées
GRDF	Gaz Réseau Distribution France
HH	Half Hourly
HHI-Index	Herfindahl-Hirschman Index
HS	Hoogspanning
HT	Haute Tension
IGO	Inkomensgarantie voor ouderen
kV	kilo Volt
kWh	kilo Watt-hour
KWKG	Kraft-Wärme-Kopplungsgesetz (see CHP in English)
LS	Laagspanning

LT	Long-term
LTSO	Local Transmission System Operator
MPA	Meter Point Administration Number
MS	Middenspanning
MT	Moyenne Tension
MWh	Mega Watt-hour
NBB	National Belgian Bank
NCG	NetConnect Germany
NHH	Non-Half Hourly
NL	The Netherlands
OFGEM	Office of Gas and Electricity Markets (UK)
PPP	Purchasing Power Parities
PSO	Public Service Obligation
PSWC	Public Social Welfare Centre
RTI	Reference Tax Income
SME	Small and medium-sized enterprise
SR	Switching rate
ST	Short-term
TSO	Transmission System Operator
UK	The United Kingdom
VAT	Value-Added Tax
YMR	Yearly meter reading

Glossary

Acronym	Definition
Industrial consumers	In this study, we refer to E0, E1, E2, E3, G1 and G2 as large industrial consumers.
Residential consumers	In this study, we refer to E-RES, G-RES as residential consumers
Small professional consumers	In this study, we refer to E-SSME, E-BSME and G-PRO as small professional consumers or as small and medium-sized enterprises
TRANS-HS	TRANS-HS comes from "Transformatorstation hoogspanning" for which DSOs are directly connected to the transformer stations. (Fluvius, 2017).
TRANS-MT	TRANS-MT comes from "Transformation moyenne tension" for which DSOs are directly connected to the transformer stations.
MS	MS comes from "Middenspanning" and encompasses consumers connected to the distribution grid on a voltage level ranging from 1 to 26 kV.
MT	MT comes from "Moyenne tension" and encompasses consumers connected to the distribution grid on a voltage level ranging from 1 to 26 kV.
LS	LS comes from "Laagspanning" and encompasses consumers connected to the distribution grid on a voltage level < 1 kV.
BT	BT comes from "Basse tension" and encompasses consumers connected to the distribution grid on a voltage level < 1 kV.

1. Executive summary

1. Executive summary

English version

In this study, the prices of electricity and natural gas for residential, small professional and industrial consumers are compared between Belgium and four of its neighbouring countries (France, Germany, the Netherlands and the United Kingdom). When deemed more relevant, the results of this study are presented at regional level rather than on a countrywide basis.

This report focuses explicitly on energy prices in force in January 2022. This is an important aspect to keep in mind considering the current volatility of electricity and natural gas prices. Due to the specific economic situation in Europe this year, we however decided to consider the measures taken by the different governments to reduce energy prices that were implemented after 1st January 2022 in Section 8 "Comparison of social measures for residential consumers". This was necessary to assess the electricity and natural gas price impact on the adjusted disposable households income.

Before going into the details of the methodology, we would like to summarise here the most relevant changes observed in 2022:

1. For both electricity and natural gas, we observed a large increase in the commodity prices compared to last year. This is valid for all the consumer profiles. Due to this general increase, we observed a convergence of the energy bills between the regions/countries under review, in particular for industrial profiles. Compared to last year, we noticed a narrowing gap of competitiveness between the industries from the different regions/countries with regards to their energy bills.

2. Regarding taxes, the large decrease of the EEG Umlage in Germany and the introduction of the federal "special" excise duty in the three Belgian regions show the intention of governments to decrease the tax burden on the energy bills, especially for residential consumers. These actions were however not sufficient to lower the energy bills due to the large increase in the commodity price. On the other hand, the introduction of the "CO2 Steuer", or Carbon tax, in Germany forces German natural gas consumers to pay an even higher natural gas bill compared to previous years.

The **consumer profiles** under review were set by the Terms of Reference of this study and remain in line with the previous comparative studies conducted by PwC for the CREG and the VREG[1]. In total, 13 different consumer profiles were studied: 8 for electricity (1 residential, 2 small professional and 5 industrial consumers) and 5 for natural gas (1 residential, 1 small professional and 3 industrial consumers). The tables below synthesize, albeit non-exhaustively, specific characteristics of our consumer profiles for which further hypotheses can be found in chapter 3.

[1] Previous year's studies on the residential and industrial consumers can be found on the CREG website (https://www.creg.be/sites/default/files/assets/Publications/Studies/F20210517EN.pdf) for 2021 and (https://www.creg.be/sites/default/files/assets/Publications/Studies/F20200520EN.pdf) for 2020 with the errata (https://www.creg.be/sites/default/files/assets/Publications/Studies/F20200520-errata.pdf) .

Electricity consumer profiles

Profile	Consumer type	Annual demand (MWh)	Contracted capacity (kW)	Annual peak (kW)
E-RES	Residential	3,5	7,4	-
E-SSME	Small professional	30	37,5	30
E-BSME	Small professional	160	125	100
E0	Industrial	2.000	625	500
E1	Industrial	10.000	2.500	2.000
E2	Industrial	25.000	5.000	5.000
E3	Industrial	100.000	13.000	13.000
E4	Industrial	500.000	62.500	62.500

Natural gas consumer profiles

Profile	Consumer type	Annual demand (MWh)	Contracted capacity (kW)
G-RES	Residential	23,26	-
G-PRO	Small professional	300	-
G0	Small professional	1.250	-
G1	Industrial	100.000	20.000
G2	Industrial	2.500.000	312.500

The comparison looks at three **components** of the energy bill: commodity costs, network costs and all other costs (taxes, levies and certificate schemes). A fourth component, the VAT, is only considered for both electricity and natural gas residential profiles.

An extensive description of the energy prices composition and components (chapter 4 and 5) precedes price comparison results (chapter 6). Energy costs are analysed following a bottom-up approach, leading to a detailed description of the various price components and their application within the countries considered in this study.

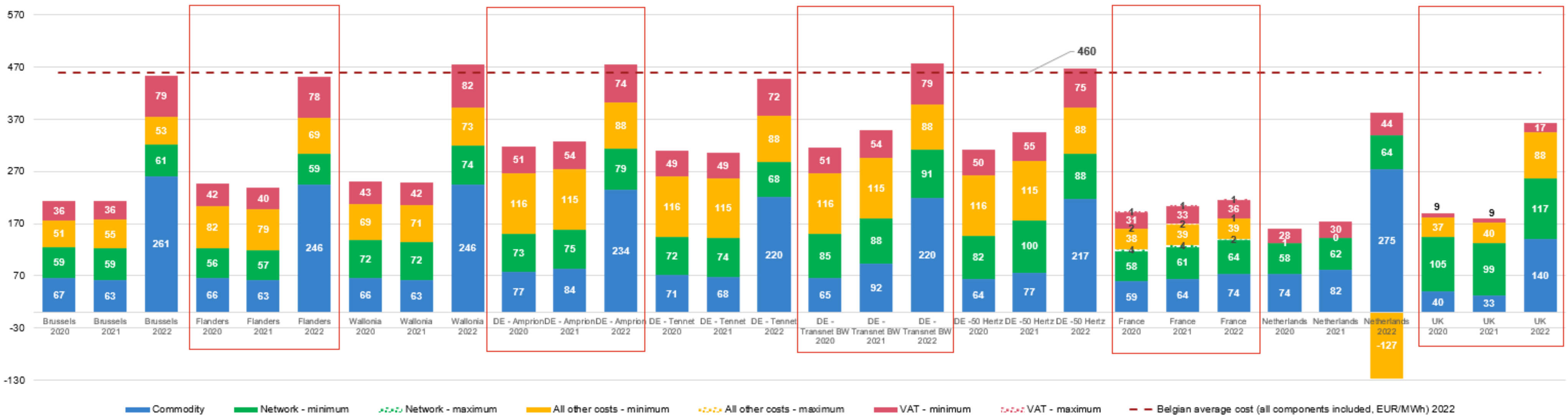
For both electricity and natural gas, this report notes great differences in the price structure between the different regions and countries, including the setting of network costs and tax regimes. This adds an additional layer of complexity for a fair comparison across all countries/regions covered in this study.

Comparison of electricity prices

Comparison of electricity prices for residential and small professional consumers

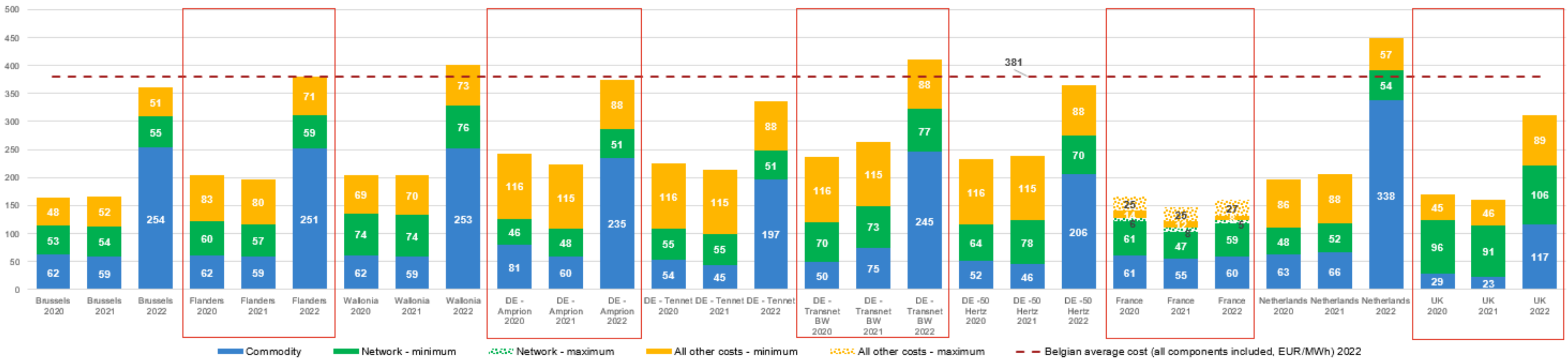
Compared to last year, the most remarkable difference is the high increase of the commodity price for the E-RES profile in all regions/countries under review, except for France and the UK where the regulated product limits this increase. For residential consumers, France has the lowest annual bill because the standard product for residential consumers is regulated by the Government, and thus does not reflect the market increase of the commodity price all over Europe. The Netherlands has the second lowest annual bill, partly due to a large rebate on taxes (“belastingvermindering”), acting as a reduction of 194 EUR/MWh on the yearly bill and making the other costs component negative. On the other hand, Germany is the country where people pay the most and have the highest tariffs for the “all other costs” component (i.e. taxes, levies and certificate systems). The commodity cost in the UK is lower than in other countries (except for France) because of price regulations. Compared to the countries studied, Belgium has relatively high prices and is the second most expensive country after Germany. In comparison to last year, the difference between Germany and Belgium has decreased due to the decline of the EEG Umlage. In Belgium, Flanders is now slightly cheaper than Brussels, while Wallonia is the most expensive region. This year Flanders has become slightly cheaper than Brussels due to a decrease of the regional public service obligations. In comparison with last year, the total amount invoiced has increased in all the regions/countries under review, and the largest increase is seen in Brussels. For Germany the largest increase is seen in the Amprion region and is due to an increase in the commodity and network costs, which also impact the VAT component.

Electricity price by component in EUR/MWh (profile E-RES)



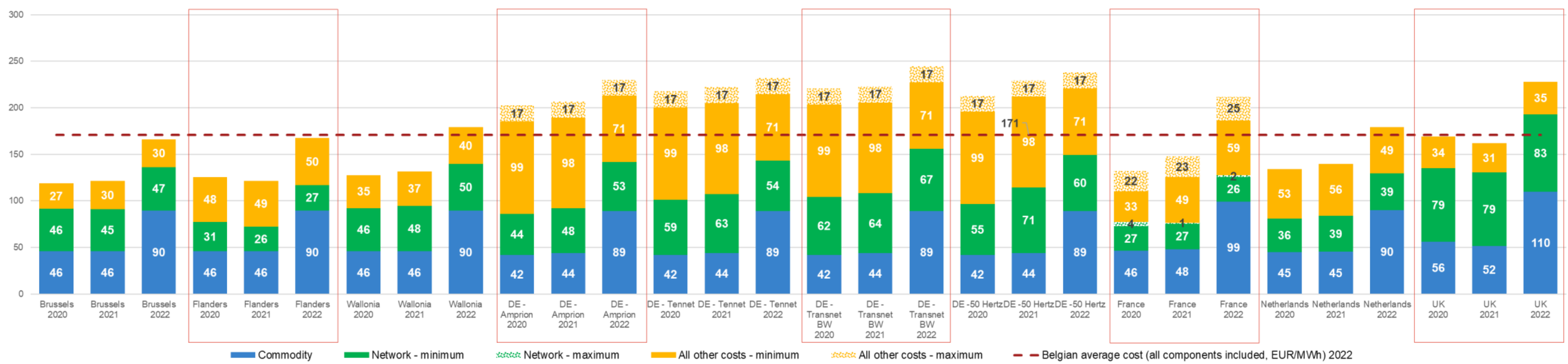
The situation is relatively similar for the E-SSME profile among small professional consumers. The most notable difference is the weaker competitive position of the Netherlands, which becomes the most expensive region for this profile in 2022 because the tax refund cannot offset the higher taxes they have to pay compared to residential consumers. Consequently, Belgium is now cheaper than the Netherlands for E-SSME profile while it is not the case for E-RES profile. As for E-RES, the United Kingdom is still the 2nd most competitive country under review. However, this position is less clear now because no VAT is considered for E-SSME. The UK had a competitive advantage regarding this component because they applied a much lower VAT rate (5%). In contrast to the E-RES profile, Brussels is the cheapest Belgian region for the E-SSME profile, followed by Flanders. Again, in comparison with last year the total invoice has increased in all the regions/countries under review. There have been however a few changes compared to 2021. The difference between Belgium and the cheapest countries, France, and the UK, has widened. While electricity prices for small, professional consumers in all these countries rose sharply, the French average remained more or less the same. Here again this is because of an overall big rise of commodity costs. The commodity price rise has a slightly lower impact in the UK and France only because of price regulation.

Electricity price by component in EUR/MWh (profile E-SSME)



While in Belgium, the commodity prices were multiplied by 5 compared to 2021 (to about 250 EUR/MWh) for E-RES and E-SSME, for E-BSME and E0-E4 there is only an increase by a factor of 2 (to about 90 EUR/MWh). This difference is partially explained by the different methodologies used. The formula used for the larger profiles in electricity mainly consider the forward prices for 2022 from 2019, 2020 and 2021. As a result, the increase in spot prices in 2021 and 2022 is only partially visible in the results. As for E-BSME, Germany lags again with far higher bills than the other countries because of much higher tax levels, despite the decrease by almost 50% of the *EEG-Umlage* compared to 2021. Brussels offers the cheapest annual invoice, just as it was already the case last year. As far as neighbouring countries are concerned, Belgian prices are now better aligned, as Germany, France and the United Kingdom still being more expensive. Inside the country, regional positions remain stable: thanks to lower taxes, Brussels is the cheapest region, followed by Flanders and finally Wallonia. The difference between Brussels and Flanders is negligible and is not even distinguishable in the figure below.

Electricity price by component in EUR/MWh (profile E-BSME)

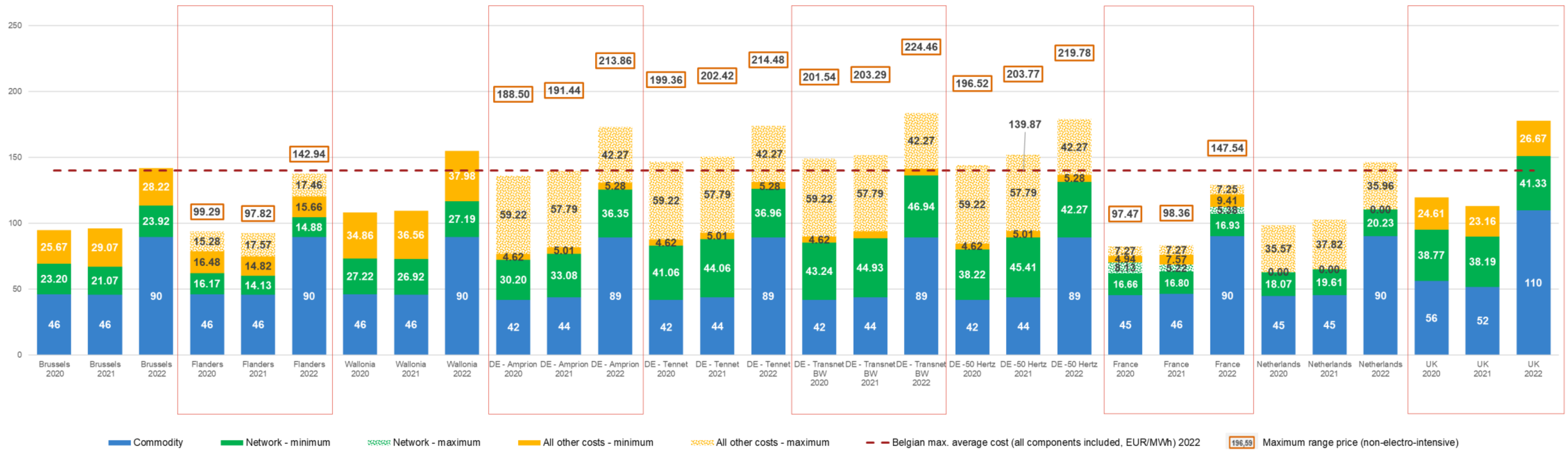


The different components examined for each country and region can vary considerably and have an impact on the competitive position of each country. Even though commodity prices are reasonably convergent across countries for the E-BSME profile - except in the United Kingdom - there are significant differences in the components network costs and all other costs. The former certainly plays a significant role in Belgium. At the same time, the all other costs component makes Germany the most expensive country, but also leads to higher Belgian prices, especially for E-RES and E-SSME.

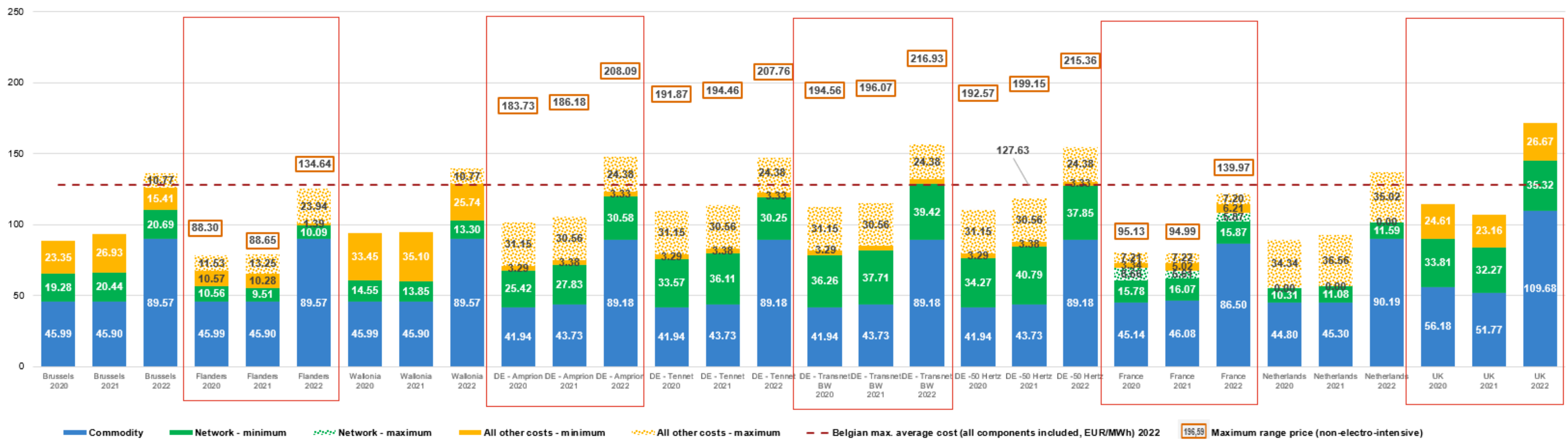
Comparison of electricity prices for industrial consumers

As for the residential and small professional consumers, the most significant change compared to last year is the large increase of the commodity price in all regions/countries under review. If all discounts are considered, the lowest cost of electricity for the E0 and E2 consumer profiles is found in the Netherlands, slightly below France. However, Flanders is quasi on par with the Netherlands for E1 and E2. Relatively low network costs, but especially the reduction of all other costs (i.e. taxes, levies and certificate systems) partly explain these lower prices. Overall, Belgium has an average annual bill compared to the other countries studied, while the United Kingdom is by far the most expensive. The results for Germany are highly variable. While they offer average prices that are somewhat comparable to those of Belgium when the reductions on all other costs apply to electro-intensive consumers, German industrial consumers face the highest prices when these reductions do not apply. In Belgium, the cost of electricity is higher in Wallonia for profiles E0, E1 and E2.

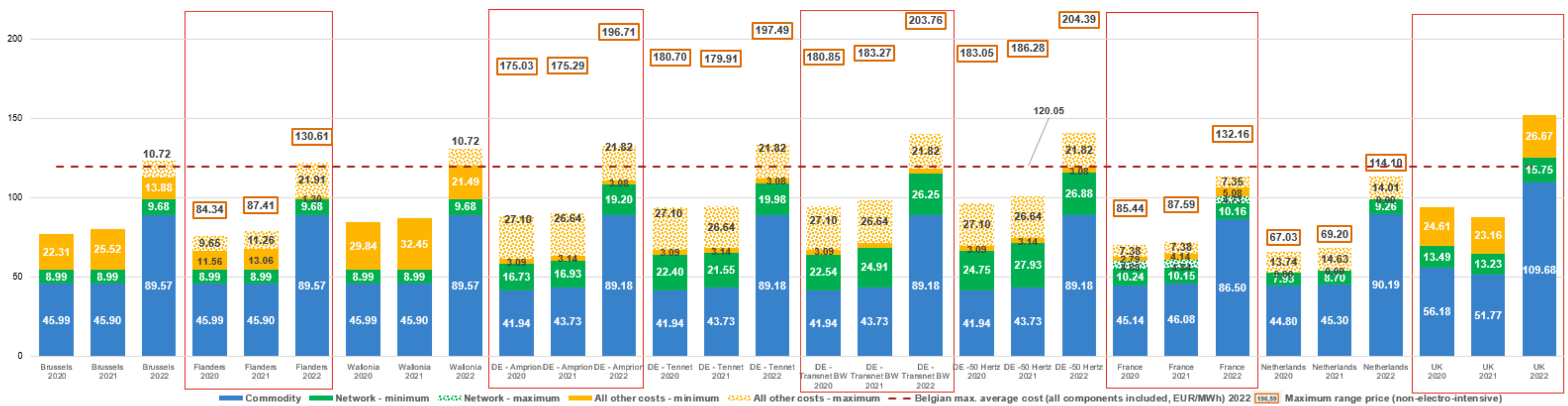
Electricity price by component in EUR/MWh (profile E0)



Electricity price by component in EUR/MWh (profile E1)



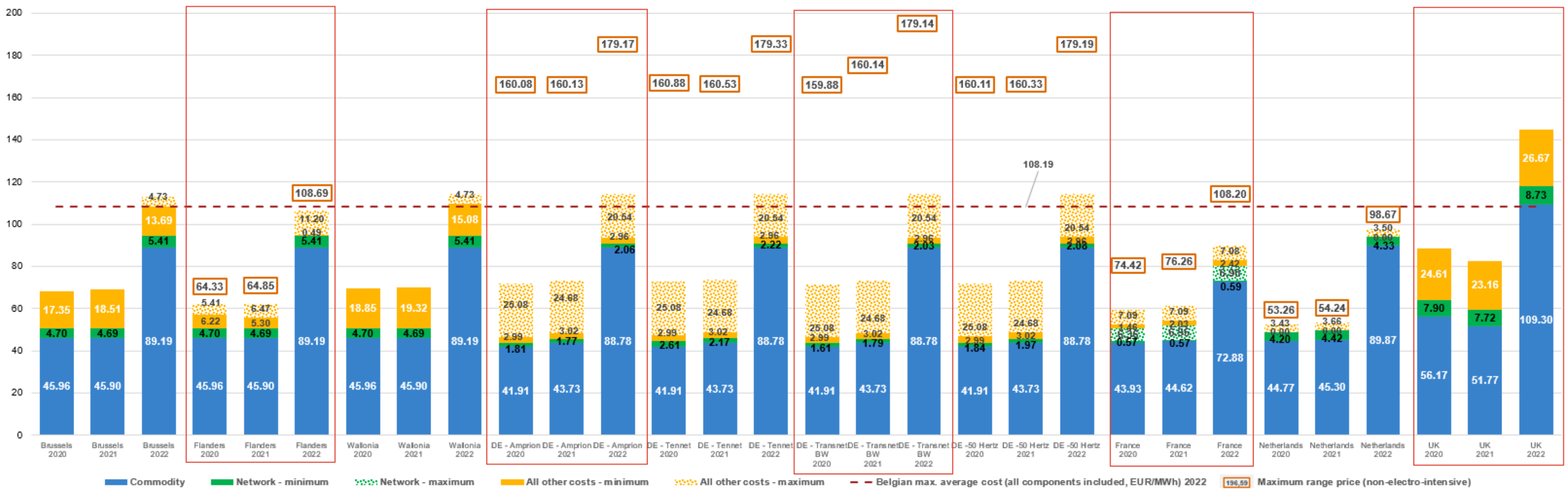
Electricity price by component in EUR/MWh (profile E2)



When considering the E3 and E4 profiles France has the potential lowest invoice of all. An important difference with E0-E2: for these profiles, Flanders came very close to France, for E3-E4 it does not. The reason for the drop in France is the ARENH mechanism from which these profiles benefit more. Second, the United Kingdom remains the most expensive country, except when considering German tariffs for non-electro-intensive consumers. Finally, Belgium shows relatively high average prices.

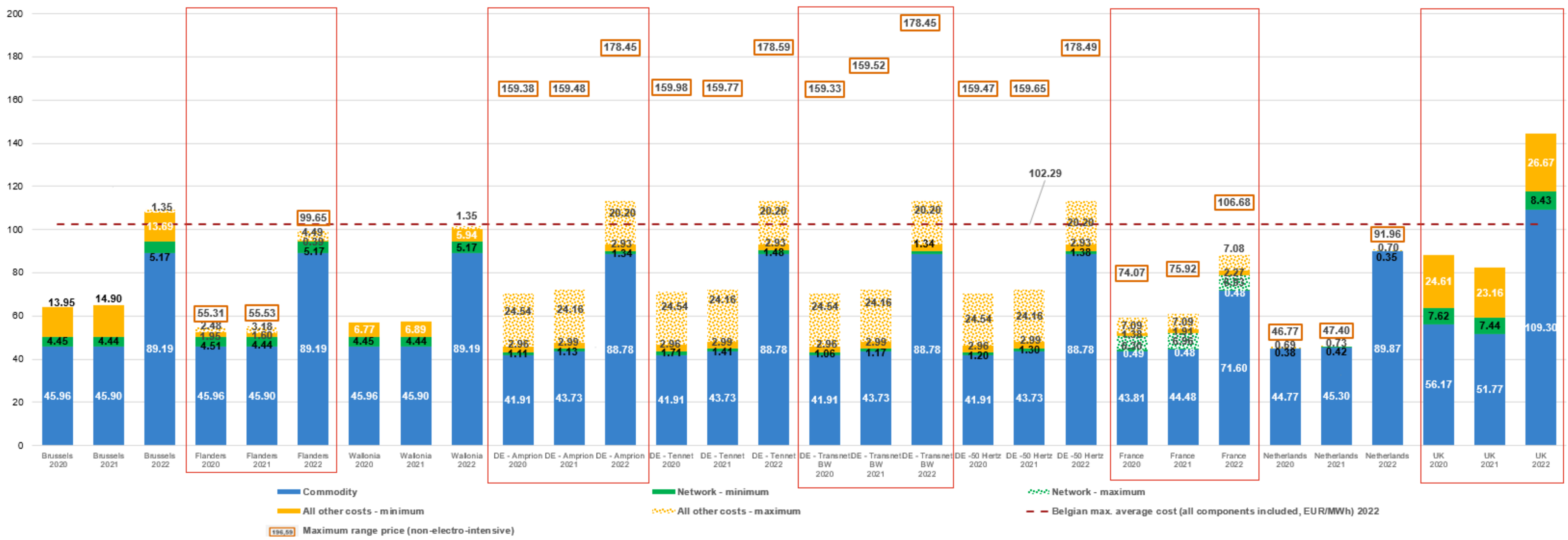
In Belgium, we observe that for E3 and E4 profiles, Flanders is always the most competitive region even for non-electro intensive consumers, which is in line with the result from last year. Since the commodity costs and network costs are harmonised over all Belgian regions, this purely depends on the all other costs component. It is however important to note that the biggest energy consumer in Brussels is closer to an E3 profile than an E4 one, and this is thus a purely theoretical observation for this region due to the absence of very large industrial consumers in the Brussels region.

Electricity price by component in EUR/MWh (profile E3)



Overall, countries in scope of this study face converging commodity prices, except for France and the United Kingdom, which represent outliers in 2022. Differences between countries also lie in the network and all other costs components. Belgium offers relatively aligned network costs but does not grant reductions on these costs, which may harm its competitiveness compared to countries that do so. Similarly, Belgium's taxes, levies and certification scheme costs would be aligned with those of other countries if the latter did not apply reductions for electricity-intensive consumers. Flanders is the only Belgian region that remains close to the other countries in scope due to lower all other costs explained by the cap on renewable energy financing and possible exemption of the federal special excise duty.

Electricity price by component in EUR/MWh (profile E4)



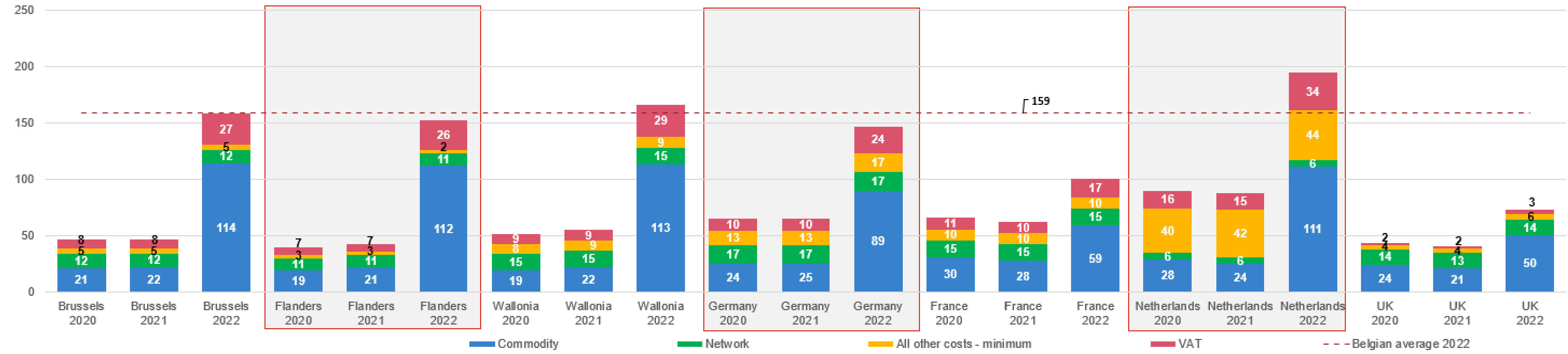
Regarding electricity for industrial consumers, the report highlights the great complexity due to government interventions to reduce electricity costs for certain categories of large industrial consumers. These interventions aim to influence the burden of grid costs and the components of all other costs (i.e. taxes, levies, certificate systems). Belgium, France, Germany and the Netherlands apply network costs and tax reductions/caps granted based on a series of specific economic criteria generally related to electro-intensity. If specific reductions can directly be applied on prices (e.g. network costs reductions in Germany), we also have to present some results according to a wide range of possibilities. As far as tax reductions are concerned, the criteria (annual offtake from 10 GWh or activity) set by the Netherlands are the least demanding. The application of these reductions leads to a change in the competitive position of the other countries in scope: Germany has the highest possible electricity cost for each profile studied, for consumers who do not meet the reduction criteria; the Netherlands and Flanders, which are already relatively cheap without reductions, become even cheaper; and France becomes cheaper than the Belgian regions, including Flanders, thanks to these reductions. Compared to 2021, Brussels and Wallonia now also have, like Flanders, a minimum-maximum range for the all other costs component thanks to the possible exemption to the federal special excise duty for the large industrial consumers (E1-E4). Finally, France is the only country to have reduced the cost of commodities thanks to the ARENH mechanism. The UK still does not offer a reduction/exemption for electro-intensive consumer, which impacts its relative competitiveness.

Comparison of natural gas prices

Comparison of natural gas prices for residential and small professional consumers

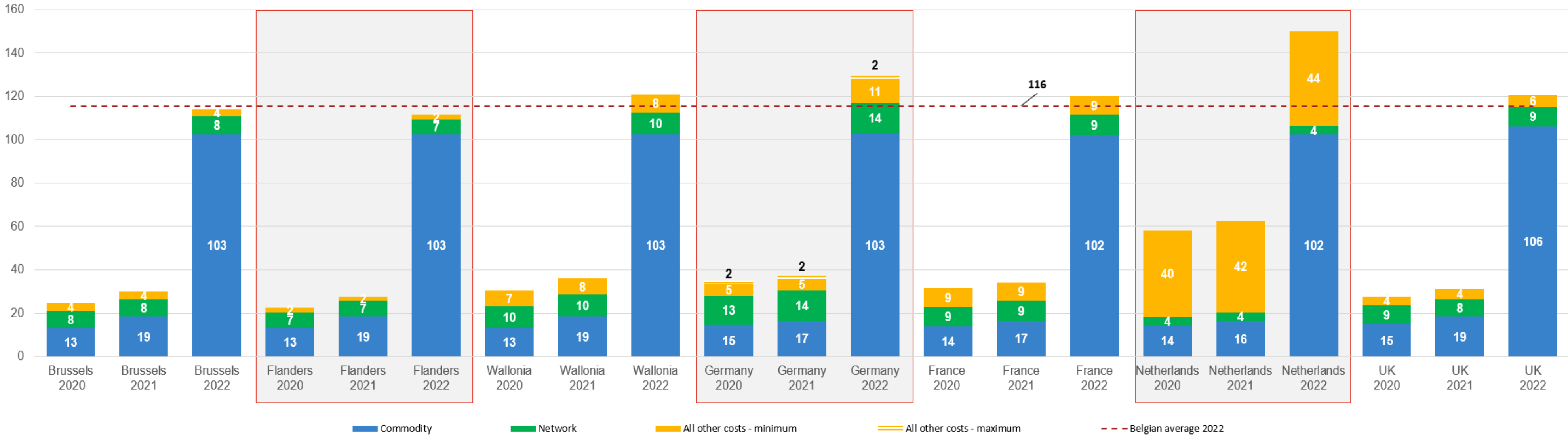
Compared to the results obtained for electricity, results drawn from the comparison of natural gas prices differ significantly. For residential consumers (G-RES), UK is the least expensive country followed by France, whereas the Netherlands becomes the most expensive. In France and the UK this is explained by the lowest commodity prices among the regions/countries under review mainly due to regulated prices for this profile. Like last year, the Netherlands is the most expensive country because of higher taxes than the other regions/countries analysed. While the competitive positioning of the UK was explained by the lowest VAT rate in 2021, it is now mainly explained by the UK's lower commodity costs component. Belgium is now the second most expensive country, due to a larger increase in the commodity price than the other regions/countries, while it was the second cheapest in 2021. Flanders is cheaper than Brussels and Wallonia due to lower regional public service obligations, which are also decreasing compared to last year. In addition to taxes, Flanders also offers the lowest network and commodity costs of all three Belgian regions, which explains its relatively lower prices. Like electricity, the most remarkable difference compared to 2021 for natural gas is the large increase in commodity price for all regions/countries under review.

Natural gas price per component in EUR/MWh (profile G-RES)



As for small professional consumers (G-PRO), Flanders shows the lowest total invoice followed by Brussels and then France. Driven by the low tax levels in Brussels and Flanders, the average Belgian invoice is the least expensive of all the countries under review and is also around 23% cheaper than the Dutch's natural gas bill for this profile. Again, the lower natural gas taxes encountered in Belgium (except in Wallonia) account for its good competitive position. For Germany, we notice a large increase of the all other costs component due to the introduction of the carbon tax, which was not considered in 2021. This is valid for G-RES and G-PRO, but also for all the larger industrial profiles (G0- G2).

Natural gas price per component in EUR/MWh (profile G-PRO)



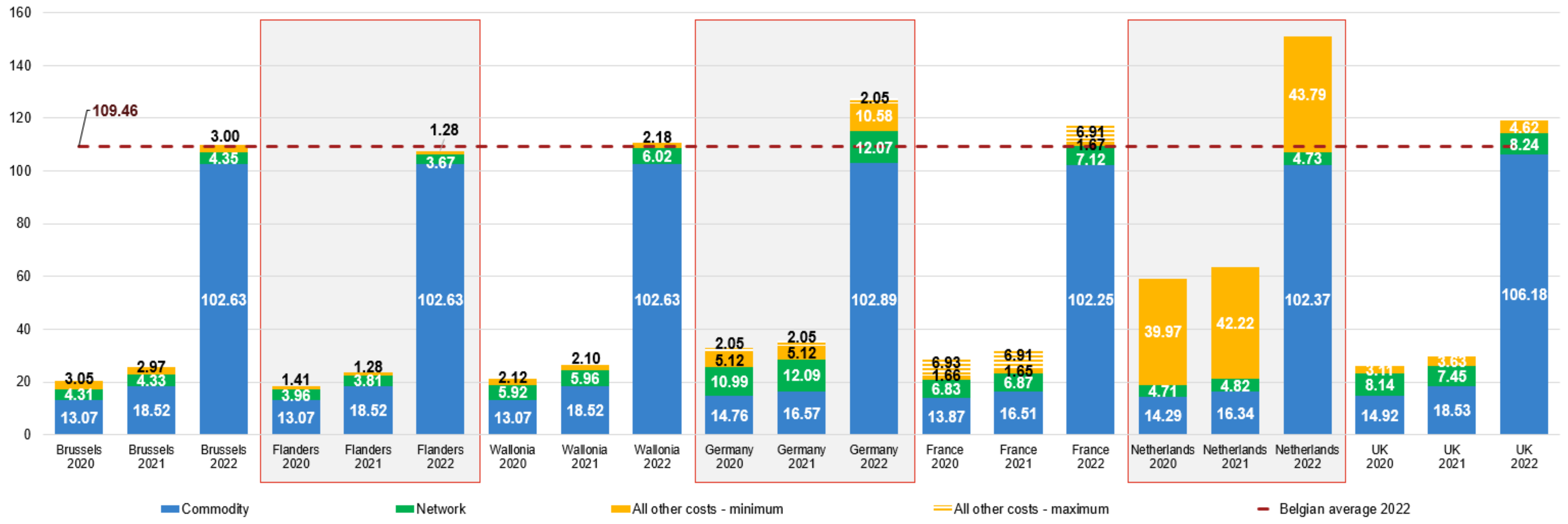
When comparing to 2021 data, we observe a big change in the total invoice mainly due to the commodity component which has risen sharply in 2022 (as was the case for the electricity profiles). In general, Belgium is relatively well aligned with its neighbouring countries mostly because of lower tax prices, which is a remarkable difference compared to electricity. In terms of commodity costs, they are convergent across countries when considering G-PRO, but the UK and France really stand out as being much less expensive when considering G-RES. The UK maintained its most competitive country position thanks to a relatively limited increase in commodity cost compared to its neighbouring countries. As for network costs, even though these costs for Belgium are on the average, Flanders certainly benefits from the smallest regional network costs to display lower fares within Belgium.

Comparison of natural gas prices for industrial consumers

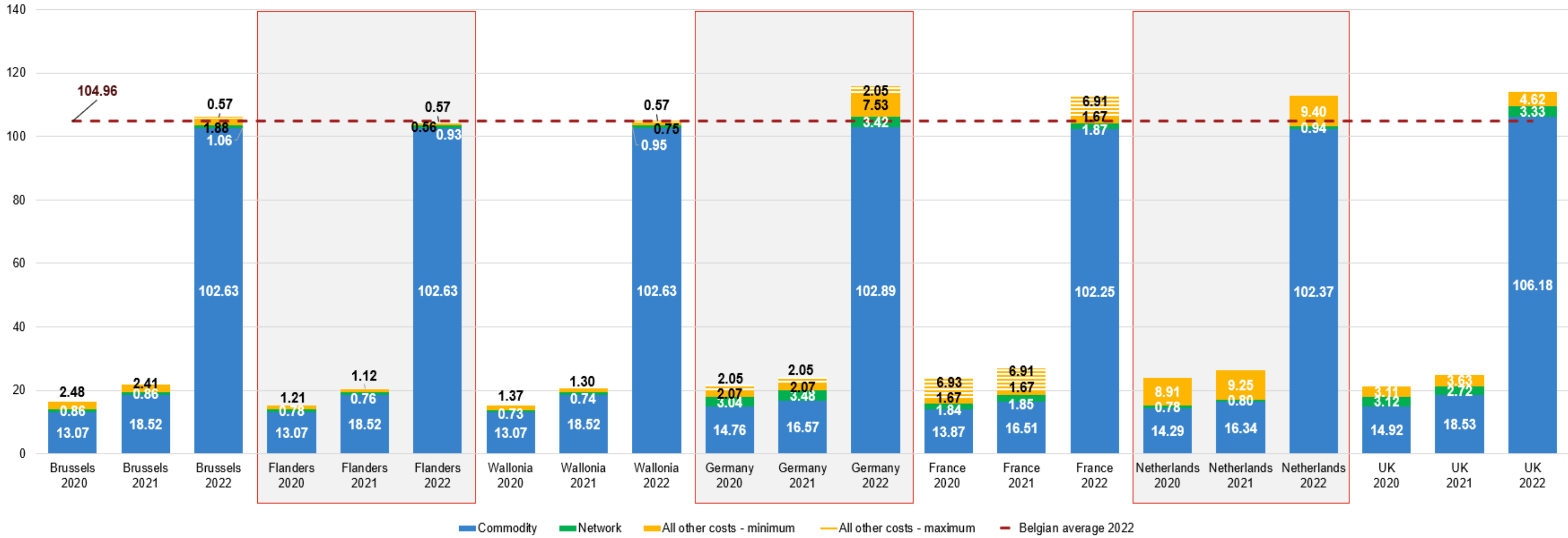
Like electricity industrial consumers, we observe a general large increase in the commodity price for industrial natural gas consumers, thus explaining a convergence among the regions/countries under review. Overall, Belgium is very competitive when it comes to natural gas, mainly thanks to its relatively low all other costs and network component prices. For profiles G0 and G1 Belgium is the most competitive country, although it is important to mention that France, when reductions apply, is closing in on Belgium. For the G2 profile it will however depend on the type of consumer since all countries offer reductions that can affect their competitive position. In Belgium, Brussels is the least competitive region (except for the G0 profile) while Flanders is the most competitive Belgian region for all industrial profiles. The price difference between Flanders and Wallonia remains however almost negligible for the G1 and G2 profiles.

For natural gas, government intervention in network costs and taxes appears to be less common (in the sense that there are few taxes levied on natural gas – except in the Netherlands). Moreover, the complexity is much lower, even if reductions or exemptions exist (e.g. exemptions for consumers using natural gas as a raw material or 'feedstock'). Only Germany and France offer reduction starting as of G0 profile. Belgium now offers an exemption in its three regions to the federal special excise duty for large industrial consumers (G1-G2), while other regions/countries only have a range to take into consideration for the G2 profile.

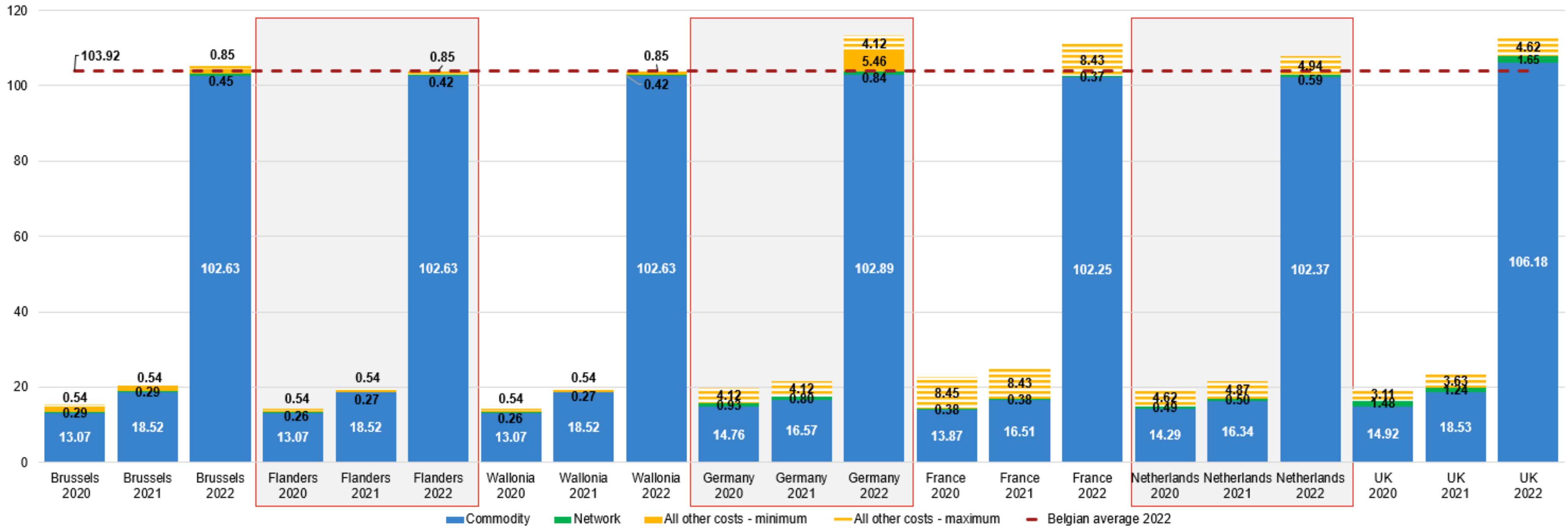
Natural gas price per component in EUR/MWh (profile G0)



Natural gas price per component in EUR/MWh (profile G1)



Natural gas price per component in EUR/MWh (profile G2)



Efforts in paying for energy bills for vulnerable consumers

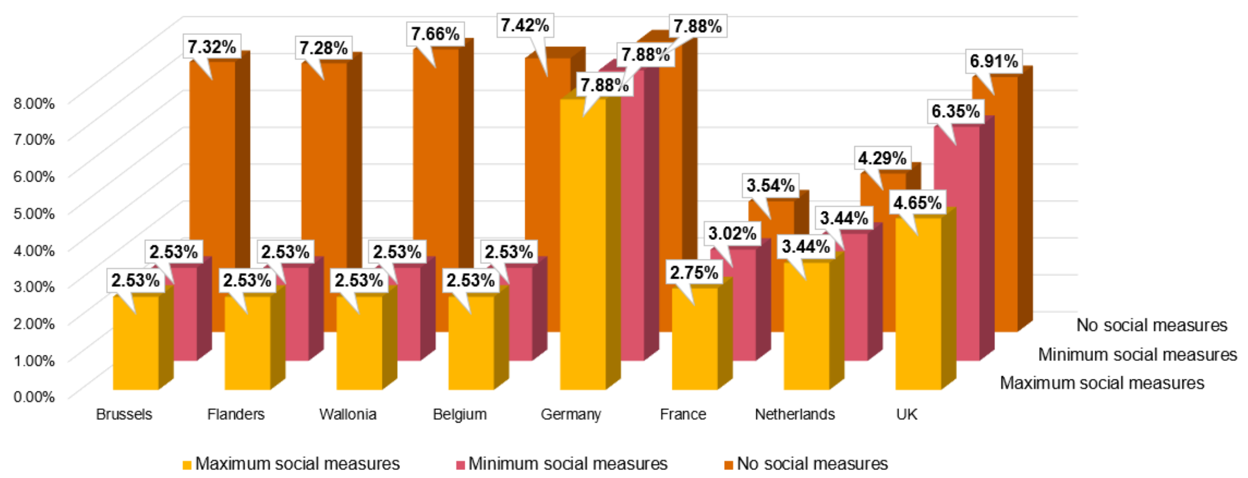
Chapter 8 aims to assess the differences in financial efforts made by vulnerable consumers to pay for their electricity and/or natural gas bills given their income level. Among the countries under review, various governments' tools exist to reduce people's energy bill. These tools can range from social tariffs to direct financial support to lower one's bill (e.g. via de chèque-énergie in France). The resulting variety makes it complex to perform a cross-country comparison.

For all regions/countries under review we observe higher effort rates (i.e. the share of a household's income dedicated to energy expenses) than last year when no social measures are considered. This can be explained by the higher electricity and natural gas bills due to the general increase in the commodity price. This year Belgium presents the second highest effort rate for electricity when no social measures are considered, with Germany having the highest one. Regarding natural gas and without social measures, Belgium shows the highest increase in effort rates compared to last year, from an average of 6% in 2021 to 17% in 2022. This is due to a relative higher increase in natural gas commodity price in Belgium than its neighbouring countries. However, like last year, the highest effort rate for natural gas without social measures is still observed in the Netherlands, followed by Belgium.

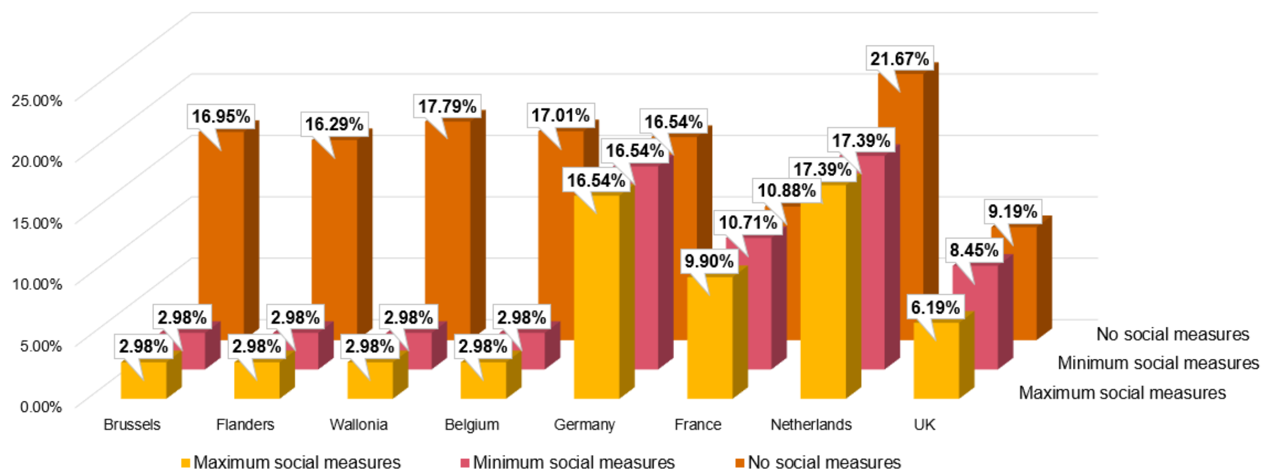
When we consider the government interventions the situation is different. In fact, Belgium tends to ensure the lowest effort rates compared to its neighbouring countries, and even more particularly for natural gas. Two elements lie behind this observation: first, relatively high disposable and living income levels (used to assess different scenarios) for residential consumers in Belgium compared to countries under study, thus helping to lower the effort rates. Second, Belgium offers significant reductions on energy prices through social tariffs (when households meet the eligibility criteria). On the federal level there are the social tariff and the Electricity and Gas Fund that can help lower the energy bill. Next to this the regional levels also have social measures, such as the social tariff (based on other criteria than on the federal level), a payment plan or pre-paid meters.

In addition, compared to last year, the Belgian government took the following additional measures to off-set the increase of the energy bill observed since the end of 2021: a temporary reduction of the VAT rate between March and September 2022, the extension of the temporary category of beneficiaries from the social tariff and the introduction of one-off payments or credit notes on the energy bill. The figures below clearly show the help given this year to the most vulnerable consumers in Belgium compared to its neighbouring countries. Chapter 8 provides further insights on these observations.

Electricity effort rate compared to disposable income (in %)



Natural gas effort rate compared to disposable income (in %)



Evaluation of Belgian industries competitiveness

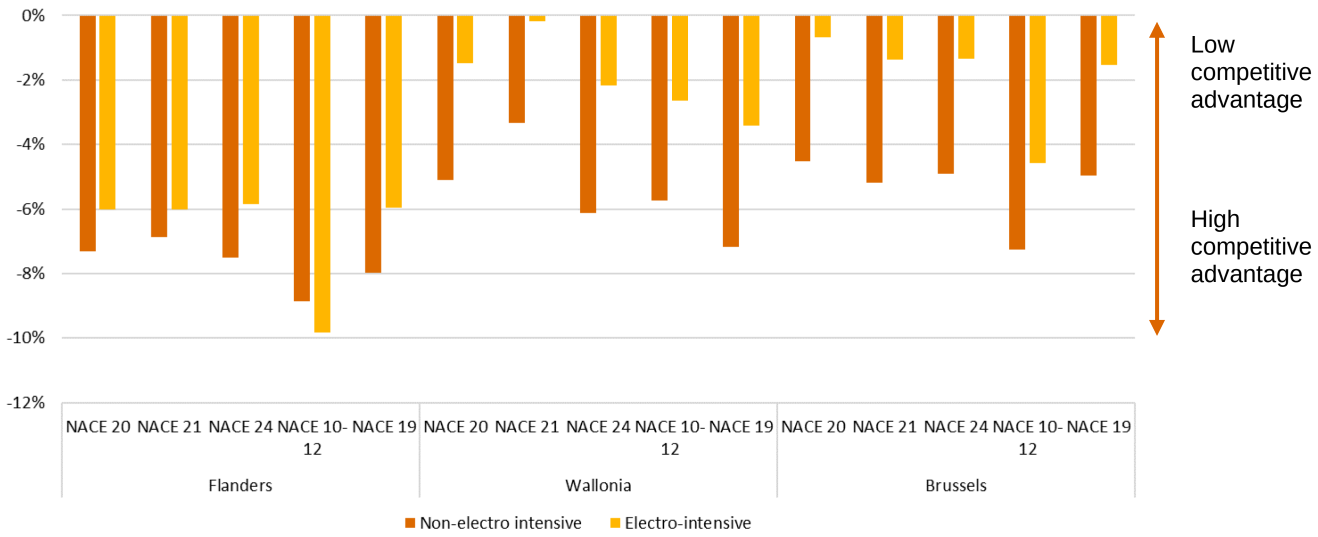
In a last chapter, sector- and region-specific electricity and natural gas prices are analysed through their impact on Belgian industrial consumers' competitiveness compared to their competitors abroad. These results cover industrial consumers from the selected sectors as detailed in section 3.3, namely: food and beverages (NACE 10-12), coke and refined petroleum products (NACE 19), chemicals (NACE 20), pharmaceuticals (NACE 21) and manufacture of basic metals (NACE 24). These sectors range from 0,10% to 2,04% of Belgium's gross value added and from 0,53% to 2,04% of the total employment[2].

As we observed that the United Kingdom was a distinctive outlier, results were differentiated depending on its inclusion or not in the comparison. It stands out from our results that industrial consumers in Belgium that compete with non-electro-intensive consumers in the neighbouring countries display a relative competitive advantage in terms of total energy cost when the UK is included, while the competitiveness decreases for all sectors and regions when excluding the UK.

For electro intensive consumers, the difference with and without the UK is even more evident. In fact, all sectors in Brussels and Wallonia, except for NACE 10-12 in Brussels, show a competitive disadvantage when excluding the UK, while they have a slight competitive advantage when including it. For electro intensive consumers, Flanders remain more competitive than its neighbouring countries with and without the UK, even if we see a decrease in competitiveness when excluding the UK.

When the UK is included, Belgium's competitive position changed compared to last year. Brussels and Wallonia see their competitiveness improving, presenting a competitive advantage in all sectors for both non-electro and electro-intensive consumers. On the other hand, Flanders sees its competitive advantage slightly decreasing compared to 2021 for both electro and non-electro intensive consumers, although it remains the most competitive Belgian region.

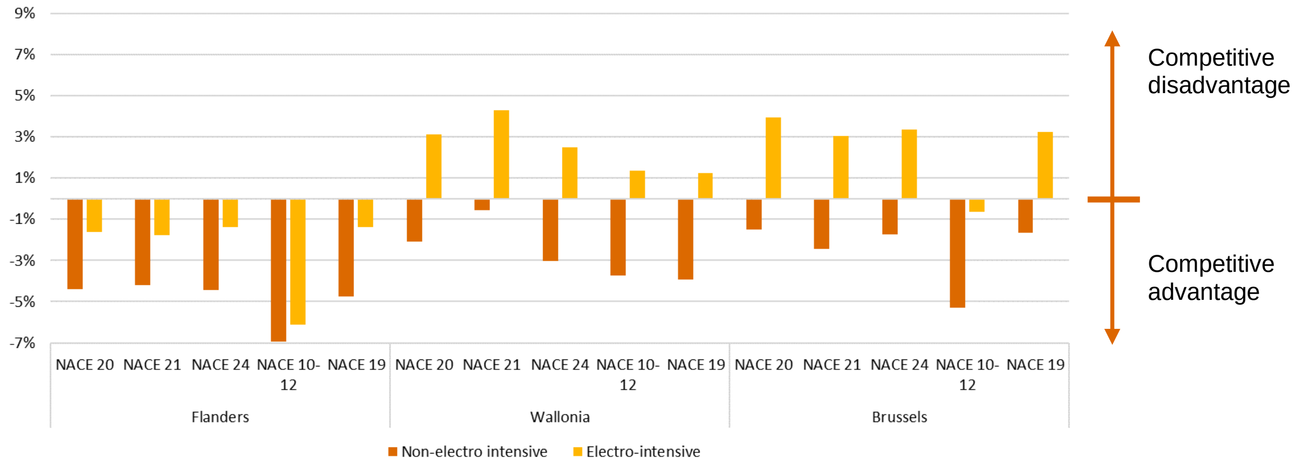
Weighted energy (electricity and natural gas) cost differences between the Belgian regions and the average costs of neighbouring countries (including the UK) for electro-intensive and non-electro-intensive consumers



[2] These are 2016 national values, which were retrieved from Eurostat.

As stated above, the situation is different when the UK is excluded. In fact, compared to 2021, we observe that Flanders keeps its competitive advantage with non-electro-intensive consumers, even if it is decreasing over the years. Regarding electro intensive consumers, Flanders presents slight competitive advantages for all sectors. As it was the case in 2021, electro-intensive consumers in Brussels and Wallonia still present competitive disadvantages even if their position is improving. Like the conclusions drawn from the analysis including the UK, we observe a convergence across all the regions/countries under review. Therefore, regions such as Flanders that were presenting a highly competitive advantage last year see their competitiveness deteriorate, while others, such as Brussels and Wallonia, see their position improving.

Weighted energy (electricity and natural gas) cost differences between the Belgian regions and the average costs of neighbouring countries (excluding the UK) for electro-intensive and non-electro-intensive consumers



Overall, this year non-electro-intensive consumers in Belgium can still benefit from competitive prices compared to their counterparts in the neighbouring countries, despite the large increase of the commodity price. On the other hand, especially in Brussels and Wallonia, electro-intensive consumers are more exposed to a lack of competitiveness. Therefore, despite the efforts already made in Flanders and at Federal level, these results still highlight the need for Brussels and Wallonia to take the necessary steps to improve the competitiveness of their industries.

As a conclusion, this could serve as a basis for a more detailed discussion of potential federal and/or regional interventions to strengthen the competitiveness of Belgian consumers by acting, for example, on tariffs and/or taxes. Regarding the latter, the European Commission provides a framework through the CEEAG[3] that could be exploited with regards to the design and/or adaptation of taxes supporting the development of renewable energy.

[3] Guidelines on State Aid for Climate, Environmental Protection, and Energy in the European Union - January 2022

Nederlandse versie

In deze studie worden de prijzen van elektriciteit en aardgas voor residentiële, kleine professionele en industriële consumenten vergeleken tussen België en vier van zijn buurlanden (Frankrijk, Duitsland, Nederland en het Verenigd Koninkrijk). Wanneer dit relevanter wordt geacht, worden de resultaten van deze studie op regionaal niveau gepresenteerd, in plaats van op nationaal niveau.

Dit verslag is expliciet gericht op de energieprijzen van kracht in januari 2022. Dit is een belangrijk aspect gezien de huidige volatiliteit van de elektriciteits- en aardgasprijzen. Wegens de specifieke economische situatie in Europa dit jaar, hebben wij echter besloten om in hoofdstuk 8 "Vergelijking van sociale maatregelen voor huishoudelijke consumenten" rekening te houden met de maatregelen die de verschillende regeringen hebben genomen om de energieprijzen te verlagen en die na 1 januari 2022 van kracht zijn geworden. Dit was nodig om de impact van de elektriciteits- en aardgasprijs te kunnen beoordelen ten opzichte van het gecorrigeerd beschikbaar inkomen van de gezinnen.

Alvorens in te gaan op de details van de methodologie, willen wij hier een samenvatting geven van de meest relevante veranderingen die in 2022 zijn waargenomen:

1. Voor zowel elektriciteit als aardgas hebben we een grote stijging van de energieprijzen vastgesteld in vergelijking met vorig jaar. Dit geldt voor alle consumentenprofielen. Als gevolg van deze algemene stijging hebben wij een convergentie van de energiefacturen tussen de onderzochte regio's/landen vastgesteld, in het bijzonder voor de industriële profielen. In vergelijking met vorig jaar is het verschil in concurrentievermogen tussen de industrieën uit de verschillende regio's/landen op vlak van concurrentievermogen zelfs kleiner geworden.

2. Wat de belastingen betreft, blijkt uit de sterke daling van de EEG Umlage in Duitsland en de invoering van de federale bijzondere accijnzen in de drie Belgische gewesten dat de regeringen de belastingdruk op de energiefactuur willen verlagen, vooral voor residentiële consumenten. Deze maatregelen waren echter niet voldoende om de energiefacturen te verlagen als gevolg van de grote stijging van de energieprijzen. Anderzijds dwingt de invoering van de "CO2 Steuer", of koolstofheffing, in Duitsland de Duitse aardgasverbruikers tot het betalen van een nog hogere aardgasfactuur in vergelijking met voorgaande jaren.

De onderzochte **consumentenprofielen** werden vastgelegd in de opdrachtomschrijving van deze studie en blijven in lijn met de vorige vergelijkende studies die PwC uitvoerde voor de CREG en de VREG[4]. In totaal werden 13 verschillende consumentenprofielen bestudeerd: 8 voor elektriciteit (1 residentiële, 2 kleine professionele en 5 industriële consumenten) en 5 voor aardgas (1 residentiële, 1 kleine professionele en 3 industriële verbruikers). De onderstaande tabellen geven, zij het niet exhaustief, een overzicht van de specifieke kenmerken van onze consumentenprofielen waarvoor in hoofdstuk 3 verdere hypothesen worden geformuleerd.

[4] De studies van vorig jaar over de residentiële en industriële consumentenprofielen zijn terug te vinden op de website van de CREG (https://www.creg.be/sites/default/files/assets/Publications/Studies/F20210517EN.pdf) voor 2021 en (https://www.creg.be/sites/default/files/assets/Publications/Studies/F20200520EN.pdf) voor 2020 met de errata (https://www.creg.be/sites/default/files/assets/Publications/Studies/F20200520-errata.pdf).

Elektriciteit consumentenprofielen

Profiel	Consument type	Jaarlijkse vraag (MWh)	Gecontracteerde capaciteit (kW)	Jaarlijkse piek (kW)
E-RES	Residentieel	3,5	7,4	-
E-SSME	Kleine professionele consumenten	30	37,5	30
E-BSME	Kleine professionele consumenten	160	125	100
E0	Industrieel	2.000	625	500
E1	Industrieel	10.000	2.500	2.000
E2	Industrieel	25.000	5.000	5.000
E3	Industrieel	100.000	13.000	13.000
E4	Industrieel	500.000	62.500	62.500

Aardgas consumentenprofielen

Profiel	Consument type	Jaarlijkse vraag (MWh)	Gecontracteerde capaciteit (kW)
G-RES	Residentieel	23,26	-
G-PRO	Kleine professionele consumenten	300	-
G0	Kleine professionele consumenten	1.250	-
G1	Industrieel	100.000	20.000
G2	Industrieel	2.500.000	312.500

Bij de vergelijking wordt gekeken naar drie **componenten** van de energierekening: energiekosten, netwerkkosten en alle overige kosten (belastingen, heffingen en certificatenregelingen). Een vierde component, de BTW, wordt alleen in aanmerking genomen voor residentiële profielen van zowel elektriciteit als aardgas.

Een uitgebreide beschrijving van de samenstelling en componenten van de energieprijzen (hoofdstuk 4 en 5) gaat vooraf aan de resultaten van de prijsvergelijking (hoofdstuk 6). De energiekosten worden geanalyseerd volgens een *bottom-up* benadering, die leidt tot een gedetailleerde beschrijving van de verschillende prijscomponenten en hun toepassing binnen de landen die in deze studie worden beschouwd.

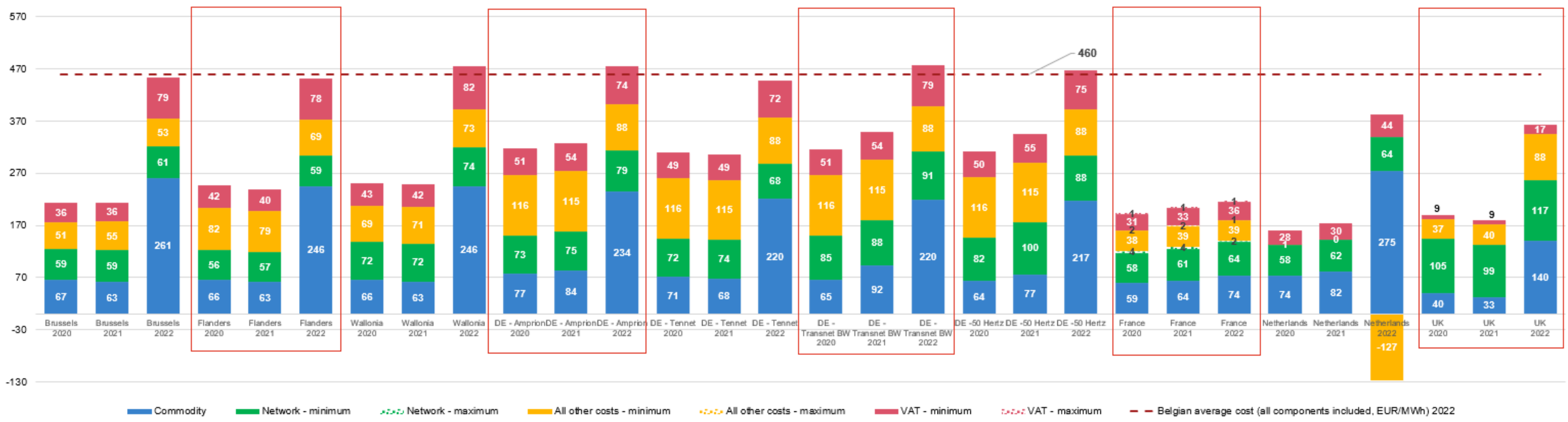
Voor zowel elektriciteit als aardgas constateert dit verslag grote verschillen in de prijsstructuur tussen de verschillende regio's en landen, met inbegrip van de vaststelling van netwerkkosten en belastingregelingen. Dit verhoogt de complexiteit van de vergelijking.

Vergelijking van elektriciteitsprijzen

Vergelijking van de elektriciteitsprijzen voor residentiële en kleine professionele consumenten

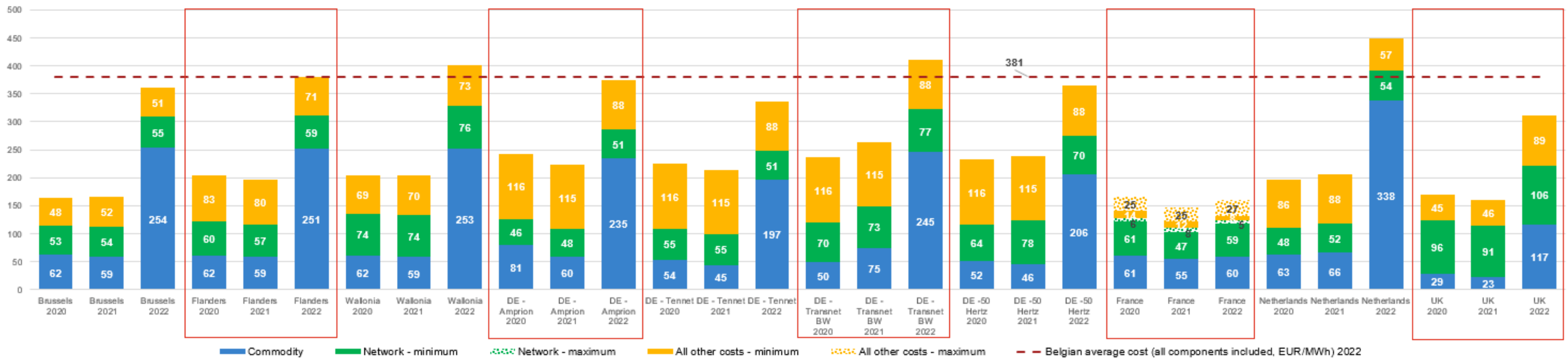
In vergelijking met vorig jaar is het meest opmerkelijke verschil de sterke stijging van de zuivere energieprijs voor het E-RES profiel in alle onderzochte regio's/landen, behalve in Frankrijk en het VK waar het gereguleerde product deze stijging beperkt. Voor residentiële consumenten heeft Frankrijk de laagste jaarfactuur omdat het standaardproduct voor residentiële consumenten door de overheid wordt gereguleerd, waardoor de algemene marktstijging van de energieprijs in heel Europa niet wordt weerspiegeld. Nederland heeft de op één na laagste jaarfactuur, deels als gevolg van een grote belastingvermindering, die de jaarfactuur met 194 EUR/MWh doet dalen en de overige kostencomponent negatief maakt. Anderzijds is Duitsland het land waar men het meest betaalt en de hoogste tarieven heeft voor de component "alle overige kosten" (d.w.z. belastingen, heffingen en certificatenstelsels). De energiekosten in het VK zijn lager dan in andere landen (met uitzondering van Frankrijk) als gevolg van prijsreguleringen. Vergeleken met de onderzochte landen heeft België relatief hoge prijzen en is het na Duitsland het duurste land. In vergelijking met vorig jaar is het verschil tussen Duitsland en België kleiner geworden als gevolg van de daling van de EEG Umlage. In België is Vlaanderen iets goedkoper dan Brussel, terwijl Wallonië het duurste gewest is. Vlaanderen is goedkoper geworden dan Brussel doordat de gewestelijke openbare-dienstverplichtingen in Vlaanderen daalden. In vergelijking met vorig jaar is het totale gefactureerde bedrag in alle onderzochte regio's/landen gestegen, waarbij de grootste stijging zich in Brussel voordoet. Voor Duitsland wordt de grootste stijging waargenomen in de regio Amprion en is deze te wijten aan een stijging van de energie- en netwerkkosten, die ook gevolgen heeft voor de BTW-component.

Elektriciteitsprijs per component in EUR/MWh (profiel E-RES)



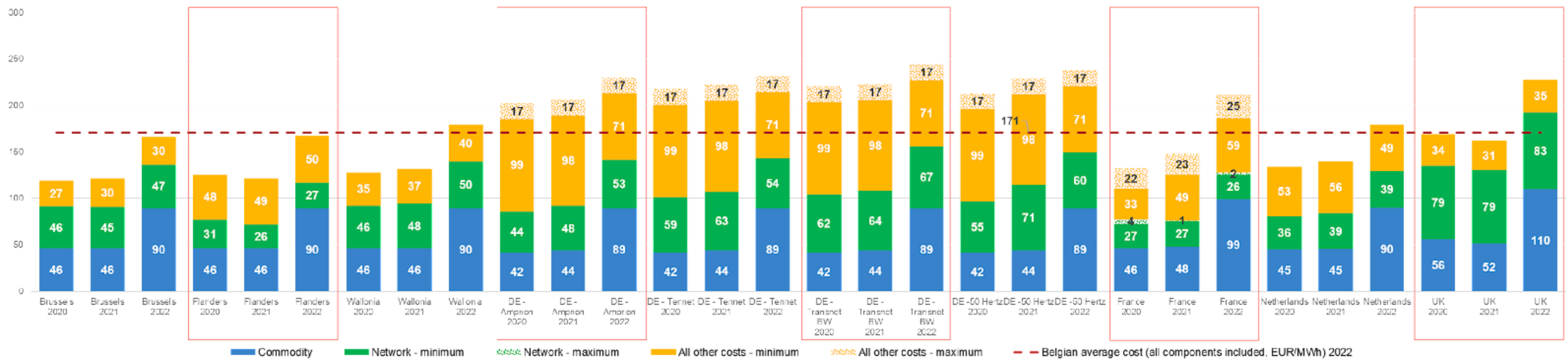
De situatie is relatief vergelijkbaar voor het E-SSME profiel, de kleine professionele consumenten. Het meest opvallende verschil is de zwakkere concurrentiepositie van Nederland, dat in 2022 de duurste regio voor dit profiel wordt, omdat de belastingteruggave de hogere belastingen die zij moeten betalen in vergelijking met residentiële consumenten niet kan compenseren. Bijgevolg is België nu goedkoper dan Nederland voor het E-SSME profiel, terwijl dit niet het geval is voor het E-RES profiel. Wat E-RES betreft, is het Verenigd Koninkrijk nog steeds het op één na meest concurrentiële land. Deze positie is nu echter minder duidelijk omdat voor E-SSME geen BTW in aanmerking wordt genomen. Het Verenigd Koninkrijk had een concurrentievoordeel voor dit onderdeel omdat het een lager tarief (5%) toepaste. In tegenstelling tot het E-RES profiel, is voor het E-SSME profiel Brussel het goedkoopste Belgische gewest, gevolgd door Vlaanderen. In vergelijking met vorig jaar is de totale factuur in alle onderzochte regio's/landen opnieuw gestegen. Er zijn echter een paar veranderingen ten opzichte van 2021. Het verschil tussen België en de goedkoopste landen, Frankrijk en het VK, is groter geworden. Terwijl de elektriciteitsprijzen voor kleine, professionele consumenten in al deze landen sterk zijn gestegen, is het Franse gemiddelde min of meer gelijk gebleven. Ook hier is dit het gevolg van een algemene sterke stijging van de energiekosten. Alleen voor het VK en Frankrijk heeft deze stijging een kleiner effect als gevolg van prijsreguleringen.

Elektriciteitsprijs per component in EUR/MWh (profiel E-SSME)



Terwijl de stijging van de energieprijzen ten opzichte van 2021 voor E-RES en E-SSME een factor 5 bedroeg (tot ongeveer 250 EUR/MWh), is er voor E-BSME en E0-E4 slechts sprake van een stijging met een factor 2 (tot ongeveer 90 EUR/MWh). Dit verschil is deels te wijten aan verschillen in de toegepaste methodologieën. In de formule die voor de grotere profielen in elektriciteit wordt gebruikt, wordt hoofdzakelijk rekening gehouden met de termijnprijzen voor 2022 van 2019, 2020 en 2021. Daardoor is de stijging van de spotprijzen in 2021 en 2022 slechts gedeeltelijk zichtbaar in de resultaten. Wat E-BSME betreft, blijft Duitsland opnieuw achter met veel hogere facturen dan de andere landen ten gevolge van veel hogere belastingniveaus, ondanks de daling met bijna 50% van de EEG-Umlage ten opzichte van 2021. Brussel biedt de goedkoopste jaarfactuur aan, net als vorig jaar. De Belgische prijzen liggen nu meer in lijn met die van de buurlanden, aangezien Duitsland, Frankrijk en het Verenigd Koninkrijk nog steeds duurder zijn. Binnen het land blijven de regionale posities stabiel: dankzij lagere belastingen is Brussel het goedkoopste gewest, gevolgd door Vlaanderen en ten slotte Wallonië. Het verschil tussen Brussel en Vlaanderen is verwaarloosbaar en in de onderstaande figuur zelfs niet te onderscheiden.

Elektriciteitsprijs per component in EUR/MWh (profiel E-BSME)

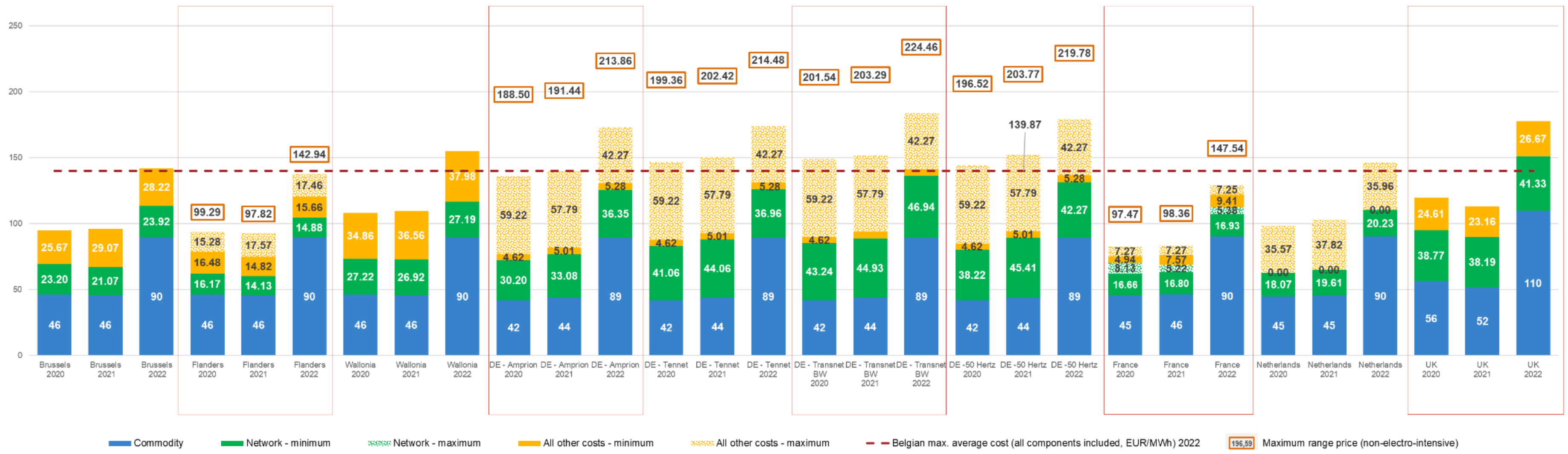


De verschillende componenten die voor elk land en elke regio worden onderzocht, kunnen aanzienlijk verschillen en hebben een invloed op de concurrentiepositie van elk land. Hoewel de energieprijzen in de verschillende landen voor het E-BSME profiel redelijk convergent zijn - behalve in het Verenigd Koninkrijk - zijn er aanzienlijke verschillen in de componenten “netwerkkosten" en "alle andere kosten". De eerstgenoemde kosten spelen zeker een belangrijke rol in België. Tegelijkertijd maakt de component "alle andere kosten" Duitsland tot het duurste land, maar leidt ook tot hogere Belgische prijzen, vooral voor E-RES en E-SSME.

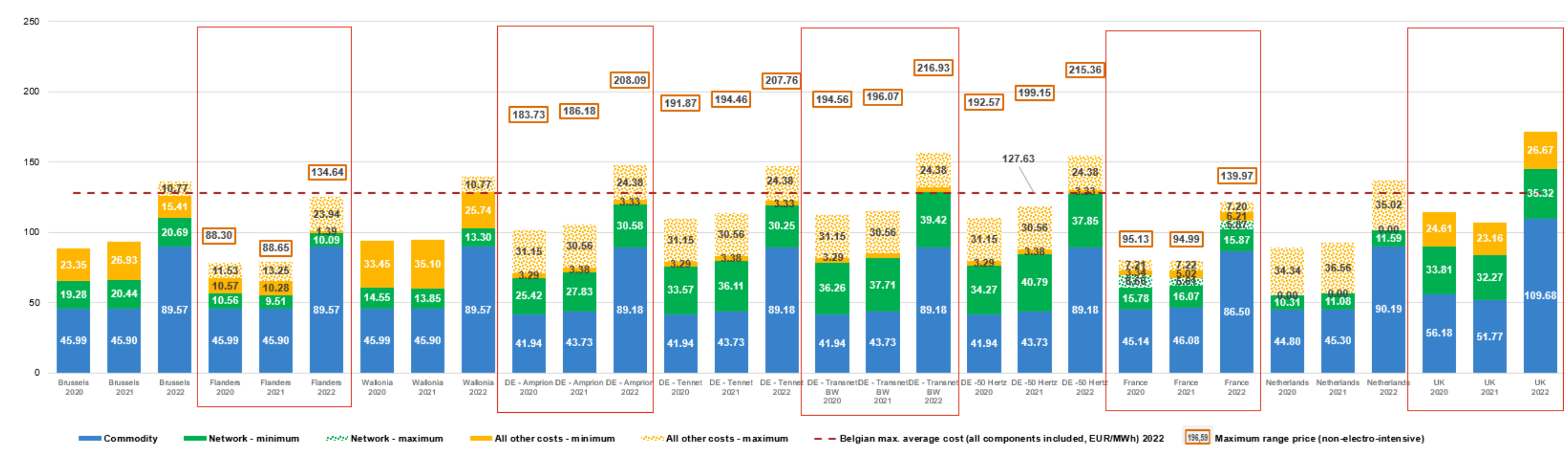
Vergelijking van de elektriciteitsprijzen voor industriële componenten

Net als bij de residentiële en kleine professionele consumenten is de meest significante verandering ten opzichte van vorig jaar de sterke stijging van de energieprijs in alle onderzochte regio's/landen. Als alle kortingen in aanmerking worden genomen, zijn de laagste elektriciteitskosten voor de consumentenprofielen E0, E1 en E2 te vinden in Nederland, dat iets goedkoper is dan Frankrijk. Vlaanderen ligt echter quasi op gelijke hoogte met Nederland voor E1 en E2. Relatief lage netwerkkosten, maar vooral de vermindering van alle andere kosten (d.w.z. belastingen, heffingen en certificatensystemen) verklaren ten dele deze lagere prijzen. Over het geheel genomen heeft België een gemiddelde jaarlijkse factuur in vergelijking met de andere bestudeerde landen, terwijl het Verenigd Koninkrijk veruit de duurste is. De resultaten voor Duitsland zijn zeer uiteenlopend. Terwijl de gemiddelde prijzen enigszins vergelijkbaar zijn met die van België wanneer de verminderingen op alle andere kosten van toepassing zijn op elektro-intensieve consumenten, worden de Duitse industriële consumenten geconfronteerd met de hoogste prijzen wanneer deze verminderingen niet van toepassing zijn. In België is de kostprijs van elektriciteit hoger in Wallonië voor de profielen E0, E1 en E2.

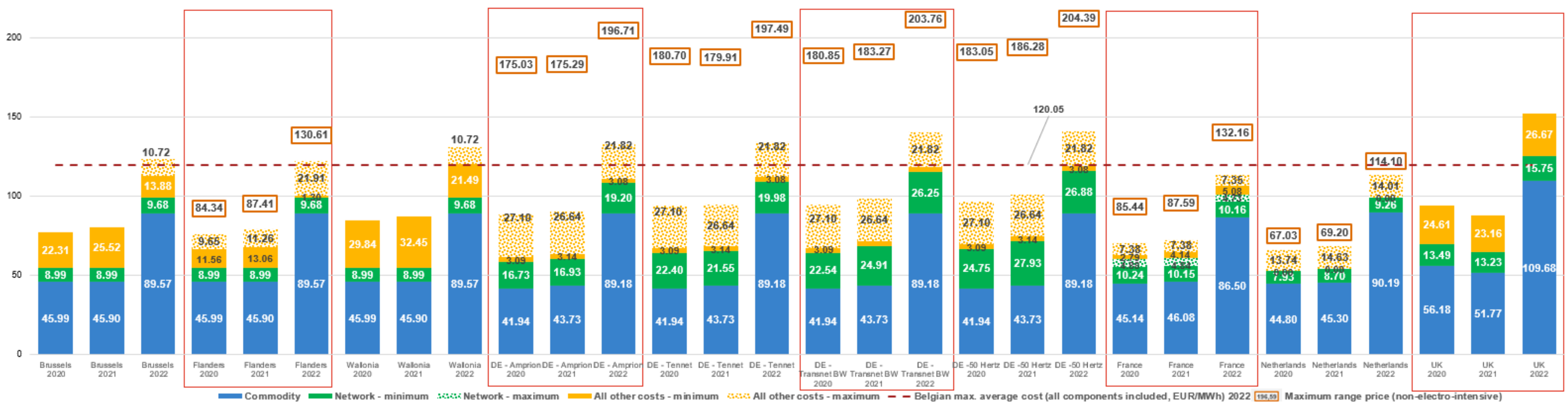
Elektriciteitsprijs per component in EUR/MWh (profiel E0)



Elektriciteitsprijs per component in EUR/MWh (profiel E1)



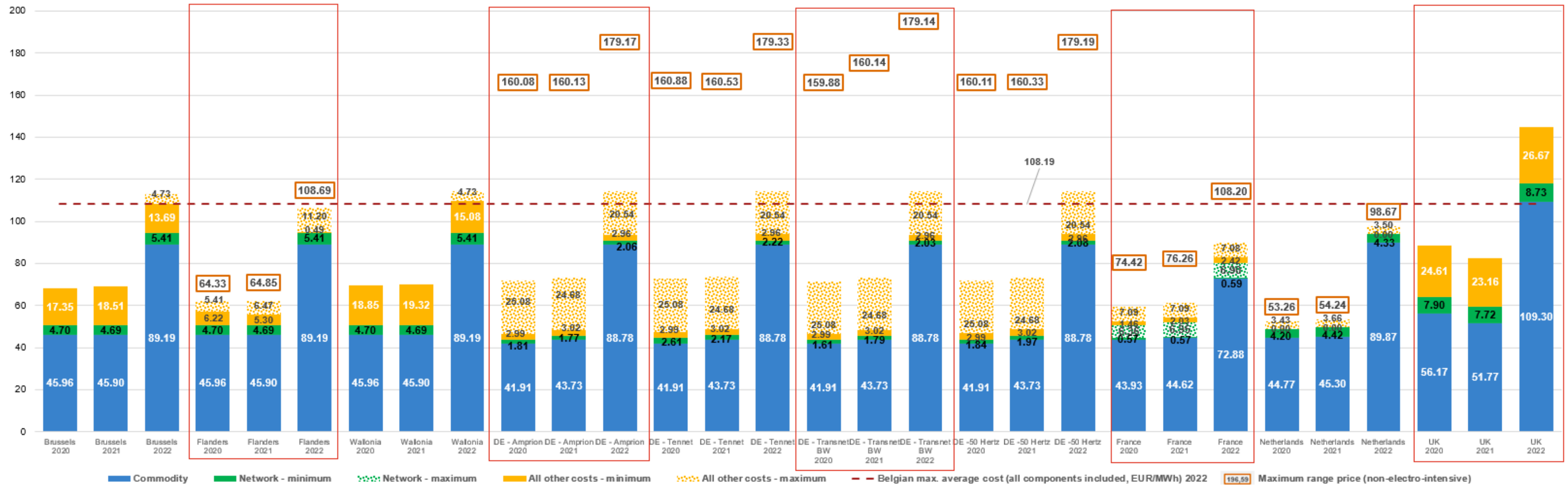
Elektriciteitsprijs per component in EUR/MWh (profiel E2)



Wanneer we kijken naar de E3 en E4 profielen heeft Frankrijk de potentieel laagste factuur van allemaal. Terwijl Vlaanderen voor de E0-E2 profielen heel dicht in de buurt kwam van Frankrijk, is dat voor de E3-E4 profielen niet het geval. De reden voor de daling in Frankrijk is de ARENH regeling die sterker doorweegt voor grote profielen. Ten tweede blijft het Verenigd Koninkrijk het duurste land, behalve wanneer rekening wordt gehouden met de Duitse tarieven voor niet-elektro-intensieve consumenten. Ten slotte vertoont België relatief hoge gemiddelde prijzen.

In België stellen we vast dat voor de profielen E3 en E4 Vlaanderen steeds het meest concurrentiële gewest is, zelfs voor niet-elektro-intensieve consumenten, wat in lijn is met het resultaat van vorig jaar. Aangezien de energiekosten en netwerkkosten geharmoniseerd zijn over alle Belgische gewesten, hangt dit louter af van de component 'alle andere kosten'. Het is echter belangrijk op te merken dat de grootste energieverbruiker in Brussel dichter bij een E3 profiel zit dan bij een E4 profiel. Dit is dus een louter theoretische vaststelling, gezien de afwezigheid van zeer grote industriële consumenten in het Brussels Gewest.

Elektriciteitsprijs per component in EUR/MWh (profiel E3)



In het algemeen hebben de landen waarop deze studie betrekking heeft, te maken met convergerende energieprijzen, behalve Frankrijk en het Verenigd Koninkrijk, die in 2022 uitschieters zijn. De verschillen tussen de landen liggen ook op het vlak van de netwerkkosten en alle andere kostencomponenten. België biedt relatief gelijkgeschakelde netwerkkosten, maar verleent geen kortingen op deze kosten, wat zijn concurrentievermogen kan schaden in vergelijking met landen die dat wel doen. Evenzo zouden de Belgische belastingen, heffingen en de kosten van de certificatieregeling op één lijn liggen met die van andere landen indien deze laatste geen kortingen zouden toekennen voor elektro-intensieve consumenten. Vlaanderen is het enige Belgische gewest dat qua reikwijdte dicht bij de andere landen blijft dankzij de lagere alle andere kosten die te verklaren zijn door het plafond voor de financiering van hernieuwbare energie en de mogelijke vrijstelling van de federale bijzondere accijns.

Elektriciteitsprijs per component in EUR/MWh (E4)

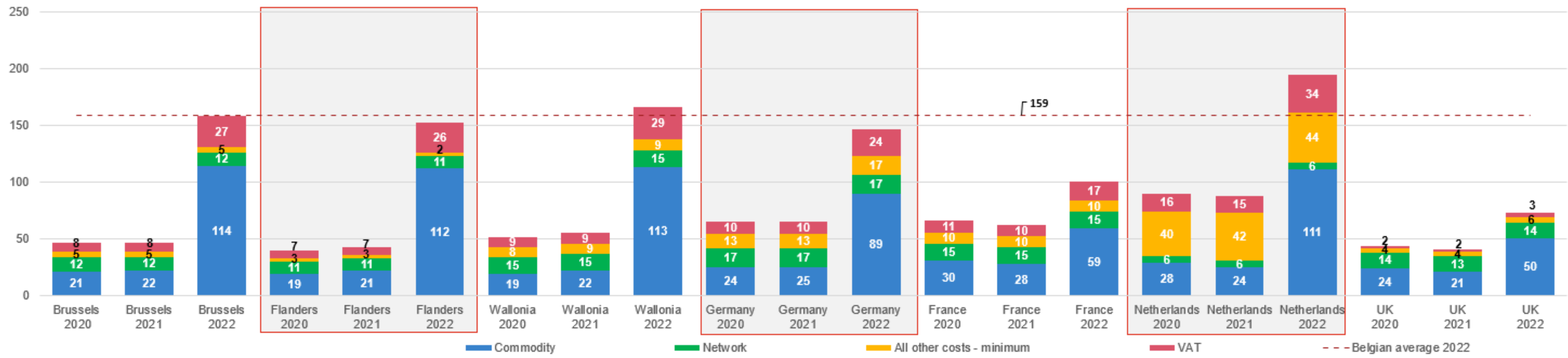
Wat de elektriciteit voor industriële consumenten betreft, wordt in het rapport gewezen op de grote complexiteit als gevolg van overheidsinterventies om de elektriciteitskosten voor bepaalde categorieën van industriële grootverbruikers te verlagen. Deze ingrepen hebben tot doel de druk van de netwerkkosten en de componenten van alle andere kosten (d.w.z. belastingen, heffingen, certificatensystemen) te beïnvloeden. België, Frankrijk, Duitsland en Nederland passen netwerkkosten en belastingverlagingen/maxima toe die worden toegekend op basis van een reeks specifieke economische criteria die in het algemeen verband houden met de elektro-intensiteit. Indien specifieke verlagingen rechtstreeks op de prijzen kunnen worden toegepast (b.v. verlagingen van netwerkkosten in Duitsland), moeten ook enkele resultaten worden gepresenteerd volgens een brede waaier van mogelijkheden. Wat de belastingverlagingen betreft, zijn de door Nederland vastgestelde criteria (jaarlijkse afname van 10 GWh of activiteit) het minst veeleisend. De toepassing van deze verlagingen leidt tot een wijziging van de concurrentiepositie van de verschillende landen: Duitsland heeft de hoogst mogelijke elektriciteitskosten voor elk onderzocht profiel, voor consumenten die niet aan de reductiecriteria voldoen; Nederland en Vlaanderen, die zonder reducties al relatief goedkoop zijn, worden nog goedkoper; en Frankrijk wordt dankzij deze reducties goedkoper dan de Belgische gewesten, inclusief Vlaanderen. In vergelijking met 2021 hebben Brussel en Wallonië nu ook, net als Vlaanderen, een bereik voor de component "alle andere kosten" dankzij de mogelijke vrijstelling van de federale bijzondere accijnzen voor de grote industriële consumenten (E1-E4). Ten slotte is Frankrijk het enige land dat de kosten van basisproducten heeft verlaagd dankzij het ARENH-mechanisme. Het VK biedt nog steeds geen verlaging/vrijstelling voor elektro-intensieve consumenten, hetgeen zijn relatieve concurrentievermogen beïnvloedt.

Vergelijking van de aardgasprijzen

Vergelijking van de aardgasprijzen voor residentiële en kleine professionele consumenten

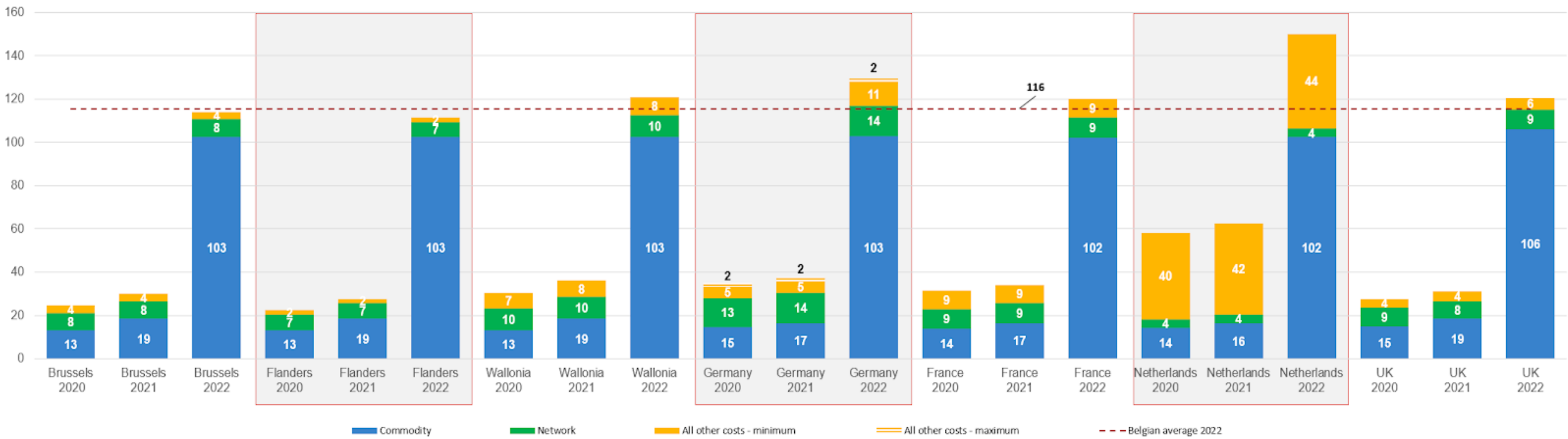
In vergelijking met de resultaten die werden verkregen voor elektriciteit, verschillen de resultaten van de vergelijking van de aardgasprijzen aanzienlijk. Voor residentiële consumenten (G-RES) is het VK het minst dure land, gevolgd door Frankrijk, terwijl Nederland het duurst wordt. In Frankrijk en het VK kan dit worden verklaard door de laagste energieprijzen in vergelijking met de andere regio's/landen, hoofdzakelijk als gevolg van prijsregulering voor dit profiel. Net als vorig jaar is Nederland het duurste land door de hogere belastingen in vergelijking met de andere onderzochte regio's/landen. Terwijl de concurrentiepositie van het VK in 2021 werd verklaard door het laagste btw-tarief, is deze nu vooral te danken aan de lagere energiecomponent. België is nu het op één na duurste land, als gevolg van een grotere stijging van de energieprijs dan in de andere regio's/landen, terwijl het in 2021 het op één na goedkoopste was. In de onderstaande figuur tonen we de gewestelijke en federale overige kosten voor de drie Belgische gewesten, waarbij Vlaanderen de laagste overige kosten biedt, zelfs lager dan het niveau van 2021. Naast de belastingen biedt Vlaanderen ook de laagste netwerk- en energiekosten van de drie Belgische gewesten, wat de relatief lagere prijzen verklaart. Net als voor elektriciteit is het meest opmerkelijke verschil met 2021 voor aardgas de grote stijging van de energieprijs voor alle onderzochte gewesten/landen.

Aardgasprijzen per component in EUR/MWh (profiel G-RES)



Wat de kleine professionele consumenten (G-PRO) betreft, vertoont Vlaanderen de laagste totale factuur, gevolgd door Brussel en vervolgens Frankrijk. Gedreven door de lage belastingniveaus in Brussel en Vlaanderen is de gemiddelde Belgische factuur de minst dure van alle onderzochte landen en is ze ook ongeveer 23% goedkoper dan de Nederlandse aardgasfactuur voor dit profiel. Ook hier zijn de lagere aardgasbelastingen in België (behalve in Wallonië) verantwoordelijk voor de goede concurrentiepositie. Voor Duitsland zien we een sterke stijging van de component "alle andere kosten" als gevolg van de invoering van de koolstofheffing, waarmee in 2021 geen rekening was gehouden. Dit geldt voor G-RES en G-PRO, maar ook voor alle grotere industriële profielen (G0- G2).

Aardgasprijzen per component in EUR/MWh (profiel G-PRO)



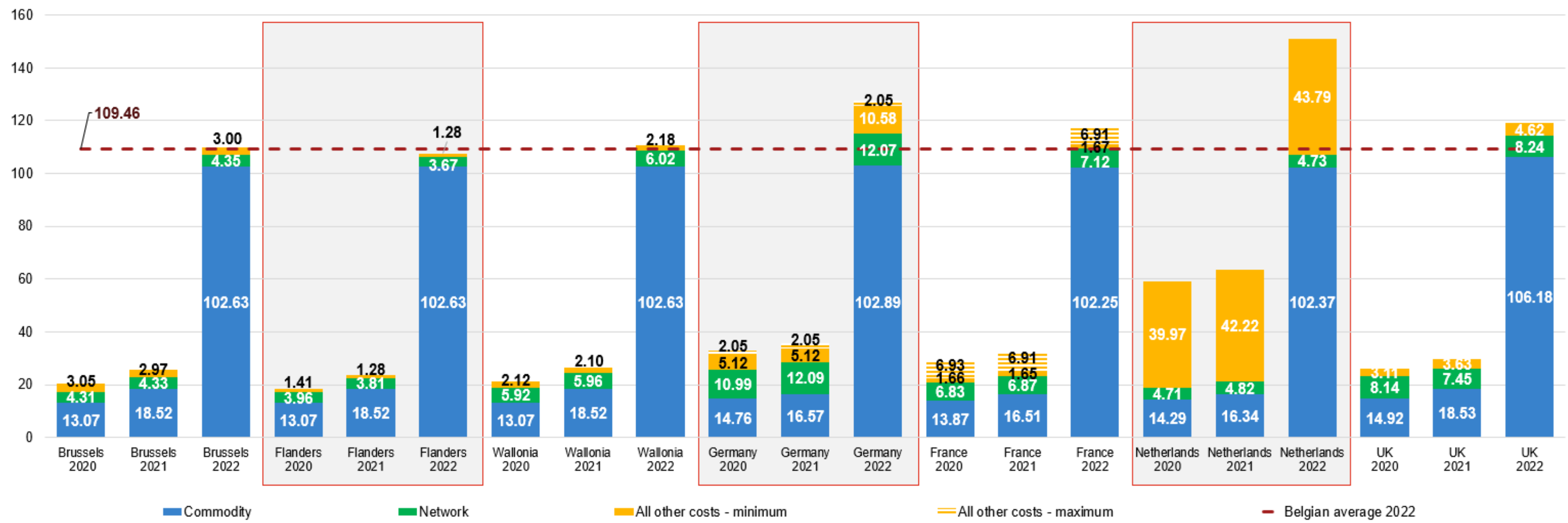
Bij een vergelijking met de gegevens voor 2021 zien we een grote verandering in de totale factuur, die vooral te wijten is aan de energiecomponent, die in 2022 sterk is gestegen (net als het geval was voor de elektriciteitsprofielen). In het algemeen liggen de prijzen in België relatief goed in lijn met deze van de buurlanden, vooral door lagere heffingen en toeslagen, wat een opmerkelijk verschil is met elektriciteit. De energiekosten zijn gelijklopend tussen de landen wanneer wordt gekeken naar G-PRO, maar het VK en Frankrijk springen er uit als landen met veel lagere kosten wanneer wordt gekeken naar G-RES. Het VK behield zijn meest concurrentiële positie dankzij een relatief beperkte stijging van de energiekosten in vergelijking met zijn buurlanden. Wat de netwerkkosten betreft, liggen deze voor België weliswaar op het gemiddelde, maar profiteert Vlaanderen zeker van de kleinste regionale netwerkkosten waardoor het de laagste tarieven van de drie Belgische gewesten heeft.

Vergelijking van aardgasprijzen voor industriële consumenten

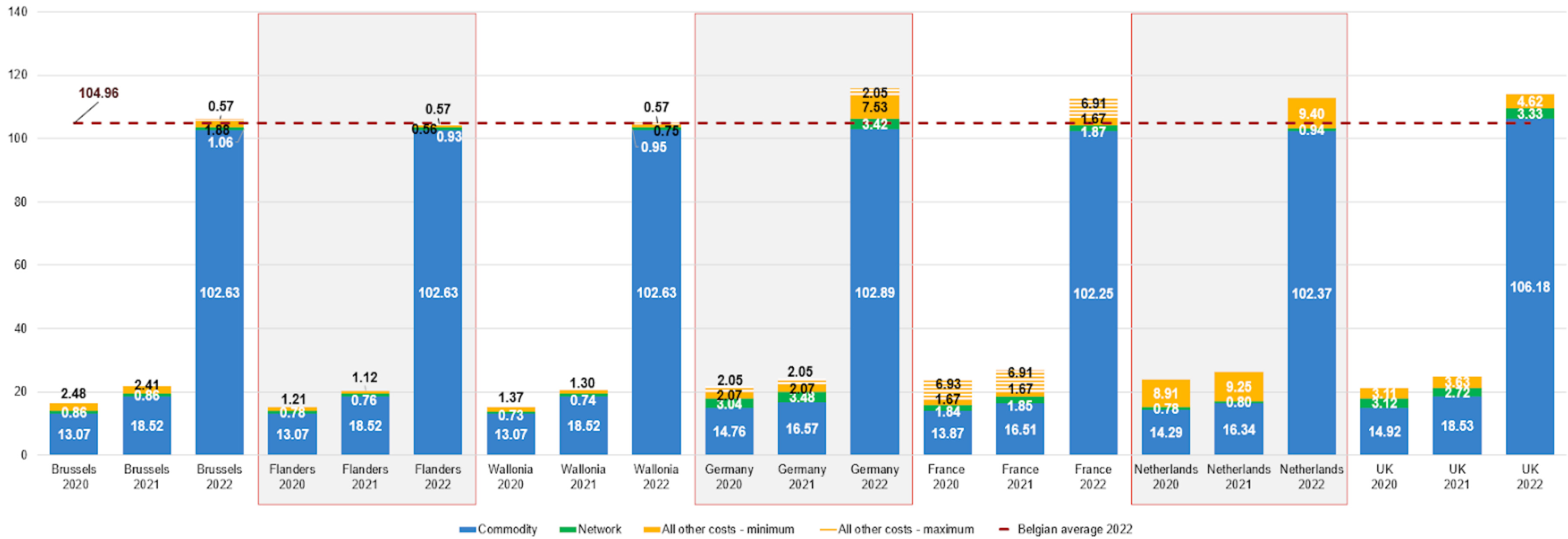
Net zoals bij de industriële elektriciteitsconsumenten stellen we een algemene sterke stijging van de energieprijs vast voor de industriële aardgasconsumenten, wat zorgt voor een convergentie van de prijzen in de onderzochte regio's/landen. In het algemeen is België zeer concurrentieel op het vlak van aardgas, vooral dankzij de relatief lage alle andere kosten en nettarieven. Voor de profielen G0 en G1 is België het meest concurrentiële land, hoewel het belangrijk is te vermelden dat Frankrijk, wanneer kortingen van toepassing zijn, België inhaalt. Voor het G2 profiel hangt het echter af van het type consument aangezien alle landen kortingen aanbieden die hun concurrentiepositie kunnen beïnvloeden. In België is Brussel het minst concurrentiële gewest (behalve voor het G0-profiel) terwijl Vlaanderen het meest concurrentiële Belgische gewest is voor alle industriële profielen. Het prijsverschil tussen Vlaanderen en Wallonië blijft echter bijna verwaarloosbaar voor de G1 en G2 profielen.

Voor aardgas lijkt overheidsingrijpen in netwerkkosten en belastingen minder gebruikelijk te zijn (in die zin dat er weinig belastingen op aardgas worden geheven - behalve in Nederland). Bovendien is de complexiteit veel kleiner, zelfs wanneer er verlagingen of vrijstellingen bestaan (bv. vrijstellingen voor consumenten die aardgas als grondstof of "feedstock" gebruiken). Alleen Duitsland en Frankrijk bieden reducties vanaf het G0 profiel. België biedt nu in zijn drie gewesten een vrijstelling van de federale bijzondere accijns voor industriële consumenten (G1-G2), terwijl andere gewesten/landen alleen kortingen toekennen bij het G2 profiel.

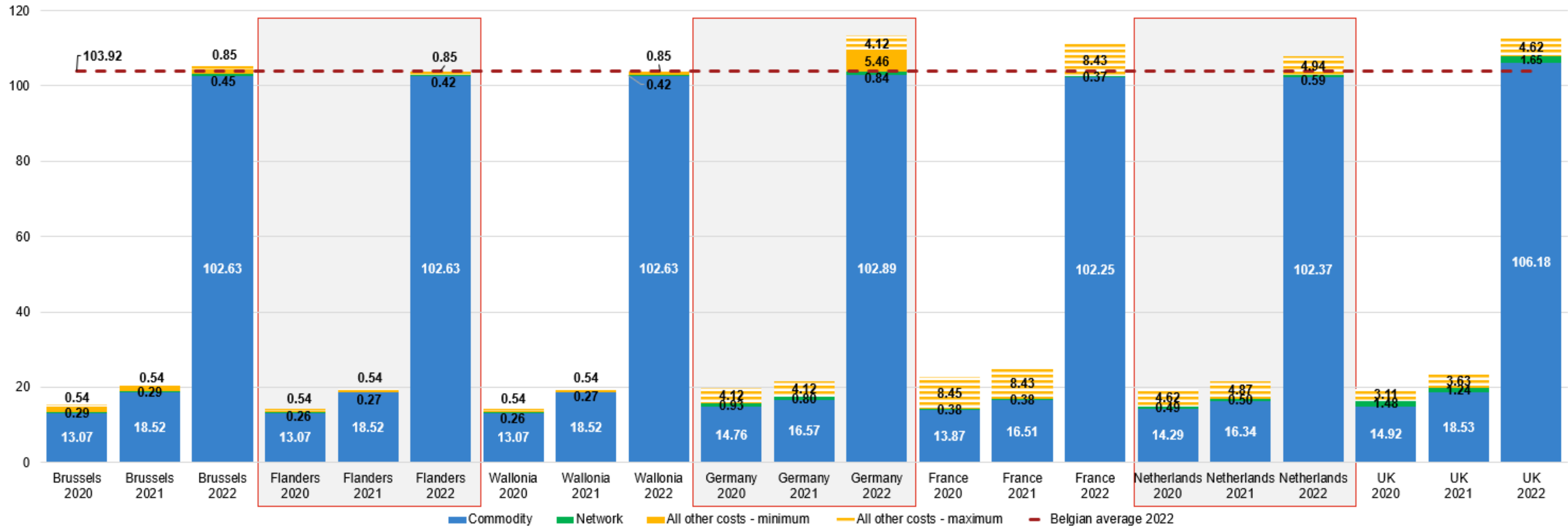
Aardgasprijs per component in EUR/MWh (profiel G0)



Aardgasprijs per component in EUR/MWh (profiel G1)



Aardgasprijs per component in EUR/MWh (profiel G2)



Inspanningen voor het betalen van de energiefacturen voor kwetsbare consumenten

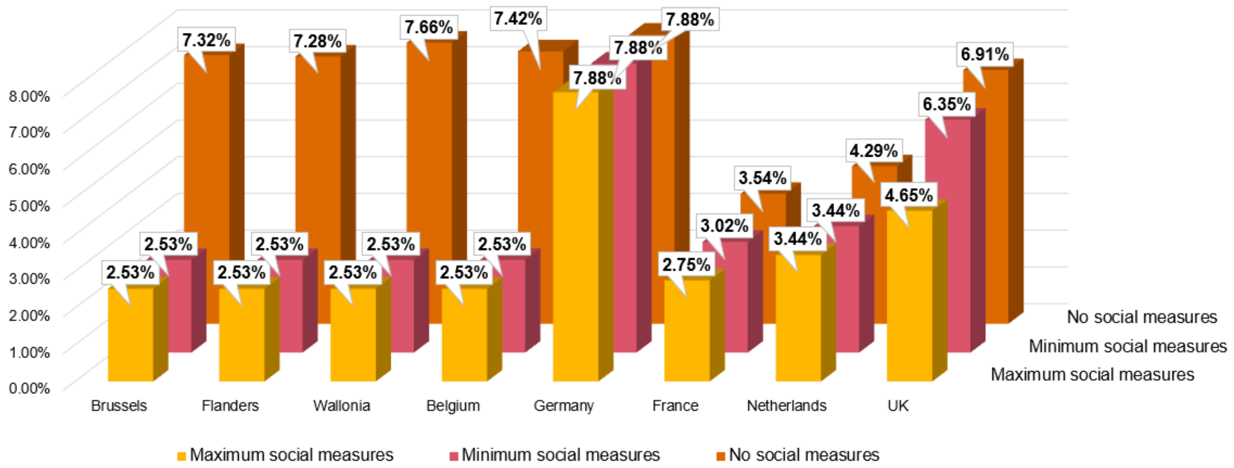
Hoofdstuk 8 heeft tot doel de verschillen te beoordelen in de financiële inspanningen die kwetsbare consumenten leveren om hun elektriciteits- en/of aardgasrekeningen te betalen, gelet op hun inkomensniveau. In de onderzochte landen bestaan verschillende overheidsinstrumenten om de energiefactuur van mensen te verlagen. Deze instrumenten kunnen variëren van sociale tarieven tot directe financiële steun om de rekening te verlagen (bv. Via de chèque-énergie in Frankrijk). De resulterende verscheidenheid maakt het complex om vergelijkingen tussen landen uit te voeren.

Voor alle onderzochte regio's/landen constateren wij hogere inspanningspercentages (d.w.z. het deel van het inkomen van een huishouden dat wordt besteed aan energie-uitgaven) dan vorig jaar wanneer geen rekening wordt gehouden met sociale maatregelen. Dit kan worden verklaard door de hogere elektriciteits- en aardgasrekeningen als gevolg van de algemene stijging van de energieprijzen. Dit jaar heeft België het op één na hoogste inspanningspercentage voor elektriciteit wanneer geen sociale maatregelen in aanmerking worden genomen, terwijl Duitsland het hoogste percentage heeft. Wat aardgas betreft en zonder sociale maatregelen, vertoont België de grootste stijging van de inspanningspercentages ten opzichte van vorig jaar, van gemiddeld 6% in 2021 tot 17% in 2022. Dit is te wijten aan een relatief hogere stijging van de aardgasprijs in België dan in de buurlanden. Net als vorig jaar wordt het hoogste inspanningspercentage voor aardgas zonder sociale maatregelen echter nog steeds waargenomen in Nederland, gevolgd door België.

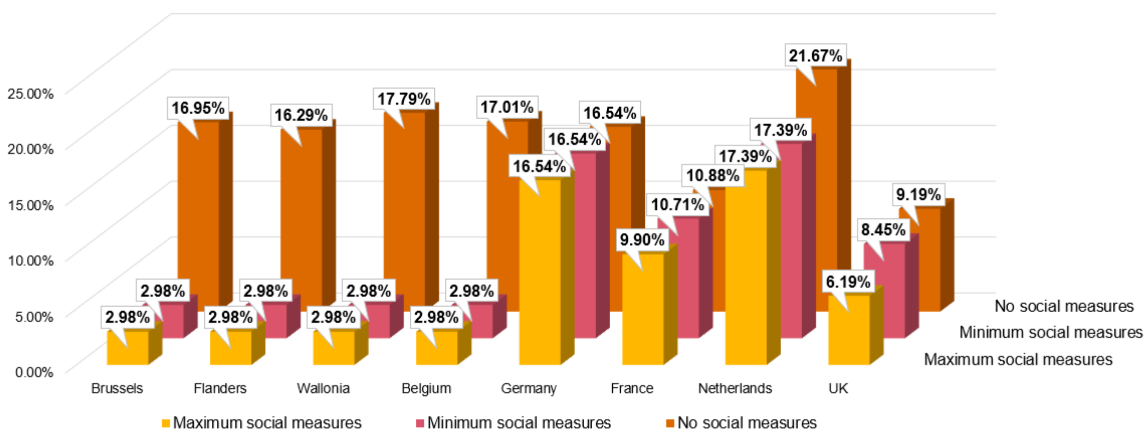
Wanneer we kijken naar de overheidsinterventies is de situatie anders. In vergelijking met de buurlanden heeft België immers de laagste. Het verschil met de buurlanden is vooral uitgesproken voor aardgas. Twee elementen liggen aan de basis van deze vaststelling: ten eerste, het relatief hoge niveau van het beschikbaar inkomen en het leefloon (gebruikt om verschillende scenario's te beoordelen) voor residentiële consumenten in België, in vergelijking met de onderzochte landen, helpt de energiekosten te drukken en dus de inspanningspercentages te verlagen. Ten tweede biedt België aanzienlijke verlagingen van energieprijzen via sociale tarieven (wanneer huishoudens voldoen aan de criteria om in aanmerking te komen). Op federaal niveau zijn er het sociaal tarief en het Elektriciteits- en Gasfonds die de energiefactuur kunnen helpen verlagen. Daarnaast bestaan er op de gewestelijke niveaus ook sociale maatregelen, zoals het sociaal tarief (gebaseerd op andere criteria dan op federaal niveau), een afbetalingsplan of prepaid meters.

Bovendien heeft de Belgische regering in vergelijking met vorig jaar de volgende aanvullende maatregelen genomen om de stijging van de energiefactuur sinds eind 2021 te compenseren: een tijdelijke verlaging van het btw-tarief tussen maart en september 2022, de verlenging van de tijdelijke categorie van begunstigden van het sociaal tarief en de invoering van eenmalige tussenkomst op de energiefactuur. Uit de onderstaande cijfers blijkt duidelijk de hoeveelheid hulp die dit jaar aan de meest kwetsbare consumenten in België is gegeven in vergelijking met de buurlanden. Hoofdstuk 8 geeft meer inzicht in deze vaststellingen.

Inspanningspercentage voor elektriciteit ten opzichte van het beschikbaar inkomen (in %)



Inspanningspercentage voor aardgas ten opzichte van het beschikbaar inkomen (in %)



Evaluatie van de Belgische industriële competitiviteit

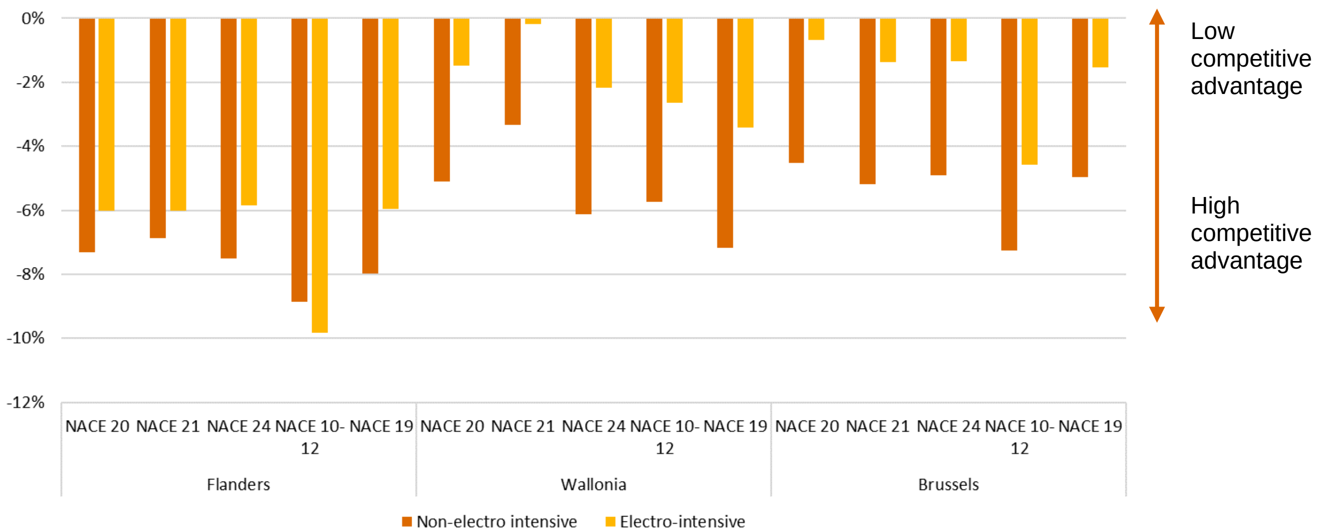
In een laatste hoofdstuk worden de sector- en regiospecifieke elektriciteits- en aardgasprijzen geanalyseerd aan de hand van hun impact op het concurrentievermogen van de Belgische industriële consumenten ten opzichte van hun concurrenten in het buitenland. Deze resultaten hebben betrekking op industriële consumenten uit de geselecteerde sectoren zoals gedetailleerd in sectie 3.3, namelijk: voeding en dranken (NACE 10-12), cokes en geraffineerde aardolieproducten (NACE 19), chemie (NACE 20), farmaceutica (NACE 21) en vervaardiging van metalen in primaire vorm (NACE 24). Deze sectoren vertegenwoordigen 0,10% tot 2,04% van de bruto toegevoegde waarde van België en 0,53% tot 2,04% van de totale werkgelegenheid[5].

Omdat we vaststelden dat het Verenigd Koninkrijk duidelijk hogere prijzen kent dan de buurlanden, vooral in het geval van de elektro-intensieve consumenten, werden de resultaten gedifferentieerd naargelang het Verenigd Koninkrijk al dan niet in de vergelijking wordt opgenomen. Uit onze resultaten blijkt dat industriële consumenten in België die concurreren met niet-elektro-intensieve consumenten in de buurlanden een relatief concurrentievoordeel vertonen in termen van totale energiekosten wanneer het Verenigd Koninkrijk wordt meegerekend, terwijl het concurrentievermogen voor alle sectoren en regio's afneemt wanneer het Verenigd Koninkrijk niet wordt meegerekend.

Voor elektro-intensieve consumenten is het verschil met en zonder het VK nog duidelijker. In feite vertonen alle sectoren in Brussel en Wallonië, behalve NACE 10-12 in Brussel, een concurrentienadeel wanneer het VK buiten beschouwing wordt gelaten, terwijl zij een licht concurrentievoordeel hebben wanneer het VK wel wordt meegerekend. Voor elektro-intensieve consumenten blijft Vlaanderen concurrentiëler dan zijn buurlanden met of zonder het VK, ook al zien we een daling van het concurrentievermogen wanneer het VK niet wordt meegerekend.

Wanneer het VK wordt meegerekend, is de concurrentiepositie van België veranderd ten opzichte van vorig jaar. Brussel en Wallonië zien hun concurrentievermogen verbeteren en vertonen een concurrentievoordeel in alle sectoren voor zowel niet-elektro- als elektro-intensieve consumenten. Anderzijds ziet Vlaanderen zijn concurrentievoordeel licht afnemen ten opzichte van 2021 voor zowel elektro- als niet-elektro-intensieve consumenten, hoewel het nog steeds het meest concurrentiële Belgische gewest is. Deze trend kan worden verklaard door de convergentie van de totale energiefactuur in de geanalyseerde landen als gevolg van de algemene stijging van de energiekosten.

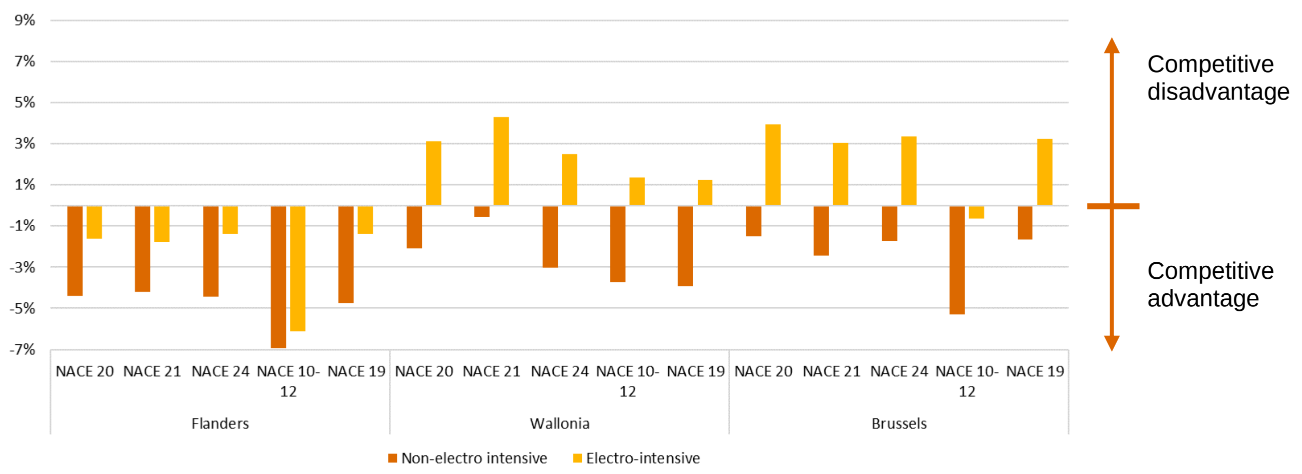
Gewogen energie (elektriciteit en aardgas) kostenververschillen tussen de Belgische regio's en de gemiddelde kosten van de buurlanden (inclusief het VK) voor elektro-intensieve en niet-elektro-intensieve consumenten



[5] Dit zijn nationale waarden voor 2016, die zijn verzameld bij Eurostat.

Zoals hierboven vermeld, is de situatie anders wanneer het VK buiten beschouwing wordt gelaten. In vergelijking met 2021 stellen we vast dat Vlaanderen zijn concurrentievoordeel bij niet-elektro-intensieve consumenten behoudt, ook al neemt het over de jaren af. Wat de elektro-intensieve consumenten betreft, heeft Vlaanderen voor alle sectoren een licht concurrentievoordeel. Net als in 2021 hebben de elektro-intensieve verbruikers in Brussel en Wallonië nog steeds een concurrentienadeel, ook al verbetert hun positie. Net als de conclusies die zijn getrokken uit de analyse waarin ook het VK is meegenomen, zien we een convergentie in alle onderzochte regio's/landen. Regio's als Vlaanderen, die vorig jaar nog een sterk concurrentievoordeel hadden, zien hun concurrentiepositie verslechteren, terwijl andere regio's, zoals Brussel en Wallonië, hun positie zien verbeteren.

Gewogen energie (elektriciteit en aardgas) kostenververschillen tussen de Belgische regio's en de gemiddelde kosten van de buurlanden (exclusief het VK) voor elektro-intensieve en niet-elektro-intensieve consumenten



Over het geheel genomen kunnen niet-elektro-intensieve verbruikers in België dit jaar nog steeds profiteren van concurrentiële prijzen in vergelijking met hun tegenhangers in de buurlanden, ondanks de sterke stijging van de energieprijzen. Anderzijds zijn, vooral in Brussel en Wallonië, de elektro-intensieve verbruikers meer blootgesteld aan een gebrek aan concurrentievermogen. Ondanks de inspanningen die reeds in Vlaanderen en op federaal niveau zijn geleverd, tonen deze resultaten dus nog steeds aan dat Brussel en Wallonië de nodige stappen moeten zetten om het concurrentievermogen van hun industrieën te verbeteren.

Als conclusie, dit zou als basis kunnen dienen voor een meer gedetailleerde discussie over mogelijke federale en/of gewestelijke tussenkomsten om het concurrentievermogen van de Belgische consumenten te versterken door bijvoorbeeld in te grijpen in de tarieven en/of belastingen. Wat dit laatste betreft, biedt de Europese Commissie via de EEAG een kader dat zou kunnen worden benut voor het ontwerp en/of de aanpassing van belastingen ter ondersteuning van de ontwikkeling van hernieuwbare energie.

Version française

Cette étude présente une comparaison des prix de l'électricité et du gaz naturel pour les consommateurs résidentiels, les petits professionnels et les industriels entre la Belgique et quatre de ses pays voisins (France, Allemagne, Pays-Bas et Royaume-Uni). Lorsque cela est jugé plus pertinent, les résultats de cette étude sont présentés au niveau régional, plutôt qu'au niveau national.

Ce rapport se concentre explicitement sur les prix de l'énergie en vigueur en janvier 2022. Il s'agit d'un aspect important à garder à l'esprit compte tenu de la volatilité actuelle des prix de l'électricité et du gaz naturel. En raison de la situation économique spécifique en Europe cette année, nous avons toutefois décidé de considérer les mesures prises par les différents gouvernements pour réduire les prix de l'énergie qui ont été mises en œuvre après le 1er janvier 2022 dans la section 8 "Comparaison des mesures sociales pour les consommateurs résidentiels ". Ceci s'est avéré nécessaire afin d'évaluer l'impact du prix de l'électricité et du gaz naturel sur le revenu disponible ajusté des ménages.

Avant d'entrer dans les détails méthodologiques, nous souhaitons résumer ici les changements les plus marquants observés en 2022:

1. Tant pour l'électricité que pour le gaz naturel, nous avons observé une forte augmentation des prix de la composante énergétique pure ("commodity") par rapport à l'année dernière. Ceci est valable pour tous les profils de consommateurs. A cause de cette augmentation générale des prix, nous avons observé une convergence des factures énergétiques entre les régions/pays étudiés, en particulier pour les profils industriels. Par rapport à l'année dernière, nous avons constaté une réduction de l'écart de la situation compétitive entre les industries des différentes régions/pays en ce qui concerne les factures énergétiques.

2. En ce qui concerne les taxes, la forte diminution de l'EEG Umlage en Allemagne et l'introduction du droit d'accise “spécial” dans les trois régions belges montrent l'intention des gouvernements de réduire la charge fiscale sur la facture énergétique, en particulier pour les consommateurs résidentiels. Ces actions n'ont cependant pas été suffisantes pour réduire les factures d'énergie en raison de la forte augmentation du prix de la composante énergétique pure ("commodity"). D'autre part, l'introduction de la "CO2 Steuer", ou taxe carbone, en Allemagne oblige les consommateurs allemands de gaz naturel à payer une facture de gaz naturel encore plus élevée que les années précédentes.

Les **profils consommateurs** examinés ont été fixés par les termes de référence de cette étude et restent dans la lignée des précédentes études comparatives menées par PwC pour la CREG et la VREG[6]. Au total, 13 profils consommateurs différents ont été étudiés: 8 pour l'électricité (1 résidentiel, 2 petits professionnels et 5 consommateurs industriels) et 5 pour le gaz naturel (1 résidentiel, 1 petit professionnel et 3 consommateurs industriels). Les tableaux ci-dessous synthétisent, de manière non exhaustive, les caractéristiques spécifiques des profils de consommateurs pour lesquels des hypothèses complémentaires sont présentées au chapitre 3.

[6] Les études des années précédentes sur les consommateurs résidentiels et industriels sont disponibles sur le site web de la CREG (https://www.creg.be/sites/default/files/assets/Publications/Studies/F20210517EN.pdf) pour 2021 et (https://www.creg.be/sites/default/files/assets/Publications/Studies/F20200520EN.pdf) pour 2020 avec l'errata (https://www.creg.be/sites/default/files/assets/Publications/Studies/F20200520-errata.pdf) .

Profils de consommateurs électricité

Profil	Type de consommateur	Consommation annuelle (MWh)	Capacité contractée (kW)	Pointe de consommation annuelle (kW)
E-RES	Résidentiel	3,5	7,4	-
E-SSME	Petit professional	30	37,5	30
E-BSME	Petit professional	160	125	100
E0	Industriel	2.000	625	500
E1	Industriel	10.000	2.500	2.000
E2	Industriel	25.000	5.000	5.000
E3	Industriel	100.000	13.000	13.000
E4	Industriel	500.000	62.500	62.500

Profils des consommateurs gaz naturel

Profil	Type de consommateur	Consommation annuelle (MWh)	Capacité contractée (kW)
G-RES	Résidentiel	23,26	-
G-PRO	Petit professional	300	-
G0	Petit professional	1.250	-
G1	Industriel	100.000	20.000
G2	Industriel	2.500.000	312.500

L’étude comparative porte sur trois **composantes** de la facture énergétique: les coûts de la composante énergétique pure ("commodity"), les coûts du réseau et tous les autres coûts (taxes, prélèvements et systèmes de certificats). Une quatrième composante, la TVA, n'est prise en compte que pour les profils résidentiels d'électricité et de gaz naturel.

Une description détaillée de la composition et des composantes des prix de l'énergie (chapitres 4 et 5) précède les résultats de la comparaison des prix (chapitre 6). Les coûts de l'énergie sont analysés selon une approche ascendante, ce qui conduit à une description détaillée des différentes composantes des prix et de leur application dans les pays considérés dans cette étude.

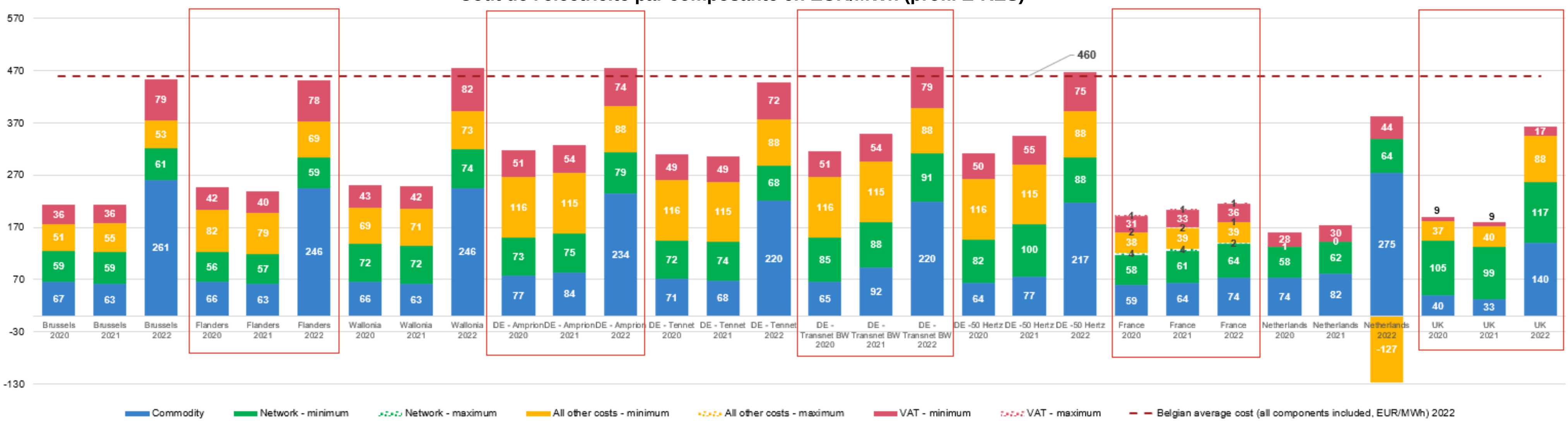
Tant pour l'électricité que pour le gaz naturel, ce rapport note de grandes différences dans la structure des prix entre les différentes régions et les différents pays, y compris au niveau des coûts de réseau et des régimes fiscaux. Ceci ajoute une couche de complexité supplémentaire en vue d’une comparaison équitable entre tous les pays/régions couverts par cette étude.

Comparaison des prix de l'électricité

Comparaison des prix de l'électricité pour les consommateurs résidentiels et les petits professionnels

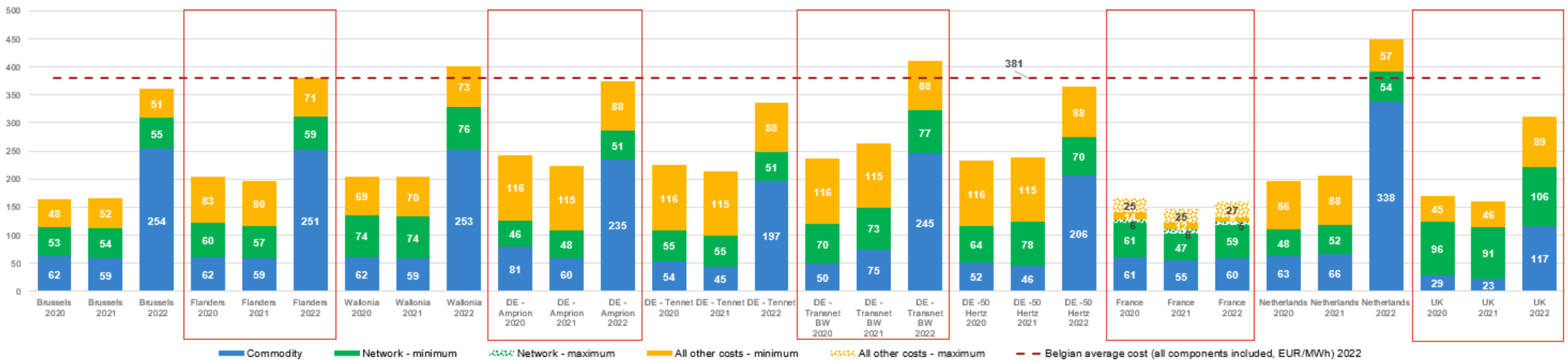
Par rapport à l'année dernière, la différence la plus remarquable est la forte augmentation du prix de la composante énergétique pure (*commodity*) pour le profil E-RES dans toutes les régions/pays étudiés, à l'exception de la France et du Royaume-Uni où le produit réglementé limite cette augmentation. Pour les consommateurs résidentiels, la France a la facture annuelle la plus basse car le produit standard pour les consommateurs résidentiels est réglementé par le gouvernement et ne reflète pas l'augmentation des prix observée sur le marché de gros européen. Les Pays-Bas ont la deuxième facture annuelle la plus basse, en partie en raison d'un important rabais sur les taxes ("belastingvermindering"), agissant comme une réduction de 194 EUR/MWh sur la facture annuelle et rendant la composante liée aux autres coûts négative. D'autre part, l'Allemagne est le pays où les gens paient le plus et où les tarifs sont les plus élevés pour la composante "tous les autres coûts" (c'est-à-dire les taxes, les prélèvements et les systèmes de certificats). Le coût de la composante énergétique pure ("commodity") au Royaume-Uni est plus faible que dans les autres pays (à l'exception de la France) en raison de la réglementation des prix. Par rapport aux pays étudiés, la Belgique a des prix relativement élevés et est le deuxième pays le plus cher après l'Allemagne. Par rapport à l'année dernière, l'Allemagne et la Belgique ont des résultats plus proches en raison de la baisse de l'EEG Umlage. En Belgique, la Flandre est désormais légèrement moins chère que Bruxelles, tandis que la Wallonie est la région la plus chère. Cette année, la Flandre est devenue légèrement moins chère que Bruxelles en raison d'une diminution des obligations régionales de service public. Par rapport à l'année dernière, le montant total facturé a augmenté dans toutes les régions/pays analysés, et la plus forte augmentation est observée à Bruxelles. Pour l'Allemagne, la plus forte augmentation est observée dans la région d'Amprion et est due à une augmentation des coûts de la composante énergétique pure ("commodity") et des réseaux, qui ont également un impact sur la composante TVA.

Coût de l'électricité par composante en EUR/MWh (profil E-RES)



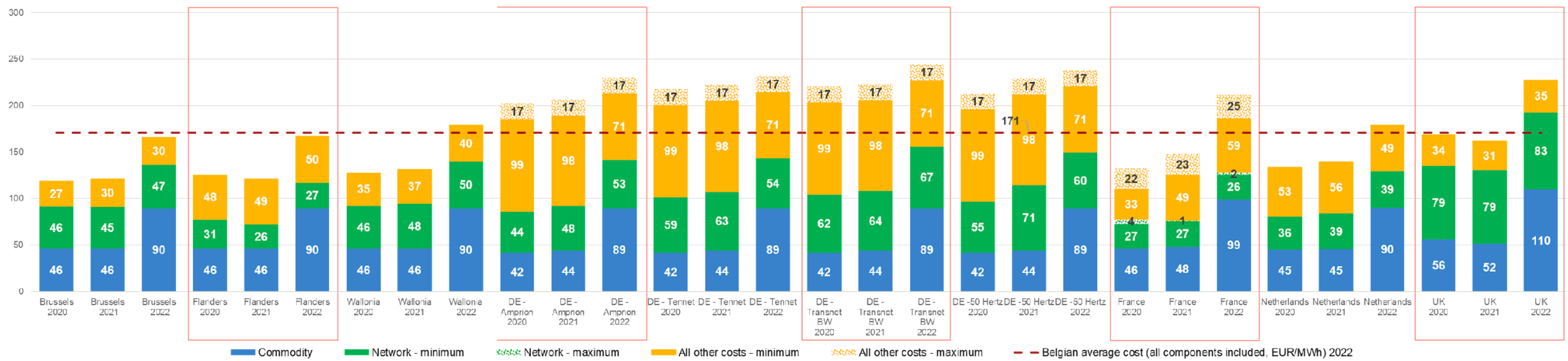
La situation est relativement similaire pour le profil E-SSME, parmi les petits consommateurs professionnels. La différence la plus notable est la position concurrentielle plus faible des Pays-Bas, qui deviennent la région la plus chère pour ce profil en 2022 car le remboursement d'impôt ne peut pas compenser les taxes plus élevées qu'ils doivent payer par rapport aux consommateurs résidentiels. Par conséquent, la Belgique est désormais moins chère que les Pays-Bas pour le profil E-SSME, alors que ce n'est pas le cas pour le profil E-RES. En ce qui concerne le profil E-RES, le Royaume-Uni est toujours le deuxième pays le plus compétitif de l'étude. Toutefois, cette position est moins claire désormais car aucune valeur de TVA n'est prise en compte pour le profil E-SSME. Le Royaume-Uni avait auparavant un avantage compétitif concernant cette composante car il appliquait un taux de TVA beaucoup plus faible (5%). Contrairement au profil E-RES, Bruxelles est la région belge la moins chère pour le profil E-SSME, suivie de la Flandre. Une fois encore, par rapport à l'année dernière, la facture totale a augmenté dans toutes les régions/pays étudiés. Il y a cependant eu quelques changements par rapport à 2021. L'écart entre la Belgique et les pays les moins chers, la France et le Royaume-Uni, s'est creusé. Alors que les prix de l'électricité pour les petits consommateurs professionnels ont fortement augmenté dans tous ces pays, la moyenne française est restée plus ou moins identique. Là encore, cela s'explique par une forte hausse générale des coûts de la composante énergétique pure ("commodity"). La hausse des prix des produits de la composante énergétique pure ("commodity") a un impact légèrement inférieur au Royaume-Uni et en France, uniquement en raison de la régulation des prix.

Coût de l'électricité par composante en EUR/MWh (profil E-SSME)



Alors que l'augmentation des prix de la composante énergétique pure ("commodity") par rapport à 2021 a été multipliée par 5 en Belgique (pour atteindre environ 250 EUR/MWh) pour E-RES et E-SSME, ce coût a seulement doublé pour les profils E-BSME et E0-E4 (pour atteindre environ 90 EUR/MWh). Cette différence s'explique en partie par les différentes méthodologies utilisées. La formule utilisée pour les profils les plus importants relatifs à l'électricité prend principalement en compte les prix à terme pour 2022 sur base de 2019, 2020 et 2021. Par conséquent, l'augmentation des prix ‘spot’ en 2021 et 2022 n'est que partiellement visible dans les résultats. En ce qui concerne le profil E-BSME, l'Allemagne est à nouveau la plus chère avec des factures bien plus élevées que les autres pays en raison de niveaux de taxes bien plus élevés, malgré la diminution de près de 50 % de l'*EEG-Umlage* par rapport à 2021. Bruxelles offre la facture annuelle la moins élevée, tout comme cela était déjà le cas l'année dernière. En ce qui concerne la comparaison avec les pays voisins, les prix belges sont désormais mieux alignés avec les pays voisins, l'Allemagne, la France et le Royaume-Uni restant cependant plus chers. Au sein du pays, les positions régionales restent stables: grâce à des taxes moins élevées, Bruxelles est la région la moins chère, suivie par la Flandre et enfin par la Wallonie. La différence entre Bruxelles et la Flandre est négligeable et n’est même pas visible dans la figure ci-dessous.

Coût de l'électricité par composante en EUR/MWh (profil E-BSME)



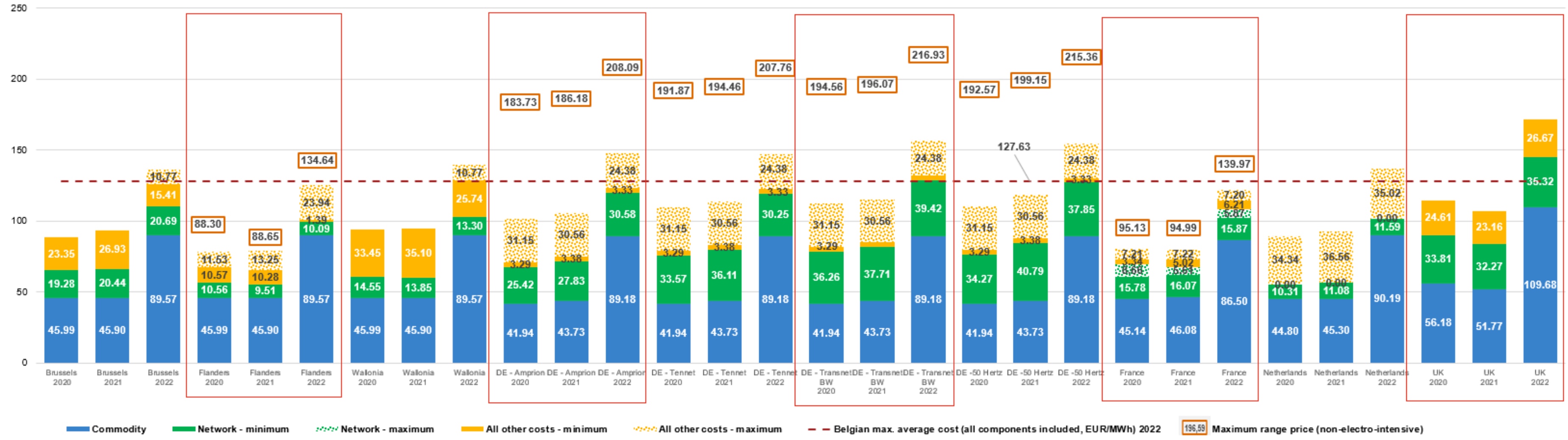
Les différentes composantes examinées pour chaque pays et région peuvent varier considérablement et avoir un impact sur la position concurrentielle de chaque pays. Même si les prix de la composante énergétique pure ("commodity") sont raisonnablement convergents d'un pays à l'autre pour le profil E-BSME - à l'exception du Royaume-Uni - il existe des différences significatives dans les "coûts de réseau" et "tous les autres coûts". Les premiers jouant certainement un rôle important en Belgique. Dans le même temps, la composante "tous les autres coûts" fait de l'Allemagne le pays le plus cher, mais entraîne également des prix belges plus élevés, en particulier pour les profils E-RES et E-SSME.

Comparaison des prix de l'électricité pour les consommateurs industriels

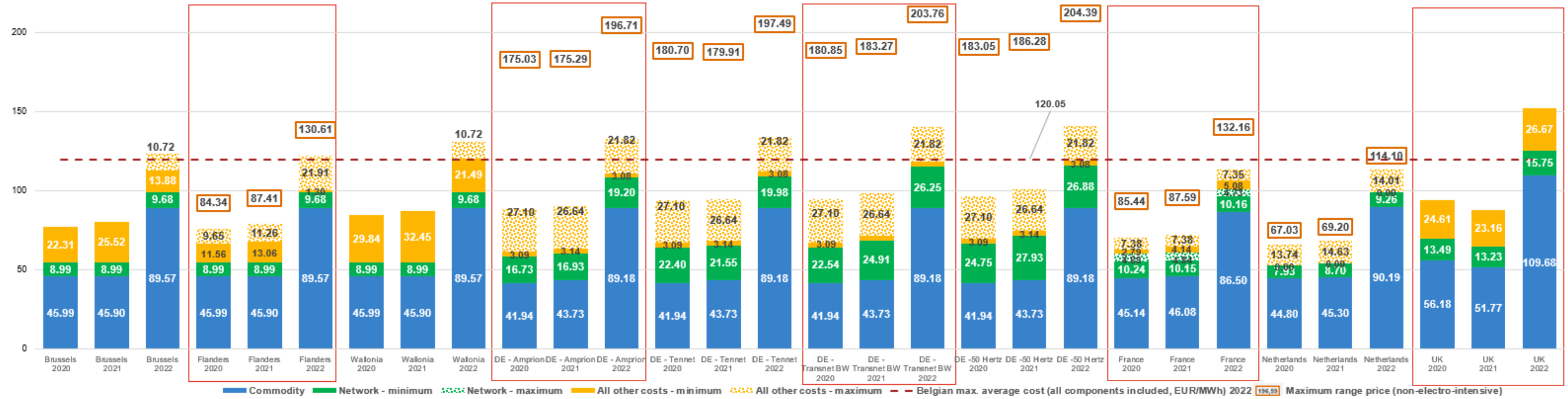
Comme pour les consommateurs résidentiels et les petits professionnels, le changement le plus significatif par rapport à l'année dernière est la forte augmentation du prix de la composante énergétique pure ("commodity") dans toutes les régions/pays étudiés. Si l'on tient compte de toutes les remises, le coût le plus bas de l'électricité pour les profils de consommateurs E0 et E2 se trouve aux Pays-Bas, légèrement en dessous du niveau observé en France. Cependant, la Flandre est quasiment à égalité avec les Pays-Bas pour les profils E1 et E2. Les coûts de réseau relativement bas, mais surtout la réduction de tous les autres coûts (c'est-à-dire les taxes, les prélèvements et les systèmes de certificats), expliquent en partie ces prix plus bas. Globalement, la Belgique présente une facture annuelle dans la moyenne des aux autres pays étudiés, tandis que le Royaume-Uni est de loin le plus cher. Les résultats de l'Allemagne sont quant à eux très variables. Alors qu'ils offrent des prix moyens quelque peu comparables à ceux de la Belgique lorsque les réductions sur tous les autres coûts s'appliquent aux consommateurs électro-intensifs, les consommateurs industriels allemands sont confrontés aux prix les plus élevés lorsque ces réductions ne s'appliquent pas. En Belgique, le coût de l'électricité est quant à lui plus élevé en Wallonie pour les profils E0, E1 et E2.

Coût de l'électricité par composante en EUR/MWh (profil E0)

Coût de l'électricité par composante en EUR/MWh (profil E1)



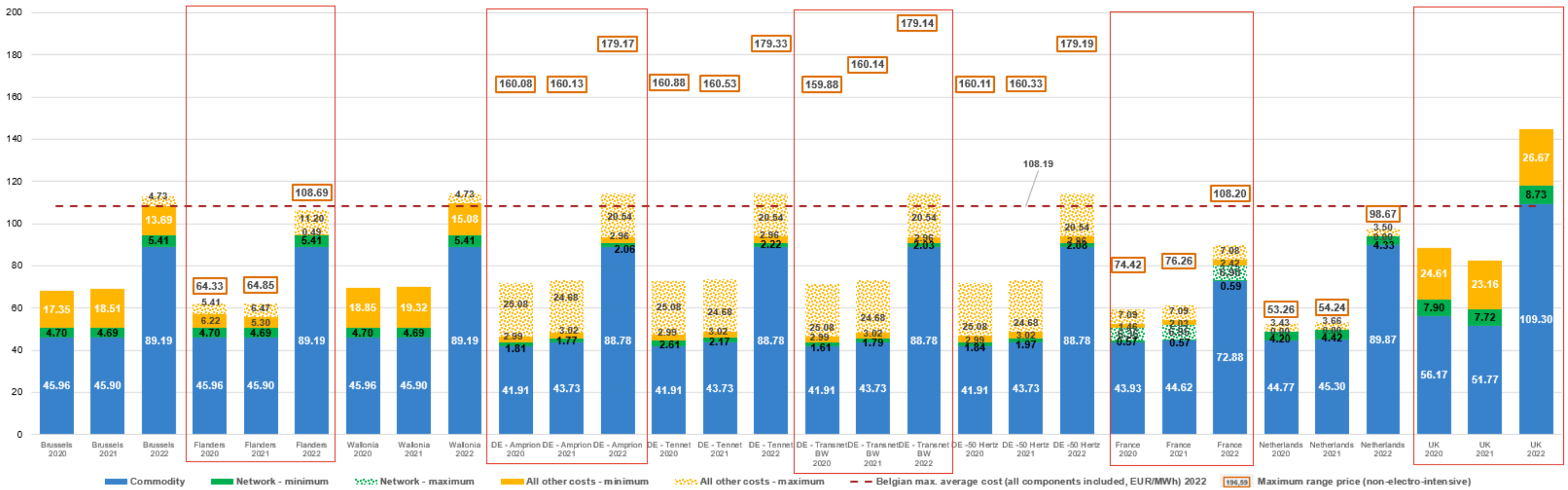
Coût de l'électricité par composante en EUR/MWh (profil E2)



Si l'on considère les profils E3 et E4, la France offre potentiellement la facture la moins élevée de toutes. Une différence importante existe pour les profils E0-E2: pour ceux-ci, la Flandre était très proche de la France, ce qui n'est pas le cas avec les profils E3-E4. La raison de cette baisse en France réside dans le mécanisme ARENH, dont ces profils bénéficient davantage. Ensuite, le Royaume-Uni reste le pays le plus cher, sauf si l'on considère les tarifs allemands pour les consommateurs non électro-intensifs. Enfin, la Belgique affiche des prix moyens relativement compétitifs.

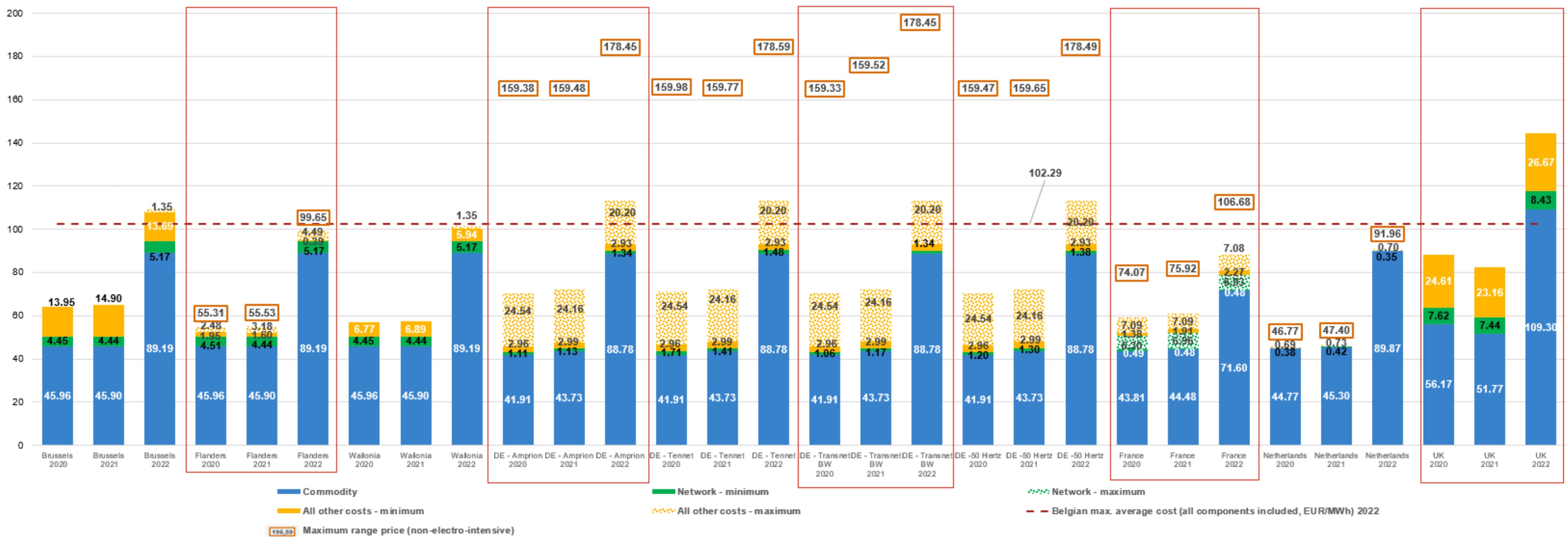
En Belgique, nous observons que pour les profils E3 et E4 la Flandre est toujours la région la plus compétitive, même pour les consommateurs non électro-intensifs, ce qui est conforme au résultat de l'année dernière. Comme les coûts de la composante énergétique pure ("commodity") et les coûts de réseau sont harmonisés dans toutes les régions belges, cela dépend donc uniquement de la composante "tous les autres coûts". Il est toutefois important de noter que le plus gros consommateur d'énergie de Bruxelles est plus proche d'un profil E3 que d'un profil E4. Il s'agit donc d'une observation purement théorique pour cette région en raison de l’absence de très gros consommateurs industriels dans la région bruxelloise.

Coût de l'électricité par composante en EUR/MWh (profil E3)



Dans l'ensemble, les pays concernés par cette étude sont confrontés à une convergence des prix de la composante énergétique pure ("commodity") à l'exception de la France et du Royaume Uni, qui restent des exceptions en 2022. Les différences entre les pays se situent aussi au niveau du coût de réseau et de la composante relative à tous les autres coûts. La Belgique offre des coûts de réseau relativement en ligne avec ses voisins mais n'accorde pas de réductions sur ces coûts, ce qui peut nuire à sa compétitivité par rapport aux pays qui le font. De même, les taxes, les prélèvements et le système de certificats de la Belgique seraient alignés sur ceux des autres pays si ces derniers n'appliquaient pas de réductions pour les gros consommateurs d'électricité. La Flandre est la seule région belge qui reste au contact des autres pays étudiés, en raison de la baisse de tous les autres coûts qui s’explique par le plafonnement du financement des énergies renouvelables et l'exonération possible du droit d’accise “spécial” fédéral.

Coût de l'électricité par composante en EUR/MWh (profil E4)



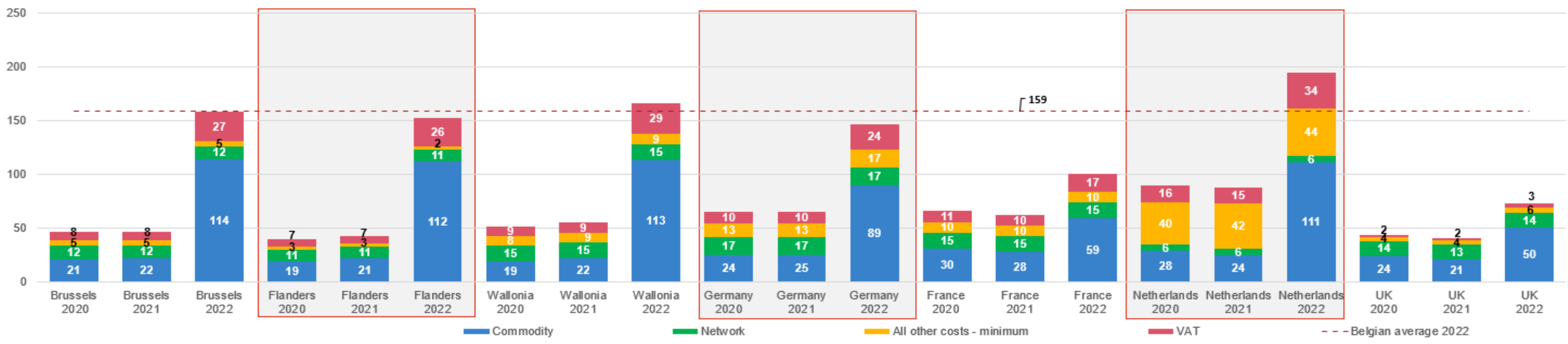
En ce qui concerne l'électricité pour les consommateurs industriels, le rapport souligne la grande complexité due aux interventions gouvernementales visant à réduire les coûts de l'électricité pour certaines catégories de grands consommateurs industriels. Ces interventions visent à limiter les coûts de réseau et tous les autres coûts (c'est-à-dire les taxes, les prélèvements, les systèmes de certificats). La Belgique, la France, l'Allemagne et les Pays-Bas appliquent leurs coûts de réseau ainsi que les réductions fiscales accordées sur la base d'une série de critères économiques spécifiques généralement liés à l'électro-intensité. Si des réductions spécifiques peuvent être appliquées directement sur les prix (par exemple, les réductions des coûts de réseau en Allemagne), nous devons également présenter certains résultats en fonction d'un large éventail de possibilités. En ce qui concerne les réductions fiscales, les critères (prélèvement annuel de 10 GWh ou activité) fixés par les Pays-Bas sont les moins exigeants. L'application de ces réductions entraîne une modification de la position concurrentielle des autres pays couverts par cette étude. L'Allemagne présente le coût de l'électricité le plus élevé possible pour chaque profil étudié, pour les consommateurs ne respectant pas les critères de réduction ; les Pays-Bas et la Flandre, déjà relativement bon marché sans réduction, deviennent encore moins chers et la France devient moins chère que les régions belges, y compris la Flandre, grâce à ces réductions. Par rapport à 2021, Bruxelles et la Wallonie disposent désormais, comme la Flandre, d'une fourchette minimum-maximum pour les grands consommateurs industriels (E1-E4) pour la composante liée à tous les autres coûts grâce à l'exemption possible du droit d'accise “spécial” fédéral. Enfin, la France est le seul pays à avoir réduit le coût de la composante énergétique pure ("commodity") grâce au mécanisme de l'ARENH. Le Royaume-Uni n'offre toujours pas de réduction/exemption pour les consommateurs électro-intensifs, ce qui a un impact sur sa compétitivité relative.

Comparaison des prix du gaz naturel

Comparaison des prix du gaz naturel pour les consommateurs résidentiels et les petits professionnels

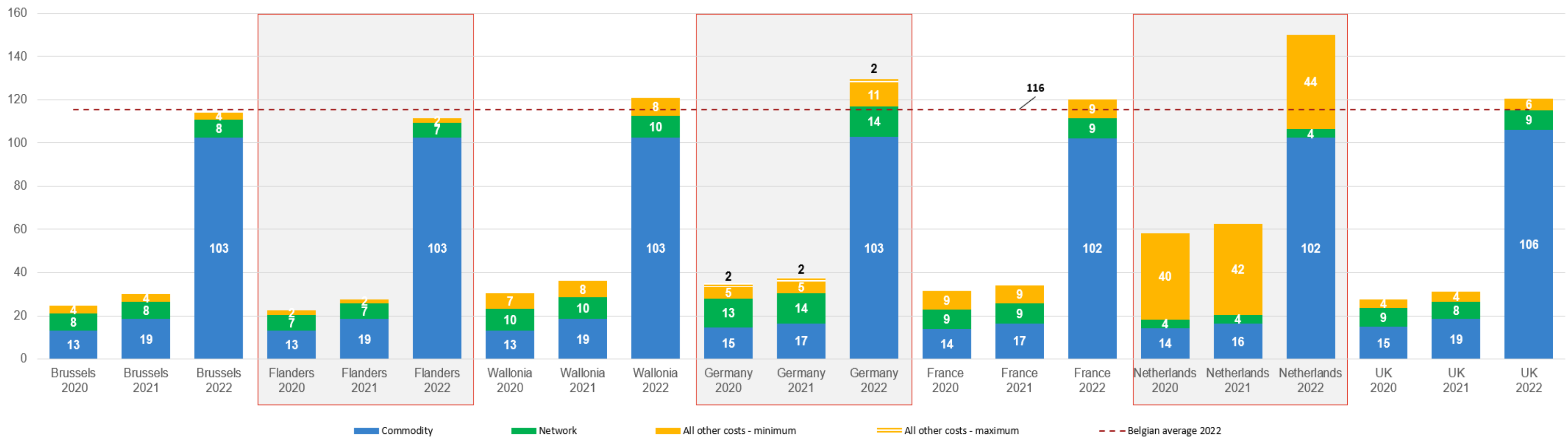
Par rapport aux résultats obtenus pour l'électricité, les résultats de la comparaison des prix du gaz naturel diffèrent sensiblement. Pour les consommateurs résidentiels (G-RES), le Royaume-Uni est le pays le moins cher, suivi de la France, tandis que les Pays-Bas deviennent le plus cher. En France et au Royaume-Uni, cela s'explique par les prix de la composante énergétique pure ("commodity") les plus bas parmi les régions/pays examinés, principalement en raison des prix réglementés pour ce profil. Comme l'année dernière, les Pays-Bas sont le pays le plus cher en raison de taxes plus élevées que dans les autres régions/pays analysés. Alors que le positionnement concurrentiel du Royaume-Uni s'expliquait par le taux de TVA le plus bas en 2021, il s'explique désormais principalement par la composante des coûts de la composante énergétique pure ("commodity") plus faibles au Royaume-Uni. La Belgique est désormais le deuxième pays le plus cher, en raison d'une augmentation plus importante du prix de la composante énergétique pure ("commodity") que les autres régions/pays de l'étude, alors qu'elle était le deuxième pays le moins cher en 2021. La Flandre est moins chère que Bruxelles et la Wallonie en raison de la baisse des obligations régionales de service public, qui diminuent également par rapport à l'année dernière. Outre les taxes, la Flandre offre également les coûts de réseau et de la composante énergétique pure ("commodity") les plus bas des trois régions belges, ce qui explique ses prix relativement plus bas. Comme pour l'électricité, la différence la plus remarquable par rapport à 2021 pour le gaz naturel est la forte augmentation du prix de la composante énergétique pure ("commodity") pour toutes les régions/pays étudiés.

Coût du gaz naturel par composante en EUR/MWh (profil G-RES)



En ce qui concerne les petits consommateurs professionnels (G-PRO), c'est la Flandre qui affiche la facture totale la plus basse, suivie de Bruxelles puis de la France. En raison des faibles niveaux de taxes à Bruxelles et en Flandre, la facture moyenne belge est la moins chère de tous les pays étudiés et est également environ 23% moins chère que la facture de gaz naturel des Pays-Bas pour ce profil. Une fois encore, les taxes sur le gaz naturel moins élevées rencontrées en Belgique (à l'exception de la Wallonie) expliquent sa bonne position concurrentielle. Pour l'Allemagne, nous constatons une forte augmentation de la composante relative à tous les autres coûts en raison de l'introduction de la taxe sur le carbone, qui n'était pas prise en compte en 2021. Ceci est valable pour les profils G-RES et G-PRO, mais aussi pour tous les grands profils industriels (G0- G2).

Coût du gaz naturel par composante en EUR/MWh (profil G-PRO)



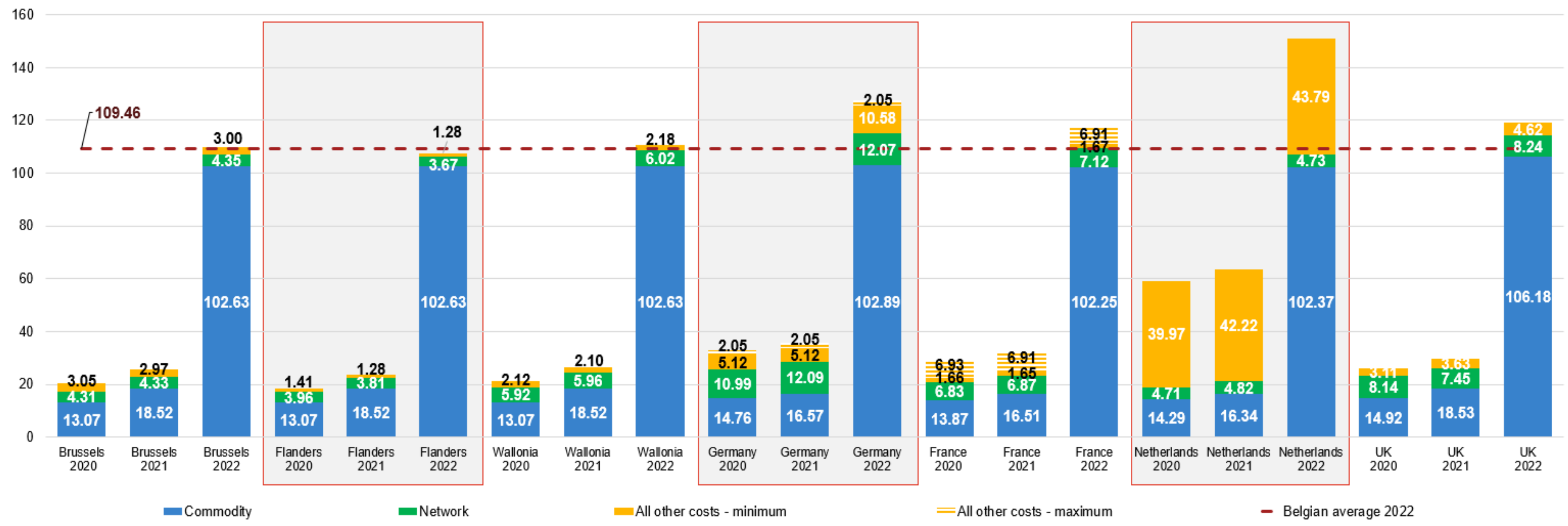
En comparant les données avec celle de 2021, nous observons un changement important dans la facture totale, principalement dû à la composante énergétique pure ("commodity") qui a fortement augmenté en 2022 (comme c'était le cas pour l'électricité). En général, la Belgique est relativement bien alignée avec ses pays voisins, principalement en raison de montants moins élevés au niveau des taxes, ce qui constitue une différence remarquable par rapport à l'électricité. En ce qui concerne les coûts de la composante énergétique pure ("commodity"), ils sont convergents d'un pays à l'autre si l'on considère le profil G-PRO, mais le Royaume-Uni et la France se distinguent vraiment comme étant beaucoup moins chers si l'on considère le profil G-RES. Le Royaume-Uni a conservé sa position de pays le plus compétitif grâce à une augmentation relativement limitée du coût de la composante énergétique pure ("commodity") par rapport à ses pays voisins. Quant aux coûts de réseau, même si ces coûts se situent dans la moyenne pour la Belgique, la Flandre bénéficie certainement des coûts de réseau régionaux les plus faibles lui permettant d'afficher les tarifs les plus bas de Belgique.

Comparaison des prix du gaz naturel pour les consommateurs industriels

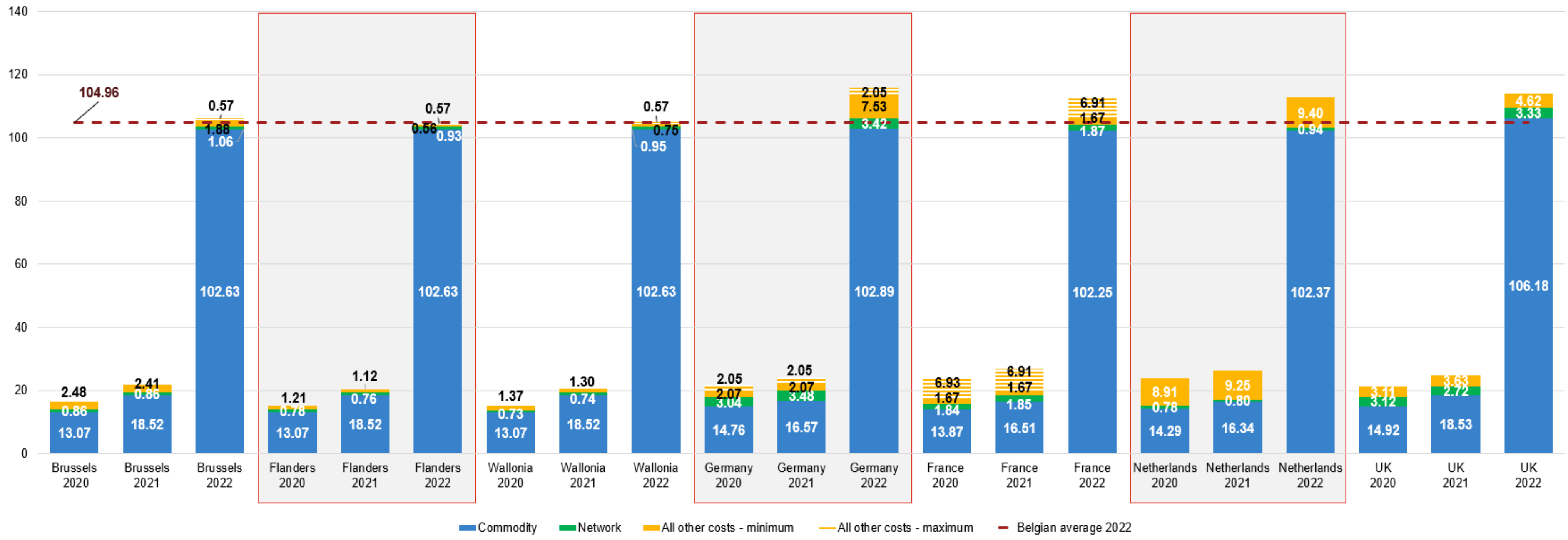
Comme pour les consommateurs industriels d'électricité, nous observons une forte augmentation générale du prix de la composante énergétique pure ("commodity") pour les consommateurs industriels de gaz naturel, ce qui amène une convergence entre les régions/pays étudiés. Globalement, la Belgique est très compétitive en ce qui concerne le gaz naturel, principalement grâce à ses prix relativement bas pour tous les autres coûts et pour les composants du réseau. Pour les profils G0 et G1, la Belgique est le pays le plus compétitif, même s'il est important de mentionner que la France, lorsque des réductions sont appliquées, se rapproche de la Belgique. Pour le profil G2, cela dépendra toutefois du type de consommateur puisque tous les pays offrent des réductions qui peuvent affecter leur position concurrentielle. En Belgique, Bruxelles est la région la moins compétitive (sauf pour le profil G0) tandis que la Flandre est la région belge la plus compétitive pour tous les profils industriels. La différence de prix entre la Flandre et la Wallonie reste cependant presque négligeable pour les profils G1 et G2.

En ce qui concerne le gaz naturel, l'intervention des pouvoirs publics dans les coûts de réseau et les taxes semble moins fréquente (en ce sens qu'il y a peu de taxes prélevées sur le gaz naturel - sauf aux Pays-Bas). En outre, la complexité est bien moindre, même si des réductions ou des exemptions existent (par exemple, des exemptions pour les consommateurs utilisant le gaz naturel comme matière première). Seules l'Allemagne et la France proposent des réductions à partir du profil G0. La Belgique offre désormais une exemption dans ses trois régions du droit d'accise fédéral spécial pour les grands consommateurs industriels (G1-G2), tandis que les autres régions/pays n'ont qu'une fourchette à prendre en considération pour le profil G2.

Coût du gaz naturel par composante en EUR/MWh (profil G0)



Coût du gaz naturel par composante en EUR/MWh (profil G1)



Coût du gaz naturel par composante en EUR/MWh (profil G2)

Niveaux d’efforts des consommateurs vulnérables pour payer les factures d'énergie

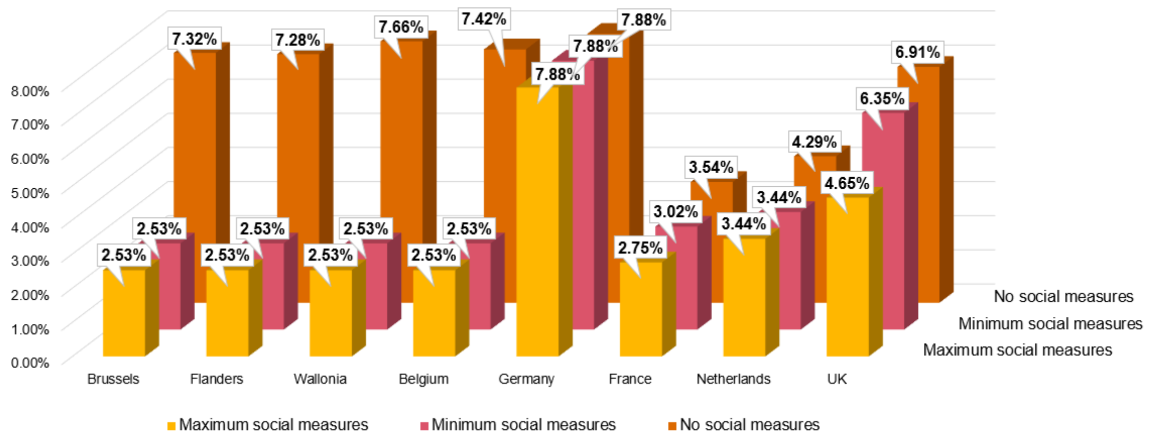
Le chapitre 8 vise à évaluer les différences dans les efforts financiers consentis par les consommateurs vulnérables pour payer leurs factures d'électricité et/ou de gaz naturel compte tenu de leur niveau de revenu. Parmi les pays étudiés, divers outils gouvernementaux existent pour réduire la facture énergétique des personnes. Ces outils peuvent aller des tarifs sociaux aux aides financières directes pour réduire la facture (par exemple via le chèque-énergie en France). La variété qui en résulte rend complexe la comparaison entre les différents pays.

Pour toutes les régions/pays étudiés, nous observons des taux d'effort (c'est-à-dire la part du revenu d'un ménage consacrée aux dépenses énergétiques) plus élevés que l'année dernière lorsqu'aucune mesure sociale n'est prise en compte. Cela peut s'expliquer par la hausse des factures d'électricité et de gaz naturel due à l'augmentation générale du prix de la composante énergétique pure ("commodity"). Cette année, la Belgique présente le deuxième taux d'effort le plus élevé pour l'électricité en l'absence de mesures sociales, l'Allemagne ayant le taux le plus élevé. En ce qui concerne le gaz naturel et sans mesures sociales, la Belgique présente la plus forte augmentation du taux d'effort par rapport à l'année dernière, passant d'une moyenne de 6 % en 2021 à 17 % en 2022. Cela s'explique par une augmentation relativement plus importante du prix du gaz naturel en Belgique par rapport aux pays voisins. Toutefois, comme l'année dernière, le taux d'effort le plus élevé pour le gaz naturel sans mesures sociales est toujours observé aux Pays-Bas, suivi par la Belgique.

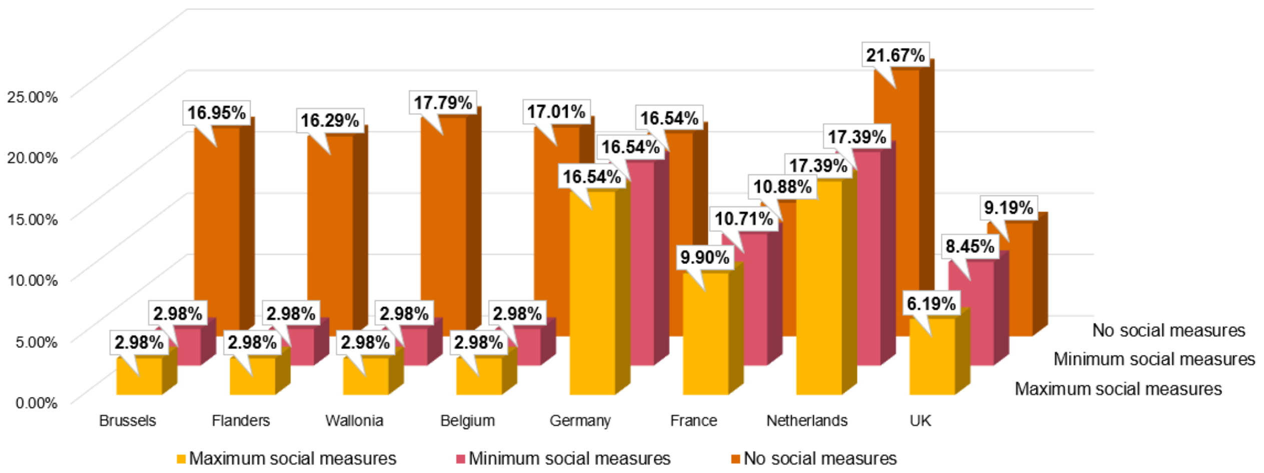
Si l'on considère les interventions des pouvoirs publics, la situation est différente. En effet, la Belgique tend à assurer les taux d'effort les plus faibles par rapport à ses pays voisins, et plus particulièrement en ce qui concerne le gaz naturel. Deux éléments sont à l'origine de cette observation: tout d'abord, des niveaux de revenu disponible et de revenu de subsistance (utilisés pour évaluer différents scénarios) relativement élevés pour les consommateurs résidentiels en Belgique par rapport aux autres pays étudiés, ce qui contribue à abaisser les taux d'effort. Deuxièmement, la Belgique offre également des réductions importantes sur les prix de l'énergie grâce aux tarifs sociaux (lorsque les ménages répondent aux critères d'éligibilité). Au niveau fédéral, le tarif social et le Fonds de l'électricité et du gaz peuvent également contribuer à réduire la facture énergétique. En outre, les niveaux régionaux disposent également de mesures sociales, telles que le tarif social (basé sur d'autres critères qu'au niveau fédéral), un plan de paiement ou des compteurs prépayés.

En outre, par rapport à l'année dernière, le gouvernement belge a pris les mesures supplémentaires suivantes pour compenser l'augmentation de la facture énergétique observée depuis fin 2021: une réduction temporaire du taux de TVA entre mars et septembre 2022, l'extension temporaire de la catégorie des bénéficiaires du tarif social et l'introduction de paiements uniques ou de notes de crédit sur la facture énergétique. Les chiffres ci-dessous montrent clairement l'aide apportée cette année aux consommateurs les plus vulnérables en Belgique par rapport aux pays voisins. Le chapitre 8 apporte un éclairage supplémentaire sur ces observations.

Niveau d'effort pour l'électricité par rapport au revenu disponible (en %)



Niveau d'effort pour le gaz naturel par rapport au revenu disponible (en %)



Évaluation de la compétitivité des industries belges

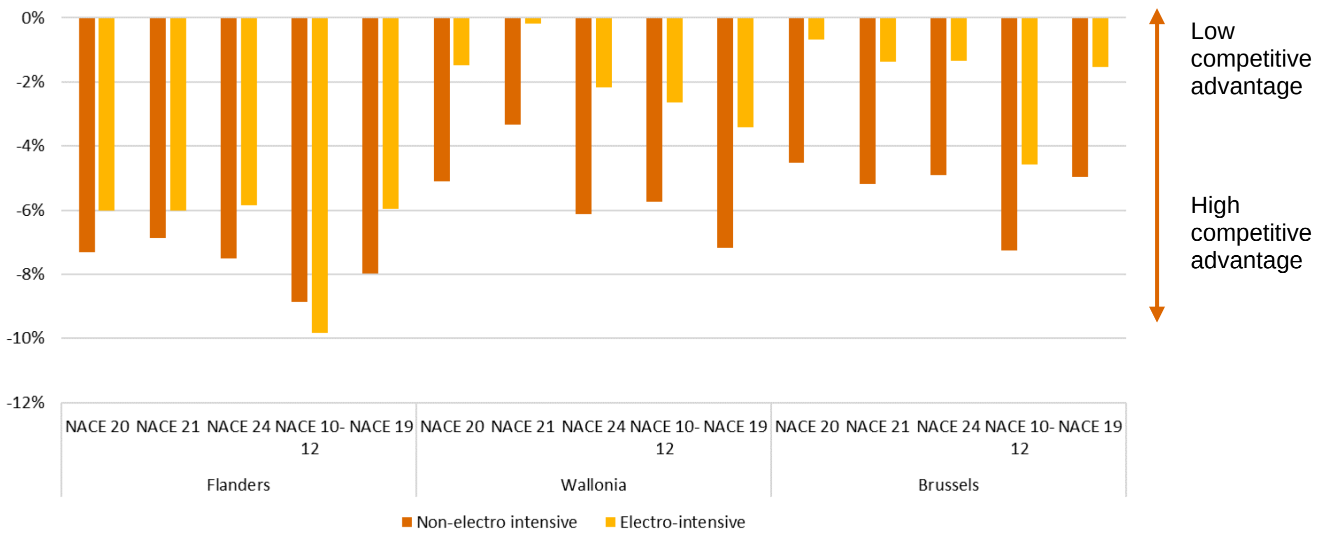
Dans un dernier chapitre, les prix de l'électricité et du gaz naturel spécifiques aux secteurs et aux régions sont analysés à travers leur impact sur la compétitivité des consommateurs industriels belges par rapport à leurs concurrents étrangers. Ces résultats couvrent les consommateurs industriels des secteurs sélectionnés, tels que détaillés à la section 3.3, à savoir: alimentation et boissons (NACE 10-12), cokéfaction et produits pétroliers raffinés (NACE 19), produits chimiques (NACE 20), produits pharmaceutiques (NACE 21) et fabrication de métaux de base (NACE 24). Ces secteurs représentent entre 0,10% et 2,04% de la valeur ajoutée brute de la Belgique et entre 0,53% et 2,04% de l'emploi total[7].

Comme nous avons observé que le Royaume-Uni était un cas particulier, les résultats ont été différenciés en fonction de son inclusion ou non dans la comparaison. Il ressort de nos résultats que les consommateurs industriels en Belgique qui sont en concurrence avec les consommateurs non électro-intensifs des pays voisins présentent un avantage compétitif relatif en termes de coût total de l'énergie lorsque le Royaume-Uni est inclus, tandis que la compétitivité diminue pour tous les secteurs et toutes les régions lorsque le Royaume-Uni est exclu.

Pour les consommateurs électro-intensifs, la différence avec et sans le Royaume-Uni est encore plus évidente. Tous les secteurs de Bruxelles et de Wallonie, à l'exception du NACE 10-12 à Bruxelles, présentent en réalité un désavantage concurrentiel lorsqu'on exclut le Royaume-Uni, alors qu'ils ont un léger avantage concurrentiel lorsqu'on l'inclut. Pour les consommateurs électro-intensifs, la Flandre reste plus compétitive que ses pays voisins avec et sans le Royaume-Uni, même si nous constatons une diminution de la compétitivité lorsque le Royaume-Uni est exclu.

Lorsque le Royaume-Uni est inclus, la position concurrentielle de la Belgique a changé par rapport à l'année dernière. Bruxelles et la Wallonie voient leur compétitivité s'améliorer, présentant un avantage concurrentiel dans tous les secteurs, tant pour les consommateurs non électro-intensifs que pour les consommateurs électro-intensifs. En revanche, la Flandre voit son avantage compétitif légèrement diminuer par rapport à 2021 pour les consommateurs électro- et non-électro-intensifs, bien qu'elle reste la région belge la plus compétitive.

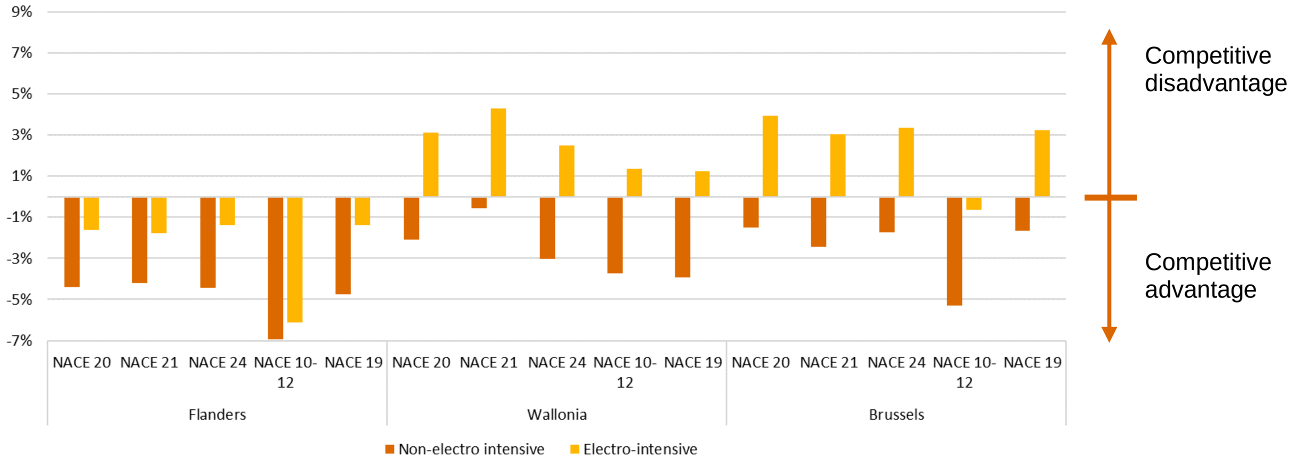
Différences des coûts énergétiques pondérés (électricité et gaz naturel) entre les régions belges et les coûts moyens des pays voisins (y compris le Royaume-Uni) pour les consommateurs électro-intensifs et non-électro-intensifs



[7] Il s'agit des valeurs nationales de 2016, qui ont été extraites d'Eurostat.

Comme indiqué ci-dessus, la situation est différente lorsque le Royaume-Uni est exclu. En effet, par rapport à 2021, nous observons que la Flandre conserve son avantage concurrentiel auprès des consommateurs non électro-intensifs, même s'il diminue au fil des ans. En ce qui concerne les consommateurs électro-intensifs, la Flandre présente de légers avantages concurrentiels pour tous les secteurs. Comme en 2021, les consommateurs électro-intensifs de Bruxelles et de Wallonie présentent toujours des désavantages concurrentiels, même si leur position s'améliore. Comme pour les conclusions tirées de l'analyse incluant le Royaume-Uni, nous observons une convergence dans tous les régions/pays étudiés. Par conséquent, les régions, comme la Flandre, qui présentaient un avantage concurrentiel important l'année dernière voient désormais leur compétitivité se détériorer tandis que d'autres, comme Bruxelles et la Wallonie, voient leur position s'améliorer.

Différences des coûts énergétiques pondérés (électricité et gaz naturel) entre les régions belges et les coûts moyens des pays voisins (hors Royaume-Uni) pour les consommateurs électro-intensifs et non-électro-intensifs



Globalement, cette année, les consommateurs non électro-intensifs bénéficient encore en Belgique de prix compétitifs par rapport à leurs concurrents situés dans les pays voisins, malgré la forte hausse du prix de la composante énergétique pure ("commodity"). En revanche, surtout à Bruxelles et en Wallonie, les consommateurs électro-intensifs sont plus exposés à un manque de compétitivité. Ainsi, malgré les efforts déjà consentis en Flandre et au niveau fédéral, ces résultats soulignent encore la nécessité pour Bruxelles et la Wallonie de prendre les mesures nécessaires pour améliorer la compétitivité de leurs industries.

En guise de conclusion, ceci pourrait servir de base à une discussion plus détaillée des interventions fédérales et/ou régionales potentielles pour renforcer la compétitivité des consommateurs belges en agissant, par exemple, sur les tarifs et/ou les taxes. En ce qui concerne ces dernières, la Commission européenne fournit un cadre par le biais du CEEAG[8] qui pourrait être exploité en ce qui concerne la conception et/ou l'adaptation des taxes soutenant le développement des énergies renouvelables.

[8] Lignes directrices de l'Union Européenne concernant les aides d'État à la protection de l'environnement et à l'énergie - janvier 2022.

2. Introduction

2. Introduction

This report is commissioned by the Belgian federal regulator for electricity and natural gas (CREG) and the three Belgian regional regulators: Brugel (Brussels), the CWaPE (Wallonia) and the VREG (Flanders) – and supported by FORBEG[9]. In the framework of their larger mission of supervising transparency and competition on the market, ensuring market conditions serve the public interest and safeguarding consumers' interests, PwC was asked to conduct a study comparing energy prices for residential, small professional and industrial consumers in Belgium and the neighbouring countries.

The purpose of this study is to compare the electricity and natural gas prices, in total as well as per component, billed to residential, small professional and large industrial consumers in the three Belgian regions (Brussels, Flanders and Wallonia) with those in Germany, France, the Netherlands and the United Kingdom. This report comes as the third edition of a multiple-year evaluation that will be conducted until 2023. As such, electricity and natural gas prices used in this study were retrieved in January 2022.

In addition to the price analysis, the purpose of this study is to further investigate the impact of energy price differences on two peculiar consumer groups, namely the vulnerable residential consumers and the Belgian industry. For the vulnerable consumers the report will estimate the effort made by the government(s) and/or other instances to help these customers pay their energy bills while for the industrial consumers we will analyse how the price differences impact the Belgian industry. It also pays special attention to reduction schemes that are beneficial to electro-intensive industrial consumers qualifying for certain criteria.

This report consists of four different sections.

The **first section** (described in chapter 3 to 5) consists of the actual price comparison for all considered consumers. Methodologically, a bottom-up approach was employed to build up the energy cost wherever possible. As such, the three main components were identified: the commodity price, the network cost, and all other costs (i.e. taxes, levies, and certificate schemes). When it comes to residential consumers, the VAT was also included. In this section, chapter 3 first describes the dataset by setting the general assumptions employed, defining the consumer profiles considered and finally presenting an overview of the different zones identified in all five countries under review. While the Terms of Reference of this study set the consumer profiles' consumption volume and annual peak power, assumptions were taken to further complete our profiles' characteristics (e.g. contracted capacity, monthly peak, etc.), which are also listed in this section. Then, chapter 4 and 5 provide a detailed description of the deconstructed energy cost for electricity and natural gas, extensively describing the existing regulatory framework.

In the **second section** (described in chapter 6 and 7), we present the results per consumer profile, using a twofold approach: how total energy prices are in Belgium compared to the other four countries, and how the three components of the energy price explain the observed results. While chapter 6 presents the results per consumer profile, chapter 7 draws general conclusions and introduces a first overview of the observed results in terms of competitiveness for Belgian residential, small professional and industrial energy consumers.

[9] FORBEG is the forum of the Belgian electricity and gas regulators. It is an informal consultation body consisting of representatives of BRUGEL, the CREG, CWaPE and VREG.

The **third section** of this study (described in chapter 8) addresses the efforts made by the government(s) and/or other instances to help vulnerable consumers pay their energy bills. This section particularly focuses on identifying social measures that are implemented by national governments and/or other instances, which are then quantified to derive the financial importance of one's energy consumption over its revenues. Through this, it is intended to illustrate the magnitude of countries' interventions to alleviate the energy cost weighing on vulnerable residential consumers.

In the **fourth section** of this report (described in chapter 9), we propose a detailed analysis of the impacts of the price differences with the neighbouring countries, obtained through the first section, on the competitiveness of the industry in the three Belgian regions. Particular attention is brought to the total energy cost for the industry on a macro-economic level where the aggregation of electricity and natural gas prices make up the total energy cost. This investigation is conducted for the five most important Belgian industrial sectors, which were identified through a preliminary exercise to be found in section 3, and assesses their competitive advantages and disadvantages compared to industries from neighbouring countries, at a national and regional level. Finally, several general conclusions and recommendations are formulated based on the report's insights.

A preliminary version of this report was submitted for review to the Belgian federal energy regulator (CREG), the regional energy regulators of Flanders (VREG), Wallonia (CWAPE) and Brussels (Brugel) as well as the national energy regulators of France (CRE), Germany (Bundesnetzagentur), the Netherlands (ACM) and the United Kingdom (OFGEM). This final report integrates all remarks formulated by those Regulatory Authorities.

3. Description of the dataset

3. Description of the dataset

General assumptions

We listed below general assumptions necessary for the overall comprehension regarding the selected consumer profiles and countries.

1. *January 2022.* This study gives an overview of the prices and tariffs of electricity and natural gas in January 2022 for Belgium, France, the Netherlands, Germany, and UK.

2. *Economically rational actors.* We assume the 13 selected profiles (8 for electricity and 5 for natural gas) are economically rational actors trying to optimise their energy cost when possible.

3. *Exemptions and reductions.* In various cases, we noticed the existence of – most of the time progressive – reductions or exemptions on taxes, levies, certificate schemes, or grid usage costs. Whenever economic criteria - such as exercising a well-defined industrial activity or paying a specific part of your company revenue as energy cost - are used to determine the eligibility for those exemptions and reductions, we do not present a single value but a range of possibilities as a result with a minimum and a maximum case. All the computation and graphs reflect the situation on 1st January 2022. Any changes that were happening afterwards were not included.

4. *Commodity prices (B-SME and industrial consumers).* All commodity prices are provided by the CREG, except for the electricity industrial consumers commodity price in the UK, which was provided by PwC based on Bloomberg market indices.

5. *Electricity/Natural gas sales margin (B-SME and industrial consumers).* While using the formula provided by the CREG to compute commodity prices, we do not add any sales margin – both for electricity and natural gas – to ensure better objectivity when comparing these different countries and consumers types. However, such a margin is *de facto* included as we consider offers, products and tariffs available on the natural gas/electricity market.

6. *Natural gas pressure level and caloric value.* As later exhibited, (some) industrial natural gas consumers are directly connected to the transport grid but are not connected to the same natural gas pressure level in every country (e.g. the Netherlands). We consider the most plausible pressure level for each country and client profile. We also consider the caloric value of natural gas for each country.

7. *Exchange rates.* When it comes to the UK, we systematically used the January 2022 average exchange rate to convert Pound Sterling to Euro[10] (0,8350 GBP/EUR or 1,1976 EUR/GBP for 2022). The commodity cost formula was entirely computed in Pound Sterling, hereafter converted in Euro at the January 2022 exchange rate.

8. *Value Added Tax (VAT).* We consider that VAT is deductible for professionals and is thus only considered for residential consumers (E-RES and G-RES). Besides, as the VAT is considered as a separate component for residential consumers, all prices reported in this document either exclude VAT or specifically mention its inclusion.

[10] European Central Bank

9. *The United Kingdom (UK).* When mentioning the United Kingdom, we talk about Great Britain, including England, Wales, and Scotland, leaving aside Northern Ireland.

10. *Auto-production*. In this study, we assume none of the selected profiles produces electricity on their own (on-site electricity production or domestic production). We, therefore, conclude that electricity consumption and invoicing correspond to one's electricity offtake.

11. *Meter ownership.* We assume that residential and small professional consumers do not own their specific meter. However, industrial consumers are considered to own their meter.

12. *Unique contracts*. We assume that residential consumers have a contract with a supplier, including all costs.

13. *Payment method.* When multiple payment methods exist, the most common option is to be considered for residentials.

14. *Reductions.* When it comes to residential consumers, we do not consider reductions such as promotional offers or temporary offers. For industrial consumers, we consider certain exemptions or reductions as specified in the law, for instance.

15. *Exclusion of products.* As a rule, each product considered to compute residential consumers' commodity products should be available to all types of residential consumers. For instance, products unavailable during the period of the price comparison, products that require the acquisition of a share, products that require pre-financing, or products that are only available on certain conditions are excluded from the price comparison resulting in the selection of another product.

16. *Holders of a sectoral (energy efficiency) agreement.* Some reductions are only applicable for holders of a sectoral agreement. Since we have already taken the assumption that our profiles are economically rational and would thus have a sectoral agreement if they qualify for the conditions (e.g. we presume British industrial consumers to be part of the climate change agreement, therefore leveraging energy efficiency and emission reduction to obtain tax reductions). As a reflection of each country's diversity of companies and of the sectoral agreements penetration rates, we explicitly specify which profiles are considered to qualify and therefore have a sectoral agreement.

Consumer profiles

Information provided by the steering committee

Table 1: Consumer profiles for electricity

		E-RES (Electricity Residential)	E-SSME (Electricity Small SME)	E-BSME (Electricity Big SME)	E0 (Electricity 0)	E1 (Electricity 1)	E2 (Electricity 2)	E3 (Electricity 3)	E4 (Electricity 4)
Date	**Unit**	January 2022	January 2022	January 2022	January 2022	January 2022	January 2022	January 2022	January 2022
Annual demand**	**MWh**	3,5	30	160	2.000	10.000	25.000	100.000	500.000
Consumption profile		-	-	-	Baseload (working days only)	Baseload (working days only)	Baseload (working days only)	Baseload (including weekends)	Baseload (including weekends)
Consumption hours eq.[11]	**h/year**	-	-	1.600	4.000	5.000	5.000	7.692	8.000
Grid operator		DSO (LS)	DSO (LS)	DSO (1-26 kV)	DSO (1-26 kV)	DSO (TransHS)	LTSO	TSO	TSO
Connection capacity*	**kVA**	9,2	46,9	156	781	3.125	6.944	18.056	86.806
Contracted capacity*	**kW**	7,4	37,5	125	625	2.500	5.000	13.000	62.500
Annual peak*	**kW**	5,9	30	100	500	2.000	5.000	13.000	62.500
Monthly peak*	**kW**	5,3	27	90	450	1.800	4.500	11.700	56.250
Metering		YMR	YMR	AMR	AMR	AMR	AMR	AMR	AMR

* Figures displayed in this part/graph were assessed based on hypotheses accepted by the steering committee. While this study does not aim at stating these figures represent the exact values for all consumers, we assume they are plausible proxies necessary to compute prices across studied countries and regions. Figures are derived from values provided by the steering committee based on the below-listed hypotheses:

- **The contracted capacity** is assumed to equal 80% of the connection capacity with a 100% cos φ (up to E1) or 90% cos φ (from E2 to E4);
- **The annual peak** is assumed to equal 80% of contracted capacity for consumers connected to the distribution grid (E-RES to E1);

[11] These are the theoretical number of hours of electricity consumption of each consumer, obtained by dividing the annual demand by the annual peak.

- **The annual peak** is assumed to equal 100% of contracted capacity for consumers connected to the transmission grid (E2 to E4) as the larger the consumption profile, the more stable ("baseload") the consumption. These consumers are more likely to precisely know their peak consumption and, therefore, sign for an identical contracted capacity;
- **The monthly peak** is assumed to equal 90% of annual peak.

** Whenever possible a distinction is made between day and night tariffs for profiles E-RES and E-SSME. This study assumes a day/night split of 1,6/1,9 MWh for E-RES and a 18/12 MWh split for E-SSME. For E-BSME profile the day/night split is 96/64 MWh, while 1.250/750 MWh for E0 and 6.250/3.750 MWh for E1 profiles.

Table 2: Detailed view of the connection level of consumer profiles for electricity per country

Profiles	Wallonia	Flanders	Brussels	Netherlands	France	Germany	UK
E-RES	BT sans mesures de pointe HP/HC (<1 kV)	LS zonder piekmeting D/N (<1 kV)	BT (T09) (<1 kV)	Fase 1: 1 x 10 t/m 3 x 25 Ampere	BT ≤ 36 kVA	Niederspannung (<1 kV)	NHH Demand tariff – Domestic two rate (< 6 kV)
E-SSME	BT sans mesures de pointe HP/HC (<1 kV)	LS zonder piekmeting D/N (<1 kV)	BT (T09) (<1 kV)	3 x 80 Ampere	BT ≥ 36 kVA	Niederspannung (<1 kV)	NHH Demand tariff – Small non-domestic customer with two rate (<6 kV)
E-BSME	MT avec mesure de pointe (1-26 kV)	1-26 kV Hoofdvoeding (T03)	26-1 kV (TO3) Alim. Principale	Afnemers MS (1-20 kV)	HTA_1 (1 - 40 kV)	Mittelspannung (1 kV - 50 kV)	HH Demand tariff-HV HH Metered (6 - 22 kV)
E0	MT avec mesure de pointe (1-26 kV)	1-26 kV Hoofdvoeding (T03)	26-1 kV (TO3) Alim. Principale	Afnemers MS (1-20 kV)	HTA_1 (1 - 40 kV)	Mittelspannung (1 kV - 50 kV)	HH Demand tariff-HV HH Metered (6 - 22 kV)
E1	T-MT avec mesure de pointe (26-36 kV)	Trans-HS Hoofdvoeding (26-36 kV)	Trans MT (26-36 kV)	Afnemers Trafo HS+TS/MS (25-50 kV)	HTA_1 (1 - 40 kV)	Mittelspannung (1 kV - 50 kV)	HH Demand tariff-HV HH Metered (6 - 22 kV)
E2	LTSO (30-70 kV)	LTSO (30-70 kV)	LTSO (30-70 kV)	Afnemers TS (25-50 kV)	HTB_1 (50 - 130 kV)	Umspannung Hoch-/Mittelspannung (50 -110 kV)	EHV EDCM (22 - 132 kV)
E3	TSO (> 150 kV)	TSO (> 150 kV)	TSO (> 150 kV)	TSO (> 150 kV)	HTB_2 (130 - 150 kV)	Hochspannung (220 - 350 kV)	TSO (150 kV)
E4	TSO (> 150 kV)	TSO (> 150 kV)	TSO (> 150 kV)	TSO (> 150 kV)	HTB_2 (130 - 150 kV)	Hochspannung (220 - 350 kV)	TSO (150 kV)

Table 3: Consumer profiles for natural gas

		G-Res (Natural gas Residentials)	G-Pro (Natural gas Professionals)	G_0 (Natural gas 0)	G_1 (Natural gas 1)	G_2 (Natural gas 2)
Date		January 2022	January 2022	January 2022	January 2022	January 2022
Annual demand	MWh	23,26	300	1.250	100.000	2.500.000
Consumption profile		-	-	Baseload (working days only)	Baseload (including weekends)	Baseload (including weekends)
Consumption hours eq.[12]	h/year	-	-	3.000	5.000	8.000
Contracted capacity	kW	-	-	-	20.000	312.500
Metering		YMR	YMR	MMR	AMR	AMR

Table 4: Detailed view of the connection level of consumer profiles for natural gas per country

Profiles	Wallonia	Flanders	Brussels	Netherlands	France	Germany	UK
G-RES	T2	T2	T2	G4: 0 t/m 10m^3(n)/h	T2	G4	Consumption band < 73.200 kWh
G-PRO	T3	T3	T3	G25: 25 t/m 40m^3(n)/h	T2	G40	73.200 < Consumption band < 732.000 kWh
G0	T4	T4	T4	G100: 40 t/m 65 m^3(n)/h	T3	G100	Consumption band ≥ 732.000 kWh
G1	T6	T6	T5	TSO	T4	G1000	Consumption band ≥ 732.000 kWh
G2	TSO	TSO	TSO	TSO	TSO	TSO	TSO

[12] These are the theoretical number of hours of natural gas consumption of each consumer, obtained by dividing the annual demand by the annual peak.

Identification of industrial sectors

The macro-economic analysis carried out in this study intends to depict the industrial fabric of the Belgian economy as a whole and, more specifically, the economy of the Belgian regions: Brussels, Flanders, and Wallonia. Through this analysis, a certain number of relevant industrial sectors are determined that will be subjected to the natural gas and electricity price comparison.

There are two crucial objectives that justify the selection of sectors for which the price comparison is particularly of interest. First, it is to ensure consistency between the selected industrial profiles and the active industrial sectors. Second, it is to use this macro-economic analysis when assessing the impact of the described results for natural gas and electricity prices on the Belgian economy and its regions.

Throughout this study, we use a variety of macro-economic data relating to the manufacturing industry. This industry can be identified over numerous sectors as defined in the Statistical Classification of Economic Activities in the European Community, commonly referred to as NACE[13].

The industrial fabric of a country can generally be grouped into two different parts:

1. The ***manufacturing industry***, including basic industries and all other industrial activities:
   - Basic industries:

Table 5: Economic activities related to basic manufacturing industries with NACE classification

NACE code	Sector – Economic activity
13 – 15	Manufacture of textiles, wearing apparel, leather, and related products
16	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
17	Manufacture of paper and paper products
18	Printing and reproduction of recorded media
19	Manufacture of coke and refined petroleum products
20	Manufacture of chemicals and chemical products
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
22	Manufacture of rubber and plastic products
23	Manufacture of other non-metallic mineral products
24	Manufacture of basic metals

   - Other sectors of the manufacturing industries:

Table 6: Economic activities related to other sectors of the manufacturing industry with NACE classification

NACE code	Sector – Economic activity
10 – 12	Manufacture of food products; beverages and tobacco products
25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment n.e.c.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
31 – 32	Manufacture of furniture; other manufacturing
33	Repair and installation of machinery and equipment

[13] NACE : Nomenclature des Activités économiques dans la Communauté Européenne

2. The ***extractive industry***, including industries extracting minerals from solid forms (e.g. coal and mineral ores), liquid forms (e.g. oil) or gaseous forms (e.g. natural gas)

Throughout this investigation, we solely focus on the manufacturing industry, considering the limited importance (in Belgium) and specific energy consumption profiles of extractive industries.

A four-step approach drives this exercise:

1. First, we portray the Belgian national and regional industrial fabrics, focusing on employment, value added and specialisation criteria.
2. Second, the energy intensity of these previously mentioned sectors is analysed to have a better insight into the energy cost role in the total cost structure among these sectors.
3. Third, export intensity indicating the exposition level of certain industrial activities regarding international competition and potential relocation risk is exhibited.
4. Fourth, we present the potential consumption reduction and energy efficiency using energy intensity data.

This study is the third edition of a multiple-year evaluation that goes on until 2023 and to ensure consistency the selected sectors will remain the same throughout every edition. The analysis below thus stays the same as last year.

Main industrial sectors for the Belgian national and regional economy

In this part, we depict the relative significance of each sub-sector of the national manufacturing industry regarding value added and employment. This inquiry also considers the Belgian economy specialisation level at a national and regional scale in comparison with neighbouring countries. The manufacturing sectors belonging to NACE classification 10 to 33, in Belgium solely, but in Wallonia, Flanders and Brussels as well are under study. While on all sectors mentioned in Table 5 and Table 6 are under review, only a few, based on the highest relevant values, are displayed in charts to make it visually understandable.

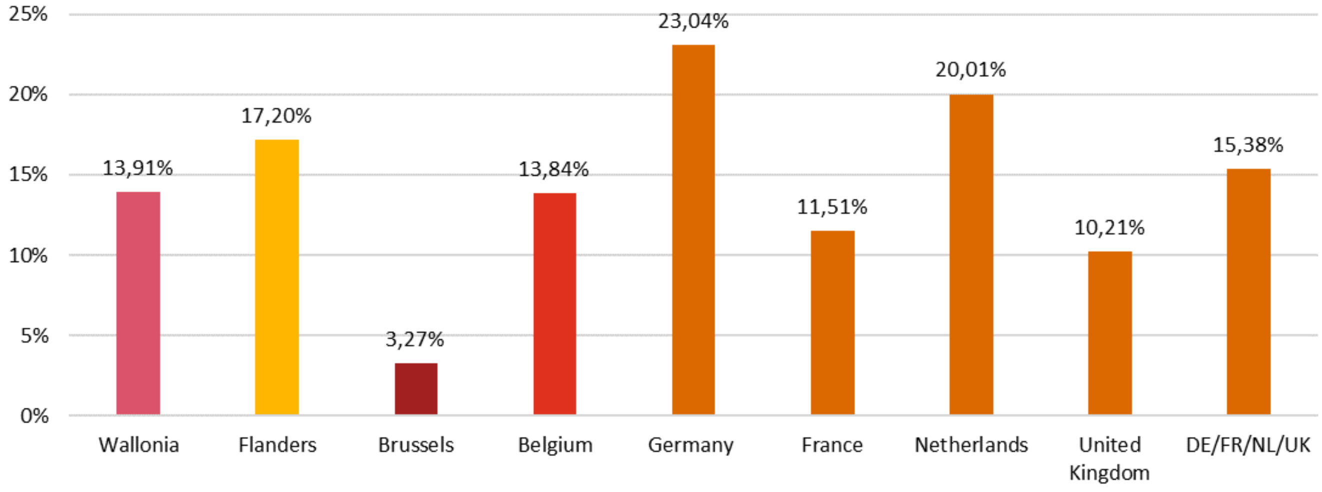
National accounts aggregated per industry coming from Eurostat dataset and the National Belgian Bank (NBB) serve as the basis for the analysis. The most recent and comprehensive datasets are from 2016.

The importance of the manufacturing industry based on value added

The first investigation intents to determine the relative significance of the Belgian manufacturing industry (NACE 10 – 33) regarding value added. Therefore, we compare the value added of this sector with the total GDP of the regional and national economy. This analysis is benchmarked with the relative importance of the manufacturing industry in each of the neighbouring countries (Germany, France, the Netherlands, and the United Kingdom) and their weighted average[14].

The following figure (Figure 1) displays higher relative importance of the previously mentioned manufacturing industry in Germany than in any other regions, followed by the Netherlands. Noteworthy, Flanders has the third-highest share of value added of the industry in the total GDP amongst all countries and regions from our study panel. At a regional level, only the manufacturing industry in Flanders has a higher "value-added/GDP ratio" than the average for neighbouring countries. Nevertheless, the manufacturing industry is less important in terms of value-added for the Belgian economy than for the average of neighbouring countries - partially due to the weight of the German economy.

Figure 1: Value added of the industry in total GDP



Source: Eurostat (2016 data), NBB (2016 data)

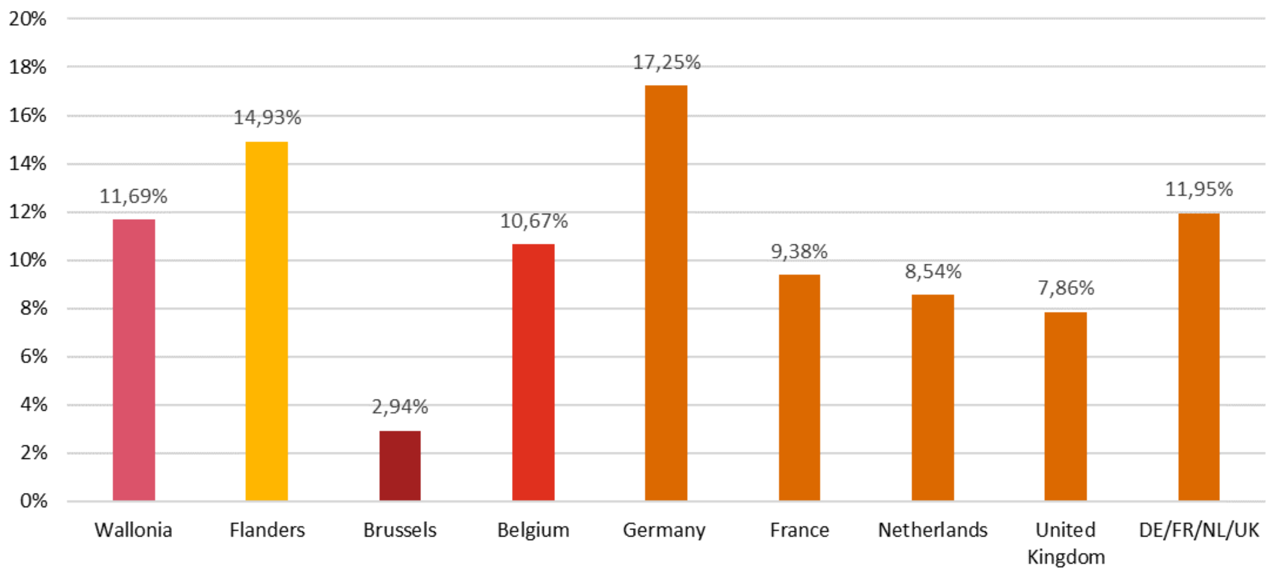
[14] The average is weighed depending on the size of the different economies.

The importance of the manufacturing industry based on employment

The second analysis of this section intends to determine the relative importance of the manufacturing industry in Belgium with regards to employment. We, therefore, compare the employment generated by the previously mentioned manufacturing industry, i.e. NACE 10 to 33 with the employment of the Belgian economy, nationally or regionally.

When examining the relative weight of industrial employment between zones, similar results are obtained as in the previous analysis of the relative importance of manufacturing industry in terms of value-added. The only difference is that, when considering manufacturing industry, Wallonia is slightly above the Belgian average in terms of relative employment (Wallonia is very similar to the Belgian average in terms of relative value-added).

Figure 2: Importance of industry employment on total employment



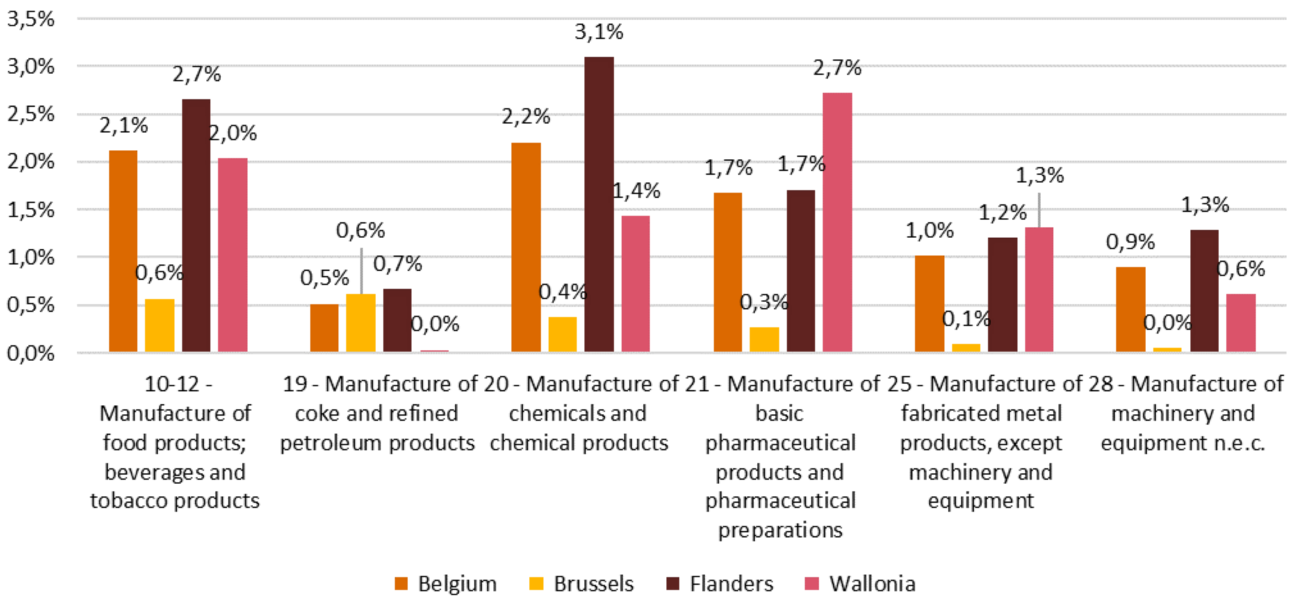
Source: Eurostat (2016 data), NBB (2016 data)

The identification of the most important manufacturing sectors based on value added

The following analysis aims to define the most important industrial sectors in terms of relative value added. Thus, for each sub-sector (within NACE codes 10-33), we compare the creation of value added to the total GDP of the economy (national or regional). The following figure presents the five main sectors of the manufacturing industry (NACE 10-33) in terms of their relative contribution to national or regional GDP. The sector NACE 19 (Manufacture of coke and refined petroleum products) is also considered due to its important weight for Brussels compared to other sectors for this region.

For the Belgian economy, these are the food and drink (NACE 10-12), the chemical (NACE 20)[15], the pharmaceutical (NACE 21), the metalworking (NACE 25) and machinery and equipment (NACE 28) sectors. It is interesting to note that these top five sectors for Belgium are also the top five in Flanders and Wallonia. Nevertheless, this analysis highlights important regional differences. Firstly, the chemical sector is important for Flanders in terms of value added (3,1% of total Flanders GDP). Second, the pharmaceutical industry is important for Wallonia (2,7% of the total GDP of Wallonia). It is also important to note that the petroleum products sector is almost non-existent in Wallonia. Thirdly, Wallonia also focuses on the food and drinks sector (2% of total Walloon GDP). It is also important to note that, when basic metals (no. 6 at Belgian level with 0,7%) and manufactured metals are added together (1%), their importance approaches the chemicals sector at Belgian level (most important sector with 2,2%).

Figure 3: Value added of most important sectors in terms of GDP



Source: Eurostat (2016 data), NBB (2016 data)

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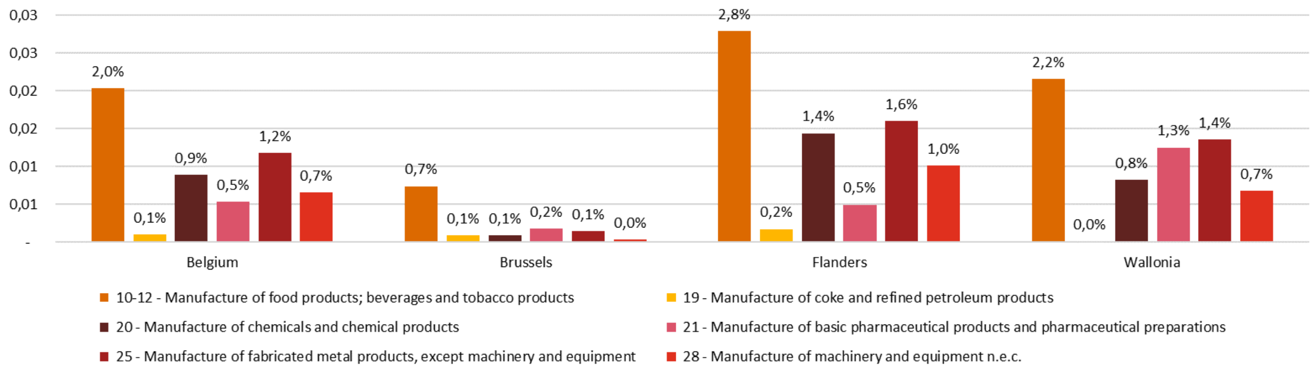
[15] One must be aware that the line between the petrol and chemical sectors might be thin. Therefore, we suggest the following definitions: sector 19 "includes the transformation of crude petroleum and coal into usable products. The dominant process is petroleum refining, which involves the separation of crude petroleum into component products through such techniques as cracking and distillation. This division includes the manufacture of gases such as ethane, propane and butane as products of petroleum refineries" (European Commission, 2020); sector 20 "includes the transformation of organic and inorganic raw materials by a chemical process and the formation of products. It distinguishes the production of basic chemicals that constitute the first industry group from the production of intermediate and end products produced by further processing of basic chemicals that make up the remaining industry classes" (European Commission, 2020).

The identification of the most important manufacturing sectors based on employment

The fourth analysis under this heading aims at identifying the most important industrial sectors in terms of relative employment. Thus, for each sub-segment (within NACE codes 10-33), we compare the level of employment with total employment in the Belgian economy. The regional level analysis is subject to the same computations. As depicted by Figure 4, the food sector (NACE 10-12) is the largest in terms of relative employment, followed by the metalworking sector (NACE 25), at both the national and regional level (except for Brussels). It is also interesting to note that the refining sector and the pharmaceutical sector are low labour-intensive, whereas the food and metal industries are high labour-intensive. The lower predominance of the chemical sector in Flanders and the pharmaceuticals sector in Wallonia compared to the previous analysis is also noticeable.

Figure 4: Share of employment in total employment for the main sectors (Nace 10 - 33)



Source: Eurostat (2016 data), NBB (2016 data)

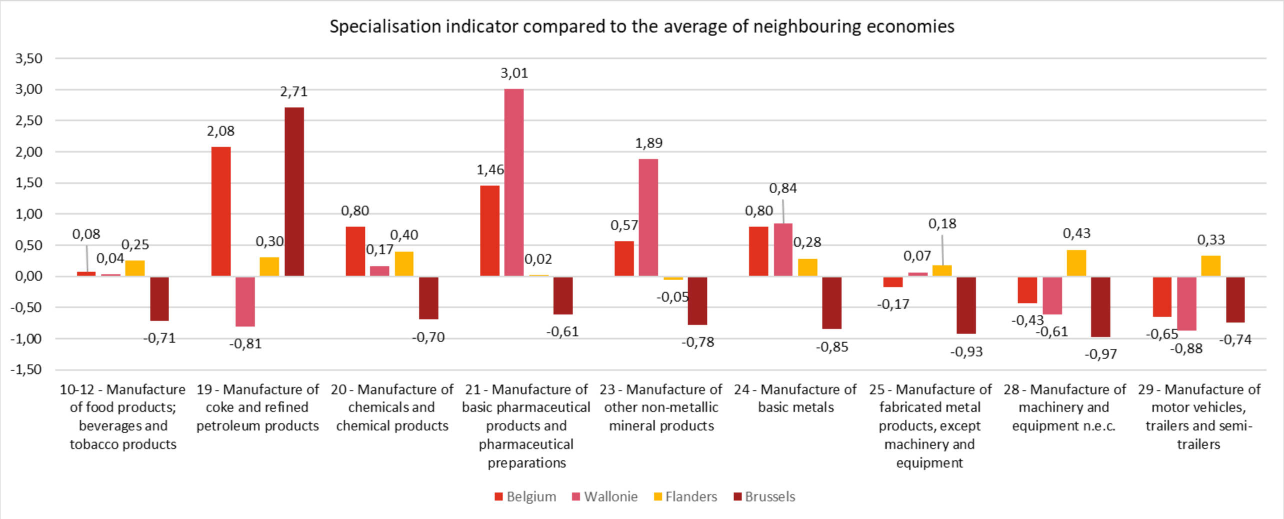
The relative specialisation of Belgian manufacturing sectors compared to neighbouring countries

The final analysis in this section focuses on the specialisation indicator for the different sub-sectors of the manufacturing industry (NACE 10-33). The specialisation indicator results from the relative value added[16] comparison of each sector with that of the average of neighbouring economies[17]. When positive, the indicator highlights that the value added created by a specific sector in Belgium (or in one of its regions) is greater than the average value added created in neighbouring countries. Conversely, when a value for a specific sector is negative, the value added created by that sector in Belgium (or in one of its regions) is below the average for neighbouring countries. The specialisation indicator is calculated according to the following formula:

$$Specialisation\ indicator\ for\ Sector_i in\ Region_j = \left(\frac{Relative\ added - value\ of\ Sector_i\ in\ Region_j}{European\ average\ of\ the\ relative\ added - value\ of\ Sector_i} - 1\right)$$

Figure 5 shows that the basic metals (NACE 24), and the pharmaceutical sector (NACE 21) are the two most essential specialisations of the Belgian economy (specialisation indicator of 2,71 and 3,01 respectively). Of the top six sectors in terms of relative value added, three are not specialised. These are the fabricated metals (NACE 25), and the machinery equipment (NACE 28) and the motor vehicles (NACE 29) industries. It is interesting to note that the Belgian economy is more specialised in basic metals than in fabricated metal products, even though the latter is the more important sector in terms of GDP. At a regional level, Wallonia is (besides the pharmaceutical industry) highly specialised in other non-metallic minerals (NACE 23). At the same time, Flanders is (besides the chemical sector) highly specialised in the manufacture of machinery and equipment (NACE 28).

Figure 5: Specialisation indicator compared to the average of neighbouring countries



Source: Eurostat (2016 data), NBB (2016 data), PwC computations

[16] The relative value added is the absolute value added of a specific NACE sector over the absolute value added of all NACE sectors. The data is retrieved from NBB and Eurostat (2016 data).

[17] The European average throughout this section refers to the average of the neighbouring countries under scope in this report: Germany, France, the Netherlands and the United Kingdom.

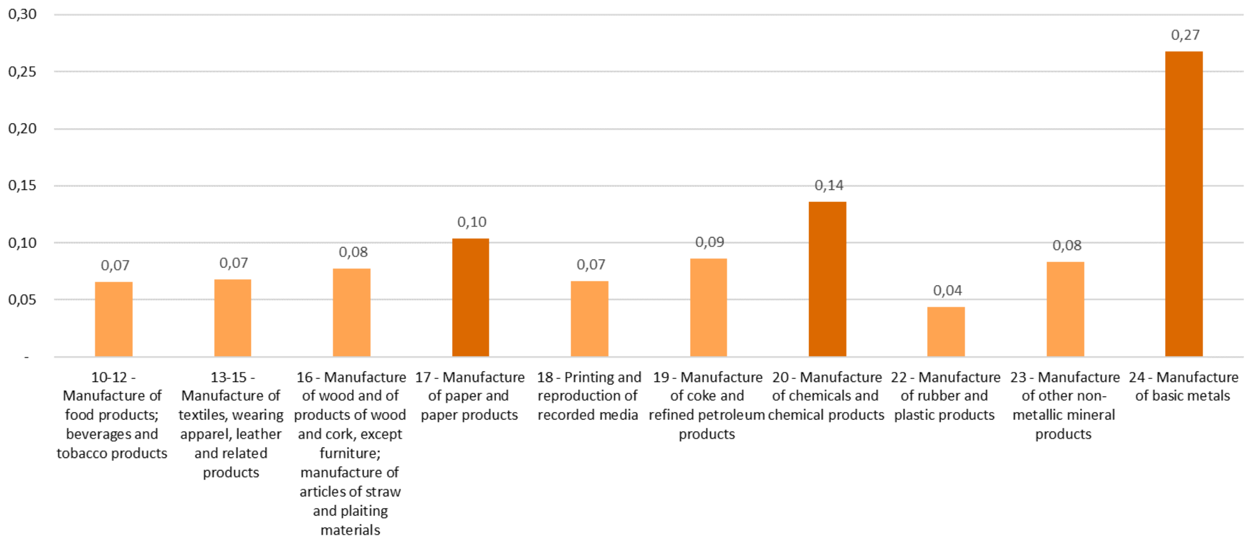
Sectors with the highest energy costs in comparison with total costs and energy intensity

This section seeks to pinpoint the sectors of the manufacturing industry (NACE 10-33) with the highest energy costs. The first analysis is a cost approach which aims to identify the cost of energy (natural gas-electricity-steam) as part of the total value added. The second approach is product-based: we look at the consumption of natural gas and electricity and compare it with the creation of value added.

The first analysis compares the cost of energy (natural gas-electricity-steam) of each sector with the sector's value added. The analysis is based on the input-output tables of the Federal Planning Bureau with figures from 2015.[18] For this purpose, we identify the value of intermediate energy consumption (NACE 35) for each sector of the Manufacturing industry (NACE 10-33). We then divide this figure by the sector's value added.

The following figure (Figure 6) shows the sectors whose energy costs (natural gas-electricity-steam) account for more than 5% of their total value added. For several of the most critical sectors in terms of GDP, the cost of energy (natural gas-electricity-steam) is relatively low. Therefore, these sectors are not represented in the figure below. This is the case for the pharmaceutical (NACE 21), automotive (NACE 29), metallurgy (NACE 25) and machinery and equipment (NACE 28) sectors. Three sectors stand out as sectors where the cost of energy accounts for a considerable share of total value added. These are the paper (NACE 17), chemicals (NACE 20) and basic metals (NACE 24) industries.

Figure 6: Cost of energy (electricity/natural gas/steam) as part of the total value added

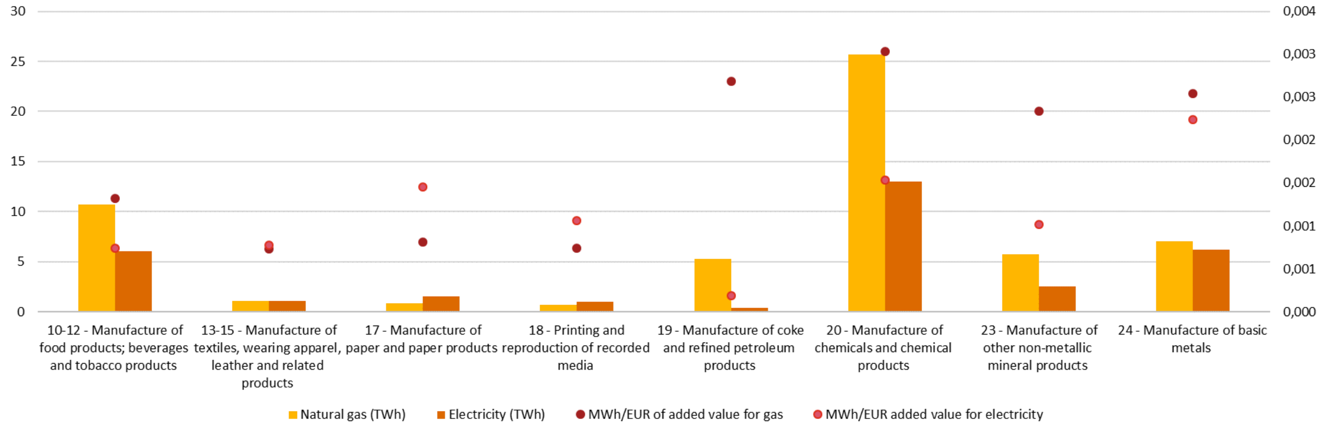


The second analysis consists of identifying the most energy-intensive sectors of the Belgian economy, based on a product approach. Energy intensity is the result of dividing the energy consumption (in MWh) of each sector by its value added (in EUR). The data on the value added of each sector come from Eurostat, while the energy consumption accounts come from the Federal Planning Bureau.

[18] Theses input-output tables are published every 5 years.

In Figure 7, the Belgian chemicals sector (NACE 20) appears to be, by far, the highest energy consumer (natural gas and electricity) per value added followed by the food and beverages industry (NACE 10-12) and the basic metals sector (NACE 24). However, the highest natural gas consumer per value added is the chemicals sector (NACE 20) followed by the manufacture of coke (NACE 19) and metallic products (NACE 23 and 24). The highest electricity consumer per value added is the basic metal industry (NACE 24), followed by the chemicals industry (NACE 20).

Figure 7: Electricity and natural gas consumption compared with value added creation



The textile manufacture (NACE 13-15), the paper manufacture (NACE 17) and the printing manufacture (NACE 18) have low energy consumption levels, and average consumption per value added. While the food and beverages industry (NACE 10-12) have relatively low average consumptions per valued added, similar to the paper manufacture (NACE 17), the manufacture of coke (NACE 19) displays the lowest average consumption per value added for electricity.

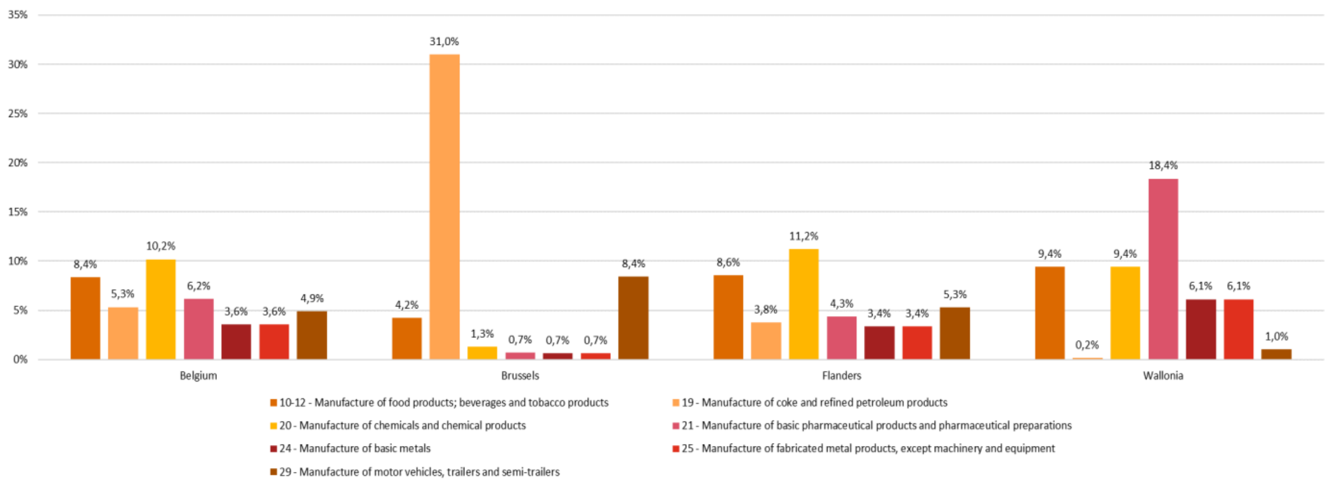
Most industrial sectors have a higher natural gas intensity than electricity intensity. The only exceptions to this observation are the textiles (NACE 13-15), paper (NACE 17) and printing (NACE 18) industries, which have a higher electricity intensity than natural gas.

Sectors most exposed to international competition (including the relocation risk)

In this chapter, we look at the exposure of sectors to international competition, through analysing the relative share of exports to total exports for each industrial sector. Based on data published by the National Bank of Belgium, we determine the value of exports in each sector and its relative importance in the total exports of an economy (regional or national).

The first 7 manufacturing industry sectors with the highest relative share of exports in the total exports of the Belgian economy are, in descending order, the chemical (NACE 20), the food and beverages (NACE 10-12), the pharmaceuticals (NACE 21), the coking and refining (NACE 19), the automotive (NACE 29) and the base and fabricated metals (NACE 24-25) sectors. These sectors are, therefore, the most exposed to international competition.

Figure 8: Relative share of exports compared to total exports



The three regions fall under the analysis of these 7 most important sectors in terms of relative exports. The top 5 sectors (each with a relative share of exports >5% of the region's total exports) in Flanders and Wallonia are also among the top 7 sectors in terms of the relative share of exports in Belgium. In Flanders, the chemical sector has the largest relative share of exports (11% of the region's total exports). As far as Wallonia is concerned, the pharmaceuticals (NACE 21) sector stands out as the sector with the largest relative share of exports (18,4% of total regional exports) followed by the manufacture of food and drinks (NACE 10-12) and the manufacture of chemicals (NACE 20) both with 9,4%. In Brussels, the coking and refining sector (NACE 19) is by far the sector with the largest relative share of exports (31% of the region's total exports)[19].

However, this should be considered with caution. Assuming two sectors (A and B) whose exports represent an identical fraction of their sectoral production, if sector A is more substantial than sector B, then the implemented indicator (export of sector I over total exports) logically gives a result more significant for sector A as for sector B while being exposed to a similar relocation risk.

Following, the next figure (Figure 9) seeks to identify for which sectors of the Belgian economy there is a significant risk of relocation. To do so, we compare the value of exports of each sector with the value of the sector's gross output[20]. The more an economic activity depends on exports, the more it is exposed to a risk of relocation (regardless of other physical or geographical criteria). The production data for each sector come from the input-output tables of the Federal Planning Bureau. The latest available data are from 2015.

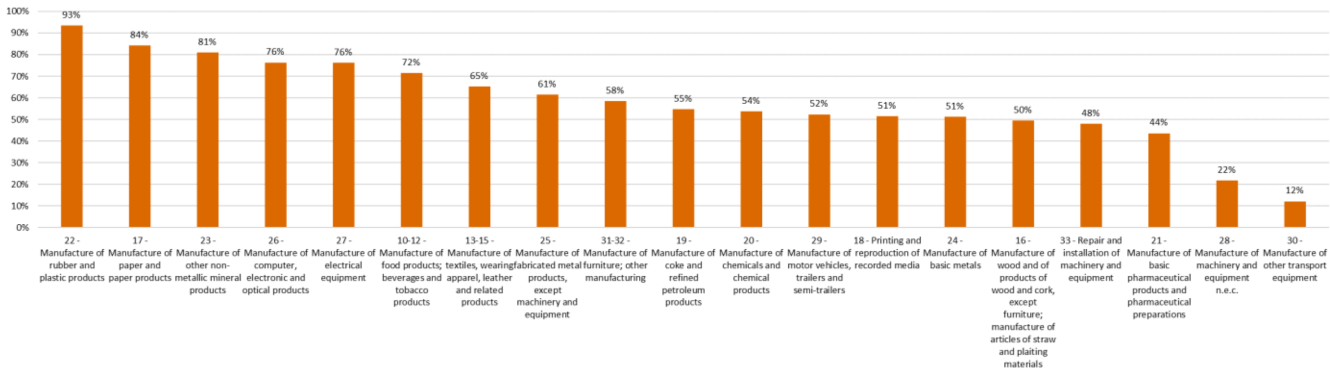
[19] This high share of oil exports certainly comes because of important imports realised in the first place. Petroleum products are the second most important goods imported via the port of Brussels (Brussels studies, 2017).

[20] According to the Federal Planning Bureau, gross output is a measure of an industry's sales or receipts, which can include sales to final users in the economy (GDP) or sales to other industries (intermediate inputs). Gross output can therefore be measured as the sum of an industry's value added and intermediate inputs.

The chart below shows that the sectors of Belgian manufacturing industry with the highest "exports to gross output" ratios are the plastics (NACE 22), the manufacture of paper (NACE 17), the manufacture of other non-metallic mineral products (NACE 23), the manufacture of electronic products (NACE 26), and the manufacture of electrical equipment (NACE 27). The sectors all have a ratio of exports to gross output of more than 75 %, meaning that these sectors are more likely to be at risk to relocate.

Among others, woodworking (NACE 16), machinery equipment (NACE 28 and 33) and basic pharmaceutical products (NACE 21) are relatively less exposed to the risk of relocation. They each have a ratio of exports to gross output of less than 50%.

Figure 9: Exports compared with gross output



Sectors with the lowest potential in relation to consumption reduction (energy efficiency)

This section aims to identify the sectors of the Belgian economy, which may or may not have the possibility of significantly improving their energy efficiency in the short term. To that end, we compared the energy intensity of each sector of the Belgian manufacturing industry (based on the categorisation of industrial sectors in NACE 2008) with that of the same sectors in neighbouring countries (Germany, the Netherlands and France). The energy consumption (in MWh) per EUR of value added created for each sector measures the energy intensity. The data on the value added of each sector comes from Eurostat, while the energy consumption accounts come from the national statistical offices[21]. Noteworthy, not enough detailed data on energy consumption in the United Kingdom were available[22]. This analysis was carried out separately for electricity and natural gas.

Energy efficiency analysis

Sector 'i' of the Belgian economy (b) can be deemed to have the potential for improvement in terms of energy efficiency, compared to sector 'i' in another country (p), if it consumes more energy to produce the same unit of output.

Energy intensity of sector 'i' of the Belgian economy > Energy intensity of sector 'i' of country 'p'

$$\frac{Energy\ consumption_b^i}{Added - value_b^i} > \frac{Energy\ consumption_p^i}{Added - value_p^i}$$

It is worth noting two caveats from a methodological point of view. First, macroeconomic data on a vast scale drives the analysis. It is therefore not possible to draw precise conclusions on a microeconomic basis that relate to a specific economic process. Secondly, we cannot establish a direct link between differences in energy efficiency at the macroeconomic level on the one hand and the capacity to improve energy efficiency on the other. Once again, we must take account of the fact that within sectors and countries, there are significant differences in terms of infrastructure, industrial processes and production that can explain these differences.

[21] Federal Plan Bureau for Belgium, CBS Statline for the Netherlands, De Statis for Germany, and Insee for France.

[22] The energy intensity split between electricity and natural gas is not available.

As a reminder Figure 10, also presented in section 2, shows that the two main energy-intensive Belgian sectors are the food and beverage industry (NACE 10-12) the base pharmaceuticals industry (NACE 20) - this is particularly the case for the energy intensity of natural gas. The Belgian wood industry is the least energy-intensive sector, as this figure shows when considering both electricity and natural gas.

Figure 10: Electricity and natural gas compared with the value-added creation

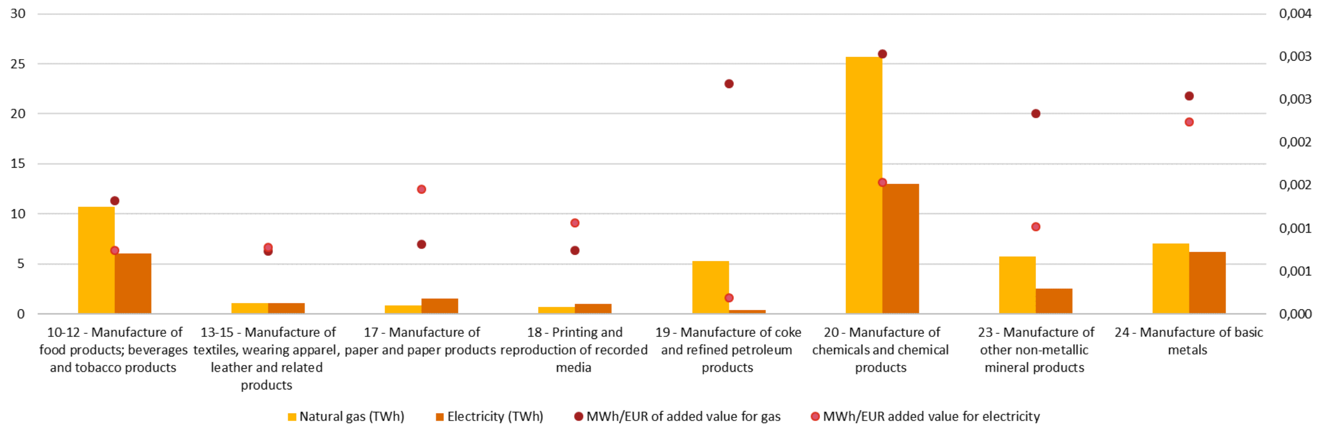


Figure 11 and Figure 12 show that most Belgian sectors have the potential for improvement in terms of energy efficiency (electricity and natural gas) when compared with the weighted average of neighbouring countries (Germany, the Netherlands and France). This is the case for the food and drink (NACE 10-12), the textile (NACE 13-15), the printing (NACE 18) and the chemical (NACE 20) industries, both for natural gas and electricity consumption. These sectors could, therefore, potentially adapt to uncompetitive electricity and natural gas prices with increased energy efficiency.

However, some Belgian sectors do not have the possibility of significantly improving their energy efficiency. This is the case of the NACE 16 and 25 sectors, which respectively represent the wood, the paper, the chemical, and the fabricated metal manufactures. As Figure 11 shows, the energy efficiency gap is particularly large in electricity for basic metals (NACE 24), in natural gas for chemical (NACE 20). The higher electricity intensity experienced by France in many sectors greatly influences the high average for electricity in the neighbouring countries.

Nevertheless, Belgium is also below France, Germany, and the Netherlands and in terms of natural gas efficiency (Figure 12) for the paper (NACE 17) and plastic products (NACE 22). This means that, with uncompetitive prices, these sectors would be unable to adapt by significantly increasing their energy efficiency in the short term. Aside from the two previously mentioned industries, Belgium is above the average of neighbouring countries in terms of natural gas efficiency (Figure 12) for other sectors.

A third example is the Belgian base metals industry, which has an electricity intensity far below the average of neighbouring countries (Figure 11), but a natural gas intensity slightly above the average of neighbouring countries (Figure 12). The high average electricity intensity of the neighbouring countries is mainly due to the French base metals industry. In other words, this sector has the potential for short-term improvement in terms of natural gas efficiency but not electricity efficiency. This is also interesting because Figure 10 shows that the Belgian base metals industry is a relatively important natural gas consumer.

Notably, data is missing for the coke and refining sector (NACE 19). Moreover, Figure 12 does not present the extremely high natural gas intensity of the Dutch sector 0,03 MWh per EUR of value added). Data on the energy intensity of this sector was not available for France.

Figure 11: Electricity consumption compared to the value-added creation

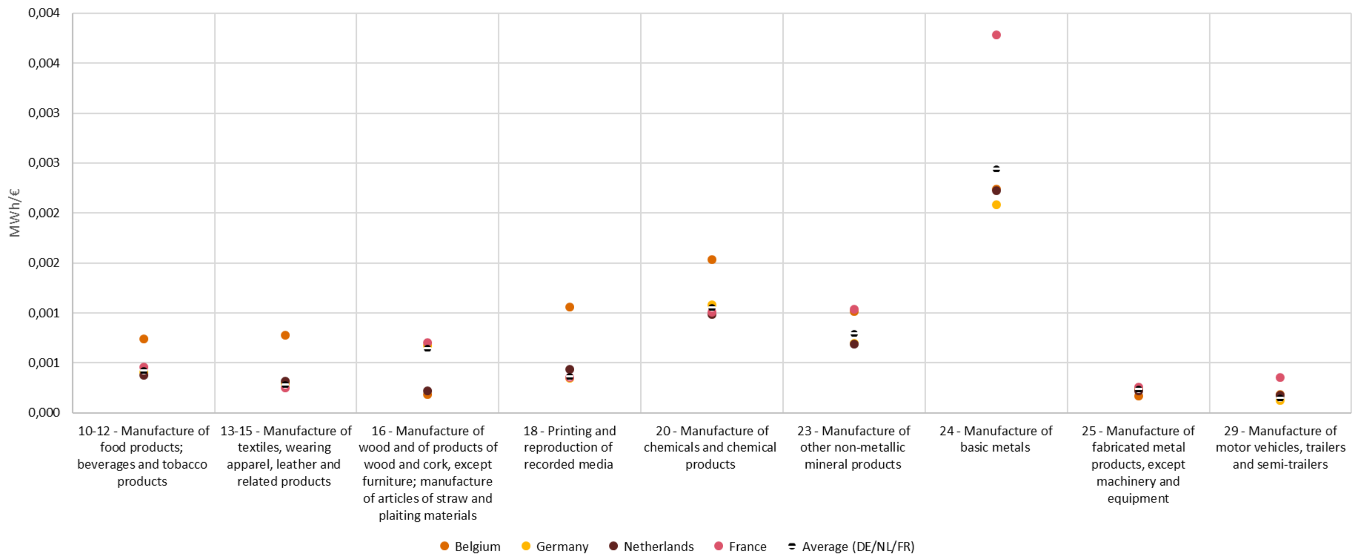
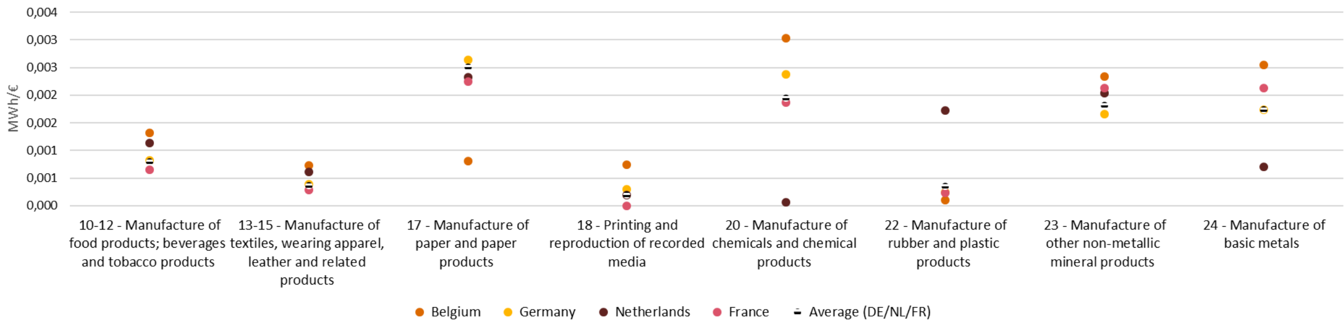


Figure 12: Natural gas consumption compared to the value-added creation



Selection of the most important sectors for our analysis

This section concludes our economic analysis by presenting a selection of the most important sectors related to electricity and natural gas prices and competitiveness.

The methodology we use to select the most important sectors is as follows:

First, we rank sectors from the highest to the lowest results with regards to the analysis: value added, employment, specialisation, cost of energy/value added, electricity consumption (absolute), natural gas consumption (absolute), electricity consumption per unit value added, natural gas consumption per unit value added, exports. In Figure 13, the smaller the number, the higher the ranking of the sector for the analysis. Next, we calculate the ranking score for each sector across all analyses, leading to a final ranking of each sector.

To illustrate this, we show a few examples. The second column illustrates the analysis we present in the section "The importance of the manufacturing industry based on value added", which concerns the value added of each sector in relation to the total GDP of the economy. We see that the most important sector in terms of relative value added is the chemical sector (NACE 20), which receives a score of 1 in Table 7, followed by the food and beverage industry (NACE 10-12), which receives a score of 2.

Another example concerns the comparison with neighbouring countries in terms of the potential for improving energy efficiency. For this analysis, we consider that the more energy efficient a sector is compared to the average of neighbouring countries, the less potential it has for improving energy efficiency. It is important to note several caveats regarding this approach. First, for some analyses, rankings for certain sectors are not available. This is mainly the case for analyses that depend on data based on the Belgian energy consumption accounts of the Federal Planning Bureau.

Secondly, for some analyses, some sectors benefit from the ranking position of another sector. This is notably the case for the pharmaceutical industry (NACE 21), which is often associated with the chemical industry (NACE 20); since for some analyses only combined data for NACE 20-21 codes are available. It also applies for the base and fabricated metal industries (NACE 24-25), which are sometimes analysed together due to the lack of available data.

Thirdly, only analyses related to national data have been considered. In other words, all sectoral classifications based on regional approaches have been excluded from this matrix.

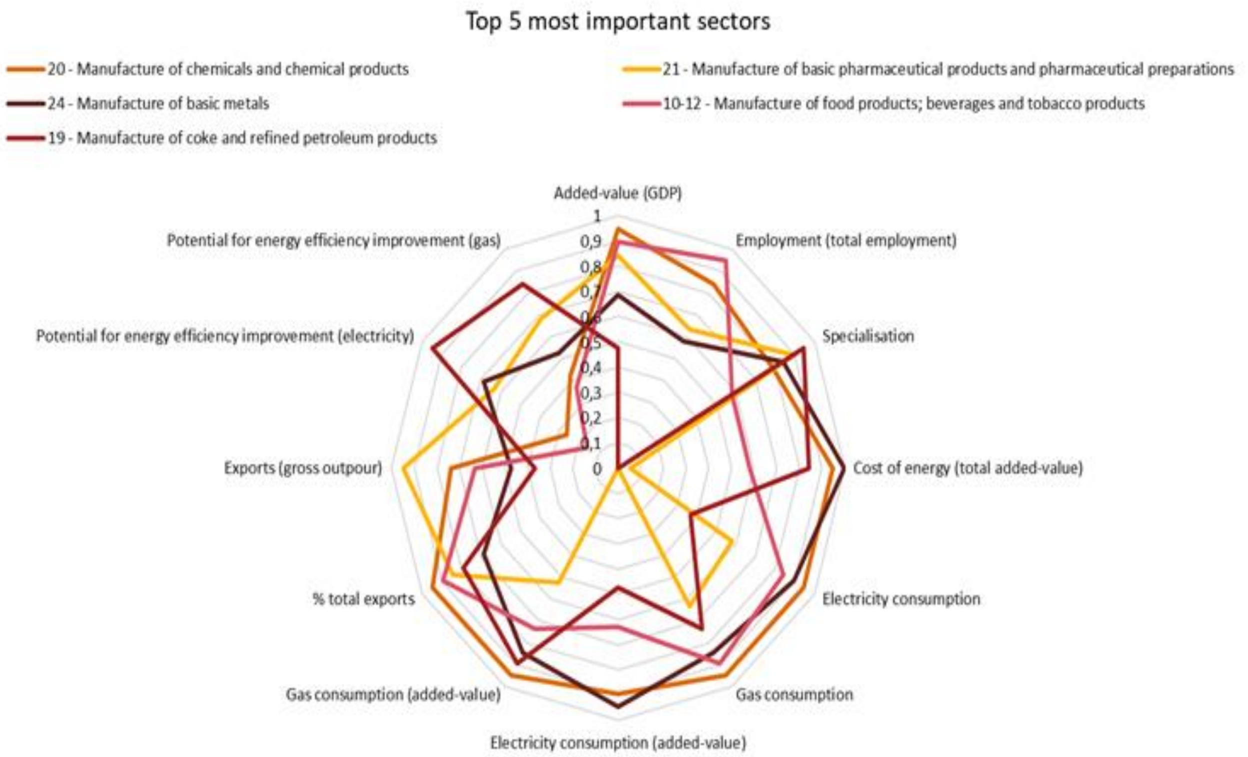
Finally, the calculation of the average score of all analyses is based on a simple average. No weight was given to any particular analysis, as all analyses were considered important in determining the most important sectors.

Table 7: Sectors ranking

NACE Code	Final sector ranking	Value added (GDP)	Employment (total employment)	Specialisation	Cost of energy (total value added)	Electricity consumption	Natural gas consumption	Electricity consumption (value added)	Natural gas consumption (value added)	% of total exports	Exports / gross output	Potential for energy efficiency improvement	Potential for energy efficiency improvement	Average score
NACE 20	1	1	3	4	18	1	1	2	1	1	5	14	11	5,2
NACE 21	2	3	7	2	1	8	7	19	9	3	1	7	6	6,1
NACE 24	3	6	8	3	19	2	3	1	3	6	10	6	9	6,3
NACE 10-12	4	2	1	8	11	3	2	7	5	2	7	16	12	6,3
NACE 19	5	10	19	1	16	12	5	10	2	4	12	1	3	7,9
NACE 23	6	7	6	5	15	4	4	5	4	10	15	12	8	7,9
NACE 25	7	4	2	12	6	9	10	14	13	7	11	4	5	8,1
NACE 28	8	5	4	15	4	10	11	13	14	8	3	13	13	9,4
NACE 17	9	16	17	10	17	5	8	3	6	12	13	5	2	9,5
NACE 13-15	10	13	10	6	13	6	6	6	8	11	4	17	14	9,5
NACE 29	11	9	5	19	9	11	12	11	11	5	2	11	10	9,6
NACE 22	12	8	9	11	10	14	14	17	19	9	16	2	1	10,8
NACE 31-32	13	14	11	14	8	15	15	8	12	14	8	15	15	12,4
NACE 18	14	17	13	9	12	7	9	4	7	18	18	18	18	12,5
NACE 16	15	18	14	7	14	18	19	12	16	16	17	3	4	13,2
NACE 26	16	12	16	16	3	16	16	16	18	13	6	10	16	13,2
NACE 33	17	11	12	13	2	13	13	9	10	19	19	19	19	13,3
NACE 27	18	15	15	17	7	17	17	15	17	15	9	9	7	13,3
NACE 30	19	19	18	18	5	19	18	18	15	17	14	8	17	15,5

With these four criteria in mind, we can conclude that the 5 most important sectors for our analysis are – ranked by importance–: the manufacture of chemicals and chemical products (NACE 20), the manufacture of basic pharmaceutical products and pharmaceuticals (NACE 21), the manufacture of basic metals (NACE 24), the food and beverage industry (NACE 10-12), the manufacture of coke and refined petroleum products (NACE 19). The next figure depicts the first five sectors. The larger the area covered by the sector, the higher the sector ranks in each of the analyses in this chapter.

Figure 13: Radar chart of the top five most important sectors



The radar chart depicts the ranking of the top five sectors, which will later be subjected to a more in-depth analysis. The higher the value on the chart (from 0 to 1), the higher the sectors ranks based on the criteria. Those scores matter as they are critical to depict the importance of the manufacturing sectors to the Belgian economy. Our analysis indicates they are possibly profoundly impacted by electricity and natural gas prices differences with the neighbouring countries.

Electricity

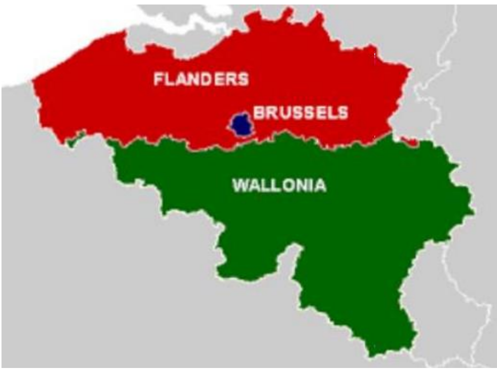
Electricity: Countries/Zone(s) identified

In this chapter, we aim at determining how a country or a region is organised as a territory. As such, we identify the transmission system operators (TSO) and distribution system operators (DSO) for each country and region. Furthermore, given that variations in prices may be due to local considerations, we specify whether a country is divided into zones for which results are presented individually rather than at national level.

Belgium

Belgium is divided into three regions, Flanders, Wallonia, and Brussels as mapped below.

Figure 14: Belgium national electricity market



Belgium's transmission grid is run by a single operator, Elia, which therefore covers the entire territory. While most charges imposed by Elia Transmission Belgium as TSO are homogenised across the country, differences appear at regional levels. Consequently, the three regions are individually evaluated as some of their characteristics vary from one another due to the existence of differing (i) distribution charges (regarding E-RES to E1) (ii) transmission charges (regarding E-RES to E1) and (iii) taxes, levies, and certificate schemes (regarding all profiles). Besides, while it is deemed that commodity cost for industrial consumers is interchangeable across Belgium, it is not the case when it comes to residential and small professional consumers.

Flanders

Distribution grids are the responsibility of each Belgian region. The table below displays a review of all DSOs in Flanders that operate on the regional distribution grid and their relative market share. Flanders counts 10 inter-municipal utility companies for electricity which are operated by Fluvius.

Table 8: Electricity distributed and market share for each Flemish DSO (electricity)[23]

DSO	Number of EAN connections (2022)	Market share (%)
Imewo	648.896	18,23%
Fluvius Antwerpen	595.375	16,72%
Iverlek	553.062	15,53%
Gaselwest	454.217	12,76%
Fluvius Limburg	450.448	12,65%
Intergem	323.137	9,08%
Iveka	232.982	6,54%
Fluvius West	141.661	3,98%
PBE	95.416	2,68%
Sibelgas	65.119	1,83%
Total	**3.560.313**	**100%**

As distribution tariffs vary from one DSO to another, we make use of a weighted average value for all 10 DSOs.

[23] Data provided by VREG, situation 1/01/2022.

Wallonia

When it comes to Wallonia, there are 11 DSOs, mostly operated by ORES (Ores Hainaut, Ores Namur, Ores Brabant Wallon, Ores Luxembourg, Ores Verviers, Ores Est, Ores Mouscron) and RESA as they account for more than 95% of the market[24]. The distribution tariffs differ between DSOs, and a weighted average is being computed for profiles from E-RES to E1. Even if ORES and RESA represent the DSOs with the broadest coverage, all DSOs in Wallonia are considered in this study. TRANS MT[25] is the highest voltage level in Wallonia. As in Flanders, the number of EAN connections for each DSO represents the backbone for the market shares computations, shown in the table below.

Table 9: Electricity distributed and the market share for each DSO in Wallonia (electricity)

DSO	Number of EAN connections (2022)	Market share (%)[26]
AIEG	26.087	1,37%
AIESH	20.902	1,10%
RESA	453.720	23,80%
ORES Namur	244.229	12,81%
ORES Hainaut	587.558	30,82%
ORES Est	60.042	3,15%
ORES Luxembourg	161.028	8,45%
ORES Verviers	81.823	4,29%
ORES Brabant Wallon	197.048	10,34%
ORES Mouscron	55.233	2,90%
Réseau d'Energies de Wavre	18.553	0,97%
Total	**1.906.223**	**100%**

Brussels

The DSO for electricity in Brussels is Sibelga, therefore accounting for 100% of the region's market shares. In 2022, Sibelga supplies 727.172 EAN connection points with electricity.[27]

The table below exhibits the first impact caused by regional service obligations because of the grid connection levels. The regions can enforce public service obligations on grid operators running below or equal to 70 kV on their territory (repercussions on profiles E-RES to E2).

Table 10: Overview of voltage distribution to Belgian system operators

Voltage level	Operator in charge	Operator in Belgium
< 30 kV	Distribution System Operator (DSO)	Several
30 kV < x < 70 kV	Local Transmission System operator (LTSO)	Elia Transmission Belgium in the 3 regions
> 70 kV	Transmission System Operator (TSO)	Elia Transmission Belgium (federal)

Certificate schemes represent the second regional impact within Belgium that results from the local competence regarding renewable energy obligations matter on their territory. Flanders, Wallonia, and Brussels institute their specific green certificate scheme on all electricity consumers within the affected region (all profiles under review). In addition to assessing Belgium over the three regions, we consider different hypotheses: the consumer profiles E1 to E4 take part in an energy efficiency agreement, and all industrial profiles are affiliated with the sectoral NACE-BEL classification codes 5-33 (all industries).

[24] (CWaPE, 2020) – Bilan de la situation du marché de l'électricité pour l'année 2020 ; Gaselwest no longer operates in Wallonia since January 1st 2019.

[25] See Glossary, p.12

[26] Data received from the CWaPE (T3 2021)

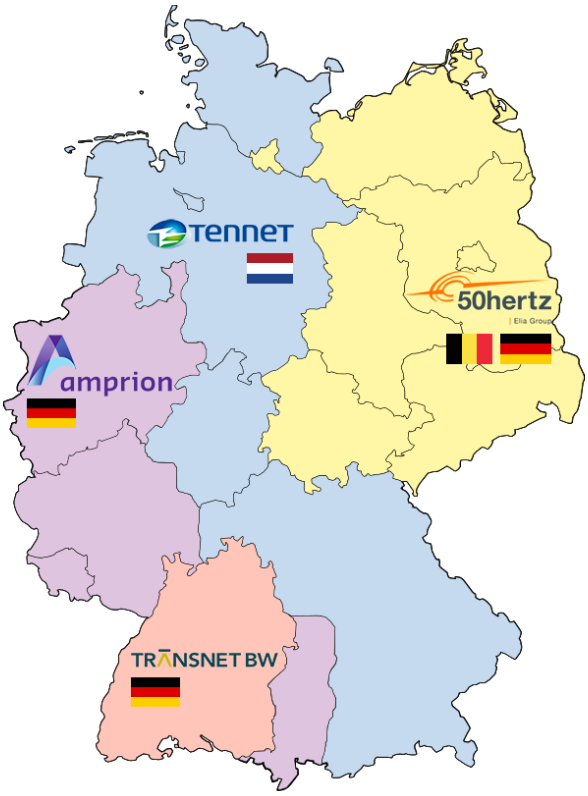
[27] (Sibelga, 2022)

Germany

Regarding Germany, consumers can participate in a single electricity market. We, therefore, assumed the commodity price is the same in the whole territory for consumers E-BSME to E4 who are highly likely to negotiate their electricity contracts with suppliers. With regards to profiles E-RES and E-SSME, the standard contract ("Grundversorgung") and its supplier depends on the region. Consequently, the commodity cost is determined per DSO region because the standard contract supplier is different.

In Germany, four different TSOs are currently active; the following figure shows their geographical spread.

Figure 15: Map of the German transmission system operators



- *West Region:* consists of Nordrhein-Westfalen, Rheinland-Pfalz and Saarland where Amprion is running the transmission grid.
- *South-West Region*: consists of Baden-Württemberg where Transnet BW is the TSO.
- *Central Region:* consists of Niedersachsen, Hessen, Bayern, Schleswig-Holstein where Tennet operates the transmission grid.
- *East Region:* consists of former East-Germany and Hamburg where 50Hertz is the local operator.

Regarding the geographical and economic eminence of these four areas (e.g. the smallest region has a similar population size than Belgium as a country), these zones are logically considered the same way we considered the three Belgian areas. We thus separately evaluate them.

In respect to the Belgium analysis, our profiles E-RES to E2 also pay a distribution cost, which is further discussed in the section "Component 2 – network costs" for the residential profiles (p. 204) and "Component 2 – network costs" for the industrial profiles (p. 242). These four transmission zones appear to be the most accurate analysis regarding Germany as the country counts around 878 distribution system operators[28]. Considering the high number of DSOs in Germany, this increases complexity in observing German prices. Therefore, for the profiles E-RES to E2 under review (as they are connected to the distribution grid), we only take the prices from two predominant DSOs (a rural and an urban) for each of the transmission zones. An average distribution price is then derived from the two DSOs' existing prices and is used as a unique price for the transmission zone in question. The table below, summarises studied DSOs and their respective market shares.

[28] (Bundesnetzagentur, 2021)

Table 11: Market shares of German electricity DSOs

TSO	DSO	Number of EAN connections (2019)	Market share (%)
Tennet	Bayernwerk	2.303.773	70,43%
	SWM	967.178	29,57%
	Total	**3.270.951**	**100%**
50 Hertz	E-Dis	1.395.378	37,24%
	Stromnetz Berlin	2.351.575	62,76%
	Total	**3.746.953**	**100%**
Amprion	Westnetz	4.325.813	79,36%
	RNG-Netz 2 – Köln	1.124.963	20,64%
	Total	**5.450.776**	**100%**
Transnet BW	Netze BW	2.153.084	84,57%
	Stuttgart Netze	392.925	15,43%
	Total	**2.546.009**	**100%**

Contrary to other countries/regions the market shares of the DSOs are not used as weights because they are only a selection of the hundreds of German DSOs. The distribution tariffs of every DSO thus has the same weight. As regards taxes, levies and certificate schemes, we observe no regional differences for electricity consumers, nor even local taxes[29].

France

Concerning the electricity market, France is investigated as a single area. Concretely, the same commodity, distribution, transmission and taxes and levies prices apply to the whole territory. With regards to transmission, the RTE ("Réseau de Transport d'Electricité") is the transmission System Operator (TSO) who oversees the transmission network. In contrast, Enedis constitutes the largest French DSO with an approximate market share of 95%[30] (mainland). We thus consider this sole DSO for all consumer profiles connected to the distribution grid (E-RES to E1).

The Netherlands

Like France, the Netherlands is examined as a single zone. No regional differences appear when it comes to commodity costs, taxes, levies, and certificate schemes: it is a single electricity market, and energy is imposed on a national level.

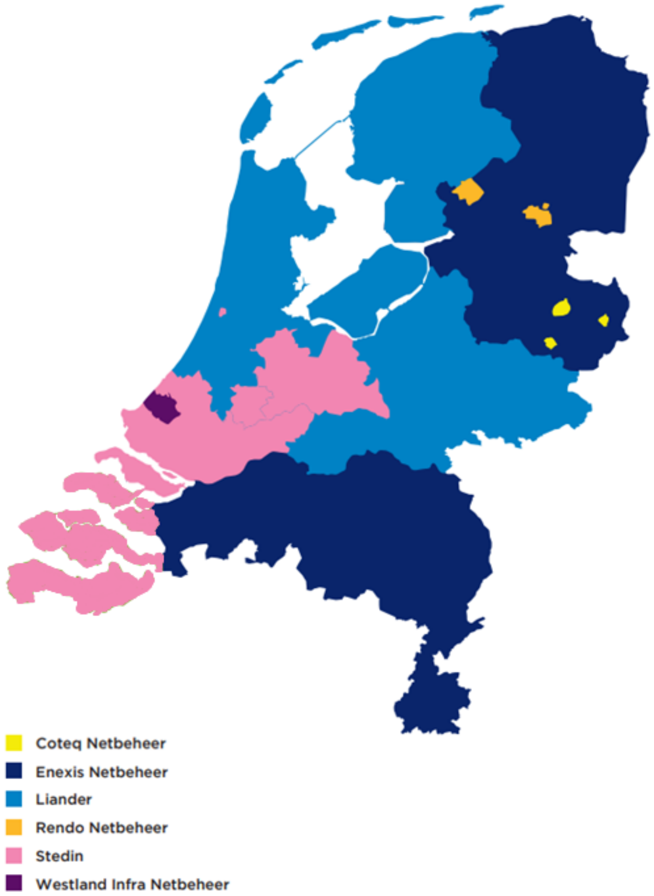
The Netherlands counts only one TSO – TenneT. For this reason, the same pricing methodology is applied throughout the national transmission grid. The network cost for the two largest consumer profiles – E3 and E4 – encompasses the transmission tariffs appointed by TenneT. Contrastingly, the Dutch profiles E-RES to E2 are connected to the national distribution grid that provides the entire network below the 110 kV voltage standard. Consequently, the network cost for profiles E-RES to E2 profiles dwell in the distribution tariff imposed by the DSOs.

The Netherlands' distribution network comprises six DSOs with different sizes and prominence, as the map below exhibits. Each DSO applies different and separate tariffs. In this case, distribution costs and transmission costs are aggregated in a cumulated fee.

[29] The Konzessionsabgabe is a local tax that applies to all electricity consumers connected to the distribution grid, but it is fixed on a national level and capped at one single rate for industrial consumers (*Konzessionsabgabenverordnung, § 1-2*). As that tax varies depending on the contract type or the city size, we consider the average paid concession fee.

[30] (Enedis, 2020)

Figure 16: Map of the Netherlands electricity distribution system operators



These six DSOs differ by the size, number, and type of clients. We thus expose a weighted average of distribution tariffs accordingly to the number of grid connections related to each DSO. The table below demonstrates an overview of the number of connections for all DSOs and their associated market share.

Table 12: Market shares and the number of connections for each Dutch DSO (electricity)

DSO	Market share[31] (%)
Liander	37,49%
Enexis	33,65%
Stedin	27,63%[32]
Westland	0,54%
Coteq	0,43%
Rendo	0,26%
Total	**100%**

When combining Liander, Enexis, and Stedin, these companies represent 95% of the market shares. Their prices subsequently have a higher impact on the weighted average distribution tariffs.

[31] The market share was given to PwC by the CREG (2020)

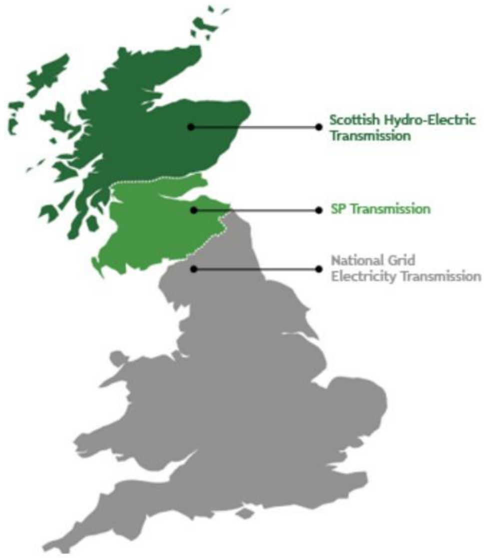
[32] Enduris merged with Stedin as of 1st January 2022, hence attributing to Stedin the market share that was previously owned by Enduris (2.56%) (Source: https://www.vemw.nl/Nieuwsoverzicht/2021-10-27-Tarievenvoorstellen-RNB-TenneT.aspx)

The United Kingdom

Similarly, to France and the Netherlands, the United Kingdom is analysed as a single area. Again, commodity costs, taxes, levies, and certificate schemes observe no regional variation as there is one single electricity market and taxes on a national level. The United Kingdom has three different transmission system operators: National Grid (for England and Wales), Scottish Hydro Electric Transmission (SHET), and Scottish Power Transmission (SPT). In addition to these TSOs, six distribution system operators are currently functioning[33]. The TSOs and DSOs rate different tariffs in the fourteen zones that count the United Kingdom.

Figure 17: The United Kingdom electricity distribution networks

Figure 18: The United Kingdom electricity transmission networks



[33] In addition to these large DSOs, the UK also has some smaller Independent Network Operators (IDNO's). These are not considered in this study.

Table 13: TSOs and DSOs in the United Kingdom zones

<table>
<tr><th>TSO</th><th>DSO</th><th>Zones</th></tr>
<tr><td>3</td><td>6</td><td>14</td></tr>
<tr><td rowspan="2">Scottish Hydro Electricity Transmission (SHE)</td><td rowspan="2">Scottish and Southern Energy Power Distribution</td><td>Northern Ireland</td></tr>
<tr><td>Scotland</td></tr>
<tr><td rowspan="2">Scottish Power Transmission (SPT)</td><td rowspan="2">SP Energy Networks</td><td>Southern Scotland</td></tr>
<tr><td>North Wales, Cheshire, and Merseyside</td></tr>
<tr><td rowspan="10">National Grid Electricity Transmission (NGET)</td><td>Electricity North West</td><td>North West</td></tr>
<tr><td rowspan="2">Northern PowerGrid</td><td>Northern</td></tr>
<tr><td>Yorkshire</td></tr>
<tr><td rowspan="3">UK Power Networks</td><td>Eastern</td></tr>
<tr><td>London</td></tr>
<tr><td>South East</td></tr>
<tr><td rowspan="4">Western Power Distribution</td><td>East Midlands</td></tr>
<tr><td>Midlands</td></tr>
<tr><td>South Wales</td></tr>
<tr><td>South Western</td></tr>
</table>

Concerning network costs – transmission and distribution tariffs for the E-RES to E2 profiles–, we present, once again, a weighted average amount for the fourteen zones.

Table 14: Market shares of the United Kingdom electricity DSOs

DSO	Number of connections[34] (2018)	Market share (%)
Eastern Power Networks	3.627.858	12,18%
Southern Electric Power Distribution	3.049.924	10,24%
Western Power Distribution East Midlands	2.647.059	8,89%
Western Power Distribution West Midlands	2.383.887	8,34%
Electricity North West Limited	2.298.786	8,01%
London Power Networks	2.345.807	7,88%
Northern Powergrid Yorkshire	2.296.864	7,72%
South Eastern Power Networks	2.481.944	7,71%
SP Distribution	2.007.341	6,74%
Northern Powergrid Northeast	1.602.128	5,38%
Western Power Distribution South West	1.512.961	5,42%
SP Manweb	1.613.218	5,08%
Western Power Distribution South Wales	1.133.101	3,81%
Scottish Hydro Electric Power Distribution	772.984	2,60%
Total	**29.773.862**	**100%**

Lastly, we consider that industrial consumers analysed in this study, are all embodied in the Climate Change Agreement.

[34] (OFGEM, 2019)

Natural gas

Natural gas: Countries/Zone(s) identified

In this chapter, we aim at determining how a country or a region is organised as a territory. As such, we identify the transmission system operators (TSO) and distribution system operators (DSO) for each country and region. Besides, given that variations in prices may be due to local considerations, we specify whether a country is divided into zones for which results are presented individually rather than at national level.

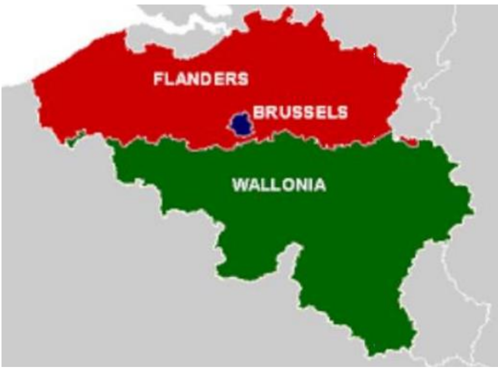
Belgium

No regional variations are observed in Belgium regarding transport and commodity costs. There is a single Transmission System Operator which is Fluxys Belgium, resulting in an equivalent transport price across the country.

The transport system is currently directly providing around 147 industrial clients (representing 187 sites), and we consider G2 as part of these direct connections[35].

In a similar fashion as for electricity, a distinct analysis is conducted for the three Belgian regions that are mapped out in Figure 19.

Figure 19: Belgium national natural gas market



Flanders

As exhibited in the consumer profiles, we consider that profiles G-RES to G1 (considered as T6) are connected to the distribution grid. Flanders counts 10 DSOs for natural gas distribution, 9 operated by Fluvius and one by Enexis[36]. Again, in this case, we present the distribution tariffs from the DSOs are assigned a weight based on the number of EAN connections for natural gas in the region.

Table 15: Market shares of Flemish natural gas DSOs[37]

DSO	Number of EAN connections (2022)	Market share (%)
Fluvius Antwerpen	446.323	19,12%
Imewo	440.146	18,85%
Iverlek	372.372	15,95%
Gaselwest	312.411	13,38%
Fluvius Limburg	279.460	11,97%
Intergem	216.001	9,25%
Iveka	161.248	6,91%
Fluvius West	58.755	2,52%
Sibelgas	48.179	2,06%
Total	**2.334.895**	**100%**

[35] None of these clients directly connected to the transport grid is located in Brussels.

[36] Enexis active in the Belgian area of Baarle-Hertog, is not considered in the study.

[37] Data provided by VREG, situation 1/01/2022.

Wallonia

Wallonia counts 6 DSOs which are operated by ORES and RESA[38]. The distribution tariffs are thus presented through an average value based on the number of EAN connections.

Table 16: Market shares of DSOs in Wallonia for natural gas

DSO	Number of EAN connections (2022)	Market share (%)
ORES BW	95.831	12,46%
ORES HAINAUT	327.882	42,63%
ORES LUX	13.082	1,70%
ORES MOUSCRON	36.071	4,69%
ORES NAMUR	45.309	5,89%
RESA	251.034	32,64%
Total	**769.209**	**100%**

Brussels

As for Brussels, there is a single DSO – Sibelga – in this region. Inevitably, it represents 100% of the region's market shares. In 2022, Sibelga supplies 513.554 EAN connection points with natural gas.[39]

Germany

Respecting commodity costs, we consider one market area in Germany, the Trading Hub Europe (THE), which is the result of the merger[40] between *Gaspool* and *Netconnect Germany (NCG)* since 1st October 2021. This area is composed of eleven different transmission system operators.

Figure 20: German national natural gas market

[38] Gaselwest no longer operates in Wallonia since January 1st, 2019.

[39] (Sibelga, 2022)

[40] https://www.icis.com/explore/resources/news/2021/09/27/10606635/topic-page-germany-s-gas-market-merger/

The eleven TSOs are the following: Gascade Gastranport, GTG Nord, ONTRAS Gastransport, Nowega, Gasunie Deutschland Transport Services, Bayernets, Fluxys TENP, GRTgaz Deutschland, Terranets BW, Thyssengas and Open Grid Europe.

As of the merger of the two market areas (Gaspool and NetConnect), we consider a single result for the German natural gas analysis. Respecting commodity costs, we demonstrate a single value for profiles G-PRO to G2 and compute a product portfolio for residential consumers G-RES that are determined by the DSOs selection we address further in this section.

Respecting network costs, transport prices are computed as the average exit tariffs of the eleven TSOs providing directly connected industrial consumers as a bedrock to evaluate the G2 profile tariffs. Other profiles are considered to pay for distribution, which already integrates transport costs in Germany. The basic contract or "*Grundversorgung*" for natural gas consumers depends on the regional DSO.

With over 700 DSOs[41] within the country, we once again present an average of the distribution tariffs of a large rural and a large urban DSO from each of the four previously defined market areas. The selected DSOs and their market share are detailed in the table below.[42]

Table 17: Normalised market shares of German natural gas DSOs

DSO	Number of EAN connections (2018)	Market share (%)
Bayernwerk	89.193	51,61%
SWM	83.642	48,39%
Total	**172.835**	**100%**
E-Dis	34.873	16,37%
NBB	178.200	83,63%
Total	**213.073**	**100%**
Westnetz	448.572	64,56%
RNG-Netz 2 – Köln	246.278	35,44%
Total	**694.850**	**100%**
Netze BW	150.960	84,32%
Karlsruhe Netz	28.074	15,68%
Total	**179.034**	**100%**

Contrary to other countries/regions the market shares of the DSOs are not used as weights because they are only a selection of the hundreds of German DSOs. The distribution tariffs of every DSO thus have the same weight. Considering the natural gas price applied to the selected profiles, the sole component that does not produce regional variation is the taxes and levies item.

[41](European Commission, 2019)

[42] These DSOs that were selected are slightly different from the DSOs that were selected for electricity. This is because geographical coverage of the distribution of electricity and natural gas are not identical within a certain area. So has Stromnetz Berlin been replaced by Netzgesellschaft Berlin-Brandenburg and Stuttgart Netze by Karlsruhe Netz.

France

France displays a single market area for natural gas, Trading Region France (TRF) since the merger of former market areas PEG Nord and TRS in 2018. Consequently, the French results are presented as a unique price zone. The country has two distinct transport operators, as depicted in Figure 21, which are:

i. GRTgaz is operating in the North, the South-East and the central region.

ii. TEREGA[43] is focusing in the South-West.

Network costs displayed by both TSOs are weighted based on their annual offtakes to come up with a single price. As for distribution costs, given that GRDF (Gaz Réseau Distribution France) supplies 95%[44] of the country's natural gas, it is considered as the unique DSO whose prices only are used in this study.

As it is the case in some other studied countries, French natural gas transport and distribution costs are integrated – except for consumers directly connected to the grid.

Figure 21: French national gas market

Residential and small professional natural gas contracts appear to be on six different price zones in France, established according to the distance between the nearest natural gas storage centre and the place of consumption, to pass on the difference in transport costs between cities[45]. The lack of information regarding the number of EAN connections per zone led us to select one area – the largest in terms of the number of cities covered (i.e. price zone 1)[46].

Concerning commodity prices, North and South regions are weighted based on their annual volume consumption. As no regional differences in taxes were noticed, France is considered as a single zone.

The Netherlands

In the Netherlands, suppliers can apply a regional surcharge depending on the distance of the region from Groningen for commodity costs, with ten different areas. In practice, the consulted suppliers (in the selection of underlying report) do not apply differentiated tariffs according to the region. Thus, we consider the commodity component to be the same within the country.

There is a single natural gas market (TTF) in the Netherlands, monitoring and managing all-natural gas entering the Dutch transport system. The TTF was established in 2003 to concentrate natural gas trading in a sole marketplace and offers a single Transmission System Operator – Gasunie Transport Services. The natural gas

[43] TIGF became TEREGA in April 2018.

[44] (CRE, 2019); (GRDF, 2019)

[45] (Selectra, 2020)

[46] Ibidem

transport grid directly provides 328 industrial clients, assuming that profiles G1 and G2 are among these clients[47]. Thence, we display the Netherlands as a harmonised zone. However, Dutch natural gas distribution is ensured by six DSOs whose tariffs are weighted based on their respective number of EAN connections described below. Therefore, the Netherlands is treated as one zone, with weighted averages for the distribution tariffs.

Figure 22: Map of the Netherlands natural gas distribution system operators

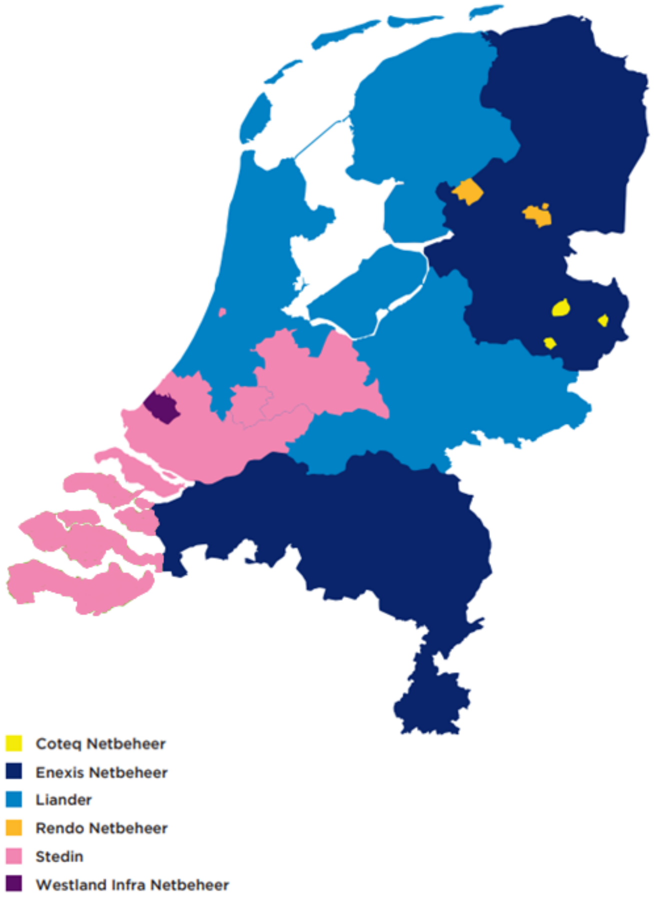


Figure 23: Market shares of Dutch natural gas DSOs

DSOs	Market share[48] (%)
Liander	34,42%
Enexis	31,62%
Stedin	29,82%[49]
Cogas Infra & Beh	1,96%
Rendo	1,44%
Westland Infra	0,74%
Total	**100%**

[47] Gasunie Transport Services is obliged by the Gas Act (Article 10, paragraph 6b) to provide a direct connection point when the applicant has a flow rate greater than 40 m³(n) per hour (equal to 350.400 m³/year). Considering a 9,77 kWh/m³ as disclosed by Gasunie Transport Services, we estimate that profile G1 has a flow rate of 2.047m³/h (= (2.500.000.000 kWh/9,77)/5000) and G2 of 31.986 m³/h (= (100.000.000 kWh/9,77)/8000). While our profile G0 could have been directly connected to the TSO based on minimum flow rate level (43 m³/h), we decided to assume this consumer remains connected to the distribution grid's highest-pressure category to further represent prices variations across consumer profiles.

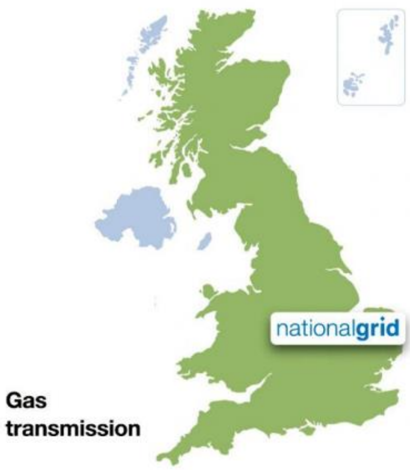
[48] The market shares were given to PwC by the CREG (2019).

[49] As of 1st January 2022 Stedin merged with Enduris, hence attributing to Stedin the market share that was previously owned by Enduris (Source: https://www.vemw.nl/Nieuwsoverzicht/2021-10-27-Tarievenvoorstellen-RNB-TenneT.aspx)

The United Kingdom

As in some other studied countries, a single zone is determined for the United Kingdom regarding natural gas, leaving out Northern Ireland given that there is a single natural gas market (NBP: National Balancing Point) in the UK. Besides, there is a unique natural gas transmission operator, known as *National Grid Gas plc*.

Figure 24: The United Kingdom national natural gas market



In addition to this unique TSO, one can find nine natural gas distribution networks, owned and managed by the four different operators:

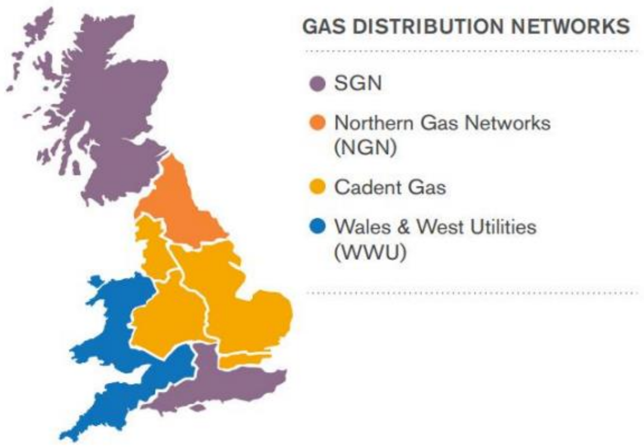
i. **Cadent Gas (4):** West Midlands, North West England, East of England and North London;

ii. **Northern Gas Networks (1):** North East England including North East, North, West and East Yorkshire and Northern Cumbria;

iii. **Wales & West Utilities (2):** Wales and South West England;

iv. **SGN (2):** Scotland and Southern England, including South London.

Figure 25: The United Kingdom natural gas distribution networks



Additionally, Independent Gas Transporters owns and manages several smaller networks, which are not considered in this analysis.

Table 18 exhibits the British DSOs for which market shares could be identified. Whereas SGN and Wales & West Utilities both operate two DSOs, the specific market shares for these DSOs could not be retrieved. Nevertheless, prices displayed by SGN and Wales & West Utilities are identical for all their DSOs, which is why we only use market share at their global level. Consequently, only 7 DSOs are detailed in the table below. Due to the lack of accurate[50] information for each natural gas distribution operator, we used a rough estimate of the number of EAN connections from the operators' websites.

Table 18: Market shares of the United Kingdom's natural gas DSOs

DSOs	Number of EAN connections (2019)	Market share (%)
Scotland and Southern England	5.900.000	26,76%
East of England (part of Cadent Gas[51])	4.019.395	18,23%
Northern Gas Networks	2.700.000	12,25%
North West (part of Cadent Gas)	2.690.935	12,20%
Wales and West Networks	2.500.000	11,34%
London (part of Cadent Gas)	2.274.533	10,32%
West Midlands (part of Cadent Gas)	1.963.755	8,91%
Total	**22.048.618**	**100%**

British prices used in this study are weighted averages of prices found by each DSO.

Summary table on the number of zones per country

Table 19: Summary table on the number of zones per country

Country	Number of zones	
	Electricity	Natural Gas
Belgium	3	3
Germany	4	1
France	1	1
The Netherlands	1	1
The United Kingdom	1	1
Total	**10**	**7**

[50] Apart from Cadent Gas, only a rough estimate of the number of EAN connections is available.

[51] In 2017, National Grid Distribution began business under a new brand, Cadent. Cadent Gas gathers four DSOs in charge of different regions.

4. Residential and small professional consumers

4. Residential and small professional consumers

This chapter aims at providing an extensive introduction to the prices, price components and the assumptions taken for each country and region. It mainly focuses on residential (E-RES and G-RES) and small professional (E-SSME, E-BSME and G-PRO) consumers of electricity and natural gas. Before delving into the description of regional and national prices, we present the standard methodology used to assess the cost of the commodity.

Methodology

The following section gives more details regarding the implemented method for data collection to construct the European comparison of electricity and natural gas prices for residential and small professional consumers. This methodology only applies for profiles E-RES, E-SSME and G-RES as for other profiles it is deemed that:

- Larger consumers are more inclined to negotiate their contracts with suppliers directly, thereby being offered more tailor-made contracts.
- Comparison websites used for this methodology do not all accept values associated with our consumer profiles, which limits the consistency of the analysis across countries.

Defining the number of products

The market concentration of the retail market (HHI-index) determines the number of selected products for each of the studied areas. According to the HHI-index, the more concentrated a market is (large combined market share of few suppliers), the fewer products are considered. The less concentrated a market is (several suppliers with rather low market shares), the more products are deemed to reflect the market dynamics.

The following table illustrates the number of products selected based on HHI-index:

Table 20: Number of products according to the HHI-index

HHI-index	Description	Number of products
HHI ≤ 1.000	Little concentrated market	5
1.000 < HHI ≥ 2.000	Concentrated market	4
HHI > 2.000	Highly concentrated market	3

The HHI-index for each country and each utility was fetched from the 2020 Retail Markets Monitoring Report from the Council of European Energy Regulators, and this needs to be updated with each report release[52].

While this methodology provides a balanced perspective of the market prices, one must be aware that it does not entirely depict the market situation given that this exercise limits the number of chosen products. Nonetheless, the methodology considered does meet the objective of this study.

[52] (CEER, 2020) With the exception of Germany, as German authorities do not report HHI indices. We thus used the HHI reported by the European Fact Sheets from the European Commission for Germany (European commission, 2014).

Selection of products portfolio

Again, based on the country-specific HHI-index for each utility, we determine several products to be selected. Before elaborating the following methodology, it is essential to define the term: standard product. The latter is considered, in this study, as either the product to which one is subscribed by default (i.e. when no specific action was taken to opt for a particular supplier product) and that secures the continuity of energy supply or the most common product from the market incumbent.[53] As introduced, several products – in addition to the standard product - are picked to constitute the portfolio.

The products were not chosen arbitrarily, but according to a specific following methodology:

- The first product to find is the standard product[54] of the market incumbent;
- The second product to consider is the cheapest product on the market, without considering any lump-sum reduction. A price comparison tool[55] is used to fetch the most affordable product in each region[56];
- The third product to consider is the cheapest product of the market incumbent through the price comparison tool of each respective region. In some instances, these comparison websites may be not up to date and are presenting prices of contracts from a previous month[57];
- The fourth/fifth product to consider is one/two of the cheapest products of the second-largest supplier that has not been considered yet.

[53] In Germany, the term *Grundversorgung* is used, and this product can be defined similarly as in Belgium. In France, the "Tarif bleu", which is regulated by the French government, was used. In the Netherlands, the *Modelcontracten*, which must be approved by the ACM and is thus also regulated, is the Dutch standard product. We took the "Model contract" from Essent, which is the most significant player on the Dutch market (as part of Innogy). In the UK, the standard product of the market incumbent, British Gas, was selected.

[54] The term "standard product" is not used in all the countries under examination so what we took as the standard product of all countries under the scope of this study might have some differences. Since this study starts from the Belgian perspective the Belgian terminology 'standard product' was taken.

[55] Price comparison tools employed are specific to each country. The ones used are reported in the respective sections assessing the cost of commodity.

[56] A limitation of this method exists as it is possible that in some cases, suppliers take the new network charges into consideration in their products, which has an impact on the ranking of price comparison tools.

[57] It is possible that in some instances (i.e. in the beginning of the month), price comparison tools do not display the most recent information available at that moment in time. In those cases, prices of contracts from previous months could be considered.

Weight of each product within the product portfolio

The selected products are weighted as follows:

- The switching rate or SR (in %) for each utility in its respective country is the weight associated with the cheapest product. Depending on the country, a distinction is made between the switching rates for household and non-household consumers but without further specifying rates for different profiles of non-household consumers.
- The remaining share (100% - SR) is then used to weight the other products as follows:
    - If the remaining products are two products of the market incumbent, their weights are the remaining share (100% - SR) divided by two[58].
    - If other products from other market players are considered, the normalised market shares of the implicated market players are extrapolated to the remaining percentage (100% - SR)[59] .
    - In the case where more than one product from a specific supplier is selected, we attribute them the same weights (hence has the previously determined weight of the supplier divided by two)[60,61].
- Switching rates were fetched on the Retail Markets Monitoring Report by the Council of European Energy Regulators and make the distinction between residential and small professional consumers[62].

[58] Example: if the switching rate amounts to 20%, the remaining 80% are used to weigh the two remaining products of the market incumbent, which each account for 40%.

[59] Example: if the switching rate amounts to 20%, the remaining 80% are used to weigh the remaining products. If the market share of the incumbent is 40% and that of the next largest supplier is 20%, in a first step, their market shares are 'normalised' (respectively 40%/60% = 66,67% and 20%/60% = 33,33%). These market shares are then extrapolated to the remaining 80% (respectively 66,67*80% = 53,33% and 33,33*80%= 26,67%.)

[60] Example: In case the switching rate amounts to 20%, and the market incumbent of the previous example has two products selected in the mix, each of its products have a weight of 53,33%/2 = 26,66%

[61] An exception is made for the electricity profiles in France, as most clients still have a regulated product. Therefore, the market share of the regulated product is maintained, and the third product is 100% - the switching rate – the market share of the regulated product.

[62] Yet, the Netherlands do not publish separate data for residential and non-residential consumers. For this country, the combined annual switching rate was therefore used as published by the Energy fact sheets from the European Commission. An exception was also made for France, the SR comes from the report "Le fonctionnement des marchés de détail français de l'électricité et du gaz naturel » which is updated every year.

Electricity

Electricity: Detailed description of the prices, price components and assumptions

For all countries under review, this section details:

1. **Commodity costs** for profiles E-RES, E-SSME and E-BSME;
2. **Network costs** for profiles E-RES, E-SSME and E-BSME;
3. **All other costs** for profiles E-RES, E-SSME and E-BSME.
4. **VAT** for profile E-RES

Profile	Consumption (kWh)	Connection capacity (kVA)[63]
E-RES	3.500	9,20
E-SSME	30.000	46,90
E-BSME	160.000	156

Belgium

Contrary to what is observed in other countries, the Belgian Electricity suppliers have quite transparent price sheets. Commonly the current price sheets can be found online, on each providers website. The price sheets also give a good overview of all charged components.

Component 1 – the commodity price

In 2020[64], the HHI of the retail market in Belgium was over 2.000, and according to the methodology, this entails that we consider only three products: the standard product, the cheapest product of the market incumbent, and the cheapest offer on the market. The switching rate for households in Belgium is 20,90% (E-RES) and for non-households 21,6% (E-SSME). The products of the market incumbent for E-RES thus each weigh (100%-20,90%)/2 or 39,55%. For the E-SSME, the two products of the market incumbent each weigh 39,20%, (100%-21,6%)/2.

The only exception is for Brussels E-RES because the cheapest product of the market is provided by Engie, which is also the market incumbent. Therefore, the cheapest product of Engie (product 2) is assigned the switching rate. Then, for product 1 we apply the normalised market share of Engie 60,96%, while for product 3, we selected the cheapest product of TotalEnergies the second largest supplier in Brussels with a normalised market share of 19,04%.

Table 21: Profile weights depending on the Belgian product

Product	Weight E-RES	Weight E-SSME
Standard product of market incumbent	39,55%	39,20%
Cheapest product on the market	20,90%	21,60%
Cheapest product of the market incumbent	39,55%	39,20%
Total	100%	100%

The table below gives an overview of the selected products, based on the consumption and characteristics of the profile, per region and their annual cost. To choose these products price comparison websites of the respective regional regulators were used: https://vtest.vreg.be/ for Flanders, www.compacwape.be for Wallonia and www.brusim.be for Brussels. All prices reported are VAT excluded.

[63] Methodology to assess connection capacity of each profile can be found in section 3.2. Consumer profiles.

[64] (CEER, 2020)

Table 22: Annual cost of selected products for profile E-RES in Belgium

Region	Supplier – Product	Fixed component (EUR/year)	Price for peak consumption (EUR/year)	Price for off-peak consumption (EUR/year)
Brussels	ENGIE - Electrabel Easy Indexed	50,00	475,00	399,54
	ENGIE - Electrabel Easy3	45,03	427,36	412,87
	TotalEnergies – TOP[65]	57,02	445,51	403,70
Wallonia	ENGIE - Electrabel Easy Indexed	50,00	475,00	399,54
	Luminus - Essential Electricité 1 an	40,00	341,79	307,22
	ENGIE - Electrabel Easy 3	45,03	427,36	412,87
Flanders	ENGIE - Electrabel Easy Indexed	50,00	475,00	399,54
	Luminus - Essential	40,00	341,79	307,22
	ENGIE - Electrabel Easy3	45,03	427,36	412,87

Table 23: Annual cost of selected products for profile E-SSME in Belgium

Region	Supplier – Product	Fixed component (EUR/year)	Price for peak consumption (EUR/year)	Price for off-peak consumption (EUR/year)
Brussels	ENGIE - Electrabel Easy Pro Indexed	48,50	5.354,95	2.556,85
	TotalEnergies - FIX Green Power	50,00	4.830,21	2.428,49
	ENGIE - Electrabel Easy3 Pro	45,03	4.807,80	2.607,60
Wallonia	ENGIE - Electrabel Easy Pro Indexed	48,50	5.354,95	2.556,85
	Eneco - Eneco Soleil & Vent Flex	70,00	4.222,91	2.797,82
	ENGIE - Electrabel Easy3 Pro	45,03	4.807,80	2.607,60
Flanders	ENGIE - Electrabel Easy Pro Indexed	48,50	5.354,95	2.556,85
	Bolt - Go	11,88	4.131,00	2.754,00
	ENGIE - Electrabel Easy3 Pro	45,03	4.807,80	2.607,60

While this methodology provides an objective view of the market situation in Belgium, one must be aware that it does not provide a full overview of market prices as only three products were considered to depict the Belgian commodity prices and the formulas used by the energy providers to calculate the indexed products might differ among the countries under review[66].

[65] Previously under the company name "Lampiris"

[66] Depending on the country, indexed products might be calculated with forward or with backward looking prices. For example. in Belgium the variable product by Engie is indexed quarterly with an indexation parameter based on the arithmetic mean of the daily ICE Endex quotations during the quarter preceding the quarter of supply.

The commodity price for the E-BSME profile was not extracted from a comparison website but calculated by the CREG according to the following formula.[67] Commodity prices computation rests on market prices and describes the cost of electricity for industrial consumers as of January 2022. CREG used the ICE Endex CAL and the Belpex DAM as national indexes for the computation. For the E-BSME profile, CREG did not include weekend hours of Belpex DAM.

$$\textit{Commodity price}$$
$$= 36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Qi_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ Belpex\ DAM$$

Where:

	Explanation
CAL Y_{-1}	Average year ahead forward price in 2021
CAL Y_{-2}	Average two years ahead forward price in 2020
CAL Y_{-3}	Average three years ahead forward price in 2019
Qi_{-1}	Average quarter ahead forward price in the fourth quarter of 2021
Mi_{-1}	Average month ahead forward price in December 2021

Component 2 – network costs

Transmission cost

All residential profiles reviewed in this study are subject to transmission tariffs. The table below synthesises the components per region:

Table 24: Network cost components per Belgian region

Brussels	Flanders	Wallonia
1. Transmission costs	1. Tariffs for the management and the development of the grid infrastructure 2. Tariffs for the management of the electric system 3. Tariffs for the power reserves and black start 4. Tariffs for market integration	1. Fares for the management and the development of the grid infrastructure
2. Tariffs for network losses[68]	-	2. Tariffs for network losses

[67] The equations are based on an analysis of all Belgian consumers with a yearly usage higher than 10 GWh, which was performed by the Belgian regulator. For 2021, ratios used in the formula were determined as being the average coefficients over three years (2016 to 2018). For the sake of consistency, the coefficients will remain the same for the initial study and the yearly updates until 2023.

[68] Network losses on the federal transmission grid (380/220/150 kV) are a separate and additional component of transmission tariffs. Suppliers usually bill these costs as a percentage (fixed every year by the TSO) of the commodity cost. While the costs associated with network losses is not a transmission tariff as such, it is deemed to be a part of the 2nd component in this study. We consider that such tariff only applies to E-BSME as commodity is not computed based on a supplier's product, which would cover network losses through its costs.

Concerning transmission tariffs, regional regulators also differ in terms of timing of tariff adoption. The table below sets out the different adoption dates per region:

Table 25: Adoption date of new tariffs by regional DSOs in Belgium

Adoption of new tariffs by local regulators	Transmission
VREG	1 July 2022
BRUGEL	1 January 2022
CWaPE	1 March 2022

This study analyses the tariffs in January 2022. Since the VREG published an additional transmission sheet for the period 1/01/2022 - 30/06/2022 and CWaPE for the period 1/01/2022 - 28/02/2022 we take these sheets into account for 2022.

Distribution costs

When consumers are also connected to the distribution grid, which is the case for all our residential and small professional profiles, distribution tariffs must be added to the transmission tariffs mentioned above. Like transmission costs charged by regional DSOs, each DSO publishes their tariff sheets from which fees were selected based on the voltage level. As our profiles have different voltage levels, we assume that each profile can be characterised as follows:

Profiles	Brussels	Flanders	Wallonia
E-RES	BT	LS Zonder piekmeting	BT Sans mesure de pointe
E-SSME	BT	LS Zonder piekmeting	BT Sans mesure de pointe
E-BSME	1-26 kV	1-26 kV Hoofdvoeding	MT Avec mesure de pointe

There is a relatively similar component in the distribution sheets of all the DSOs of all regions, namely "Tariff for the use of the distribution grid". This component is composed of three terms:

Table 26: Distribution cost composition in Belgium

Brussels	Flanders	Wallonia
Capacity term (in EUR/Year)	Capacity term	Capacity term
Fixed term (in EUR/Year)	Fixed term	Fixed term
Proportional term (in EUR/kWh)	Proportional term	Proportional term

Whereas Brussels[69] and Flanders both assess their capacity term based on consumers' annual peak, Wallonia considers the yearly and monthly peaks. The yearly peak is considered as the peak over the last 11 months before invoicing month and makes up for 75% of the component. Monthly peak, the remaining 25%, is determined as the peak of the invoicing month. It is to be noted that the capacity term only applies from consumer E-BSME and in Wallonia there is also a tariff for the regulatory balance since March 1st 2019.

Furthermore, all three regions differentiate these distribution charges according to the time of the day. As such, different prices prevail whether electricity is consumed during daytime hours (from 7 am to 10 pm during weekdays) or night-time (from 10 pm to 7 am during weekdays and all hours during weekends)[70]. Besides, an exclusive night-time tariff exists (same hours as night-time schedule) for consumers equipped with meters only functioning overnight.

[69] In Brussels, the capacity term for "BT sans mesure de pointe" customers is based on the connection point capacity in EUR/kVA.

[70] There are some exceptions in Flanders and Wallonia for residential customers in a limited number of areas, for which off-peak hours during the week are from 9 pm to 6 am. Based on our professional judgement, these exceptions would not impact the results and, therefore, are not considered for the analysis.

Besides, the following components are part of distribution tariffs:

Table 27: Other distribution cost components in Belgium

Brussels	Flanders	Wallonia[71]
Metering costs	Tariff of data management[72]	Regulatory balances
-	Tariff for system services	-
	Network losses	

Considering tariffs are region- and DSO-dependent, we compute the weighted average for each component. The weights of elements are attributed based on the number of EAN connections[73] per DSO. For Flanders and Wallonia, all operating DSOs are considered, representing 100% of the EAN connections[74]. In Brussels, Sibelga is the only DSO, representing 100% of EAN connections.

Component 3 – all other costs

In Belgium, several additional fees apply to electricity. Because of the existence of three regions, these costs often have different rates that are only applicable to a specific region. To summarise the above, two aspects must be considered when looking at the other costs. Firstly, there are costs on the federal level and the three regional levels. Secondly, there are PSOs (Public Services Obligations) on one side and taxes, levies, and surcharges on another side. These costs are summarised below with a distinction between average costs to all three Belgian regions and the one's specific per region. As of January 2022, it is to be noted that federal charges are invoiced by the energy suppliers to the consumers. The proceeds are paid to FPS Finance. In turn, the FPS Finance pays the necessary amounts to the Belgian TSO Elia on the one hand, and to the CREG on the other hand. Some regional charges are levied by regional DSOs, others are levied by Elia. Tariff rates (excluding VAT) are mentioned when they do not vary depending on the consumer profile and/or the DSO; otherwise, units in which they are expressed are detailed:

Table 28: Other costs for residential and small professional electricity consumers applying in all three Belgian regions

All regions	Profiles
Regional Public Service Obligations (Regional PSOs)	
Regional PSOs on distribution[75]	
a. A general tariff for regional PSOs (expressed in EUR/MWh)	All
Taxes and levies on the federal level	
a. Energy contribution[76] (1,9261 EUR/MWh). b. Special excise duty	a. E-RES and E-SSME b. E-RES, E-SSME and E-BSME

[71] Charges for metering activities in Wallonia are built in tariffs for the use of the distribution grid.

[72] In 2019, the Flemish government conferred Fluvius the role of data manager with a view to the roll-out of the digital meter, among other things. The activities to be performed by the data manager concern data recorded by all types of meter, not only digital meters, but also analogue and electronic meters. The costs of all these activities will be charged as of 2021 via the data management tariff which replaces the metering costs.

[73] EAN (European Article Numbering) is a unique code attributed to meters and which indicates a supply point for electricity or natural gas.

[74] The number of EAN connections for Flanders and Wallonia at their 2022 level.

[75] For each region of Belgium, we compute the tariff through a weighted average of each component across all DSO active in the region (weights are given in terms of number of EAN connection per DSO).

[76] Not applicable on E-BSME profile because it has a connection level > 1kV.

As of 1st of January 2022 the federal contribution, offshore contribution, Green Power Certificate contributions and SR contributions have been replaced by the special federal excise duty. This means that only the degressive amount of the special excise duty is applicable for this report.

The table below shows the tax rates applied as of 1st January 2022 at the Federal level in Belgium for both residential and commercial profiles regarding the special excise duty.[77]

Table 29: Special excise duty rates in Belgium for residential and commercial electricity consumers

Yearly consumption	Tax for E-RES (EUR/MWh)	Tax for professional profiles (E-SSME and E-BSME) (EUR/MWh)
Consumption up to 20 MWh	13,6	14,21
Consumption between 20 – 50 MWh	11,58	12,09
Consumption between 50 - 1.000 MWh	10,9	11,39
Consumption between 1.000 – 25.000 MWh	10,23	10,69
Consumption between 25.000 - 100.000 MWh	2,4	2,73
Consumption above 100.000 MWh	1,0	0,5

[77] In Section 5 it is further detailed the exemption that is applied to Industrial consumers for this excise duty.

Table 30: Regional other costs for residential and small professional electricity consumers[78]

Brussels	Flanders	Wallonia	Profiles
Regional Public Service Obligations (Regional PSOs)			
Regional PSOs on transmission			
a. Financing of regional energy policies[79] (E-RES and E-SSME: 1,39 - 6,95 EUR/month; E-BSME: 0,97 EUR/kVA)	a. Financing of support measures for renewable energy and cogeneration (0, 553 EUR/MWh)	a. Funding of support measures for renewable energy[80] (12,5057 EUR/MWh)	All
-	b. Financing measures for the promotion of rational energy use (0,0628 EUR/MWh)	-	
Taxes and levies on the regional level			
Regional taxes and levies on distribution			
a. Charges on non-capitalised pensions (0,259 - 1,00 EUR/MWh)	a. Charges on non-capitalised pensions (0,0906 - 0,8151 EUR/MWh)	a. Levy for occupying road network (0,002832 - 2,9379 EUR/MWh)	All
b. Levy for occupying road network (3,621 - 7,242 EUR/MWh)	b. Contribution for the energy fund[81](0,45 – 161,98 EUR/month)	b. Corporate income tax (0,8555 - 4,4324 EUR/MWh)	
c. Corporate income tax and other taxes (0,917 - 4,077 EUR/MWh)	c. Other local, provincial, regional, and federal taxes, Charges, Surcharges, Fees, and contributions (0,0655 - 0,5892 EUR/MWh)	c. Other local, provincial, regional, and federal taxes, Charges, Surcharges, Fees, and contributions (0,0042 - 0,0048 EUR/MWh)	
Regional taxes and levies on transmission			
-	a. Levy for the taxes pylons and trenches in Flanders (0,4445 EUR/MWh)	a. Connection fee (75 EUR/MWh for the first 0,1 MWh; 0,3 - 0,75 in EUR/MWh for consumption above 0,1MWh)	All
-	-	b. Levy for the use of the public domain (0,2997 EUR/MWh)	

[78] The tariffs represented in this table vary depending on the DSO and we have thus chosen to only present the minimum and maximum range of the tariff from the largest (or only) DSO of the region. Sibelga for Brussels, Imewo for Flanders and ORES Hainaut for Wallonia.

[79] (Sibelga, 2020)

[80] In Wallonia a partial exemption of 85% applies for holders of a sectoral energy efficiency agreement, meaning that the E-BSME profile can profit from this reduction.

[81] (Vlaamse Overheid, sd)

In addition to these previously mentioned taxes and levies, the three Belgian regions also implemented **certificate schemes** that come as another indirect cost. Even though these schemes mechanisms are similar, they present regional differences. Every year, suppliers must reach a certain quota, differing depending on the region, of green certificates, or they are fined. Suppliers charge these additional costs to their customers. We consider the extra "Green Certificate costs" surcharge published by each of the selected suppliers on their tariff sheets in each of the regions. In Wallonia, there is a reduction on the green certificate scheme for holders of a climate change or sector agreement, which we consider applies to profile E1 and above and is therefore not considered for residential and small professional consumers[82]. Flanders also has a reduction on the green certificate scheme which is based on the NACE-code, the total consumption, the gross value added and the energy bill of the company. Besides, while there is a green certificate system for renewable energies in each region, Flanders also has a certification scheme for combined heat/power (WKK).

Component 4 – VAT

There is no reduced VAT electricity for residential consumers in Belgium, and it is thus subjected to an additional 21%. The VAT is presented as a different price component. However, this VAT is not due on the contribution for the energy fund in Flanders and on the connection fee in Wallonia.[83]

Germany

Component 1 – the commodity price

Germany had an HHI-index, not retrieved from CEER, of 2.021 for the retail market in 2014[84]. We thus consider three products for both profiles E-RES and E-SSME. However, Germany presents peculiarities leading to separately identifying each mentioned product for each region:

- As detailed in the methodology section of Germany, different areas are considered because of the existence of price divergences, and all have different standard products called *Grundversorgung*. Product 1 is always the standard product for each of the regions.
- For the 2022 update, CREG provided the products and prices for German E-RES and E-SSME profiles. This information was provided due to the extra-ordinary situation on the energy markets in 2022. The lack of active suppliers on the market and the lack of offerings to new customers were other reasons. The situation slightly improved in February 2022, hence the reason why the CREG applied these tariffs of February 2022 in a retro-active manner to January 2022. The tariffs provided by the CREG were for households and small enterprises with consumption of 50.000 kWH/year for electricity. However, these products do not match the above-mentioned methodology. For example, in most regions the standard product of the market incumbent is also the cheapest product of the market and the cheapest product of the market incumbent. Therefore, the same weight (33,33%) is assigned to all products in all regions since the market shares of the different providers are not always available and assigning the switching rate to the standard product of the market incumbent did not seem to be the correct approach.

In previous countries, we have set out which weights are attributed to the chosen products. The table below illustrates the products' weights assigned for German products in 2022 because of the inconsistency of data with the methodology used for the other regions.

Table 31: Profile weights depending on the German product

Product	Weight E-RES	Weight E-SSME
Standard product of the market incumbent	33,33%	33,33%
Cheapest product on the market	33,33%	33,33%
Cheapest product of the market incumbent	33,33%	33,33%

[82] See General assumption (p.78)

[83] As mentioned in the General Assumptions, we considered the VAT levels effective on 1st January 2022, namely 21%. Therefore, we did not include in the analysis of this section any change in the VAT rate happening during 2022 due to government interventions, such as the decision to temporarily reduce VAT on electricity and gas from 21% to 6% in Belgium in 2022.

[84] (European commission, 2014)

The prices presented in the table below still integrate taxes (except VAT) and network costs because German suppliers use “all-in tariffs”. The following products and prices were provided by CREG to PwC.

Table 32: Annual cost of selected products for profile E-RES in German

Region	Supplier - product	Grundpreis (EUR/year)[85]	Arbeitspreis[86] without dual tariff (EUR/kWh)	Arbeitspreis without dual tariff (EUR/year)
Bayern-werk	Vattenfall - Bayernwerk - VTF Easy12Strom	130,08	0,325	1.138,24
	Badenova - Bayernwerk - Ökostrom24Online	116,47	0,398	1.393,24
	E.ON – Bayernwerk - E.ON Strom Öko Plus 12	180,99	0,323	1.130,59
SWM Infrastruktur Stammgebiet	SWM – SWM - Grundversorgung Strom	97,88	0,246	864,41
	Badenova - SWM Ökostrom24Online	106,99	0,411	1.439,12
	E.ON - SWM - E.ON Strom öko Plus12	142,93	0,335	1.175,88
E-DIS	Vattenfall - E-DIS - VTF Easy12Strom	150,25	0,363	1.273,53
	Badenova - E-DIS - Ökostrom24Online	136,84	0,438	1.535,59
	E.ON – E-DIS - E.ON Strom Öko Plus 12	172,03	0,362	1.269,71
Stromnetz Berlin	Vattenfall – Berlin Tarif Berlin Basis Privatstrom	82,69	0,279	977,94
	Badenova - Berlin - Ökostrom24Online	94,99	0,422	1.477,35
	Vattenfall – Berlin - Easy24 Strom fûr Berlin	89,75	0,283	991,18
Westnetz	ExtraEnergie - Westnetz - ExtraStrom CleverÖko	131,29	0,427	1.497,94
	Badenova - Westnetz - Ökostrom24Online	138,25	0,426	1.493,82
	ExtraEnergie - Westnetz - ExtrasStrom KlassikÖko	131,29	0,416	1.457,35
RNG-Netz 2-Köln	RheinEnergie – RNG-Netz 2-Köln - FairRegio Strom Basis	157,30	0,241	843,53
	Badenova - RNG-Netz 2-Köln - Ökostrom24Online	170,92	0,401	1.403,82
	RheinEnergie - RNG-Netz 2-Kôln StromTarif FairRegion Strom plus	161,85	0,316	1.108,24
Netze BW	EnBW – Netze BW - ENBW Sorgenfrei&Grün	123,03	0,323	1.131,18
	Badenova - Netze BW - Ökostrom24Online	114,25	0,414	1.451,47
	EnBW - Netze BW - Gûnstig&Einfach	123,03	0,314	1.101,76
Stuttgart Netze	EnBW – Stuttgart Netze - ENBW Sorgenfrei&Grûn	123,03	0,323	1.131,18
	Badenova - Stuttgart Netze - Ökostrom24Online	63,03	0,441	1.544,18
	EnBW - Stuttgart Netze - ENBW Gûnstig&Einfach	123,03	0,314	1.101,76

[85] Basic price (fixed)

[86] Labour price (variable)

Table 33: Annual cost of selected products for profile E-SSME in Germany

Region	Supplier - product	Grundpreis	Arbeitspreis[87] without dual tariff (EUR/KWh)	Arbeitspreis without dual tariff (EUR/year)
Bayernwerk	E.ON – Bayernwerk - E.ON Unternehmer-Strom 24 Fix Öko	257,08	0,320	9.606,00
	123Energie - Bayernwerk - 123Strom Profi	186,22	0,316	9.483,00
	Vattenfall - Bayernwerk - VTF Profi12Strom	166,80	0,379	11.370,00
SWM Infrastruktur Stammgebiet	SWM – SWM - grundversorgung	97,88	0,247	7.410,00
	123Energie - SWM - 123Strom Profi	177,18	0,328	9.867,00
	Vattenfall - SWM - VTF Profi12Strom	148,80	0,392	11.760,00
E-DIS	E.ON – E-DIS - E.ON Unternehmer-Strom 24 Fix Öko	223,11	0,357	10.728,00
	123Energie - E.DIS - E.ON Unternehmer-Strom 24 Fix öko	205,87	0,355	10.656,00
	Vattenfall - E.DIS -VTF Profi12Strom	184,80	0,418	12.540,00
Stromnetz Berlin	Vattenfall – Berlin - Profi12 Strom	148,80	0,399	11.970,00
	123Energie - Berlin - 123Strom Profi	165,51	0,339	10.182,00
	Vattenfall - Berlin - Gewerbe Strom	82,20	0,280	8.426,10
Westnetz	Maingau - Westnetz - Maingau StromKomfort	151,26	0,363	10.908,00
	123Energie - Westnetz -123Strom Profi	207,29	0,344	10.320,00
	Vattenfall - Westnetz - VTF Profi12Strom	184,80	0,407	12.210,00
RNG-Netz 2-Köln	RheinEnergie - RNG-Netz 2-Köln - TradeRegio Strom basis	174,00	0,619	18.585,00
	123Energie - RNG-Netz 2-Köln - 123Strom Profi	238,69	0,319	9.576,00
	RheinEnergie - RNG-Netz 2-Köln - RE Trade Ökostrom 24	181,80	0,308	9.267,00
Netze BW	EnBW - Netze BW - ENBW Sorgenfrei&Grûn	215,40	0,371	11.133,00
	123Energie - Netze BW - 123Strom Profi	184,10	0,332	9.966,00
	Vattenfall - Netze BW - VTF Profi12Strom	166,80	0,395	11.850,00
Stuttgart Netze	EnBW - Stuttgart Netze - ENBW Sorgenfrei&Grün	155,76	0,402	12.063,00
	123Energie - Stuttgart Netze - 123Strom Profi	134,61	0,357	10.737,00
	Vattenfall - Stuttgart Netze - VTF Profi12Strom	112,80	0,420	12.600,00

The commodity price could not be extracted through the comparing site for the E-BSME profile, and we have thus used the data that was provided to us by the CREG[88]. The EEX Futures and EPEX DAM prices are the national indexes employed in the computation. CREG did not take the weekend hours of the EPEX SPOT DE DAM into account for the E-BSME profile. The CREG provided us with the data.

[87] Labour price (variable)

[88] The formula is based on an analysis carried by the Belgian regulator of electricity supply contracts of all Belgian consumers with consumption higher than 10 GWh dating back to 2015.

Commodity price

$$= 36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Qi_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ EPEX\ Spot\ DE$$

Where:

	Explanation
CAL Y$_{-1}$	Average year ahead forward price in 2021
CAL Y$_{-2}$	Average two years ahead forward price in 2020
CAL Y$_{-3}$	Average three years ahead forward price in 2019
Qi$_{-1}$	Average quarter ahead forward price in the fourth quarter of 2021
Mi$_{-1}$	Average month ahead forward price in December 2021

Component 2 – network costs

Integrated transmission and distribution costs

The German electricity market is quite different than the Belgian one. The four TSOs exclusively operate on the (extra-) high voltage grid whereas all lower voltage levels are managed by DSOs (often up to 110 kV).

Furthermore, the German price-setting offers less transparency because they use "all-in tariffs", meaning that the consumer is only presented one tariff without a clear distinction of its components. As described in the dataset, we offer results for four TSO, but since Germany counts more than 800 DSOs[89], a weighted average of 2 DSOs (one rural and one urban) is being presented. This is the case for the E-RES and E-SSME profile. Since the commodity price of E-BSME is computed with a formula, network costs must be added separately. A more detailed description is provided in "Chapter 5. Component 2 – network costs" E-BSME is subject to the same network costs as the E0 and E1 profiles.

When it comes to the transmission and distribution tariff methodology, German DSOs and TSOs offer a similar structure even though terms are labelled differently. Although every DSO imposes different rates for different ranges of both maximum capacity contracted and electricity consumer, it always involves the same 3 components which are synthesised in the table underneath:

Table 34: Components of the German network costs

Network costs		
Component	**German label**	**Explanation**
Basic charge	Grundpreis	The basic fee expressed in EUR/year.
Consumption charge	Arbeitspreis	It depends upon the volume of energy consumed in kWh/year, expressed in cEUR/kWh/year.
Metering costs	Messstellenbetrieb	The charges are related to the cost of metering and invoicing; fixed prices expressed in EUR/year.

[89] (European Commission, 2019)

Component 3 – all other costs

Regarding German taxes and levies, 7 surcharges apply on electricity price:

1. The "*KWKG-Umlage*" – Kraft-Wärme-Kopplungsgesetz or Combined Heat and Power Act – is a tax contributing to CHP-plant subsidies. The calculation is based on the present forecast data of DSOs and the Federal office for Economic Affairs and Export Control (BAFA). This cost (3,78 EUR/MWh) applies to E-RES, E-SSME and E-BSME[90].
2. The "*StromNEV*" or Electricity Network Charges Ordinance, based on the regulation of charges for access to electricity networks § 19, is a digressive levy to compensate for §19 transmission tariff reductions. This cost (4,37 EUR/MWh) applies to E-RES, E-SSME and E-BSME[91].
3. The "*Offshore-Netzumlage*" or Offshore Network Levy, is a digressive levy. Several rates apply depending on the consumption level and discounts can be granted from above 1 GWh, which does not concern the profiles under review in this section. We thus use the basic rate (4,19 EUR/MWh) for all profiles[92].
4. The "*EEG-Umlage*" – Erneuerbare-Energie-Gesetz or Renewable Energy Act – is a contribution to the renewable energy financing other than offshore wind power generation unit. Since reductions do not apply to any of the profiles under review in this section, the standard rate (37,23 EUR/MWh) is used[93].
5. The "*Stromsteuer*" or Electricity tax, as its translation shows, is a tax on electricity with a standard rate (20,50 EUR/MWh) that remains unchanged since 2003[94].
6. The "*Konzessionsabgabe*" or Concession fee, is a tax (18,23 EUR/MWh) imposed on all users to fund local governments. The municipality size, as well as the contract type of the consumer[95], constitute the criteria regarding the applied rate. Reductions may be granted from a 30 MWh annual offtake.
7. The "*Abschaltbaren Lasten-Umlage*" or Interruptible loads levy, is a tax (0,03 EUR/MWh) used to offset compensation payments made by transmission system operators to demand-side response (DSR) service providers[96].

Component 4 – VAT

Germany imposes a 19% rate VAT on electricity consumption for residential consumers[97].

90 (Netztransparenz.de, 2021).
91 (Netztransparenz.de, 2021).
92 (Netztransparenz.de, 2021).
93 (Netztransparenz.de, 2021).
94 (Bundesamt für Justiz, 2021).
95 We distinguish the basic contract, or "*Grundversorgung*", and the other types of contracts.
96 (Netztransparenz.de, 2021).
97 VAT or "Mehrwertsteuer" (MwST) in Germany is 19% on electricity. (Smart Rechner, 2019)

France

Component 1 – the commodity price

The HHI of the retail market in France is over 2.000 in 2020[98], meaning that only three products are considered: the standard product, the cheapest offer on the market and the most affordable product of the market incumbent. In 2019, the switching rate for household products in France was 11,0%, and the switching-rate for non-household consumers was 10,5%.[99] The methodology for assigning weights to the products is different for France because most consumers consume the regulated product. The market share for the regulated product is taken as its weight, and the third product has the rest of the weights.

Table 35: French product weights depending on the profile

Product	Weight E-RES	Weight E- SSME
Standard product of the market incumbent	73,00%	63,00%
Cheapest product on the market	11,00%	10,5%
Cheapest product of the market incumbent/2nd largest supplier	16,00%	26,50%
Total	100%	100%

In France, consumers are presented with "all-in tariffs" which toughens the extraction of the commodity component. Using the price comparison website that the CRE puts forward, http://comparateur-offres.energie-info.fr. The commodity cost presented below still includes network and all other costs, but the VAT has already been deducted.

Table 36: Annual cost of selected products for profile E-RES in France

Region	Supplier – Product	Fixed component (EUR/year)	Price for peak consumption (EUR/year)	Price for off-peak consumption (EUR/year)
France	EDF - Tarif Blue - option heures creuses	175,39	242,80	215,33
	TotalEnergies - Offre Classique Electricité	175,38	227,47	202,98
	ENGIE - Elec Référence Verte 3 ans	172,13	261,07	253,38

Table 37: Annual cost of selected products for profile E-SSME in France

Region	Supplier – Product	Fixed component (EUR/year)	Price for peak consumption (EUR/year)	Price for off-peak consumption (EUR/year)
France	EDF - Tarif Bleu - réglementé professionels	461,88	2.6677,60	1.348,80
	LLUM - Offre Azur	406,70	2.545,20	1.347,60
	ENGIE - Electricité Activert 3 ans	509,82	3.499,20	1.721,60

When it comes to E-BSME, consumers in France can benefit from governmental intervention on the commodity costs through the ARENH mechanism. This peculiarity, as well as the formula applied for E-BSME's commodity price, is further explained in section 5 for large industrial consumers.

[98] (CEER, 2020)

[99] (CEER, 2020)

Component 2 – network costs

Integrated transmission and distribution costs

As in Germany, the transmission and distribution costs are also integrated as one tariff in France. While this might help consumers to better understand their bill, it also makes it less transparent. There are several DSOs in France, but Enedis has a market share of 95% for continental France.[100] Because of this, it is the only DSO that is considered in France in the present study. Distribution prices in France are known as the 'Tarif d'Utilisation du Réseau Public d'Electricité' (TURPE). In January 2022 TURPE 6 is in effect, as it has replaced TURPE 5bis since August 2021. The French distribution cost consists of 3 components.

Table 38: Distribution costs in France

Network costs		
Component	**Explanation**	
Management component[101][102]	The management component depends on whether a consumer has a unique contract or not. We assume profiles E-RES and E-SSME opted for exclusive contracts.	
Component for taking off electricity[103]	Multiple prices options exist varying depending on a utilisation length and temporal differentiators capacity and consumption components. The prices options are:	
	Consumers < 36 kVA (E-RES)	**Consumers ≥ 36 kVA (E-SSME)**
	1. Short use (CU)	1. Short use (CU)
	2. Short use with 4 temporal classes (CU4)	2. Long use (LU)
	3. Medium use with a temporal differentiation between peak and off-peak hours (MUDT)	
	4. Medium use with 4 temporal classes (MU4)	
	5. Long use (LU)	
Metering tariff[104]	The metering tariff depends on whether the meter is owned by the consumer or not. The assumption is taken that all three profiles (E-RES, E-SSME and E-BSME) do not own their meters.	

Consumers E-RES and E-SSME face different prices options as depicted in the table above. Concerning E-RES, only two price options out of five presented are considered: CU4 and MU4. The reason behind this lies in the heavy usage of 'Linky' smart meters. The entire French territory is expected to be covered with such meters by 2021 as its implementation started in 2016[105]. As we assume residential consumers to be equipped with 'Linky' smart meters from 2020 onwards, CU4 and MU4 are the only price options available. As for E-SSME, it can either opt for CU or LU prices options. In both cases, both price options were calculated. As we cannot anticipate which option our potential consumers will prefer, all options are computed and are presented as a price range.

MU4 and CU both rely on 4 temporal classes: peak hours high season (HPH), off-peak hours high season (HCH), peak hours low season (HPB) and off-peak hours low season (HCB). SLP S21 (E-RES) and SLP S11 (E-SSME) for 2020 were used and resulted in the following allocation to determine the proportion of electricity consumed during each temporal class.

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[100] (Enedis, 2019)

[101] Since 2018, the level of this component also considers the financial compensation paid to suppliers in connection with the management of single-contract customers.

[102] French labelling: Composante annuelle de Gestion

[103] French labelling: Composante annuelle de soutirage

[104] French labelling: Composante annuelle de comptage

[105] (Selectra, 2020)

Table 39: Allocation of consumption per temporal class in France

Distribution of consumption per temporal class		
Temporal class	**E-RES**	**E-SSME**
HPH	35%	34%
HCH	11%	12%
HPB	38%	40%
HCB	16%	14%

With regards to profile E-BSME, it falls under the category HTA1 for which 4 prices options are available:

- Short use with fixed peak (CU fixed peak);
- Short use with mobile peak (CU mobile peak);
- Long use with fixed peak (LU fixed peak);
- Long use with mobile peak (LU mobile peak);

In a similar fashion to the first two profiles, we computed each price option that is presented as a price range. Given that these price options also depend on temporal classes, allocation of hours was also estimated. However, we used RTE's timeframe (see below) to determine hours allocation, considering that E-BSME does not operate during weekends.

Table 40: Hours per temporal classes in France

Hours per temporal classes		
Temporal class	**Weekdays**	**Weekends**
Peak	4h/day for three months (December to February)	/
HPH	12h/day for three months (December to March) + 16h/day for 2 months (March and November)	/
HCH	8h/day for five months (November to March)	24h/day for five months (November to March)
HPB	16h/day for seven months (April to October)	/
HCB	8h/day for seven months (April to October)	24h/day for seven months (April to October)

Component 3 – all other costs

Three extra surcharges, set out below, add up to the price components in France.:

Table 41: Other costs in France (E-RES, E-SSME, E-BSME)

Title	Definition	Amount
Contribution tarifaire d'acheminement (CTA)	The CTA finances part of the pensions of staff in the energy sector for Electricity and Natural gas Industries.	21,93% for residential and small professional consumers that are connected to the distribution grid and are due on the fixed and power component of the network tariffs.[106] As explained above, network tariffs may vary according to the selected price option. Consequently, the CTA may vary, which is why it is represented as a range.
Consommation finale d'électricité (TCFE) (TCCFE)	The TCFE is a departmental and municipal tax. This tax consists of two parts, namely a default tax and factor defined by the department or municipality. From 1st January 2022 the departmental tax TDCFE is included in the CSPE.	In 2022, the default tax is set on 0,78 EUR/MWh[107]. Every municipality can change it with a factor between 0 and 8,5[108]. Almost 80% of the municipalities set a coefficient of 8,5, leading to a tax of 6,63 EUR/MWh.[109] Therefore, we use these factors since they are the most representative.
Contribution au service public d'électricité (CSPE)	The CSPE is a surcharge that finances expenses related to public service missions in the electricity sector. This surcharge is, for the most part, used for renewables generation subvention schemes.	In 2022, the tax amounts to 25,8291 EUR/MWh for residential and small professionals[110]. For small professionals, this tax can reach a minimum of 0,50 EUR/MWh. We present these two tariffs for small professionals as the minimum fare can benefit companies involved in transport activities (freight and passengers), which could be the case of some companies under the small professional profiles.

Component 4 – VAT

Two different VAT rates apply to electricity tariffs, 5,5% and 20%. While the 5,5% rate is imposed on the subscription and the CTA, the 20% VAT is computed on the consumers' actual consumption, the TCFE and CSPE surcharges.[111] As a result of CTA potential variance, a range of possible VAT is also presented in final results.

[106] (CRE, 2019)

[107] (Collectivités locales (gouv.fr), 2021)

[108] The possible factors are limited to 0, 2, 4, 6, 8 et 8,50 for municipalities and to 2, 4 and 4,25 for departments.

[109] (Ministère des Finances (France), 2020)

[110] As of 1st February 2022 the French government applies changes to the CPSE and "bouclier tarifaire". Since this report intends to take a picture of the situation in January 2022, this information is not considered but can be of importance for future reports.

[111] (Selectra, 2020)

The Netherlands

Component 1 – the commodity price

In the Netherlands, the HHI-index was between 1,000 and 2,000 in 2020.[112] Therefore, we consider four products. These are the standard product, the cheapest product on the market, the most affordable product of the market incumbent and the most competitive product of the second-largest supplier. The switching rate provided by the CEER is 19,80% for the Netherlands in 2020 and it is the weight attributed to the cheapest product for both profiles E-RES and E-SSME[113]. Other products weights are computed based on the normalised market share, which are presented in the table below.

Table 42: Normalised market shares of the largest two Dutch energy suppliers

Energy supplier	Customers	Normalised market share[114]
Essent	3.100.000	56,40%
Eneco	2.400.000	43,60%

Weights are allocated according to the following calculations regarding normalised market shares. The weight of the cheapest product equals the annual switching-rate (15,1%). The normalised market share of the market incumbent is 56,4%, estimated as 3.100.000/(3.100.000+2.400.000), and therefore 43,6% for the second-largest supplier. The market incumbent product has a weight of (100%-19,80)*56,40%/2 and the product of the second-largest supplier of (100%-19,80%)*43,60%, which respectively results in 22,62% and 34,97%. The table below presents the applied weights of profiles E-RES and E-SSME.

Table 43: Profile weights depending on the Dutch product

Product	Weight
Standard product of the market incumbent	22,62%
Cheapest product on the market	19,80%
Cheapest product of the market incumbent	22,62%
Cheapest product of the second largest player	34,97%

The following price comparison website was used to obtain the cheapest products, https://www.energieleveranciers.nl/. The products are set out in the table below.

[112] (CEER, 2020)

[113] No distinction between household and non-household switching rates could be found. Consequently, we use a unique switching rate for both profiles E-RES and E-SSME.

[114] A more detailed explanation of the need of this normalised market share to compute commodity prices can be found under the section "Residential and small professional consumers' commodity computation methodology - Weight of each product within the product portfolio" (p. 115).

Table 44: Annual cost of selected products for profile E-RES in the Netherlands

Region	Supplier – Product	Fixed component (EUR/year)	Price for peak consumption (EUR/year)	Price for off-peak consumption (EUR/year)
Netherlands	Essent - Flexibel Modelcontract	64,36	448,16	456,19
	Coolblue - Coolblue Energie	64,36	439,52	444,98
	Essent - Superdalen	64,36	432,00	456,00
	Eneco - Hollandse Wind & Zon	59,40	451,04	460,96

Table 45: Annual cost of selected products for profile E-SSME in the Netherlands

Region	Supplier – Product	Fixed component (EUR/year)	Price for peak consumption (EUR/year)	Price for off-peak consumption (EUR/year)
Netherlands	Essent - Modelcontract	107,88	6.175,62	3.637,08
	Clean Energy - Zakelijke Stroom 1 jaar Vast	75,00	4.104,00	2.496,00
	Essent - Stroom Variabel	64,32	5.041,8	2.881,20
	Eneco - Stroom Variabel	71,88	9.330,12	4.212,12

As already mentioned, the previous methodology applied for our profiles E-RES and E-SSME, whereas CREG used a formula to compute the commodity costs for E-BSME and provided PwC with the data already computed. The computation rests on market prices and describes the cost of electricity for industrial consumers as of January 2022. CREG used the ICE Endex CAL and the APX NL DAM as national indexes for the computation. The underneath commodity formula is used for each profile. For E-BSME, CREG did not include weekend hours of APX NL DAM. The CREG provided the data and the formula used for commodities pricing in this investigation.[115]

$$Commodity\ price$$
$$= 36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Qi_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ APX\ NL\ DAM$$

Where:

	Explanation
CAL Y_{-1}	Average year ahead forward price in 2021
CAL Y_{-2}	Average two years ahead forward price in 2020
CAL Y_{-3}	Average three years ahead forward price in 2019
Qi_{-1}	Average quarter ahead forward price in the fourth quarter of 2021
Mi_{-1}	Average month ahead forward price in December 2021

[115] The equations are based on an analysis of all Belgian consumers with a yearly usage higher than 10 GWh performed by the Belgian regulator of the electricity supply.

Component 2 – network costs

Network prices in the Netherlands are integrated as one tariff and are built on the four components presented in the table below[116]. We take the weighted average of all six distribution zones' prices.

Table 46: Network cost for electricity in the Netherlands (E-RES, E-SSME, E-BSME)

Network costs		
Component	**Dutch labelling**	**Explanation**
Standing charge	Vastrecht	Fixed basic fee (expressed in EUR/year).
Capacity charge	Capaciteitstarieven	The fixed fee is covering the costs associated with the transmission of electricity. Its height depends on the capacity of the connection (expressed in EUR/year).
Periodical connection tariff	Periodieke aansluitvergoeding	The fixed fee is covering the costs for managing the connection (expressed in EUR/year).
Metering charge	Meettarief	The fixed charges are covering the use and management of energy meters (expressed in EUR/year).

The capacity charge is composed differently for the E-BSME profile:

- Fixed charge depending on the contracted capacity, expressed in EUR/year;
- Variable charge depending on the monthly peak expressed in EUR/kW/month;
- Variable charge depending on the consumption level, expressed in EUR/kWh.

Component 3 – all other costs

For the profiles discussed in this part of the study, two surcharges apply, namely:

- The Energy Tax, *Regulerende Energie Belasting* (REB), which varies, in a degressive trend, according to the amount of consumed electricity. Besides, a reduction of 681,63 EUR/year on the Energy tax is granted to every electricity connection with residential purposes. This reduction ("*Belastingvermindering*") changes every year and is financed by the Dutch government as they consider electricity as a basic need of the population.
- The ODE Levy, *Opslag Duurzame Energie* (ODE), is degressive levy, with reductions starting from 10 MWh.

The rates of the Energy Tax and ODE Levy for electricity in 2022 are displayed in the table below:

Table 47: Electricity Energy Tax and ODE bands (Netherlands)[117]

Band	Consumption	Energy Tax (EUR/MWh)	ODE (EUR/MWh)
A	Up to 10 MWh	36,79	30,50
B	10 - 50 MWh	43,61	41,80
C	50 - 10.000 MWh	11,89	22,90
D	> 10.000 MWh (residential)	1,14	0,50
E	> 10.000 MWh (professional)	0, 57	0,50

Given the consumption level of our profiles under study, they fall into the following bands: A for E-RES, B for E-SSME and C for E-BSME.

[116] (ACM, 2020)

[117] (Belastingdienst Nederland, 2021)

Component 4 – VAT

The VAT on electricity is 21% for residential consumers[118].

The United Kingdom

Component 1 – the commodity price

In the UK suppliers often combine electricity and natural gas in one product, the so-called dual tariff, which is supposed to result in lower prices. Since this is not the case in all the other countries and to have a consistent methodology across the study, we only consider products where electricity is offered by itself. Furthermore, suppliers in the UK generally present all-in tariffs that are not entirely transparent. These tariffs consist of:

- The Standing Charge (fixed element), which is expressed in p/day and covers the fixed costs of the DSO and
- Unit Rate Charge (variable element), which is expressed in p/kWh and varies according to the energy consumption.

Since we only want the commodity price in this section, network charges, taxes and VAT from these 'all-in tariffs' were extracted. Commodity prices of a supplier are not very different between regions, and for the sake of simplicity, we only look at the commodity price in one region, which is then used for all 14 DSO regions. An Ofgem study from 2015[119] analysed the prices throughout the different regions, and out of this study, Yorkshire appeared to be the median zone in terms of commodity price. For this reason, the selected products come from the Yorkshire region. The network cost, VAT and taxes are deducted from the all-in prices of the Yorkshire region. Like other countries in review, the weighted average of network tariffs for all DSOs are used to determine the network cost.

For this 2022 update, CREG provided PwC with the products and prices of E-RES and E-SSME profiles in the UK. This information was provided due to the extra-ordinary situation on the energy markets in 2022. The unit prices for professional customers are the same as for residential customers due to the lack of publicly available data for professional customers (50.000 kWh/year). Since these do not seem to match the methodology put in place for the other regions, the same weight is assigned to the different products, namely 25% each. In fact, similarly to the situation in Germany for residential profiles, the standard product is also the cheapest product on the market and the cheapest product of the market incumbent. Therefore, it is not evident which weight it is best to assign the standard product and some of the products selected come from providers whose market share is not always available.

Table 48: Profile weights depending on the products in the UK

Product	Weight E-RES	Weight E-SSME
Standard product of the market incumbent	25,00%	25,00%
Cheapest product on the market	25,00%	25,00%
Cheapest product of the market incumbent	25,00%	25,00%
Cheapest product of the second largest player	25,00%	25,00%

118 (Energie Leveranciers, 2021)

119 (OFGEM, 2015)

For the 2022 update, CREG provided PwC with the products and prices for E-RES and E-SSME profiles in the UK. The prices displayed in the table below are VAT exclusive but still encompasses the network costs and taxes. It is important to mention that the standard products in the UK are governed by the energy price cap, introduced by market regulator Ofgem in 2019 with the objective of reducing the impact of an increase of energy costs on final consumers.

Table 49: Annual cost of selected products for profile E-RES in the UK

Region	Supplier – Product	Fixed component (EUR/year)	Price for variable (EUR/year)
United Kingdom	British Gas - Standard Monthly DD	110,16	806,04
	E.ON Next - E.ON Next - Next2year	200,70	1.316,96
	SoEnergy - SoGuava 1 year	110,03	1.369,26
	SSE - Standard DD	110,16	806,78

Table 50: Annual cost of selected products for profile E-SSME in the UK

Region	Supplier – Product	Fixed component (EUR/year)	Price for variable (EUR/year)
United Kingdom[120]	British Gas - Standard Monthly DD	110,16	6.914,60
	E.ON Next - E.ON Next - Next2year	200,70	11.288,24
	SoEnergy - SoGuava 1 year	110,03	11.736,48
	SSE - Standard DD	110,16	6.915,28

The commodity price of the E-BSME profile could not be extracted from the comparison website and is therefore computed on the market prices and describes the cost of electricity for industrial consumers as of January 2022. We used the APX UK DAM as the national index for the calculation. The CREG provided us with the formula used for commodity pricing and is based on an analysis carried by the Belgian regulator of electricity supply contracts of all Belgian consumers with consumption higher than 10 GWh[121]. We do not use the weekend hours of APX UK DAM for the E-BSME profile.

$$\textit{Commodity price} = 36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Qi_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ APX\ UK\ DAM$$

Where:

	Explanation
CAL Y_{-1}	Average year ahead forward price in 2021
CAL Y_{-2}	Average two years ahead forward price in 2020
CAL Y_{-3}	Average three years ahead forward price in 2019
Qi_{-1}	Average quarter ahead forward price in the fourth quarter of 2021
Mi_{-1}	Average month ahead forward price in December 2021

120 (OFGEM, 2020)

121 Based on the data available to us from Bloomberg, we used the following indices ELU0YR1, ELU0YR2 and ELU0YR3 to calculate respectively the CAL Y-1, CAL Y-2 and CAL Y-3.

Component 2 – network costs

Transmission cost

The transmission costs in the UK are covered by the Transmission Network Use of System (TNUoS) charges and have two possible options: Non-Half-Hourly (NHH) and Half-Hourly (HH). The E-RES and E-SSME profiles are subject to NHH and E-BSME to the HH rate.

Table 51: Transmission costs options

United Kingdom		
Tariff option	**Explanation**	**Profile**
Not Half-Hourly (NHH)	Monthly metered customers are paying a demand rate in function of their electricity consumption, expressed in p/kWh.	E-RES and E-SSME
Half-Hourly (HH)	Metering system, which utilises AMR (automatic meter reading) technology to provide electricity consumption reading. The system sends updated meter reads to the energy supplier every half hour. Customers pay a capacity tariff depending on their connection capacity, expressed in p/kVA/day.	E-BSME

The NHH tariff is zonal, meaning that the rates differ between all fourteen zones of the UK. We use a weighted average value of these fourteen zonal tariffs as transmission cost for our E-RES and E-SSME profiles.

Distribution costs

Our residential and small professional profiles are subject to these costs but follow a different methodology because it depends on the connection voltage. The distribution costs, called Distribution Use of System (DUoS) tariffs, follow two possible charging methods. Since all of our residential and small professional profiles are connected to the LV-grid, the "Common Distribution Charging Methodology" (CDCM) is applicable.[122] This methodology encompasses the following components:

Table 52: Distribution costs in the United Kingdom

United Kingdom	
Component	**Explanation**
Total consumption	A unit charge in p/kWh
Fixed charge	Fixed charge per offtake points in p/MPAN[123]/day
Metering costs[124]	Cost for use and management of your energy meter in p/day or GBP/year

To estimate UK prices, we took the weighted average (based on the number of connections of DSOs) of the fourteen zonal tariffs to calculate the distribution costs.

[122] (ENA, 2020)

[123] Meter Point Administration Number

[124] Electricity metering charges in the UK are not easily accessible. A proxy was used to account for these charges based on a methodology disclosed by National Grid, the British TSO delivering electricity and natural gas. As electricity and natural gas are frequently offered as one product with a dual tariff, natural gas metering methodology was used as a proxy. Charges are billed as a fixed yearly charge for installation costs recovered via a rental given that we assume our profiles do not own the meters.

Component 3 – all other costs

Three different additional costs are identified for the UK: two levies and the indirect cost of one renewable subsidies scheme.

1. Energy suppliers need to account for the cost of the Energy Company Obligation (ECO) scheme, which helps to reduce carbon emissions and tackle energy poverty. The cost of the ECO scheme represents, according to Ofgem, around 25,48% of the electricity bill.[125]
2. The Climate Change Levy (CCL) is a levy payable on electricity, natural gas, fuel, etc. The basic rate (7,8 GBP/MWh or 9,3 EUR/MWh[126]) of the Climate Change Levy is always determined for a year starting on 1 April, in this study in April 2021. Residential consumers are exempted from it.[127]
3. The Renewables Obligation (RO) is the cost considered by energy suppliers for the large-scale renewable subsidy scheme. Like the Climate Change Levy, the quota and buyout price are determined for a year starting in April. From April 2021 to April 2022, the renewable quota is 0,492 Renewable Obligation Certificates (ROC's) per MWh. To compute the cost of RO, the quota must be multiplied with buyout price per ROC, which is 50,8 GBP (60,83 EUR). This amounts to 24,99 GBP/MWh (29,93 EUR/MWh) for the residential and small professional profiles[128]
4. The Assistance for Areas with High electricity distribution Costs[129] (AAHEDC) levy compensates for high distribution costs in the zone of Northern Scotland (1 of the 14 zones) corresponding to 0,40427 GBP/MWh (0,48 EUR/MWh).

Component 4 – VAT

Electricity used for residential and domestic purposes is subject to a 5% VAT in the UK.[130]

[125] As no exact price could be identified for this cost, a proxy derived from OFGEM's website is used. We consider ECO to account for the full weight of Environmental and Social Costs component as estimated by OFGEM. https://www.ofgem.gov.uk/consumers/household-gas-and-electricity-guide/understand-your-gas-and-electricity-bills (OFGEM, 2020)

[126] With a GBP/EUR exchange rate of 1,1976.

[127] (GOV.UK, 2020)

[128] (OFGEM, 2020)

[129] (National Grid ESO, 2020)

[130] (GOV.UK, 2020)

Natural gas

Natural gas: Detailed description of the prices, price components and assumptions

For all countries under review, this section details:

1. **Commodity costs** for profiles G-RES and G-PRO.
2. **Network costs** for profiles G-RES and G-PRO.
3. **All other costs** for profiles G-RES and G-PRO.
4. **VAT** for profile G-RES

Profile	Consumption (kWh)
G-RES	23.260
G-PRO	300.000

Belgium

Contrary to what is observed in other countries, the Belgian Electricity suppliers have quite transparent price sheets. Commonly the current price sheets can be found online, on each providers website. The price sheets also give a good overview of all charged components.

Component 1 – the commodity price

In 2020[131], the HHI of the retail market in Belgium was over 2.000. According to the methodology, this entails that only three products are considered: the standard product of the market incumbent, the cheapest product of the market incumbent, and the cheapest offer on the market. The switching rate for households in Belgium is 24,60% (G-RES). The products of the market incumbent for G-RES thus each weight (100%-24,60%)/2 or 37,70%.

Table 53: Profile weights depending on the products in Belgium

Product	Weight G-RES
Standard product of the market incumbent	37,70%
Cheapest product on the market	24,60%
Cheapest product of the market incumbent	37,70%
Total	**100%**

The table below gives an overview of the selected products per region and their annual cost, which is based on the profile's characteristics. To choose these products, price comparison websites of the respective regional regulators were used[132]. All prices reported are VAT excluded.

[131] (CEER, 2020)

[132] Flanders : https://vtest.vreg.be; Brussels : www.brusim.be; Wallonia : www.compacwape.be

Table 54: Annual cost of selected products for profile G-RES in Belgium

Region	Supplier – Product	Fixed component (EUR/year)	Variable component (EUR/year)
Brussels	ENGIE - Electrabel Easy Indexed	35,00	2.751,13
	TotalEnergies – TOP[133]	57,02	2.434,70
	ENGIE - Electrabel Direct	15,00	2.599,06
Wallonia	ENGIE - Electrabel Easy Indexed	35,00	2.751,13
	Luminus - Luminus Basic Gaz	15,00	2.394,37
	ENGIE - Electrabel Direct	15,00	2.599,06
Flanders	ENGIE - Electrabel Easy Indexed	35,00	2.751,13
	Energie.be - Aardgas	28,93	2.315,53
	ENGIE - Electrabel Direct Indexed	15,00	2.599,06

While this methodology provides an objective view of the market situation in Belgium, one must be aware that it does not provide a full overview of market prices as only three products were considered to depict the Belgian commodity prices. In addition, due to the limitations of the web comparison tools and the volatility observed on the energy market in the beginning of 2022, there might be inconsistencies between the regions/countries under review regarding the type of products selected. For example, depending on the country indexed products can be calculated with forward or with backward looking prices. However, we do not believe these differences would impact the overall conclusions of this report.

The commodity component for the G-Pro profile was not extracted from a comparison site but is based on the prices observed in January 2022 and they are provided by the CREG for the 2022 update. The formula that was used to compute the commodity cost for this profile is the same as the large industrial profiles and is set out in the corresponding segment. However, it is known that most Belgian industrial consumers' contracts are TTF indexed[134], which represents their most significant component of natural gas bills.[135] The CREG provided all necessary commodity data and already calculated the commodity cost for G-PRO and all other industrial gas profiles.

Component 2 – network costs

Transport costs

As discussed in the consumer profiles, we assume that G-RES profile is connected on the T2 level and G-Pro on the T3 level. Contrary to the transmission costs for electricity, transport costs are not easy to calculate for natural gas. Therefore, this cost is based on an estimate disclosed by Fluxys[136].

Table 55: Transmission cost of Belgian TSO

TSO	Transport cost (EUR/kWh)
Fluxys	0,00147

The transport cost for residential and small professional consumers takes the entry and exit tariffs into account while also taking a weighted average of low (L) and high (H) caloric natural gas.

[133] Previously under the company name "Lampiris"

[134] https://www.creg.be/fr/publications/etude-f2097, (CREG, 2020).

[135] This method tackles down the non-intuitive results that were obtained with the previous methodology as a commodity price can undergo heavy variations month to month and therefore lessen significant differences regarding commodity prices between countries considering their distinct situation within a period.

[136] (Fluxys, 2022)

Distribution costs

Since both G-RES and G-PRO profiles are connected to the distribution grid, distribution tariffs must be considered and therefore added to the transport costs. Like the transport tariffs, the T2 and T3 levels were chosen for respectively G-RES (T2) and G-PRO (T3). Typically, each Belgian region splits distribution tariffs into a different number of components but has at least one common component: *tariff for the use of the network*, which is always composed of*:*

a. Fixed term (expressed in EUR/Year).

b. Proportional term (expressed in EUR/kWh).

Besides, other components are part of the distribution costs, although they vary depending on the region. Brussels includes a tariff for the measuring activities and Flanders includes a tariff of data management and the system management. In contrast, Wallonia only adds a tariff for regulatory balances.

Since tariffs vary between regions and DSOs, a weighted average is computed across all DSOs that are active in the region. The weight is distributed according to the number of EAN connections the DSO owns in the region. In Flanders, all DSOs operated by Fluvius were considered. For Wallonia, all DSOs operated by ORES, as well as RESA, were considered. Both regions' market shares can be found in chapter 3. Belgium. In Brussels, Sibelga is the unique DSO to be running and therefore selected.

Component 3 – all other costs

There are additional costs in Belgium that can be charged to our natural gas consumers under review. While two additional costs are at the federal level and apply to all profiles, regional costs exist in Brussels and Wallonia. These costs are summarised below with a distinction between common costs to all three Belgian regions and the ones specific per region. It is to be noted that federal charges are levied by suppliers and regional charges are levied by regional DSOs (and invoiced to the suppliers which invoice final customers). Tariff rates are mentioned when they do not vary depending on the consumer profile and/or the DSO; otherwise, units in which they are expressed are detailed:

Table 56: Other costs for residential and small professional natural gas consumers applying to all Belgian regions

All regions	Profiles
Regional Public Service Obligations (Regional PSOs) on distribution	
a. A general tariff for regional PSOs (expressed in EUR/MWh)	All
Taxes and levies on the federal level	
I. Federal taxes and levies	
a. Energy contribution (0,9978 EUR/MWh). b. Special excise duty	a. All b. G-RES and G-PRO

The table below shows the new Federal special excise duty rates, applicable as of 1st of January to G-RES and G-PRO profiles.

Table 57: Special excise duty rates in Belgium for natural gas consumers

Yearly consumption	Tax for G-RES (EUR/MWh)	Tax for G-PRO (EUR/MWh)
Consumption up to 20.000 MWh	0,54	0,66
Consumption between 20.000- 50.000 MWh	0,46	0,56
Consumption between 50.000- 250.000 MWh	0,44	0,54
Consumption between 250.000 – 1.000.000 MWh	0,34	0,42
Consumption between 1.000.000 – 2.500.000 MWh	0,18	0,22
Consumption above 2.500.000 MWh	0,15	0,15

Table 58: Other regional costs for residential and small professional natural gas consumers[137]

Brussels	Flanders	Wallonia	Profiles
Regional Public Service Obligations (Regional PSOs) on transport			
a. Brussels regional public service obligation[138] (0,80 or 4,79 EUR/month)	-	-	All
Taxes and levies on the regional level			
Regional taxes and levies on distribution			
a. Charges on non-capitalised pensions (0,116 - 0,194 EUR/MWh)	a. Charges on non-capitalised pensions (0,2676 EUR/MWh)	a. Levy for occupying road network (1,676 - 1,910 EUR/MWh)	All
b. Levy for occupying road network (1,304 EUR/MWh)	b. Other local, provincial, regional, and federal taxes, Charges, Surcharges, Fees, and contributions (0,0524 EUR/MWh)	b. Corporate income tax (0,8144 - 1,2743 EUR/MWh)	
c. Corporate income tax and other taxes [139] (0,536 - 0,893 EUR/MWh)	-	c. Other local, provincial, regional, and federal taxes, Charges, Surcharges, Fees, and contributions (0,0012 - 0,0018 EUR/MWh)	
Regional taxes and levies on transport			
-	-	Connection fee 0,075 EUR/kWh for the first 1 MWh; then - if yearly consumption < 1 GWh: 0,000075 EUR/kWh - if yearly consumption < 10 GWh: 0,00006 EUR/kWh - if yearly consumption >= 10 GWh: 0,00003 EUR/kWh	All

137 The tariffs represented in this table vary depending on the DSO and we have thus chosen to only present the minimum and maximum range of the tariff from the largest (or only) DSO of the region. Sibelga for Brussels, Fluvius Antwerpen for Flanders and ORES Hainaut for Wallonia.

138 Depends on the calibre of the meter being installed.

139 Brussels groups the last two regional taxes as one labelled “Financing of Corporate income tax & other taxes”.

Component 4 – VAT

VAT cost is presented as a different price component and amounts to 21%. No VAT is due on the connection fee in Wallonia.

Germany

German natural gas suppliers generally present only two tariffs on their tariff sheets, a fixed tariff per month (in EUR/month), the “Grundpreis”, and a variable price named “Arbeitspreis” per kWh of natural gas consumed (in cEUR/kWh). Since Germany uses “all-in tariffs”, which is less transparent, we deducted the network costs, taxes, and VAT to retrieve the commodity component.

Component 1 – the commodity price

The CEER does not set out the German HHI for natural gas suppliers, and we have thus taken the EU Energy market study from 2014. This study tells us that the HHI-index was 300 in 2014 for our natural gas profiles, meaning that five products should be considered. Since Germany counts plenty of small suppliers that offer low prices, no supplier can be considered consistently as the largest one across the whole of Germany. Therefore, we adapted the methodology for this country, and only three products were found: the standard product of the market incumbent, the cheapest offer on the market and the most affordable product of the market incumbent. While this approach might pose a limitation, we expect it to have a limited impact on representativeness, given the robustness offered by the regional approach, as three products are selected for every DSO region under study (8 times 3 products). The standard product (“*Grundversorgung*”) is offered by a standard supplier, which varies in every DSO region.

For the 2022 update, CREG provided PwC with the products and prices for the German regions, like the E-RES and E-SSME profiles. This information was provided due to the extraordinary situation on the energy markets in 2022. The lack of active suppliers on the market and the lack of offerings to new customers were other reasons. The situation slightly improved in February 2022, hence the reason why the CREG applied these tariffs of February 2022 in a retro-active manner to January 2022. Regarding the weights, the same approach as the one used for the electricity profiles is used. Therefore, the same weight is assigned to all the products (33,33%), given the fact that the prices provided by the CREG cannot entirely match with the methodology used for the other regions.

Table 59: Profile weights depending on the products in Germany

Product	Weight G-RES
Standard product of the market incumbent	33,33%
Cheapest product on the market	33,33%
Cheapest product of the market incumbent or the 2nd largest supplier	33,33%

The prices presented in the table below still integrate taxes (except VAT) and network costs because German suppliers use "all-in tariffs". The following products and prices were provided by CREG to PwC.

Table 60: Annual cost of selected products for profile G-RES in Germany

DSO	Supplier - product	Grundpreis[140] (EUR/year)	Arbeitspreis[141] (EUR/year)
Bayernwerk	Vattenfall - Bayernwerk VTF-Easy12 Gas	180,50	2.494,10
	Badenova - Bayernwerk - Erdgas24Online	109,92	2.756,02
	E.ON - Bayernwerk - ErdgasÖkoPlus	216,56	2.791,20
SWM Infrastruktur Stammgebiet	SWM - SWM-grundversorgung	118,89	1.403,42
	Badenova - SWM - Erdgas24Online	98,12	2.730,61
	E.ON - SWM - ErdgasÖkoPlus	203,25	2.765,79
E-DIS	Vattenfall - Bayernwerk VTF-Easy12 Gas	220,84	2.431,55
	Badenova - Bayernwerk - Erdgas24Online	188,87	2.646,56
	E.ON - Bayernwerk - ErdgasÖkoPlus	268,97	2.713,02
Stromnetz Berlin	GASAG Erdgas - NBB Netzgesellschaft - Komfort	156,00	1.559,79
	Badenova - NBB Netzgesellschaft - Erdgas24Online	89,55	2.765,79
	E.ON - NBB Netzgesellschaft - ErdgasÖkoPlus	206,15	2.781,43
Westnetz	ExtraEnergie - Westnetz - ExtraGas KlassikÖko	126,25	3.078,53
	Badenova - Westnetz - Erdgas24Online	125,46	2.763,84
	ExtraEnergie - Westnetz - ExtraGas FlexÖko	119,60	2.916,30
RNG-Netz 2-Köln	RheinEnergie - RNG-Netz 2-Köln - FairRegio Erdgas Basis	145,01	1.538,29
	Badenova - RNG-Netz 2-Köln - Erdgas24Online	137,75	2.732,56
	RheinEnergie - RNG-Netz 2-Köln - FairRegio FairGas12	213,38	4.325,58
Netze BW	EnBW - Netze BW-EnBW Erdgas Günstig&Einfach	133,31	3.432,32
	Badenova - Netze BW - Erdgas24Online	88,84	2.789,25
	EnBW - Erdgas Sorgenfrei&Grün	133,31	3.479,23
Stuttgart Netze	SW Karlsruhe - Stadtwerke Karlsruhe-BasisGas	162,05	1.581,29
	Badenova - Stadtwerke Karlsruhe - Erdgas24Online	79,66	2.873,29
	SW Karlsruhe - Stadtwerke Karlsruhe-Vorteilsgas	144,00	1.372,14

The values provided to us by the CREG for the G-PRO profile in Germany could not be used because they were extracted assuming a consumption of 100 MWh/year, while we consider 300 MWh/year for this profile. For this reason, in previous versions of this report the price of industrial profiles was also applied to the G-PRO consumer. Therefore, also to ensure comparability with previous years, the commodity price exhibited in this document is the same price used for the industrial profiles.

Component 2 – network costs

Integrated transport and distribution costs

Similarly to the methodology employed for electricity, four rural (1/zone) and four urban DSOs (1/zone), for a grand total of eight DSOs, are selected. As both of our profiles, G-RES and G-PRO are connected to the distribution network; they are thus subject to transport and distribution costs, which are integrated into one single tariff. Besides, we assume these profiles to fall under the category "*Netzentgelte für Entnahmestellen ohne Leistungsmessung*" (or network charges for offtake points without power metering) as their consumption is yearly metered.

[140] Basic price (fixed)

[141] Labour price (variable)

The annual charge is comprised of four components as listed below, even if DSOs might use different bands or rates:

Table 61: Distribution costs in Germany

Network costs		
Component	**German label**	**Explanation**
Basic charge	Grundpreis	A fixed basic fee expressed in EUR/year.
Consumption charge	Arbeitspreis	A variable element which depends upon the volume of energy consumed in cEUR/kWh/year.
Metering costs	Messung	Fixed charges related to the cost of metering and invoicing, for which we assume our residential and small professional consumers to have been metered annually.
Metering point operation per counting point charges	Messstellenbetrieb	

German annual charge for natural gas is computed as follows:

$$Annual\ charge = Arbeitspreis * (Annual\ Consumption - \ Durch\ Grundpreis\ abgegoltene\ Arbeit) + Grundpreis$$

Where, “*Durch Grundpreis abgegoltene Arbeit*” is the price band bottom level, expressed in kWh.

Depending on the consumers’ consumption volumes, they fall under certain categories (the number of categories depends on the local DSO). These categories determine the amount of consumption volume that must be set at a standard rate, while the rest fall under the network cost fares as determined by local DSOs. These volumes are said to be compensated to limit network costs and ultimately, DSOs’ remuneration.

Component 3 – all other costs

We flagged three supplementary costs for natural gas consumers in Germany: the “*Erdgassteuer*” or Gas tax, the “*Konzessionsabgabe*” or Concession fee and the *“CO2 Steuer”* or Carbon tax:

- The “*Erdgassteuer*” or Gas tax, is an energy tax that applies at several rates depending on the consumer. This price of 5,50 EUR/MWh is the standard rate when using natural gas for heating purposes[142], which is applied for our G-RES profile. Regarding our small professional profile, G-PRO, a reduced rate is ranging from 4,12 EUR/MWh to 2,07 EUR/MWh as companies fall under other regimes specified by the law when not using natural gas for heating purposes[143].
- The “*Konzessionsabgabe*, or Concession fee, exists for electricity and natural gas depending on the municipality size and the contract type of the consumer. As it is impossible to compute a weighted average of the fee, we calculated a non-weighted mean for the four categories of municipalities. Since the natural gas usage has different associated prices, we computed two rates respectively for our two studied profiles:
    - Natural gas only for cooking and for hot water in municipalities (7,05 EUR/MWh): we attribute this usage to strictly residential consumers (G-RES)[144].
    - Natural gas for other purposes (3,05 EUR/MWh): we attribute this usage to SME consumers (G-PRO)[145]. As small professionals fall under reduced rates as the law implemented special rates for companies.
- The “CO2 Steuer” or Carbon tax is an energy tax that is applied to the gas used for heating and transport and it is applicable to all consumers profiles under review. The rate amounts to 0,5461 ct/kWh of gas consumed.

[142] (Bundesamt für Justiz, 2021)
[143] § 54 and § 55 Energiesteuergesetz
[144] (Bundesamt für Justiz, 2021)
[145] (Bundesamt für Justiz, 2020)

Component 4 – VAT

Germany imposes a 19% rate VAT on natural gas consumption for residential consumers (G-RES), which is presented as a separate price component[146].

France

Component 1 – the commodity price

Only three products are considered for the French market since the HHI of the retail market in France is over 2.000 in 2020[147]. These products are the standard product of the market incumbent, the cheapest product on the market and the most affordable product of the market incumbent. As defined by the methodology, the weight of the most inexpensive option equals the annual switching rate and is 15,80% for household consumers.[148] The weights of the products for the G-RES profile are set out in the table below.

Table 62: Profile G-RES weight for each product

Product	Weight G-RES
Standard product of the market incumbent	42,10%
Cheapest product on the market	15,80%
Cheapest product of the market incumbent	42,10%

To extract the commodity price, we have used the price comparison website that the CRE puts forward, http://comparateur-offres.energie-info.fr. In France, consumers are presented with "all-in tariffs" which toughens the extraction of the commodity component. Therefore, we present the total cost without VAT but with other taxes and network costs.

Table 63: Annual cost of selected products for profile G-RES in France

Region	Supplier – Product	Fixed component (EUR/year)	Variable price based on consumption (EUR/year)
France	ENGIE - Tarif Réglementé	236,73	1.692,17
	TotalEnergies - Offre Classique Gaz	236,30	1.614,63
	ENGIE - Gaz Référence 3 ans	219,85	1.773,58

As mentioned before, six price zones exist in France. Given that our consumers' profiles could be randomly dispersed on the territory, the price zone with the most significant number of cities, reflecting, therefore, the majority prices, were used.

In France, residential consumers and consumers with an annual consumption up to 300 MWh can benefit from regulated tariffs ("*tarifs réglementés*"). The table below lists consumers categories that can benefit from it:

[146] VAT or "Mehrwertsteuer" (MwST) in German is 19% on natural gas. (Toptarif, 2021)

[147] (CEER, 2020)

[148] (CRE, 2019)

Table 64: Categories depending on the yearly consumption in France

Annual consumption (MWh/year)	Network	Type of consumers	Usage	Category
< 1 MWh	Distribution network	Residential and Industrial consumers	Cooking	Base
1 < x < 6 MWh			Hot water	B0
6 < x < 300 MWh			Individual heating	B1
			Small boiler	B2i

However, in November 2019, French public authorities decided to terminate the commercialisation of such tariffs even if existing contracts remain in force until December 2020 for professional consumers and June 2023 for residential consumers.

Component 2 – network costs

Transport costs

Transmission tariffs[149] have the following components:

1. Transport costs (expressed in EUR/MWh).
2. Storage costs (expressed in EUR/MWh) are charged on final residential consumers to finance the cost of storing natural gas to smoothen the seasonal demand effect.

Distribution costs

As stated before, 96% of all distributed natural gas in France is delivered by GRDF (Gaz Réseau Distribution France)[150], which is why GRDF is considered as the sole DSO for this study. Given their annual consumption levels, both G-RES and G-PRO are subject to the tariffs T2. The fare has three components:

1. Subscription (expressed in EUR/year);
2. A daily capacity charge (expressed in EUR/MWh/day);
3. A proportional component (expressed in EUR/MWh).

Component 3 – all extra costs

In France, two surcharges must be considered for natural gas consumers:

1. The "Contribution tarifaire d'acheminement" (CTA) is a surcharge for energy sector pensions (for Electricity and Gas Industries). It amounts to 20,80% for clients connected to the distribution grid. The CTA is only due on the fixed part of the distribution cost (i.e. subscription).
2. The "Taxe intérieure sur la consommation de gaz naturel" (TICGN) is a tax on natural gas consumption, that amounts to 0,845 EUR/kWh in 2022.

Component 4 – VAT

A reduced VAT of 5,5% applies to the amount of the subscription as well as on the CTA. A 20% VAT applies to the amount of consumption as well as on the TICGN.

[149] The CREG provided PwC with the data for these two components.

[150] (CRE, 2019)

The Netherlands

Component 1 – the commodity price

The HHI-index of the retail market in the Netherlands is between 1.000 and 2.000 in 2020.[151] Therefore, four products are considered: the standard product of the market incumbent, the cheapest product on the market, the cheapest product of the market incumbent and the cheapest product of the second-largest supplier. According to the methodology, normalised market shares of the two biggest suppliers must be considered when distributing the weights of the products. The underneath table displays the normalised market shares used in this study:

Table 65: Normalised market shares of the largest two Dutch energy suppliers

Energy supplier	Customers	Normalised market share[152]
Innogy (Essent)	3.100.000	56,40%
Eneco	2.400.000	43,60%

When considering the normalised market shares, the weights are distributed according to the following calculations. The weight of the cheapest product equalled the annual switching rate and was 19,8%[153]. The normalised market share of the market incumbent is 56,36%, namely 3.100.000/(3.100.000+2.400.000), and that of the second-largest supplier is 43,64% which is the result of the calculation above but while switching the numerator with the number of clients of the second-largest supplier. The product of the market incumbent thus has a weight of (100%-19,8%)*56,36%/2 and the product of the second-largest supplier (100%-15,1%)*43,64 which respectively results in 22,62% and 34,97%. The weights are set out in tables below.

Table 66: Profile weight for each product in the Netherlands

Product	Weight G-RES
Standard product of the market incumbent	22,62%
Cheapest product on the market	19,80%
Cheapest product of the market incumbent	22,62%
Cheapest product of the second largest player	34,97%

The cheapest product was obtained by consulting a Dutch price comparison website https://www.energieleveranciers.nl/. The weight of the products for profiles G-RES is presented in the table above. The products selected for profiles G-RES and their prices are stated in the next tables. These prices exclude charges and taxes.

[151] (CEER, 2020)

[152] A more detailed explanation of the need of this normalised market share to compute commodity prices can be found under the section "Residential and small professional consumers' commodity computation methodology - Weight of each product within the product portfolio" (p. 115).

[153] No distinction between household and non-household switching rates could be found. Consequently, we use a unique switching rate for both profiles E-RES and E-SSME.

Table 67: Annual cost of selected products for profile G-RES in the Netherlands

Region	Supplier – Product	Fixed component (EUR/year)	Variable price based on consumption (EUR/year)
The Netherlands	Essent - Flexibel	64,36	2.522,86
	Budget Energie - Actie Gas Vast 1jr.	53,56	2.356,92
	Essent - SuperDalen	64,36	2.499,77
	Eneco - Eneco Gas	59,40	2.608,04

As described in the section “Natural gas: Countries/Zone(s) identified” (p. 109), suppliers have the option to apply a regional surcharge, based on how far the region is situated from Groningen. Yet, the selected suppliers did not do this and offered the same prices for each region. Besides, the Dutch network is primarily supplied with the so-called “Groningen-gas”. This natural gas has a lower calorific value (L-gas) than the natural gas used in most of Western Europe (H-gas). As prices in the Netherlands are reported by m³ instead of by kWh, a conversion factor is used. The latter is of 9,77 kWh/m³ as all residential and small users, use low caloric natural gas[154].

The commodity price for the G-PRO profile is the January 2022 observed prices for TTF, and the CREG provided all commodity prices data.

Component 2 – network costs

Integrated transport and distribution costs

As it is the case for electricity, the Netherlands use a combined tariff including four components:

Table 68: Components of network costs in the Netherlands

Network costs		
Component	**Dutch labelling**	**Explanation**
Standing charge	Vastrecht	Fixed basic fee (expressed in EUR/year).
Capacity charge	Capaciteitstarieven	Fixed fee covering the costs associated with the transport of natural gas. Its height depends on the capacity of the connection (expressed in EUR/Year/m³/h).
Periodical connection tariff	Periodieke aansluitvergoeding	Fixed fee covering the costs for managing the connection (expressed in EUR/year).
Metering charge	Meettarief	Fixed charges are covering the use and management of energy meters (expressed in EUR/year).

As the Dutch distribution tariffs are notably dependent on a capacity charge, which is based on the m³ volume consumption, the same conversion factor, as mentioned above, is used.

Component 3 – all other costs

Two surcharges apply to the natural gas invoice for the profiles under study in the Netherlands:

1. Energy Tax, *Regulerende Energiebelasting*, (REB) is a digressive tax on all energy carriers which depends on the consumption;
2. The ODE levy, *Opslag duurzame energie*, is also a digressive levy that varies depending on the use and the revenues are used to finance renewable energy.

[154] (Gasunie Transport Services, 2020), 1 m³ under normal conditions (zero degrees Celsius, 1 atm) is considered to have a calorific value of 35.17 MJ (Groningen-gas equivalent) with a conversion factor of 1 MJ= 0.278 kWh.

The tables below show the 2022 rates for each band of natural gas consumption.

Table 69: Energy tax and ODE 2022 rates in the Netherlands

Band	Consumption	Energy Tax (EUR/m³)	ODE (EUR/m³)
A	Consumption up to 170.000 m3	0,36322	0,0865
B	Consumption between 170.000- 1.000.000 m³	0,06632	0,0239
C	Consumption between 1.000.000- 10.000.000 m³	0,02417	0,0236
D	Consumption above 10.000.000 m³	0,01298	0,0236

As the Energy Tax and ODE Levy are fixed in EUR per volume units (EUR/m³) and not in EUR per energy unit, the calorific value of the used natural gas has an impact on the total amount paid. As stated under "Component 1 – the commodity price" of the Netherlands, low caloric natural gas is used, except in around 80 industrial companies, the assumption is made that the profiles G-RES and G-PRO use low caloric natural gas. To determine our profiles' tax categories, we use the same conversion factor of 9,77 kWh/m³ mentioned previously.

Given the consumption level of our profiles understudy, all profiles for G-RES and G-PRO fall in the A band.

Component 4 – VAT

In the Netherlands, VAT on natural gas equals 21% and is due on the full energy invoice.

The United Kingdom

Component 1 – the commodity price

In the UK gas suppliers generally present all-in prices that are not transparent. These prices consist of:

- The Standing Charge (fixed element), which is expressed in p/day and that covers the fixed costs of the energy supplier and;
- Unit Rate Charge (variable element), which is expressed in p/kWh and that varies according to the energy consumption

Since we only want the commodity price in this section, we had to deduct network charges, taxes and VAT from these 'all-in prices'. Commodity prices of a supplier are not very different between regions, and for the sake of simplicity, the commodity price of only one region is used for all 8 DSO regions. An Ofgem study from 2015[155] analysed the costs throughout the different areas, and out of this study, Yorkshire appeared to be the median zone in terms of commodity price. For this reason, the selected products come from the Yorkshire region. The network cost, VAT and taxes are deducted from the all-in prices of the Yorkshire region. Like other countries in review, the weighted average of network prices for all DSOs are used to determine the network cost.

The HHI of the retail market in the United Kingdom is between 1.000 and 2.000 in 2020, meaning that only four products are considered: the standard product of the market incumbent, the cheapest product on the market, the cheapest product of the market incumbent and the cheapest product of the second-largest supplier. However, for the 2022 update, CREG provided PwC with the products and prices for the UK G-RES profile. This information was provided due to the extraordinary situation on the energy markets in 2022. The lack of active suppliers on the market and the lack of offerings to new customers were other reasons. The situation slightly improved in February 2022, hence the reason why the CREG applied these tariffs of February 2022 in a retro-active manner to January 2022. These products do not necessarily follow the methodology put in place for the other regions. Therefore, similarly to the German regions, the same weight (25%) is attributed to the 4 products.

[155] (OFGEM, 2015)

Table 70: Weight for each product in the United Kingdom

Product	Weight G-RES
Standard product of the market incumbent	25,00%
Cheapest product on the market	25,00%
Cheapest product of the market incumbent	25,00%
Cheapest product of the second largest player	25,00%

An overview of the products and their respective pricing elements are presented in the table below, but these still include the network costs and taxes. It is important to mention that the standard products in the UK are governed by the energy price cap, introduced by market regulator Ofgem in 2019 with the objective of reducing the impact of an increase of energy costs on final consumers.

Table 71: Annual cost of selected products for profile G-RES in the UK

Region	Supplier – Product	Fixed component (EUR/year)	Variable price based on consumption (EUR/year)
The United Kingdom	British Gas - British Gas Standard Monthly DD	108,75	1.101,71
	EDF - EDF Standard (variable)	108,74	1.101,71
	SoEnergy - SoGuava1year	108,70	2.690,91
	SSE - SSE Standard DD	108,70	1.099,76

The commodity price of the G-PRO profile was provided by the CREG. The national commodity price is the result of January 2022 prices.

Component 2 – network costs

Transport costs

Only one TSO, excluding the Northern Islands, operates in the UK: National Grid Gas. The Gas Transmission Transportation Charges are comprised of the following components:

Table 72: Transport costs components in the UK

United Kingdom	
Component	**Explanation**
Entry Commodity Charge	A charge per unit of natural gas transported payable for flow entering the system in p/kWh/day
Exit Commodity Charge	A charge per unit of natural gas transported payable for flow exiting the system in p/kWh/day
Commodity charge	A charge per unit of natural gas transported payable for flows entering and exiting the system in p/kWh

National Grid Gas provides a weighted average of the entry and exit capacity tariffs in their Statement of Gas Transmission Transportation Charges[156].

[156] We have used the weighted averages published in the Gas Transmission Transportation Charges of the NGG valid as from the 1st of April 2020, (Nationalgrid, 2020).

Distribution costs

Both of our residential and small professional profiles (G-RES and G-PRO) must pay distribution tariffs since they are connected to the distribution grid. There are eight natural gas DSOs in the UK, out of which 4 are run by Cadent Gas. The distribution tariff for natural gas is composed of the following components:

Table 73: Distribution costs for residential users and small professionals in the United Kingdom

United Kingdom		
Component	**Explanation**	**Profile**
LDZ System Capacity Charge	With charge band for consumption up to 73.200 kWh, calculated using the supply point End User Category (EUC) and the appropriate load factor in p/kWh.	G-RES
	With charge band between 73.200 and 732.000 kWh, calculated using the supply point End User Category (EUC) and the appropriate load factor in p/kWh.	G-PRO
LDZ System Commodity Charge	With charge band for consumption up to 73.200 kWh, calculated using the supply point End User Category (EUC) and the appropriate load factor in p/kWh.	G-RES
	With charge band between 73.200 and 732.000 kWh, calculated using the supply point End User Category (EUC) and the appropriate load factor in p/kWh.	G-PRO
LDZ Customer Capacity Charge	With charge band for consumption up to 73.200 kWh, it is a capacity charge in p/Peak day kWh/day.	G-RES
	With charge band between 73.200 and 732.000 kWh, a fixed charge which depends on the frequency of meter reading, plus a capacity charge based on the registered SOQ.	G-PRO
LDZ Customer Fixed Charges	Only due for supply points with annual consumption between 73.200 and 732.000 kWh/year	G-PRO
Exit Capacity Charges	Capacity charge applied to the supply point like LDZ System Capacity Charge. These charges are applied per exit zone on an administered on peak day basis in GBP/year.	G-RES and G-PRO
Metering charges	Cost for use and management of your energy meter in GBP/year.	G-RES and G-PRO

The capacity terms are based on the estimated maximum daily offtake. This is calculated by dividing the total consumption in a year by the number of days of consumption multiplied by the load factor. This load factor is related to the EUC (End User Category) bands. Each local distribution zone has 33 individual EUC bands that define 9 different consumption profiles based on annual consumption. The load factors, therefore, differ depending on the annual consumption of a profile and the local distribution zone. Each DSO has its own load factor percentages, but only Northern Gas Networks discloses its load factors, which we used as a proxy for all other DSOs. The table below depicts the load factors used for profiles G-RES and G-PRO:

Table 74: Load factors for profiles G-RES and G-PRO

Profile	Bands	Threshold (kWh)	Average load factor
G-RES	1	1 – 73.200	34,00%
G-PRO	2	293.001 – 732.000	38,4%

Based on this, the capacity term is computed as follows:

$$annual\ charge = (SOQ * 365\ days) * unit\ rate$$

Where,

$$SOQ = annual\ consumption/(365\ days * Load\ Factor)$$

We considered a weighted average of these components across four active DSOs for natural gas in the UK.

Component 3 – all other costs

In the United Kingdom, the following taxes and levies are due to the consumers under review:

1. **Energy Company Obligation** (ECO) scheme helps to reduce carbon emissions and tackle fuel poverty. The cost of the ECO scheme amounts to roughly 2,46% of the total natural gas invoice.[157]
2. **Climate Change Levy** (CCL) is payable for small professional consumers of natural gas with a standard rate of 4,65 GBP/MWh (5,57 EUR/MWh[158]).[159]

Component 4 – VAT

VAT on the consumption of natural gas in the UK amounts to 5% for residential consumer.

[157] (OFGEM, 2020)

[158] We use the following exchange rate: 1,1976 GBP/EUR (see General assumptions)

[159] (GOV.UK, 2020)

5. Large industrial consumers

5. Large industrial consumers

This chapter aims at providing an extensive introduction to the prices, price components and the assumptions taken for each country and region with a particular focus on industrial consumers of electricity (E0 to E4) and natural gas (G0 to G2).

Electricity

Electricity: Detailed description of the prices, price components and assumptions

For all countries under review, this section details:

1. **Commodity costs** for profiles E0, E1, E2, E3 and E4
2. **Network costs** for profiles E0, E1, E2, E3 and E4
3. **All other costs** for profiles E0, E1, E2, E3 and E4

Profile	Consumption (MWh)	Connection capacity (kVA)
E0	2.000	781
E1	10.000	3.125
E2	25.000	6.944
E3	100.000	18.056
E4	500.000	86.806

Belgium

Component 1 – the commodity price

Commodity prices computation rests on market prices and describes the cost of electricity for industrial consumers as of January 2022. The underneath commodity formula is used for each profile and is based on an analysis performed by the CREG of all Belgian consumers contracts with a yearly consumption higher than 10 GWh. For E0, E1 and E2, CREG did not include weekend hours of Belpex DAM, while for E3 and E4 CREG included weekdays and weekend hours.

$$\text{Commodity price}$$
$$= 36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Qi_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ Belpex\ DAM$$

Where:

	Explanation
CAL Y_{-1}	Average year ahead forward price in 2021
CAL Y_{-2}	Average two years ahead forward price in 2020
CAL Y_{-3}	Average three years ahead forward price in 2019
Qi_{-1}	Average quarter ahead forward price in the fourth quarter of 2021
Mi_{-1}	Average month ahead forward price in December 2021

Component 2 – network costs

Transmission cost

Whether connected to the transmission grid 30-70 kV (Local Transmission System) – profile E2 - or to the transmission network itself – profiles E3 and E4 -, the same transmission tariff structure applies to all our industrial profiles under review in this study. However, in the function of the voltage connection, different rates apply.

The transmission costs in Belgium are fixed by Elia Transmission Belgium and consists of five components:

1. **Connection tariffs**: charges to operate and maintain the user connection for consumers directly connected to Elia's grid (from E2);[160]
2. **Tariffs for the operation and the development of the grid infrastructure**: including (i) the tariff for the monthly peak for the offtake, (ii) the tariff for the yearly peak for the offtake and (iii) the power put at disposal.
3. **Tariffs for the operation of the electric system**: including (i) the tariff for the management of the electric system and (ii) tariffs for the offtake of additional reactive energy (not considered).
4. **Tariffs for the compensation of imbalances**: including (i) the tariff for the power reserves and black-start and (ii) the tariff for the maintenance and restoring of the residual balance of the individual access responsible parties. The latter includes (a) imbalance tariffs, which are not considered as they are (generally) not explicitly billed by the TSO or by suppliers to end consumers and (b) network losses. Network losses on the federal transmission grid (380/220/150 kV) are a separate and additional component of transmission tariffs. Suppliers usually bill these costs as a percentage (fixed every year by the TSO) of the commodity cost. While the costs associated with network losses is not a transmission tariff as such, it is deemed a part of the 2nd component in this study. Yet, for consumers connected to the distribution grid, Flanders integrates network costs as a distribution component as we later detail.
5. **Tariffs for market integration**: Elia Transmission Belgium provides services such as the development and integration of an effective and efficient electricity market, the operation of interconnections, coordination with neighbouring countries and the European authorities and publication of data as required by transparency obligations. The costs that come from these services are covered by the market integration tariff.

As profiles E0 and E1 remain connected to the distribution grid, transmission costs are charged based on DSOs' transmission price sheets. Further explanation on the latter can be retrieved in the Transmission cost (p.120) of the residential profiles.

As the table below sets out, regional regulators adopt transmission tariffs on different dates, with Flanders and Wallonia being deferred compared to Brussels.

Table 75: Date of adoption of new transmission tariffs in Belgium

Adoption of new tariffs by regional regulators	Transmission
VREG	1 July 2022
BRUGEL	1 January 2022
CWaPE	1 March 2022

This study analyses the tariffs in January 2022. Since the VREG published an additional transmission sheet for the period 1/01/2022 - 30/06/2022 and CWaPE for the period 1/01/2022 - 28/02/2022 we take these sheets into account for 2022.

[160] This cost depends on the distance between the connection bay and the consumer. We have taken the assumption that this is 500 meters.

Distribution costs

As part of our industrial consumers, 2 profiles (namely E0 and E1) are connected to the distribution grid. Consequently, they are also subject to distribution tariffs, which must be added to the transmission tariffs. Voltage level networks have been determined to both industrial profiles connected to the distribution grid as illustrated below.

Table 76: Voltage level for industrial profiles in Belgium

Profiles	Brussels	Flanders	Wallonia
E0	1-26 kV	1-26 kV Hoofdvoeding	MT Avec mesure de pointe
E1	Trans MT	Trans-HS Hoofdvoeding	T-MT Avec mesure de pointe

Distribution tariffs from all regions have one similar component: tariff for the use of the distribution grid. For both E0 and E1, such component is decomposed as follows.

Table 77: Tariff for the usage of the distribution grid in Belgium

Brussels	Flanders	Wallonia
Capacity term (EUR/kW)	Capacity term (EUR/kW)	Capacity term (EUR/kW)
Proportional term (EUR/kWh)	Proportional term (EUR/kWh)	Proportional term (EUR/kWh)
Fixed term (EUR/Year)	-	Fixed term (EUR/Year)

Whereas Brussels and Flanders both assess their capacity term based on consumers' annual peak, Wallonia considers the annual and monthly peaks. The former is considered as the peak over the last 11 months before the invoicing month and make up for 75% of the component while monthly peak, the remaining 25%, is determined as the peak of the invoicing month.

Additional components are part of distribution tariffs, as described in the following table.

Table 78: Additional components for Belgian industrial consumers

Brussels	Flanders	Wallonia[161]
Metering costs	Tariff of data management[162]	Regulatory balances
-	Tariff for system services	-
	Network losses	

As tariffs differ from region to region and from DSO to DSO, a weighted average is computed. Each DSO's weights are determined according to the number of EAN connections[163] owned by each DSO. While we consider all DSOs operated by Fluvius in Flanders, accounting to 100% of EAN connections, we also consider all DSOs from Wallonia (100% of EAN connections).

[161] Charges for metering activities in Wallonia are built in tariffs for the use of the distribution grid.

[162] In 2019, the Flemish regulator conferred Fluvius the role of data manager with a view to the roll-out of the digital meter, among other things. The activities to be performed by the data manager concern data recorded by all types of meter, not only digital meters, but also analogue and electronic meters. The costs of all these activities will be charged as of 2021 via the data management tariff which replace the metering costs.

[163] EAN (European Article Numbering) is a unique code attributed to meters and which indicates a supply point for electricity or natural gas.

Component 3 – all other costs

In Belgium, three different kinds of extra costs apply to electricity: tariffs for Public Service Obligations (PSO), taxes and levies, certificate schemes and other indirect costs. These costs are summarised below with a distinction between common costs to all three Belgian regions and the one's specific per region. It is to be noted that federal charges are levied by the suppliers, and regional charges are levied by regional DSOs. Tariff rates are mentioned when they do not vary depending on the consumer profile and/or the DSO; otherwise, units in which they are expressed are detailed:

Table 79: Other costs for industrial electricity consumers applying in all three Belgian regions

All regions	Profiles
Regional Public Service Obligations (Regional PSOs)	
Regional PSOs on distribution[164]	
a. A general tariff for regional PSOs (expressed in EUR/MWh)	E0 and E1
Taxes and levies on the federal level	
a. Special excise duty	All

The table below shows the tax rates applied as of 2022 at the Federal level in Belgium for all commercial profiles. According to Art. 429.§ 1er of the law from 27th December 2004[165] an exemption is foreseen when electricity and gas are not used only for heating and transport, but also for metallurgic or chemical industrial procedures. For the sake of this report, we assumed that profiles E1 to E4 could potentially benefit from this exemption, if they fall within the conditions specified by the law.

Table 80: Special excise duty in Belgium for Electrical commercial consumers

Yearly consumption	Tax for professional profiles (EUR/MWh)
Consumption up to 20 MWh	14,21
Consumption between 20 - 50 MWh	12,09
Consumption between 50 - 1.000 MWh	11,39
Consumption between 1.000 – 25.000 MWh	10,69
Consumption between 25.000- 100.000 MWh	2,73
Consumption above 100.000 MWh	0,5

[164] For each region of Belgium, we compute the tariff through a weighted average of each component across all DSO active in the region (weights are given in terms of number of EAN connection per DSO).

[165] https://www.ejustice.just.fgov.be/eli/loi/2004/12/27/2004021170/justel

Table 81: Regional other costs for industrial electricity consumers[166]

Brussels	Flanders	Wallonia	Profiles
Regional Public Service Obligations (Regional PSOs)			
Regional PSOs on transmission			
a. Financing of regional energy policies[167] (6,95 EUR/month or 0,97 EUR/kVA) (E0 to E2)	a. Financing of support measures for renewable energy and cogeneration (0,553 EUR/MWh) (E0 and E1)	a. Funding of support measures for renewable energy[168] (1,875855 EUR/MWh)	E0, E1 and E2
b. Levy compensating for the use of public highways[169] (3,6035 EUR/MWh) (from E1)	b. Financing measures for the promotion of rational energy use (0,0628 EUR/MWh) (E0 and E1)	-	
Taxes and levies on the regional level			
Regional taxes and levies on distribution			
a. Charges on non-capitalised pensions (0,174 - 0,259 EUR/MWh)	a. Charges on non-capitalised pensions (0,0046 - 0,0906 EUR/MWh)	a. Levy for occupying road network (2,872 -2,981 EUR/MWh)	E0 and E1
b. Levy for occupying road network (3,621 EUR/MWh)	b. Contribution for the energy fund[170](161,98 EUR/month)	b. Corporate income tax (0,2657 - 0,8555 EUR/MWh)	
c. Corporate income tax and other taxes (0,454 - 0,917 EUR/MWh)	c. Other local, provincial, regional, and federal taxes, Charges, Surcharges, Fees, and contributions (0,0033 - 0,0655 EUR/MWh)	c. Other local, provincial, regional, and federal taxes, Charges, Surcharges, Fees, and contributions (0,0041 - 0,0042 EUR/MWh)	
Regional taxes and levies on transmission			
-	a. Levy for the taxes pylons and trenches in Flanders (0,3719 in EUR/MWh)[171]	a. Connection fee (0,075 EUR for the first 0,100 MWh; 0,3 - 0,75 in EUR/MWh above 0,1 MWh)	All
-	-	b. Levy for the use of the public domain (0,3074 EUR/MWh) (E2)	

Because of the regional quota for green certificates (all regions) and combined heat/power-certificates (only Flanders), there are some indirect costs that are added on the commodity price. The average market price of the certificates over the last 12 months, which means for 2022 from 1st of January 2021 until 31st of December 2021, is considered to estimate the cost of this mechanism. The average values for each region considered are presented in the table below and are based on figures retrieved from the respective regional regulators. To estimate the cost of this mechanism, we also consider the quotas and some associated reductions.

166 The tariffs represented in this table vary depending on the DSO and we have thus chosen to only present the minimum and maximum range of the tariff from the largest (or only) DSO of the region. Sibelga for Brussels, Imewo for Flanders and ORES Hainaut for Wallonia.

167 (Sibelga, 2020)

168 In Wallonia a partial exemption of 85% applies for holders of a sectoral energy efficiency agreement, meaning that to the E-BSME profile can profit from this reduction.

169 (Sibelga, 2020)

170 (Vlaamse Overheid, sd)

171 (Sibelga, 2022)

Table 82: Certificate schemes in each Belgian region

Region		
Average price of certificate schemes		
Flanders (GC)	93,21 EUR/GC	
Wallonia (GC)	67,5 EUR/GC	
Brussels (GC)	93,41 EUR/GC	
Flanders (CHPC)	24,90 EUR/CHPC	
Certificate schemes		
Brussels	Green certificates	The quota increases every year. As opposed to Flanders and Wallonia, no reduction applies for large industrial consumers in Brussels.
Flanders	Green certificates	Since the introduction of the green certificates, the quota has increased yearly (except in 2018). Yet, as of 2019, there will be no quota change in the upcoming years.[172] Flanders also applies progressive quota reductions for large consumers. Part of these reductions are only applicable to large consumers active in certain electro-intensive sectors.
	Combined heat/power certificates	Flanders is the only region that also has these certificates. As seen with the green certificates, the quota also increased every year from introduction to 2016 but remain steady ever since and for the coming years.[173] Similar to the GC there are also progressive quota reductions for large consumers, partly limited to large consumers active in certain electro-intensive sectors. [174]
	Cap on GC and CHPC	As of 2019 two caps on green certificates were introduced for certain industrial consumers. However, starting 2021 these have been replaced by a cap combining GC and CHPC: [175] i. The amount due for the costs related to the financing of renewable energy and qualitative combined heat and power is capped at 0,5% of gross value added (average last 3 years) for all consumers with an electro-intensity over 20% for consumers belonging to sectors that are listed in annexes 3 and 5 of the EEAG ; ii. The amount due for the costs related to the financing of renewable energy and qualitative combined heat and power is capped at 4% of gross value added (average last 3 years) for all consumers belonging to sectors that are listed in annexe 3 of the EEAG;
Wallonia	Green certificates	The quota has increased every year. Progressive quota reductions apply to large consumers, reinforced by the new regional decree that entered into force on July 1st, 2014. These reductions apply for consumers that have contracted a sectoral agreement and we consider that these reductions only apply from consumer profile BSME.
Computation		
The cost of the GC and CHPC scheme is easily computed by multiplying the average yearly consumption by the average market price of the certificates weighted by the quota. The quota and GC (and CHPC) cost depend on the region. Wallonia and Flanders also have a **reduction on quota** that must be **considered for GC** (**and** CHPC**).**		

[172] Art. 7.1.10 § 2 Energiedecreet
[173] Art. 7.1.11 § 2 Energiedecreet
[174] (Elia, 2018)
[175] Art. 7.1.11/1 Energiedecreet; The companies listed in Annexe 3 and 5 of EEAG correspond to the companies listed in the Energiedecreet except for Nace 3832 (Recycling of waste) which is listed in Annexe 3 EEAG but not in the Energiedecreet.

Germany

Component 1 – the commodity price

Commodity prices computation rests on market prices and describes the cost of electricity for industrial consumers as of January 2022. The underneath commodity formula is used for each profile and is based on an analysis performed by the CREG of all Belgian consumers contracts with a yearly consumption higher than 10 GWh The EEX Futures and EPEX DAM prices are the national indexes employed in the computation. For profiles E0, E1 and E2, we use all hours apart from weekends of EPEX SPOT DE DAM, while for profile E3 and E4, we utilise all hours of EPEX SPOT DE DAM.

$$\textit{Commodity price}$$
$$= 36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Qi_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ EPEX\ Spot\ DE$$

Where:

	Explanation
CAL Y_{-1}	Average year ahead forward price in 2021
CAL Y_{-2}	Average two year ahead forward price in 2020
CAL Y_{-3}	Average three year ahead forward price in 2019
Qi_{-1}	Average quarter ahead forward price in the fourth quarter of 2021
Mi_{-1}	Average month ahead forward price in December 2021

Component 2 – network costs

The German electricity market differs from the Belgian one. The four TSOs exclusively operate on the (extra-) high voltage grid and all lower voltage levels are operated by DSOs (often up to 110 kV).

Our profiles are connected to different voltage levels, and different tariffs thus apply. The profiles are associated with the appropriate voltage level in the following table:

Table 83: Connection voltage for each consumer profile

<table>
<tr><th>Connection voltage (U_n)</th><th>Voltage profile</th><th>Consumer profile</th><th>Grid operator</th></tr>
<tr><td rowspan="3">1 kV ≤ Un ≤ 50 kV</td><td rowspan="3">Medium voltage</td><td>E0</td><td rowspan="5">DSO</td></tr>
<tr><td>E1</td></tr>
<tr><td rowspan="2">E2</td></tr>
<tr><td rowspan="2">Un = 110 kV</td><td rowspan="2">High voltage</td></tr>
<tr><td rowspan="2">E3</td></tr>
<tr><td rowspan="2">220 kV < Un ≤ 350 kV</td><td rowspan="2">Extra-High voltage</td><td rowspan="2">TSO</td></tr>
<tr><td>E4</td></tr>
</table>

German prices are disclosed as integrated tariffs both for transmission and distribution, thereby offering less view on the bill components. As described in the dataset, all four transmission zones are represented, but since Germany counts more than 800 DSOs[176], a weighted average of two DSOs (one rural and one urban) per zone is presented.

[176] (European Commission, 2010)

Transmission cost

Like Belgium, the German integrated transmission fees involve three main components:

Table 84: Components of German transmission costs

Transmission costs		
Component	**German label**	**Explanation**
Capacity charge	Leistungspreis	Depends upon the maximum capacity in kW contracted, expressed in EUR/year.
Consumption charge	Arbeitspreis	Depends upon the volume of energy consumed in kWh per year, expressed in cEUR/kWh/year.
Metering costs	Messstellenbetrieb	Charges related to the cost of metering and invoicing; fixed prices expressed in EUR/year.

Since it is assumed that load profiles do not exceed their contracted capacity, no other fees such as capacity excess fees are considered

When annual consumption exceeds 10 GWh, important transmission network costs reductions can apply on large industrial consumers. Users with a very abnormal load profile (case by case)[177] get a reduction of max. 90%. Moreover, users who exceed 7.000 consumption hours[178] a year, benefit from reductions, as shown in the table below:

Table 85: Grid fee reduction conditions

Annual consumption	Annual offtake hours	Grid fee reduction
>10 GWh	≥ 7.000 hours	- 80%
> 10 GWh	≥ 7.500 hours	- 85%
> 10 GWh	≥ 8.000 hours	- 90%

These reductions apply to profiles E3 and E4. We assumed that Profile E3 has a profile of 7.692 hours and pays consequently, only 15% of the grid fee, while this is only 10% for profile E4 (8.000 consumption hours). The costs can be allocated pro-rata to final consumers as a surcharge on network charges. Other profiles do not qualify for the following reasons:

- Profile E-BSME and E0 do not consume 10 GWh in addition to reaching fewer offtake hours, respectively 1.600 hours and 4.000 hours.
- Profile E1 and E2 do consume 10 GWh or more, but their offtake hours are lower (5.000 hours).

Distribution costs

Distribution costs follow an identical pricing methodology as for the transmission grid with similar terminology. Tariffs are also composed of three elements: capacity charge (i.e. “Leistungspreis”), consumption charge (i.e. “Arbeitspreis”) and the metering costs (“Messstellenbetrieb”). The tariffs may differ on price or range of maximum capacity contracted and electricity consumed.

Component 3 – all other costs

When it comes to German taxes and levies, the case is somewhat more complicated with many exemptions, progressive reductions, and various rates. As stated in the section “3.1 General assumptions”, we expect the consumer to behave in an economically rational manner aiming at the lowest tax rate. Whenever the application of reductions or exemptions depends on economic criteria, not under the full control of the user (energy cost/turnover, energy cost/gross value added, pension payments etc.), we present a range of possible options.

We counted seven taxes or surcharges that apply on electricity in Germany:

1. The “*KWKG-Umlage*” – Kraft-Wärme-Kopplungsgesetz or Combined Heat and Power Act – is a tax contributing to CHP-plant subsidies. The present forecast data of DSOs and the Federal office for

[177] (Bundesamt für Justiz, 2021)

[178] See definition in section 0. Consumer profiles.

Economic Affairs and Export - Bundesamt für Wirtschaft und Ausfuhrkontrolle shorten by BAFA – represent the backbone of the computations. There is a specific rate for consumers under certain conditions, below detailed. This applies to all profiles from E0 to E4.

Table 86: KWKG-Umlage tax in Germany

Category	Consumer group	Rates
Category A	All other consumers	**3,78 EUR/MWh**
Category B	If consumption > 1 GWh / year and electricity cost is: • For an extensive list of industrial sectors (annexe 3 of EEAG)[179]: >17% of gross value added [180]	**0,57 EUR/MWh** (85% reduction) but capped[181] at 0,5% of gross value added (average last three years) for all consumers with electricity cost >20% of gross value added
	If consumption > 1 GWh / year and electricity cost is: • For a less extensive list of industrial sectors (annexe 5 of EEAG): >20% of gross value added	**0,57 EUR/MWh** (85% reduction) but capped at 4,0% of gross value added (average last three years) for all consumers with electricity cost
Category C	If consumption > 1 GWh / year and electricity cost is: • For an extensive list of industrial sectors (annexe 3 of EEAG)[182]: between 14 and 17% of gross value added (avg. last three years)	**0,76 EUR/MWh** (80% reduction) but capped[183] at 0,5% of gross value added (average last three years) for all consumers with electricity cost >20% of gross value added
		0,76 EUR/MWh (80% reduction) but capped[184] at 4,0% of gross value added (average last three years) for all consumers with electricity cost

A **bottom rate of 0,30 EUR/MWh** exists that can benefit some consumers from category B and C. While the bottom rate applied for taxes might differ (see further with EEG-Umlage) depending on whether a consumer is, on the one hand, active in the aluminium, lead, zinc, or copper production or, on the other hand, active in another sector but the ones mentioned previously, it is not the case for the KWKG.

Regarding our reviewed profiles (E0 to E4), we display a range from the bottom rate to the category C rate for electro-intensive consumers. As for non-electro-intensive consumers, we consider a maximum price based on category A rates.

[179] (European Commission, 2014-2021)

[180] The notion of gross value added is defined in Annexe 4 of the Environmental and Energy State Aide Guidelines, Communication C200/50 of the European Commission. (European Commission, 2014-2021)

[181] However, these caps are only applicable if the consumer is part of an energy efficiency system improvement program.

[182] (European Commission, 2014-2021).

[183] However, these caps are only applicable if the consumer is part of an energy efficiency system improvement program.

[184] However, these caps are only applicable if the consumer is part of an energy efficiency system improvement program.

2. The "*StromNEV*", or Electricity Network Charges Ordinance, based on the regulation of charges for access to electricity networks § 19, is a digressive levy to compensate for §19 transmission tariff reductions. Again, different rates apply to the respective following categories:

Table 87: StromNEV tax in Germany

Band	Electricity offtake	Rates
Band A	Offtake ≤ 1 GWh/year	**4,37 EUR/MWh**
Band B	Offtake > 1 GWh /year	**0,50 EUR/MWh**
Band C	Offtake > 1 GWh/year and manufacturing industry with electricity cost > 4% of turnover	**0,25 EUR/MWh**

For all profiles understudy, we display two possibilities: the consumer can benefit from the Band C rate for his offtake above 1 GWh with the bottom range, or he does not qualify for the given conditions, in which case Band B rate applies for his offtake above 1 GWh and with top range on offtakes up to 1 GWh.

3. The "*Offshore-Netzumlage*", or Offshore Network Levy, is a levy to pay for offshore wind power generation units. Several rates apply depending on the band they fall into which depends on the total electricity offtake in a similar way we have seen for the KWKG/CHP surcharge.

Table 88: Offshore-Netzumlage tax in Germany

Category	Consumer group	Rates
Category A	All consumers that do not belong to category B or C	**4,19 EUR/MWh**
Category B	If consumption > 1 GWh / year and electricity cost is: • For an extensive list of industrial sectors (annexe 3 of EEAG)[185]: >17% of gross value added [186]	**0,630 EUR/MWh** (85% reduction) but capped[187] **at 0,5% of gross value added** (average last three years) for all consumers with electricity cost > 20% of gross value added
	If consumption > 1 GWh / year and electricity cost is: • For a less extensive list of industrial sectors (annexe 5 of EEAG): >20% of gross value added	**0,630 EUR/MWh** (85% reduction) but capped[188] **at 4,0% of gross value added** (average last three years) for all consumers with electricity cost < 20% of gross value added
Category C	If consumption > 1 GWh / year and electricity cost is: • For an extensive list of industrial sectors (annexe 3 of EEAG) [189]: between 14 and 17% of gross value added (avg. last three years)	**0,840 EUR/MWh** (80% reduction) but capped[190] at 0,5% of gross value added (average last three years) for all consumers with electricity cost > 20% of gross value added
		0,840 EUR/MWh (80% reduction) but capped[191] at 4,0% of gross value added (average last three years) for all consumers with electricity cost < 20% of gross value added

[185] (European Commission, 2014-2021).

[186] The notion of gross value added is defined in Annexe 4 of the Environmental and Energy State Aide Guidelines, Communication C200/50 of the European Commission. (European Commission, 2014-2021)

[187] However, these caps are only applicable if the consumer is part of an energy efficiency system improvement program.

[188] However, these caps are only applicable if the consumer is part of an energy efficiency system improvement program.

[189] (European Commission, 2014-2021).

[190] However, these caps are only applicable if the consumer is part of an energy efficiency system improvement program.

[191] However, these caps are only applicable if the consumer is part of an energy efficiency system improvement program.

A **bottom rate of 0,30 EUR/MWh** exists that can benefit some consumers of the EEG for the Offshore-Netzumlage (Offshore Network Levy).

Regarding our reviewed profiles (E0 to E4), we display a scope from the bottom rate to the category C rate for electro-intensive consumers. As for non-electro-intensive consumers, we consider a maximum price based on category A rates.

4. The "*EEG-Umlage*" – Erneuerbare-Energie-Gesetz or Renewable Energy Act – is a contribution to the renewable energy financing other than offshore wind power generation units. There are two different consumer categories: category A that pays a single 'top rate' for their total consumption and category B that only pays this top rate for the first GWh consumed. For the exceeding use (more than 1 GWh/year), the latter category benefits from an 85% reduction on the EEG-Umlage tax[192] while category C benefits from an 80% reduction on the EEG-Umlage fee. The following table gathers the information.

Table 89: EEG-Umlage tax in Germany

Category	Consumer group	Rates
Category A	All consumers that do not belong to category B	**37,23 EUR/MWh**
Category B	If consumption > 1 GWh / year and electricity cost is: • For an extensive list of industrial sectors (annexe 3 of EEAG)[193]: >17% of gross value added [194]	**5,58 EUR/MWh** (85% reduction) but capped[195] at 0,5% of gross value added (average last three years) for all consumers with electricity cost >20% of gross value added
	If consumption > 1 GWh / year and electricity cost is: • For a less extensive list of industrial sectors (annexe 5 of EEAG): >20% of gross value added	**5,58 EUR/MWh** (85% reduction) but capped[196] at 4,0% of gross value added (average last three years) for all consumers with electricity cost < 20% of gross value added
Category C	If consumption > 1 GWh / year and electricity cost is: • For an extensive list of industrial sectors (annexe 3 of EEAG)[197]: between 14 and 17% of gross value added (avg. last three years)	**13,0 EUR/MWh** (80% reduction) but capped[198] at 0,5% of gross value added (average previous three years) for all consumers with electricity cost >20% of gross value added
		13,0 EUR/MWh (80% reduction) but capped[199] at 4,0% of gross value added (average last three years) for all consumers with electricity cost

[192] Reductions such as the EEG-Umlage that are destined to fund renewable energy are allowed according to the Environmental and Energy State Aid Guidelines or so-called EEAG framework (European Commission, 2014-2020).

[193] (European Commission, 2014-2020).

[194] The notion of gross value added is defined in Annexe 4 of the Environmental and Energy State Aide Guidelines, Communication C200/50 of the European Commission. (European Commission, 2014-2020).

[195] However, these caps are only applicable if the consumer is part of an energy efficiency system improvement program.

[196] However, these caps are only applicable if the consumer is part of an energy efficiency system improvement program.

[197] (European Commission, 2014-2020).

[198] However, these caps are only applicable if the consumer is part of an energy efficiency system improvement program.

[199] However, these caps are only applicable if the consumer is part of an energy efficiency system improvement program.

For both categories B and C, there is a 1 EUR/MWh rate that applies to the industrial sectors, except for three particular industries - aluminium, zinc, lead, and copper production – that benefit from a **0,50 EUR/MWh bottom rate**.

The EEG-Umlage partially covers self-generated electricity consumption, depending on nature and amount of generated electricity (called '*Eigenversorgung'* in German). Anew, we presume the five studied profiles are not producing electricity, therefore not concerned by the EEG-Umlage regulations regarding self-generation.

Hereabout, we present a range of potentialities reflecting the impossibility to determine whether the consumer profiles meet the economic criteria to qualify as category B or C. The category A – paying the full price of 65 EUR/MWh is shown as an outlier even though it represents a significant group of non-electro-intensive consumers. As in 2017, in Germany, solely 2.058 companies among over 45.000 industrial companies are entitled to category B tariff. Notwithstanding, these companies designate around 42% of the overall German industrial energy consumption, as of 2018[200].

Regarding our profiles (E0 to E4) under review, we display a scope from the bottom rate to the category C rate for electro-intensive consumers. As for non-electro-intensive consumers, we consider a maximum price based on category A rates.

5. The "*Stromsteuer*", or Electricity tax, as its translation shows, is a tax on electricity. The standard rate is 20,50 EUR/MWh, remaining unchanged since 2003 (Bundesamt für Justiz, 2021). All applying industrial consumers benefit from a 15,37 EUR/MWh rate, which represents a 25% reduction. Initially implemented to fund employees' pensions, companies may be granted important reductions whether they do not contribute much because of a low number of employees.

   The maximum reduction rate that can be reached is 1,537 EUR/MWh with a 90% reduction. Since 2015, the implementation of this reduction, also called '*Spitzenausgleich*' depends on the countrywide effort regarding energy efficiency goals[201]. In 2019, 5.488 companies benefit from a reduction through this system[202].

   Apart from these cutbacks, electricity as a raw material for electro-intensive industrial processes is entirely exempted from electricity tax (Stromsteuer). Furthermore, for all profiles, we exhibit a scope from 0 EUR/MWh (exemptions) to 15,37 EUR/MWh. The lowest considered tariff for the non-exempted consumers is included in this range as it amounts to 1,537 EUR/MWh.

6. The "*Konzessionsabgabe*", or Concession fee, is a tax imposed on all users to fund local governments. The basic rate for industrial consumers is 1,10 EUR/MWh[203]. Yet, consumers whose final electricity price (all taxes and grid fees included) remains below a fixed threshold (in 2018: 139,20 EUR/MWh, published in December 2019[204]), are exempted from the concession fee. For our profiles, this means that the concession fee is only due when no substantial reductions are applicable for the EEG-Umlage. We hence only apply the concession fee in the (outlier) case where the full rate (64,05 EUR/MWh) of the EEG-Umlage is due.

7. The "*Abschaltbaren Lasten-Umlage*", or Interruptible loads levy, is a tax used to offset compensation payments made by transmission system operators to providers of so-called "switch-off" services. Providers of disconnection capacity are, for example, industrial companies that can refrain from supplying electricity for an agreed period of time or even at short notice if there is not enough electricity available in the electricity grid at the time. The TSOs balance their payments among themselves and allocate the amount to all final consumers. The aim is to improve grid stability and thus increase supply security.[205] The 2022-rate amounts to 0,03 EUR/MWh with a significant decrease compared to the 2021 -rate, which amounted to 0,09 EUR/MWh.

[200] (Bundesamtes für Wirtschaft und Ausfuhrko-trolle, 2017); (BDEW, 2018)

[201] (Bundesamt für Justiz, 2019)

[202] Bericht der Bundesregierung über die Entwicklung der Finanzhilfen des Bundes und der Steuervergünstigungen für die Jahre 2015 bis 2018, pg. 98

[203] (Acteno, 2019)

[204] (RGC Manager, 2019)

[205] (Netztransparenz.de, 2020)

France

Component 1 – the commodity price

In France, there is a specific scheme that enables alternative suppliers – apart from the historical one EDF – to obtain electricity from EDF under conditions set by the public authorities. The maximum aggregated amount is capped at 100 TWh/year, with a current price of 46,50 EUR/MWh[206]. The access to this regulated rate "ARENH" ("Accès Régulé à l'Electricité Nucléaire Historique")[207] depends on the consumer profile. This fixed-rate and the electricity market price compose the overall commodity price. In this document, we presume that consumers, behaving as rational actors, can choose between the following:

1. a combination of a market price and a regulated price (ARENH);
2. a market price only.

The amount of nuclear power at regulated prices (ARENH) attributed to a supplier depends on its consumer portfolio and the usage of that portfolio during a 'reference period' (low national consumption), which is highlighted in the following table.

Table 90: Reference period for the ARENH

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weekdays only	1 am < x < 7 am												
	All hours												
Weekends and bank holidays	All hours												

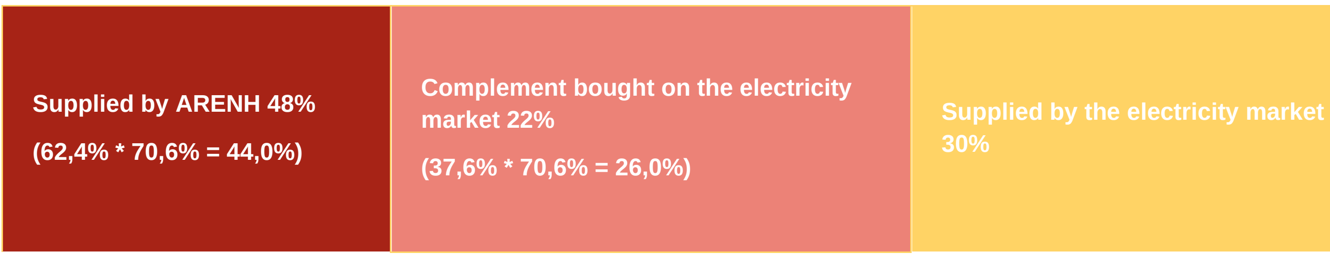
The Energy regulatory commission stated the regulated tariffs could be allocated only if two conditions were met:

- ARENH volumes must be representative of the share of historical nuclear production in total electricity consumption in France (approximately 70% in 2019[208])
- the distribution of the ARENH among suppliers must be made according to their customers' consumption during the hours of low national consumption.

In other words, for each supplier, the amount of electricity supplied by ARENH represents 70%, and the rest is bought in the electricity market (30%).

In 2022, as in 2021, the commodity price is thus a combination of the market price (including capacity certificates) and the regulated price. For the year 2022, the demand was 160 TWh which is above what EDF provides (100 TWh). To reach the capped level, only 62,4% of the demand for each supplier is fulfilled ('écrêtement' or capping).

Figure 26: Capping in 2022 for the ARENH



[206] The price has not changed since 2012 (Selectra, n.d.)

[207] ARENH started in 2011, its termination process will start in 2021 to be definitely stopped in 2025. (CRE, 2019)

[208] (Connaissance des Energies, 2020)

Under the ARENH conditions, defined in the French law[209], the electricity is sold by EDF to authorized suppliers in the form of products delivered over a one-year period, characterised by a quantity and a profile. This quantity is the average power of electricity delivered during the delivery period.

Given the consumption profiles and the capping we have determined, this means that 10,2% of the consumption of profile E-BSME, 25,5% of the consumption of profile E0, 31,9% of the consumption of profiles E1 and E2 is considered to allocate nuclear power at regulated prices to its supplier, 54,8% for E3 and 57,0% for E4. In 2020, commodity prices are a combination of the market price (including capacity certificates) and the regulated rate.

Table 91: Percentage of ARENH hours compared to their overall consumption hours

Days included	Weekdays	Weekends and Public holidays	Percentage of total consumption hours under ARENH (capping excl.)	Percentage of total consumption hours under ARENH (capping incl.)
Profile E-BSME	✔	✖	16,4%	11,2%
Profile E0	✔	✖	40,9%	28,0%
Profile E1	✔	✖	51,2%	35,0%
Profile E2	✔	✖	51,2%	35,0%
Profile E3	✔	✔	87,8%	60,1%
Profile E4	✔	✔	91,3%	62,5%

For the supply part not covered by regulated prices (ARENH), market prices are based on an analysis performed by the CREG of all Belgian consumers contracts with a yearly consumption higher than 10 GWh. For E0, E1 and E2, CREG did not include weekend hours of EPEX SPOT, while for E3 and E4 CREG included weekdays and weekend hours.

As a result, the commodity price equations are exhibited below:

$$\text{Commodity price E-BSME} = 10{,}2\%\ ARENH + 89{,}8\%\ (36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Qi_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ EPEX\ Spot\ FR)$$

$$\text{Commodity price E0} = 25{,}5\%\ ARENH + 74{,}5\%\ (36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Qi_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ EPEX\ Spot\ FR)$$

$$\text{Commodity price E1, E2} = 31{,}9\%\ ARENH + 68{,}1\%\ (36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Qi_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ EPEX\ Spot\ FR)$$

$$\text{Commodity price E3} = 54{,}8\%\ ARENH + 45{,}2\%\ (36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Qi_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ EPEX\ Spot\ FR)$$

$$\text{Commodity price E4} = 57{,}0\%\ ARENH + 43{,}0\%\ (36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Q_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ EPEX\ Spot\ FR)$$

209 (Legifrance, 2020)

Where:

	Explanation
ARENH	Nuclear power at the regulated price of 46,5 EUR/MWh
CAL Y_{-1}	Average year ahead forward price in 2021
CAL Y_{-2}	Average two year ahead forward price in 2020
CAL Y_{-3}	Average three year ahead forward price in 2019
Qi_{-1}	Average quarter ahead forward price in the fourth quarter of 2021
Mi_{-1}	Average month ahead forward price in December 2021

Component 2 – network costs

Integrated transmission and distribution costs

The RTE ("Réseau de Transport d'Electricité") is the Transmission System Operator (TSO) who oversees the transmission network. The French high voltage network starts at 1 kV, as shown in the table below and RTE operates the HTB (> 50 kV) networks.

Table 92: Voltage connection level and voltage domain in France

Voltage connection level (Un)	Voltage domain	
$U_n \leq 1$ kV	BT	Low Voltage domain
1 kV < $U_n \leq 40$ kV	HTA1 (E0, E1)	High Voltage domain
40 kV < $U_n \leq 50$ kV	HTA2	High Voltage domain
50 kV < $U_n \leq 130$ kV	HTB1 (E2)	High Voltage domain
130 kV < $U_n \leq 150$ kV	HTB2 (E3, E4)	High Voltage domain
350 kV < $U_n \leq 500$ kV	HTB3	High Voltage domain

The French transmission tariffs are composed of 3 components which are presented in this table:

Table 93: French transmission tariffs

<table>
<tr><th colspan="4">Network costs</th></tr>
<tr><th>Component</th><th>French label</th><th colspan="2">Explanation</th></tr>
<tr><td>Management component[210]</td><td>Composante annuelle de gestion</td><td colspan="2">The management component depends on whether a consumer has a unique contract or not. We assume profile E-BSME opted for individual contracts.</td></tr>
<tr><td rowspan="6">Component for taking off electricity</td><td rowspan="6">Composante annuelle de soutirage</td><td colspan="2">Multiple prices options exist varying depending on utilisation length and temporal differentiators with both capacity and consumption components. The prices options are:</td></tr>
<tr><td>HTA</td><td>HTB</td></tr>
<tr><td>1. Short use (CU) with a fixed peak</td><td>1. Short use (CU)</td></tr>
<tr><td>2. Short use (CU) with a mobile peak</td><td>2. Medium use (MU)</td></tr>
<tr><td>3. Long use (LU) with a fixed peak</td><td>3. Long use (LU)</td></tr>
<tr><td>4. Long use (LU) with a mobile peak</td><td></td></tr>
<tr><td>Metering tariff</td><td>Composante annuelle de comptage</td><td colspan="2">The metering tariff depends on whether the meter is owned by the consumer or not. The assumption is taken that concerned industrial profiles (E0 and E1) own their own meters.</td></tr>
</table>

For the consumers that fall under the HTA1 (E0 and E1), there is a similar offering, namely four contract options (see Table 94) based on the offtake in 5 different time slots. The number of hours per time slot was determined based on RTE's timeframe (see Table 95), considering that all these profiles do not operate during weekends. Again, all options were computed and are presented as a price range given that we cannot anticipate what option is preferred by our potential consumers.

Table 94: Hours per temporal classes in France

Hours per temporal classes – RTE Timeframe		
Temporal class	**Weekdays**	**Weekends**
Peak	4h/day for three months (December to February)	n/a
HPH	12h/day for three months (December to March) + 16h/day for two months (March and November)	n/a
HCH	8h/day for five months (November to March)	24h/day for five months (November to March)
HPB	16h/day for seven months (April to October)	n/a
HCB	8h/day for seven months (April to October)	24h/day for seven months (April to October)

[210] Since 2018, the level of this component also considers the financial compensation paid to suppliers in connection with the management of single-contract customers.

The offtake tariffs are a bit more complicated than the other components for profiles falling under HTB (HTB1 for E2 and HTB2 for E3/E4) tariffs. There are additional fees that could have been considered, but we chose not to in this study. Firstly, there are fees for planned and unplanned exceeding of power capacity, a cost for the regrouping of connection, a complimentary fee and emergency power supplies, a fee for reactive energy and a transformation fee. Secondly, there are injection fees, which need to be paid for the injection in the grid. As we assume that the load capacity is constant throughout the year and do not exceed their contracted capacity, the latter components are not taken into consideration.

Since February 2016, a new and relatively complex transmission tariff reduction was introduced to replace the more straightforward transmission tariff reductions that were in place between mid-2014 and late 2015. An increase in transmission tariffs finances those reductions billed to the network users who are not eligible for those reductions. Discounts are granted to baseload, 'anti-cyclical' and very large consumers according to the principles laid out in the table below.

Table 95: Transmission reductions eligibility criteria and rates

Origin of eligibility						
Stable profiles	**Anti-cyclical**	**Large consumers**	**Hyper electro-intensive cons. sites (art. D. 351-3)**	**Electro-intensive cons. sites (art. D. 351-2 or art D. 351-1)**	**Power storage sites connected to the grid**	**Other sites**
Annual offtake >10GWh and ≥ 7000 hours	Annual offtake >20 GWh and off-peak grid utilisation ≥44%	Annual offtake >500 GWh and off-peak grid utilisation ≥40% and ≤44%	80 %	45 %	30 %	5 %
Annual offtake >10 GWh and ≥ 7500 hours	Annual offtake >20 GWh and off-peak grid utilisation ≥48%	/	85 %	50 %	40 %	10 %
Annual offtake >10 GWh and ≥ 8000 hours	Annual offtake >20 GWh and off-peak grid utilisation ≥53%		90 %	60 %	50 %	20 %

With Electro-intensive and hyper-electro-intensive consumers defined as follows:

Table 96: Definitions of electro- and hyper-electro-intensive consumers

	Power consumed/Value added	Trade-intensity	Annual power consumption
Electro-intensive	>2,5 kWh/EUR	>4%	>50 GWh
Hyper-electro-intensive	>6 kWh/EUR	>25%	Not applicable

Given this framework, we can make the following assumptions for the four consumer profiles under review:

- Profile E0 and E1 are **not eligible** for any reduction, as it does not meet the criteria for stable, anti-cyclical or large consumers.
- Profile E2 is **not eligible** for any reduction, as it does not meet the criteria for stable, anti-cyclical or large consumers - with an off-peak utilisation rate of 41%.

- Profile E3 **is eligible** for a reduction, as a stable consumer profile. With 7.692 consumption hours per year, depending on the industrial activity and hence the electro-intensity of the consumer, the discount can vary from 10% to 85%.
- Profile E4 **is eligible** for a reduction, as a stable consumer profile. With 8.000 consumption hours per year, depending on the industrial activity and hence the electro-intensity of the consumer, the discount can vary from 20% to 90%.

Component 3 – all other costs

There are two different surcharges that must be considered for electricity in France, and two different surcharges apply to electricity. Furthermore, users have to pay for capacity certificates covering their demand. The surcharges for the large industrial profiles have remained the same between 2020 and 2021 except for capacity certificates. The surcharges are detailed as follow:

1. The "Contribution tarifaire d'acheminement" (CTA) is a surcharge for energy sector pensions (for Electricity and Natural gas Industries). There are two tariffs of the CTA depending on the grid to which the user is connected. For consumers directly connected to the transmission grid (profiles E2, E3 and E4 in France), the CTA amounts to 10,11%. For all other consumers connected to the distribution grid, the CTA amounts to 21,93% (profile E0 and E1 in France). The CTA is due on the fixed and capacity component of the transmission tariff. As the latter tariffs may vary according to the selected price option, CTA variance is represented as a range.
2. The "Contribution au service public d'électricité" (CSPE) is a surcharge which feeds a special budgetary program "Public service of energy" that pays (amongst other things) for the cost of support to produce electricity from natural gas-fired cogeneration plants, the péréquation tarifaire (including a small part of the cost of renewables) and social tariffs.[211] The standard tariff of the CSPE is 22,50 EUR/MWh, but three reductions are applicable:
    a. For electro-intensive consumers where the CSPE would have been (without reductions and exemptions) at least equal to 0,5% of value added, the CSPE is equal to:
        i. 2 EUR/MWh for consumers consuming above 3 kWh per euro of value added.
        ii. 5 EUR/MWh for consumers consuming between 1,50 and 3 kWh per euro of value added.
        iii. 7,50 EUR/MWh for consumers consuming below 1,50 kWh per euro of value added.
    b. For hyper-electro-intensive consumers, the tariff amounts to 0,50 EUR/MWh. To be very electro-intensive, consumers must satisfy both conditions:
        i. their energy consumption represents more than 6 kWh per euro of value added.
        ii. their activity belongs to a sector with a high trade intensity with third countries (> 25%).
    c. Sectors with a high risk of carbon leakage are metallurgy, electrolysis, non-metal minerals or chemical sectors. For electro-intensive consumers described under (i) above with a high risk of carbon leakage linked to indirect carbon emissions, the CSPE amounts to:
        i. 1 EUR/MWh for consumers consuming above 3 kWh per euro of value added.
        ii. 2,50 EUR/MWh for consumers consuming between 1,50 and 3 kWh per euro of value added.
        iii. 5,50 EUR/MWh for consumers consuming below 1,50 kWh per euro of value added.

[211] As of 1st February 2022, the French government applies changes to the CPSE and "bouclier tarifaire". Since this report intends to take a picture of the situation in January 2022, this information is not considered but can be of importance for future reports.

Lacking more detailed economic and financial data on the consumer profiles, we cannot exclude that the maximum rate of 22,5 EUR/MWh applies to one or more of our consumer profiles. More specifically, the economic conditions needed for the maximum rate to be applicable are the following (cumulative):

1. The annual value added of the industrial company exceeds:

	Value added
Profile E1 (10 GWh)	45 MEUR
Profile E2 (25 GWh)	112,50 MEUR
Profile E3 (100 GWh)	450 MEUR
Profile E4 (500 GWh)	2.250 MEUR

2. The industrial company does not meet the criteria for very-electro-intensity specified under (ii).
3. The industrial company does not meet the criteria for carbon leakage risk defined under (iii).

We, therefore, present the maximum rate of 22,50 EUR/euros per MWh as a possible outlier for all consumer profiles (non-electro-intensive consumers). In addition, we also present a range from 0,50 EUR/MWh to 7,50 EUR/MWh for electro-intensive consumers.

There are also exonerations on the CSPE, namely for 5 types of consumption/activities:

i. Electricity is used for metallurgical processes, chemical reduction and electrolysis
ii. Companies for which electricity accounts for more than half of the cost of a product
iii. Manufacture of non-metallic mineral products
iv. Production of energy products, electricity generation
v. Compensation for losses on the public electricity transmission and distribution network.

This exemption may be total or partial, depending on the use of the site's electricity.

3. Since 2017, every supplier needs to hold capacity certificates to cover for the demand of its users during peak times. Final consumers also need to hold capacity certificates to cover their demand during peak times. The final demand to be covered is subject to a reduction factor, which was 0,99 in 2020. The price per certificate is 31.241,77 EUR/MW in 2020.[212] Capacity certificates only need to be bought for the electricity which is not bought at regulated rates since the electricity bought at regulated prices contains capacity certificates. For the industrial profiles understudy, the assumption is made that their electricity usage during peak moments is the same as during other moments.

[212] Data was made available by the French regulator, CRE

The Netherlands

Component 1 – the commodity price

Commodity prices computation rests on market prices and describes the cost of electricity for industrial consumers as of January 2022. CREG used the ICE Endex CAL and the APX NL DAM as national indexes for the computation. The underneath commodity formula is used for each profile and is based on an analysis performed by the CREG of all Belgian consumers contracts with a yearly consumption higher than 10 GWh. For E-BSME to E24, CREG did not include weekend hours of APX NL DAM, while for E3 and E4 CREG included weekdays and weekend hours of APX NL DAM. The CREG provided the formulas and the computation of the commodity price. The equations are based on an analysis of all Belgian consumers with a yearly usage higher than 10 GWh, performed by the Belgian regulator of the electricity supply.

Commodity price

$$= 36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Qi_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ APX\ NL\ DAM$$

Where:

	Explanation
CAL Y_{-1}	Average year ahead forward price in 2021
CAL Y_{-2}	Average two year ahead forward price in 2020
CAL Y_{-3}	Average three year ahead forward price in 2019
Qi_{-1}	Average quarter ahead forward price in the fourth quarter of 2021
Mi_{-1}	Average month ahead forward price in December 2021

Component 2 – network costs

Integrated transmission and distribution costs

In the Netherlands, the network costs integrate both transmission and distribution costs. As Dutch TSO, Tennet operates the transmission grid and is responsible for the infrastructure above 110 kV. Hence, profiles E3 and E4 are assumed to be directly connected to the transmission grid, respectively to the high voltage (110-150 kV) and the extra high voltage grid (220-380 kV). Consequently, they are subject to Tennet's prices. Concerning the other industrial profiles (E0, E1 and E2) and E-BSME, connected to lower voltages and thus to the distribution grid, they are subject to DSOs 'prices. Similar to the residential profiles in the Netherlands, we use a weighted average of the seven distribution zones because the Netherlands uses an integrated tariff[213].

[213] All industrial profiles are not served by all DSOs. COTEQ and RENDO do not serve consumers similar to our E1 and E2 profiles (from HS voltage level) while Westland does not provide profiles similar to E2 (from TS)

For all profiles above-mentioned, they involve the same four main components[214]:

Table 97: Network cost component in the Netherlands

Network costs		
Component	**Dutch labelling**	**Explanation**
Standing charge	Vastrecht	Fixed basic fee (expressed in EUR/year).
Capacity charge	Capaciteitstarieven	Fees are covering the costs associated with the transmission of electricity. They are subdivided into three terms: - Fixed charge depending on the contracted capacity (expressed in EUR/year); - Variable charge depending on the monthly peak (expressed in EUR/kW/month); - Variable charge depending on the consumption level (expressed in EUR/kWh).
Periodical connection tariff	Periodieke aansluitvergoeding	Fixed fee is covering the costs for managing the connection (expressed in EUR/year).
Metering charge	Meettarief	Fixed charges are covering for the use and management of energy meters (expressed in EUR/year).

However, a reduction ("*Volumecorrectie*") in transmission prices must be taken into consideration. This correction targets energy-intensive consumers who jointly fulfil the following two conditions[215]:

1. The customer exceeds 50 GWh/year in terms of offtake.
2. The operating time exceeds 5.700 hours per year (or 65%) during off-peak hours[216].

The possible reduction is calculated according to the following formula, with a 90% reduction limit:

$$Volume\ correction\ (in\ \%) = \frac{(Company\ operating\ time - 65\%)}{(85\% - 65\%)} * \frac{(offtake - 50\ GWh)}{(250\ GWh - 50\ GWh)} * 100$$

Where

$$Company\ operating\ time\ (in\ \%) = \frac{(Total\ offtake\ during\ offpeak\ hours\ /\ maximum\ capacity)}{(hours\ per\ annum)} * 100$$

Component 3 – all other costs

In general, two surcharges apply to the electricity bill for industrial consumers:

1. The Energy Tax, *Regulerende Energie Belasting* (REB), is a degressive tax, except for the first 10 MWh, on all energy carriers;
2. The ODE levy is a digressive levy, *Opslag Duurzame Energie* (ODE), except for the first 10 MWh, on electricity that the revenues are used to finance renewable energy.

[214] (TenneT, 2020)
[215] (Overheid, 2014)
[216] In the Netherlands, off-peak hours are between 11pm-7am in addition to weekends and bank holidays.

Both taxes rates for 2022 are as follows:

Table 98: Energy tax and ODE levy according to the consumption level for electricity (industrial consumers)

Band	Consumption level	Energy Tax (EUR/MWh)	ODE (EUR/MWh)
Band A	0 – 10 MWh	36,79	30,50
Band B	10 – 50 MWh	43,61	41,80
Band C	50- 10.000 MWh	11,89	22,90
Band D	>10.000 MWh (professional)	0,57	0,50

There are several reductions and exemptions for these above-mentioned taxes:

1. Tax refund scheme ("teruggaafregeling"): This is applicable for industrial consumers who are classified as being energy-intensive and which concluded a multiple-year agreement with the Dutch government to save energy by improving their energy efficiency. These consumers can apply for a refund of any tax paid above their consumption of 10.000 MWh after each financial year. Given the latter threshold, only consumer profiles from E2 to E4 are considered for this refund. Concretely, the payback potentially granted is computed as the positive difference between[217]:
    a. The tax due on electricity consumption and;
    b. The highest amount between the tax normally due on the first 10 GWh consumption and the tax that would be due if all consumption was taxed at a rate equal to the European minimum level of taxation (0,5 EUR/MWh).

This refund is to be computed on joined taxes amounts for the Energy tax and the ODE[218].

2. Industrial consumers are exempted if they use electricity for chemical reduction or electrolytic and metallurgical processes.
3. Tax discounts are also possible for cooperatives. However, the profiles under study are assumed not to fall under this category.

Several of the criteria that give access to these tax refunds are based upon economic and accounting data, which are not defined for the industrial profiles of this study. Therefore, we present a range of results with an outlier option (maximum rate only applies if the industrial consumer is not energy-intensive and cannot qualify for the full exemption) and a range spanning from the minimal option (totally exempted) to the refund rate (0,50 EUR/MWh).

[217] (Belastingdienst, 2019)

[218] At 2022 level, for profile E2 (consumption of 25 GWh), the tax normally due for both the Energy tax and the ODE amounts to 366.299,80 EUR whereas the tax due on the first 10 GWh equals 350.249,80 EUR and the total consumption taxed at European minimum level reaches 12.500 EUR. Therefore, this profile is paid back 16.050 EUR (= 366.299,80 - 350.249,80).

The United Kingdom

Component 1 – the commodity price

Commodity prices computation rests on market prices and describes the cost of electricity for industrial consumers as of January 2022. We used the APX UK DAM as the national index for the calculation. The underneath commodity formula is used for each profile and is based on an analysis performed by the CREG of all Belgian consumers contracts with a yearly consumption higher than 10 GWh.

The commodity formula applies to each profile. For profiles E0, E1 and E2, we use all hours apart from weekends of APX UK DAM, while for profile E3 and E4, we utilise all hours of APX UK DAM.

Commodity price

$$= 36.5\%\ CAL\ Y_{-1} + 27.4\%\ CAL\ Y_{-2} + 21.4\%\ CAL\ Y_{-3} + 8.2\%\ Qi_{-1} + 4.2\%\ Mi_{-1} + 2.3\%\ APX\ UK\ DAM$$

Where:

	Explanation
CAL Y_{-1}	Average year ahead forward price in 2021
CAL Y_{-2}	Average two year ahead forward price in 2020
CAL Y_{-3}	Average three year ahead forward price in 2019
Qi_{-1}	Average quarter ahead forward price in the fourth quarter of 2021
Mi_{-1}	Average month ahead forward price in December 2021

We computed the commodity price based on the formula mentioned above, entirely in Pound Sterling which has been converted to Euro at the January 2022 rate[219] (also see section "General assumptions")

Component 2 – network costs

Transmission cost

As we have described above, the UK's network structure is divided between three TSOs, six DSOs and fourteen identified tariff zones. On a technical level, the grid is organised as follows:

Table 99: Tariff scheme regarding transmission cost in the United Kingdom

United Kingdom		
Connection voltage (U_n)	**Operator**	**Tariff scheme**
U_n < 22 kV	**DSO**	Common Distribution charging methodology (CDCM) + Transmission charges (TNUoS)
22 kV =< U_n =< 132 kV		Extra high voltage distribution charging methodology (EDCM) + TNUoS
275 kV =< U_n =< 400 kV	**TSO**	Transmission charges (TNUoS)

[219] Conversion factor of 1,1976 EUR/GBP, the average conversion factor over the month of January, according to the European Central Bank is considered.

The voltage of the transmission grid is particularly high, which is why we assume that E-BSME, E0, E1 and E2 are still connected to the distribution grid, but the bigger industrial profiles (E3 and E4) are directly connected to the transmission grid. In the UK transmission charges are known as the Transmission Network Use of System (TNUoS) charges and have two different rates: Half-Hourly (HH) and Non-Half-Hourly (NHH). As only the former applies to our industrial profiles, we only detail this one below:

Table 100: Half-hourly (HH) tariff option in the United Kingdom

United Kingdom		
Tariff option	**Explanation**	**Profile**
Half-Hourly (HH)	Metering system, which utilises AMR (automatic meter reading) technology to provide electricity consumption reading. The system sends updated meter reads to the energy supplier every half hour. Customers pay a capacity tariff depending on their connection capacity, expressed in p/kVA/day.	E0 to E4

Since the HH tariffs differ between all fourteen zones of the UK, a weighted average of the transmission costs is presented for all our industrial profiles.

There are also rates applied to cover for network losses, and the UK uses a system similar to the Belgian one (but more dynamic) to apply these costs. The Balancing and Settlement Code Administrator, each half-hour, defines the Transmission losses multiplier (TLM) applicable for offtake and delivery. This cost is added to the bill as a percentage of the commodity cost for offtake and should thus not be part of this component. Yet, even though it is not part of the tariff structure as such, we include it as a network component.

Distribution costs

Distribution costs, which are due for profiles E0, E1 and E2, have a more complex methodology.

Profiles E0 and E1 pay according to the Common Distribution Charging Methodology (CDCM). They are billed for total offtake across all demand time periods and with important differences between peak and off-peak offtake. This methodology encompasses the following components:

Table 101: Distribution costs (CDCM) in the United Kingdom

United Kingdom	
Component	**Explanation**
Total consumption	A unit charge in p/kWh
Fixed charge	Fixed charge per offtake point in p/MPAN[220]/day
Metering costs[221]	Cost for use and management of your energy meter in p/day or GBP/year

[220] Meter Point Administration Number

[221] Electricity metering charges in the UK are not easily accessible. A proxy was used to account for these charges based on a methodology disclosed by National Grid, British TSO delivering electricity and natural gas. As electricity and natural gas are frequently offered as one product with a dual tariff, natural gas metering methodology was used as a proxy. Charges are billed as a fixed yearly charge for installation costs recovered via a rental given that we assume our profiles do not own the meters.

As for profile E2, it is charged through the EHV Distribution Charging Methodology (EDCM), which are largely based on capacity with a small element for offtake in the high demand time-period in addition to a fixed charge. The EDCM provides for individual tariffs for each customer depending upon location, demand, generation (type) and capacity. The individual EDCM-rates are made public, which is why we calculated the average individualized EDCM-rates compared to CDCM-tariffs in each of the fourteen zones. We present the average EDCM-rates on CDCM-tariffs in the fourteen zones as the distribution cost value for profile E2. The following components compose EDCM charges:

Table 102: Distribution costs (EDCM) in the United Kingdom

United Kingdom	
Component	**Explanation**
Total consumption	A unit charge for high demand periods, expressed in p/kWh.
Fixed charge	Fixed charge per offtake point in p/day
Capacity charge	Daily Fixed charge function of the contracted capacity, expressed in p/kVA/day
Metering costs[222]	Cost for use and management of your energy meter in p/day or GBP/year

Component 3 – all other costs

Three different extra costs exist in the UK: two levies and the indirect cost of one renewable subsidies scheme.

1. The Climate Change Levy[223] (CCL) is applicable to electricity. The standard rate for electricity offtake is 0,0078 GBP/kWh, but there is a possible reduction of 93% if the energy-intensive consumer has a Climate Change Agreement (CCA). We assume that all industrial profiles (E0 to E4) under this study concluded a CCA. Given that 7.814 facilities were covered by a CCA in 2017[224] for about 7.700 large businesses (>250 employees)[225], we consider that all industrial profiles from this study are part of a sectoral agreement. Besides, a large spectrum of industrial processes[226] is accepted to be eligible to apply for a CCA, which widens the number of companies that can be considered.

   There are multiple exemptions regarding the CCL, among others when electricity is a supply[227]:

   - For domestic use or used by a charity for its non-business activities
   - Used in some forms of transmission
   - To combined heat and power stations
   - For small generating stations (other than combined heat and power) used to generate any electricity that’s not self-supplied
   - Not used as fuel
   - For use in metallurgical and mineralogical processes.

[222] Electricity metering charges in the UK are not easily accessible. A proxy was used to account for these charges based on a methodology disclosed by National Grid, British TSO delivering electricity and natural gas. As electricity and natural gas are frequently offered as one product with a dual tariff, natural gas metering methodology was used as a proxy. Charges are billed as a fixed yearly charge for installation costs recovered via a rental given that we assume our profiles do not own the meters.

[223] (GOV.UK, 2021)

[224] (Ecofys and adelphi, 2018)

[225] (Department for Business, Energy & Industrial Strategy, 2020)

[226] Defined in the Appendix A of the Climate Change Agreements Operations Manual.

[227] (GOV.UK, 2020)

2. The Assistance for Areas with High electricity distribution Costs[228] (AAHEDC) the levy compensates for high distribution costs in the zone of Northern Scotland (1 of the 14 zones) corresponding to 0,040427 p/kWh.
3. The Renewables Obligation (RO) is the cost considered for the large-scale renewable subsidy scheme. The renewable quota is 0,471 Renewable Obligation Certificates (ROC's) per MWh for the period between 1st of April 2021 and 31st March of 2022. To encourage companies to meet the renewables obligation, a fee per missing ROC of 50,80 GBP/ROC (or 60,83 EUR/ROC). Since the renewable quota is 0,492 ROC/MWh, this ends up in a potential fee of 24,99 GBP/MWh (or 29,93 EUR/MWh). The obligation period lasts from the 1st of April until the 31st of March, and we thus take the ROC buy-out price and quota from the year 2021.[229]
4. An additional cost identified in the United Kingdom is that of the capacity market. However, it was decided to not take this cost into consideration. Firstly, because it is paid for by the suppliers, who integrate it in their offerings and do not disclose the exact amount of the costs and secondly because the United Kingdom is an outlier in most electricity profiles under review (E1 to E4). Therefore, the prices in this study can be seen as a slight underestimation of the real electricity cost in the United Kingdom.

[228] (National Grid ESO, 2020)
[229] (OFGEM, 2020)

Natural gas

Natural gas: Detailed description of the prices, price components and assumptions

For all countries under review, this section details:

1. **Commodity costs** for profiles G0, G1 and G2
2. **Network costs** for profiles G0, G1 and G2
3. **All other costs** for profiles G0, G1 and G2

Profile	Consumption (in MWh)
G0	1.250
G1	100.000
G2	2.500.000

Belgium

Component 1 – the commodity price

Commodity prices, in this document, rest on market prices. The given prices for profiles G0 to G2, are the result of prices observed in January 2022 and the CREG provided PwC with the commodity price for the Belgian regions.

Component 2 – network costs

Transport costs

According to the consumer profiles set out above, G0 and G1 are still connected to the distribution grid. We assume that they are respectively connected at T4 and T6 levels. Concerning G2, as most industrial consumers in Belgium are connected at high-pressure level, we assume that this is also the case for our G2 profile.

Natural gas transport costs have 3 main components for clients directly connected to the transport grid:[230]

1. Entry capacity fee (border point entry fee)
2. Exit capacity fee (HP-service fee or RPS[231])[232]
3. Commodity fee ("energy in cash").

The optional odorization tariff is not considered in the scope of this study. The reasoning is that most industrial consumers in Belgium on the TSO-grid do not need odorization services from Fluxys.

Part of the network in Belgium is supplied with "L-gas". This natural gas has a lower calorific value than the "H-gas" that is used in most of Western Europe. The following table illustrates the repartition of industrial consumers supplied with H- or L-gas depending on their connection to the Distribution (DG) or Transport grid (TG).

Table 103: Natural gas type by grid type for each Belgian region (in%)

[230] Since 2020, the "fix/flex" tariff option does no longer exist and therefore cannot be chosen by directly connected consumers (CREG, 2020).

[231] RPS stands for Reduced Pressure Service which, since 2020, encompasses both former Medium Pressure (MP) and Pressure-reducing stations (DPRS) services.

[232] For exit capacity fee at end-user domestic exit points, HP (High Pressure) tariff option or RPS can be chosen. As 99% of Belgian industrial consumers need to pay HP capacity fees, while the MP capacity fee is due for 31% of the Belgian industrial consumers, the exit capacity was therefore calculated as follows: 0,99* HP-tariff + 0,31*RPS-tariff.

	Brussels		Flanders		Wallonia	
Natural gas Type	**DG**	**TG**	**DG**	**TG**	**DG**	**TG**
H-gas	30,18%	-	58,25%	94,78%	87,53%	98,96%
L-gas	69,82%	-	41,75%	5,22%	12,47%	1,04%

Source: CREG (2022)

The transport tariffs for natural gas in Belgium are largely capacity-based and expressed in EUR/kWh/year. Transport costs vary depending on the type of natural gas consumed, which is why a weighted average of H- and L-tariffs for the G2 profile are computed.

Finally, the commodity fee depends on the annual consumption of the end-user (in MWh/year). It accounts for 0,08% of a theoretical commodity cost per year, based on the Gas Price Reference[233], which is the ZTP average of day-ahead commodity prices, as published by Powernext.

Distribution costs

As previously stated, profile G0 and G1 are connected to the distribution grid. Users of the distribution grid are also subject to additional tariffs. The T4 category was selected for our G0 profile and T6 for G1. Since the highest category on the Brussels' distribution grid is T5, this one was selected for the G1 profile.[234] The distribution tariffs are typically divided over 3 components:

1. Fixed component
2. Proportional component
3. Capacity component (only Flanders and Wallonia).

Besides, other components are part of the distribution costs, although they vary depending on the region. As such Brussels includes a tariff for the measuring activities and Flanders a tariff of data management, whereas Wallonia adds a tariff for regulatory balances.

The weighted average of each component across all DSOs active in the region is considered since the tariffs differ across regions and DSOs. The weights are based on the number of EAN connections of each DSO. For Flanders, all DSOs under FLUVIUS were considered (100% of EAN connections) and in Wallonia all the DSOs under ORES and RESA (100% of EAN connections). With only one DSO, Sibelga is the DSO used for Brussels.

Component 3 – all other costs

In Belgium, two extra costs are charged to natural gas consumers directly connected to the transport grid; three regional taxes also apply to all profiles studied whereas local taxes and levies can be charged to profiles G0 and G1 given their connection to the distribution grid. These costs can be grouped into two categories, as presented below, where federal charges are levied by the suppliers and regional charges are levied by regional DSOs (and invoiced to the suppliers which invoice final customers): Tariff rates are mentioned when they do not vary depending on the consumer profile and/or the DSO; otherwise, units in which they are expressed are detailed.

[233] For more information on the Gas Price Reference, please see (Fluxys, 2020)

[234] T5 (and not T6) is the highest category for Sibelga network active in Brussels which we use in the scope of this study.

Table 104: Other costs for industrial natural gas consumers applying to all Belgian regions

All regions	Profiles
Regional Public Service Obligations (Regional PSOs) on distribution	
a. A general tariff for regional PSOs (expressed in EUR/MWh)	G0 and G1
Taxes and levies on the federal level	
II. Federal taxes and levies	
a. Energy contribution[235] (0,9978 EUR/MWh). b. Special excise duty	a. All b. All

The table below shows the tax rates applied as of 2022 at the Federal level in Belgium for all commercial profiles. According to Art. 429.§ 1er of the law from 27th December 2004[236] an exemption is foreseen when electricity and gas are not used only for heating and transport, but also for metallurgic or chemical industrial procedures. For the sake of this report, we assumed that profiles G1 and G2 could potentially benefit from this exemption, if they fall within the conditions specified by the law.

Table 105: Special excise duty rates in Belgium for Gas commercial consumers

Yearly consumption	Tax for G0, G1 and G2 (EUR/MWh)
Consumption up to 20.000 MWh	0,66
Consumption between 20.000- 50.000 MWh	0,56
Consumption between 50.000- 250.000 MWh	0,54
Consumption between 250.000 – 1.000.000 MWh	0,42
Consumption between 1.000.000- 2.500.000 MWh	0,22
Consumption above 2.500.000 MWh	0,15

[235] The tariff is reduced to 0,54 €MWh for holders of an EBO or sector agreement. We assume that the reduction applies starting G0.

[236] https://www.ejustice.just.fgov.be/eli/loi/2004/12/27/2004021170/justel

Table 106: Other regional costs for industrial natural gas consumers[237]

Brussels	Flanders	Wallonia	Profiles
Regional Public Service Obligations (Regional PSOs) on transport			
a. Brussels regional public service obligation[238] (expressed in EUR/MWh)	-	-	G0 and G1
Taxes and levies on the regional level			
Regional taxes and levies on distribution			
a. Charges on non-capitalised pensions (0,005 - 0,047 EUR/MWh)	a. Charges on non-capitalised pensions (0,0063 - 0,0488 EUR/MWh)	a. Levy for occupying road network (0,067 - 0,492 EUR/MWh)	G0 and G1
b. Levy for occupying road network (1,304 EUR/MWh)	b. Other local, provincial, regional, and federal taxes, Charges, Surcharges, Fees, and contributions (0,0012 - 0,0095 EUR/MWh)	b. Corporate income tax (0,0359 - 0,2677 EUR/MWh)	
c. Corporate income tax and other taxes (0,021 - 0,214 EUR/MWh)	-	c. Other local, provincial, regional, and federal taxes, Charges, Surcharges, Fees, and contributions (0,0002 - 0,0022 EUR/MWh)	
Regional taxes and levies on transport			
-	-	Connection fee 0,075 EUR/kWh for the first 1 MWh; then a. if yearly consumption < 1 GWh: 0,000075 EUR/kWh b. if yearly consumption < 10 GWh: 0,00006 EUR/kWh c. if yearly consumption >= 10 GWh: 0,00003 EUR/kWh	All

[237] The tariffs represented in this table vary depending on the DSO and we have thus chosen to only present the minimum and maximum range of the tariff from the largest (or only) DSO of the region. Sibelga for Brussels, Fluvius Antwerpen for Flanders and ORES Hainaut for Wallonia.

[238] Depends on the calibre of the meter being installed. For G-Pro, G0 and G1 we respectively chose the meters process between 16-25 m^3, 40-65 m^3 and > 160 m^3. Which respectively coincides with 57,48€, 287,64€ and 742,32€, on which VAT is due.

Germany

Component 1 – the commodity price

In this study, natural gas commodity prices are estimated based on market prices.

For all industrial profiles (G0 to G2) as well as G-PRO, the commodity price exhibited in this document is provided by the CREG.

Component 2 – network costs

Transport costs

There are 11 TSOs for natural gas in Germany, which all have directly connected clients. While their tariff methodology might be similar, they use different rates. As we consider that profile G2 is directly connected to the transport grid, entry and exit capacity tariffs for all TSOs have been considered in addition to the costs related to metering and invoicing. The transport tariffs comprise in general, the same three components:

Table 107: Components of German transport costs

Transport costs	
Component	**Explanation**
Entry point capacity rate (Einspeisung)	Depends on the contracted entry point and the capacity contracted (in kW)
Exit point capacity rate (Ausspeisung)	Depends on the exit point chosen and the capacity contracted (in kW)
Metering costs (Messung)	Both charges related to the cost of metering, fixed prices (in EUR/year)
Metering point operation per counting point charges (Messstellenbetrieb)	

Distribution costs

Since two of our profiles (G0 and G1) are connected to the distribution grid, they are subject to distribution costs. Since these differ between DSOs, prices from 8 different DSOs (4 rural, 4 urban) are considered. However, the tariffs from the DSOs also integrate the transport tariffs. While we assume profile G0 falls under the category "Netzentgelte für Entnahmestellen ohne Leistungsmessung" (or Network charges for offtake points without power metering) as their consumption is yearly metered, G1 is considered as being in the category "Netzentgelte für Entnahmestellen mit Leistungsmessung" due to its daily metered consumption (or Network charges for offtake points with power metering).

These distribution tariffs are generally composed of 5 components:

Table 108: Components of German distribution costs

Transport costs	
Component	**Explanation**
Basic charge (Sockelbetrag Arbeit/Leistung)	Fixed basic fee, expressed in EUR/year.
Capacity charge (Leistungspreis)	Depends upon the maximum capacity in kW contracted, expressed in EUR/year.
Labour charge (Arbeitspreis)	Depends upon the volume of energy consumed in kWh per year, expressed in cEUR/kWh/year.
Metering costs (Messung)	Charges related to the cost of metering and invoicing, fixed prices (in EUR/year)
Metering point operation per counting point charges (Messstellenbetrieb)	

German annual charge for natural gas is computed as follows:

$$\begin{aligned} Annual\ charge = {} & [Arbeitspreis * (Annual\ Consumption - \ Durch\ Sockelbetrag\ abgegoltene\ Arbeit) \\ & + Sockelbetrag\ Arbeit] + [Leistungspreis \\ & * (Annual\ Consumption - \ Durch\ Sockelbetrag\ abgegoltene\ Leistung) \\ & + Sockelbetrag\ Leistung \end{aligned}$$

Where, *Durch Sockelbetrag abgegoltene Arbeit/Leistung* is the price band bottom levels, expressed in kWh or in kW respectively.

Depending on the consumers' consumption volumes and capacity, they fall under certain categories (the number of categories depends on the local DSO). These categories determine the amount of consumption volume and capacity that must be set at a standard rate, while the rest fall under the network cost fares as determined by local DSOs. These volumes and capacity are said to be compensated to limit network costs and ultimately, DSOs' remuneration.

Component 3 – all other costs

Four further costs were found for industrial consumers in Germany: the "*Biogaskostenwälzung*" or Biogas levy, the "*Marktraumumstellungsumlage*" or Market Area Conversion Levy, the "*Erdgassteuer*", or Gas tax, the "*Konzessionsabgabe*", or concession fee, and the "CO2 Steuer, or carbon tax, which are detailed in the table below.

Table 109: Other costs for large industrial natural gas consumers

All other costs			
Component	**German label**	**Explanation**	**Profiles**
Biogas levy	Biogaskostenwälzung	A Nationwide standard levy implemented in January 2014. This levy amounts to 0,574 EUR/kWh/year in 2022.	All
Market Area Conversion Levy	Marktraumumstellungs-Umlage	A burden to balance the conversion costs from L-gas to H-gas, implemented in January 2015. The 2022 levy amounts to 0,734 EUR/kWh/y.	All
Energy tax	Energiesteuer	This tax has various rates depending on the energy source (e.g. coal, biodiesel, natural gas, bioethanol…), valid since January 1989. For natural gas for industrial consumers, **the standard tax rate is 5,50 EUR/MWh**. A reduction of 1,38 EUR/MWh can apply, bringing the price down to **4,12 EUR/MWh** (= 5,50 EUR/MWh -1,38 EUR/MWh)[239] As mentioned for the electricity in Germany, based on the amount of pension contributions paid by the company, more reductions can be granted. Initially implemented to fund employees' pensions, companies may be granted important reductions whether they do not contribute much because of a low number of employees. Another cut of 2,28 EUR/MWh can be used for natural gas, lowering the rate to 1,84 EUR/MWh (= 4,12 EUR/MWh - 2,28 EUR/MWh); however, it is an 'incompressible' rate. **The minimum tariff** is computed as follows: A 90% reduction on 2,28 EUR/MWh represents the maximum cut ((100%-90%) * 2,28 EUR/MWh = 0,228 EUR/MWh) to which we add the previous lowest rate (1,84 EUR/MWh) reaching **2,068 EUR/MWh** (=0,228 EUR/MWh + 1,84 EUR/MWh)[240][241]. These reductions apply depending on the sectorial affiliation of companies. No energy tax applies when the natural gas purpose is not fuel or heating, but as raw material, feedstock part of an industrial process[242]. As the pension payment reduction system is based on economic criteria that are not precise for profile G0 and G1, we exhibit a range from 2,068 EUR/MWh (minimum rate) to 4,12 EUR/MWh (standard reduction). As we assume that G2 might consume electricity as feedstock in its industrial processes, we display a scope from 0 EUR/MWh (exemption – only the biogas levy must be paid) to 4,12 EUR/MWh (standard reduction)	All
Concession fee	Konzessions-abgabe	A tax that also exists for electricity consumption. However, clients with a high-level use (higher than 5 GWh/year) benefit from a total exemption, meaning this tax is not relevant as we study profiles with greater use (i.e., not relevant for G1 and G2) except for G0.[243]	G-PRO and G0
Carbon Tax	CO2 Steuer	An energy tax that is applied to the gas used for heating and transport and it is applicable to all consumers profiles under review. The rate amounts to 0,5461 ct/kWh of gas consumed.	All

[239] This tax rate hasn't changed in the past years.

[240] Energiesteuergesetz § 54, Energiesteuergesetz § 55

[241] In very specific cases, further reductions are possible. We have not included these in our report.

[242] Energiesteuergesetz § 27

[243] This tax rate hasn't changed in the past years.

France

Component 1 – the commodity price

France used to work with two market areas (PEG Nord and TRS) regarding natural gas. In 2018, the merger of these areas resulted in the creation of a single zone, TRF (PEG), which we present accordingly as a unique price zone[244]. The commodity price exhibited in this document is the prices collected in January 2022. The CREG provided all commodity data.

Unlike electricity supply for industrial consumers with a yearly consumption higher than 300 MWh (ARENH), France does not provide a regulated tariff for natural gas supply[245].

Component 2 – network costs

Transport costs

As previously stated, there are two Transmission System Operators (TSOs) in charge of the natural gas transport network: GRTgaz and Teréga. Transport costs are computed based on a weighted average of TSOs' annual natural gas offtakes, as set out below:

Table 110: TSOs natural gas offtake in France

TSO	Annual consumption (2019) in GWh	Percentage of annual consumption (%)
GRTgaz	451.728	94,20%
Terega	27.758	5,80%

Transport tariffs are built along with the same methodology, and made of three main components for end-users on the transport grid:

Table 111: Transport cost component in France

Transport		
Component	**French labelling**	**Explanation**
Fixed charge	Terme fixe de livraison	Applicable per year per delivery station (expressed in EUR/year)
Entry capacity fee	Terme de capacité d'entrée sur le réseau principal	Applicable to daily delivery capacity subscriptions (expressed in EUR/year/MWh/day)
Delivery charge	Terme de capacité de livraison	Applicable to daily delivery capacity subscriptions for industrial consumers (expressed in EUR/year/MWh/day)

[244] On 1 April 2015, a common market area in Southern France, "Trading Region South" (TRS), replaced the former PEG TIGF and PEG SUD. On 1 November 2018, TRS and PEG-Nord merged into a single market area (TRF) with a unique trading hub (PEG or Point d'échange de gaz).

[245] France used to provide regulated selling rates regarding natural gas based on categories for professionals (B2S, TEL S2S/STS) with a higher yearly consumption than 300 MWh. However, this disappeared in December 2015 for industrial consumers.

Distribution costs

Profiles G-Pro, G0, and G1 are located on the distribution grid, respectively subject to T3 and T4 tariff option (determined by their annual consumption level). Given that distribution costs integrate transport costs, only these tariffs apply to our G0 and G1 profiles. Only tariffs from GRDF (Gaz Réseau Distribution France) are considered as it delivers 96% of all distributed natural gas in France. The tariff has three components:

Table 112: Distribution cost components in France

Transport		
Component	**French labelling**	**Explanation**
Fixed charge	Abonnement	Applicable per year per subscription (expressed in EUR/year)
Proportional component	Prix proportionnel	Variable component based on consumption (expressed in EUR/MWh)
Delivery charge	Terme de souscription capacitaire journalière	Applicable to daily delivery capacity subscriptions for industrial consumers with annual consumption from 5.000 MWh (expressed in EUR/MWh/day)

Component 3 – all other costs

In France, two surcharges apply on natural gas:

Table 113: Surcharges on natural gas in France

Surcharges	Definition	Amount in 2021	Profile
Contribution tarifaire d'acheminement (CTA)	The CTA is a surcharge for energy sector pensions - for Electricity and Gas Industries.	20,80% on the fixed part of distribution cost	Profiles G0 and G1
		4,70% on the fixed part of the transport cost	Profile G2 (Not on G0 and G1 as distribution tariffs include transport costs)
Taxe intérieure sur la consommation de gaz naturel (TICGN)	The TICGN is a tax on natural gas consumption	8,43 EUR/MWh	
		Reductions: • 1,52 EUR/MWh for companies that participate in the carbon market and that are energy-intensive • 1,60 EUR/MWh for companies that belong to a sector with a high risk of carbon leakage and that are energy-intensive	
		Exemptions: • Companies that do not use natural gas as a fuel (for example as raw materials); • Natural gas is used for dual purposes in a certain metallurgical, chemical reduction or electrolysis processes; • For the manufacture of non-metallic mineral products; • For the manufacturing of energy products; • For the production of electricity; • For the purposes of its extraction and production.	

As we include the option that the profile G2 could use natural gas as raw material, we present a range from 0 EUR/MWh (totally exempted from the TICGN) to 8,43 EUR/MWh. As we do not consider that option for profiles G0 and G1, a range from 1,52 EUR/MWh (reduced rate) to 8,43 EUR/MWh is displayed for those consumers G0 and G1.

The Netherlands

Component 1 – the commodity price

For investigated profiles, the commodity price in the Netherlands given in this study is the January 2022 observed prices for TTF. The CREG provided all commodity prices data.

Component 2 – network costs

Transport costs

The Dutch natural gas transport network is operated by the TSO Gasunie Transport Services and serves distribution networks and direct exit points. According to the Gas Act (Article 10, paragraph 6b), it is the duty of the Dutch TSO, Gasunie Transport Services to provide an applicant with a connection point if the connection has a flow rate greater than 40 m^3 per hour. Consequently, we consider that profiles G0, G1 and G2 are directly connected to the transmission network.

Since 2020, transport tariffs have changed of structure. Following the principles of the 'Network code on harmonized transport tariff structures for gas' (NC-TAR), decided by the European Commission, the Netherlands has simplified its tariff's structure. They are therefore only composed of 2 components, which can vary depending on the contracted capacity:

Table 114: Network cost component in the Netherlands

France	
Component	**Explanation**
Entry capacity fee	Fee depending on the entry point and function of the contracted capacity (expressed in EUR/kWh/year).
Exit capacity fee	Fee depending on the exit point and function of the contracted capacity (expressed in EUR/kWh/year).

The Dutch network is essentially supplied with the so-called "Groningen-gas". This natural gas has a lower calorific value (L-gas) than the natural gas used in most of Western Europe (H-gas). Yet, as the Dutch transport tariffs are fixed in terms of capacity and expressed in EUR/kWh/year, this evens out this calorific value effect. While Gasunie Transport Services used to offer individualised rates for the entry and exit capacity fees, it is no longer the case. One single exit capacity fee as well as one entry capacity fee is used for the 328 directly connected industrial consumers.

Component 3 – all other costs

In general, two surcharges apply to the natural gas bill for industrial consumers:

1. The Energy Tax, *Regulerende Energie Belasting* (REB)*,* is, if the first band is not considered, a digressive tax on all energy carriers;
2. The ODE levy is a degressive levy, *Opslag Duurzame Energie* (ODE), that finances renewable capacity.

Both tax rates for 2022 are as follows:

Table 115: Energy tax and ODE 2022 rates in the Netherlands

Band	Consumption level	Energy Tax (EUR/m³)	ODE (EUR/m³)
Band A	0 – 170.000 m^3	0,36322	0,0865
Band B	170.000 – 1.000.000 m^3	0,06632	0,0239
Band C	1.000.000 – 10.000.000 m^3	0,02417	0,0236
Band D	> 10.000.000 m3	0,01298	0,0236

A lowered tariff also exists for both surcharges, but only for agricultural heating installations.[246] We assume our profiles do not benefit from the lowered tariffs.

As the Energy tax and ODE Levy are fixed in euros per volume units (EUR/m³) and not in euros per energy units, the calorific value of the used natural gas has an impact on the total amount paid. We thus use a weighted average in function of the calorific value distribution of all-natural gas industrial users directly connected to the transport grid in the Netherlands. Out of the 328 industrial consumers[247] directly connected to the grid, the following table depicts the allocation of companies using which type of natural gas (H, G or G+)[248]:

Table 116: Companies directly connected to the transport grid in the Netherlands

Natural gas type	Number of companies directly connected to the transport grid	Percentage of companies directly connected to the transport grid per gas type (%)
H-Gas	99	30%
G-Gas	26	8%
G+ Gas	203	62%

Like the surcharges on electricity there are also some exemptions and reductions for natural gas. Since the conditions are slightly different from those for electricity, they are set out below:

a. **Exemptions** if natural gas is:
    i. Used to generate electricity in an installation with an electrical efficiency of at least 30%.
    ii. Not used as fuel as an additive or filler substance.
    iii. Used for metallurgical and mineralogical processes.
    iv. Used as fuel for commercial shipping.
b. **Tax refund scheme** ('teruggaafregeling'), which applies to public and religious institutions such as clinics, schools, sports centres, churches, etc. We assume that our profiles are not part of these specific categories and thus do not take this specific scheme into account.

As we do not consider profiles G0 and G1 as consumers using natural gas as a fuel or natural gas that has been used as an additive or filler substance, we present the maximum option (no refund applicable) for both profiles. Considering that G2 can represent a large consumer using natural gas as a feedstock for its industrial processes, we assume that it can be granted an exemption of taxes and we, therefore, present a range between the minimal option (totally exempted from taxes) to the maximum option (no refund applicable) for this consumer profile.

[246] (Belastingsdienst Nederland, 2020)

[247] We could not verify the source of this information for this year update. The figures were then carried over from the last two editions of this report.

[248] G- and G+ Gases are both considered as L-Gas. In this study, they are considered as having the same calorific value and the same conversion factor to kWh, namely 9,77 kWh/m³.

The United Kingdom

Component 1 – the commodity price

The National Balancing Point is the referent market index regarding the United Kingdom. For both investigated profiles, the national commodity price is the result of January 2022 prices for NBP. The CREG provided all commodity price data.

Component 2 – network costs

Transport costs

As already mentioned for our residential and small professional profiles, there is only one TSO in the UK (except for Northern Ireland): National Grid Gas. The Gas Transmission Transportation Charges are comprised of the following components:

Table 117: Transport costs components in the UK

United Kingdom	
Component	**Explanation**
Entry Commodity Charge	A charge per unit of natural gas transported payable for flow entering the system, expressed in p/kWh/day.
Exit Commodity Charge	A charge per unit of natural gas transported payable for flow exiting the system, expressed in p/kWh/day.
Commodity charge	A charge per unit of natural gas transported payable for flows entering and exiting the system expressed in p/kWh.
Compression charge	Additional charge payable where natural gas is delivered into the National Grid NTS system at a lower pressure than that required, expressed in p/kWh.

National Grid Gas provides a weighted average of the entry and exit capacity tariffs in their Statement of Gas Transmission Transportation Charges.[249]

[249] We have used the weighted averages published in the Gas Transmission Transportation Charges of the NGG valid as from the 1st of April 2020, (Nationalgrid, 2020).

Distribution costs

Industrial consumers that are still connected to the distribution grid are also subjected to their tariffs, and this is the case for the G0 and G1 profiles. The UK has eight DSOs for natural gas, amongst which four are owned by Cadent Gas. The distribution tariff for natural gas is composed of four components:

Table 118: Distribution cost components in the UK

The United Kingdom		
Component	**Explanation**	**Profile**
LDZ System Capacity Charge	With charge band with 732.000 kWh and above LDZ charges are based on functions, these functions use Supply Point Offtake Quantity (SOQ) in the determination of the charges. The LDZ System capacity charge is expressed in p/Peak day kWh/day and the LDZ System commodity charge in p/kWh.	G0 and G1
LDZ System commodity Charge		
LDZ Customer Capacity Charge	With charge band with 732.000 kWh and above customer, the capacity charge is based on a function related to the registered SOQ. Expressed in p/peak day kWh/day.	
Exit Capacity Charges	A capacity charge applied to the supply point similar to LDZ System Capacity Charge. These charges are applied per exit zone on an administered peak day basis and are expressed in GBP/year.	
Metering charges	A cost for use and management of your energy meter, which is expressed in GBP/year.	

An average of these components is presented across all active DSOs for natural gas in the UK.

The capacity terms are based on the estimated maximum daily offtake. This is calculated by dividing the total consumption in a year by the number of days of consumption multiplied by the load factor. This load factor is related to the EUC (End User Category) bands. Each local distribution zone has 33 individual EUC bands that define 9 different consumption profiles based on annual consumption. The load factors, therefore, differ depending on the annual consumption of a profile and the local distribution zone[250]. Each DSO has its own load factor percentages, but only Northern Gas Networks discloses its load factors, which we used as a proxy for all other DSOs. The table below depicts load factors used for profiles G0, G1 and G2:

Table 119: Load factors for profiles G0, G1 and G2

Profile	Bands	Threshold (kWh)	Average load factor
G0	4	732.001 - 2.196.000	38,20%
G1/G2	9	58.600.000 -99.999.999.999	66,30%

[250] Load factors for bands 3 to 9 (from 293 MWh to 58,600 MWh/year) are determined based on a Winter Annual Ratio (consumption between December to March over annual consumption).

Based on this, the capacity term is computed as follows:

$$Annual\ charge = (SOQ * 365\ days) * unit\ rate$$

Where,

$$SOQ = annual\ consumption/(365\ days * Load\ Factor)$$

Component 3 – all other costs

Only the **Climate Change Levy** (CCL) is applicable to the consumption of natural gas. Holders of climate change agreement, for which all industrial consumers are considered to be part of[251], can benefit from a reduction of 22%. Furthermore, the consumption of natural gas for non-fuel use is exempted from this levy. As in other countries, we included the option that profile G2 can be such a consumer, and hence we present a range from 0 EUR/MWh (exempted from the Climate Change Levy) to +/- 1,49 EUR/MWh (reduction when being part of Climate Change Agreement).

[251] See General assumption

6. Presentation and interpretation of results

6. Presentation of results

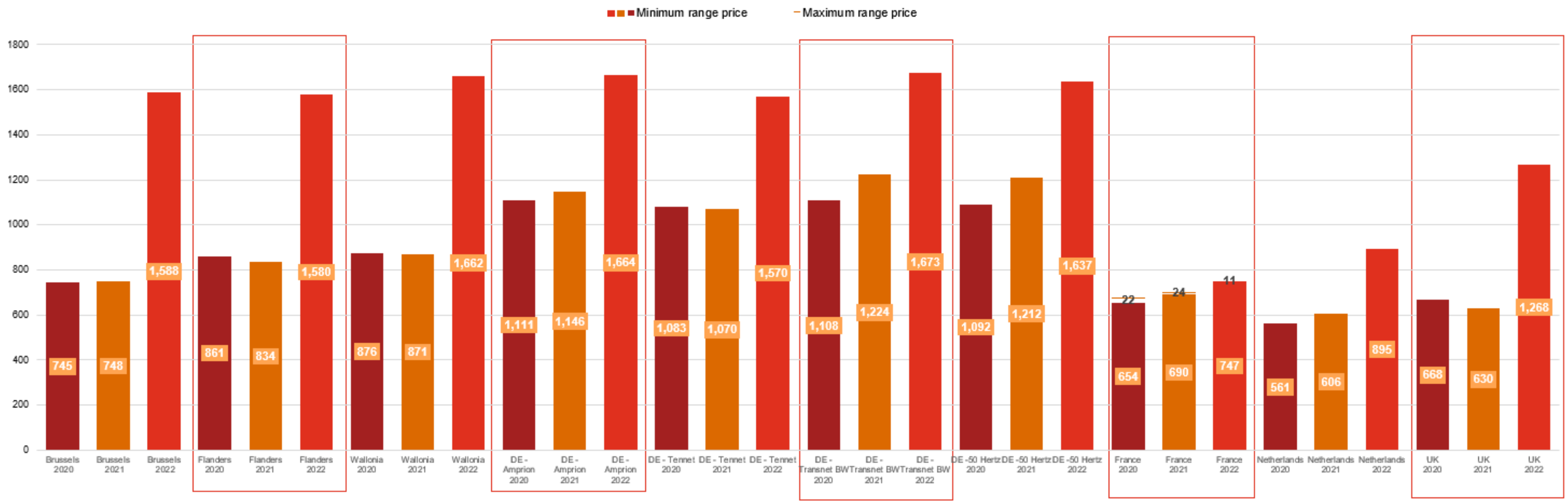
Presentation of figures (Electricity)

Profile E-RES (Electricity)

Total invoice analysis

The figure below provides a comparison of the total yearly invoice paid by a residential consumer (E-RES) in the different studied countries and regions. The results are expressed in EUR/year.

Figure 27: Total yearly invoice in EUR/year for residential consumers (profile E-RES)



Similar to last year Belgium is split into three regions and Germany into four regions because of regional differences. The other countries under review – France, the Netherlands, and the UK – are represented as one single result. The reasoning behind the distinction between regions was already set out above with an additional explanation of how the countries organise themselves regarding energy regulation. Furthermore, we show the results of the computations of 2020 (burgundy), 2021 (orange) and 2022 (red) and have added frames to easily identify different regions/countries.

Differently from the previous year, Belgium has become the second most expensive country for this profile, slightly less expensive than the German average. Compared to 2021 the total invoice has increased in all the 10 regions/countries under review. Even though this is the smallest electricity profile under review, we already see that there's a price range in France. The price range (minimum and maximum) is the consequence of the possibility to opt for the CU4 or MU4 network cost option which also has an impact on the CTA. The figure below thus shows a range for the network and all other cost components.

France has become the cheapest country with the Netherlands as a close second. As it will be shown more in detail in the next section with the analysis per component, the large increase in the total invoice in the UK can be mainly explained by the increase in the commodity price.

Belgium is not competitive regarding the E-RES profile and Germany is only slightly less competitive than Belgium. Concerning the positioning of the Belgian regions, Flanders is now the most competitive Belgian region, followed by Brussels.

Breakdown per component

The previous results are further detailed for profile E-RES by the figure underneath, which provides a closer look at the breakdown of the different price components.

Figure 28: Electricity price by component in EUR/MWh (profile E-RES)

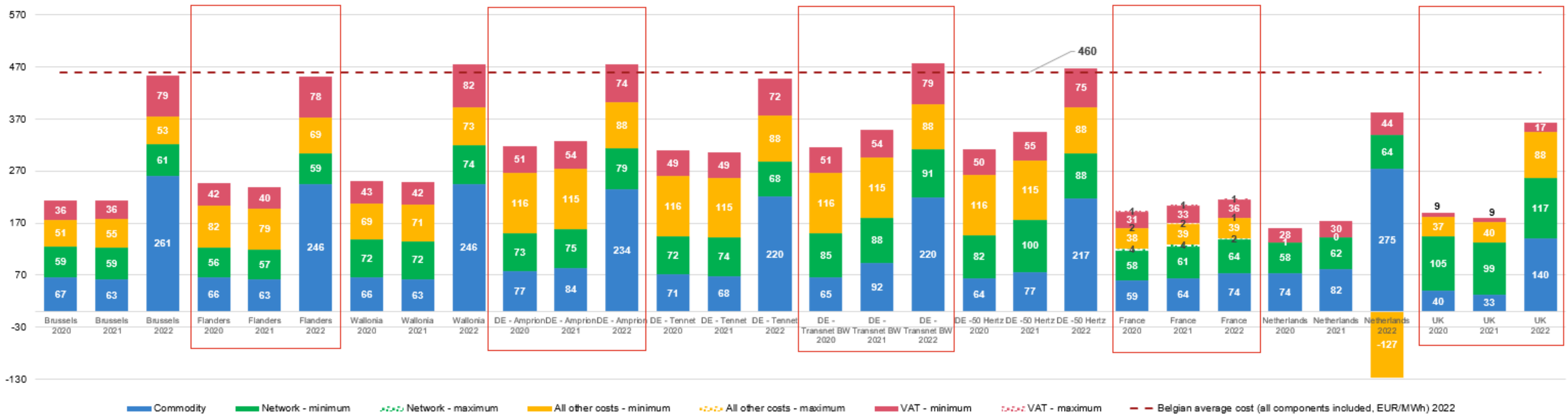
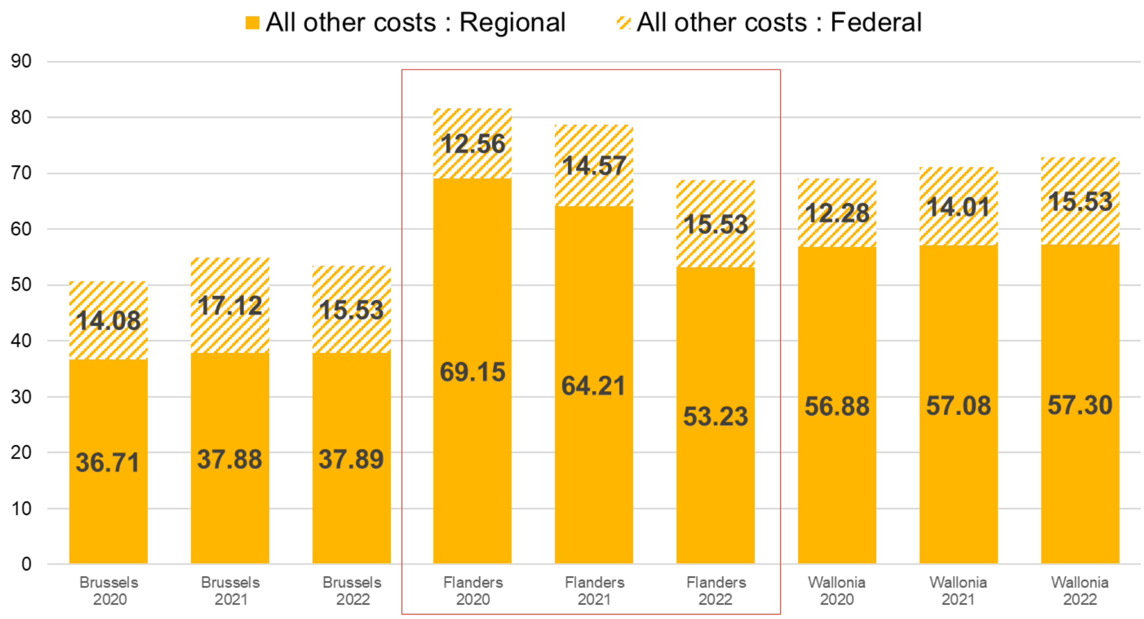


Figure 29: Regional and Federal all other costs in Belgium in EUR/MWh (profile E-RES)



The ***commodity component***[252] is by far the lowest in France (74 EUR/MWh). The largest increase in this component is observed in the Netherlands, namely an increase of 193 EUR/MWh. Except for France, we see a large increase of the commodity price for all the other regions and countries under review. In fact, in France the increase is limited to only 10 EUR/MWh, while for the other regions the commodity component is two to four times the value of 2021. This can be explained by the fact that in France the standard product for residential consumers is regulated by the Government, thus not reflecting the market increase of the commodity price all over Europe. In the UK, the energy price cap, introduced by market regulator Ofgem in 2019, sets the maximum level of prices per kWh of gas and electricity for the default tariff that each energy supplier offers to residential customers.[253] The cap is reviewed twice a year, with the last two updates in October 2021 and April 2022. This system allows to absorb in the UK the increase in commodity cost observed in the beginning of 2022.

The ***network cost*** component has increased in most regions/countries (8 out of 10) under review. The UK has the highest network cost, followed by the German Transnet BW region. While important network cost reductions are in place for the large industrial profiles in Germany this is not the case for the residential consumers. In the UK the high network cost is mainly because of Transmission costs (TNUos) which is computed based on the consumption of the consumer (p/kWh) and compensates for the very low commodity component. On the Belgian front we see that the network costs are still the highest in Wallonia. The network cost component is slightly increasing in Brussels and Flanders, which is still the Belgian region with the lowest network cost with 59 EUR/MWh.

The ***all other costs component***[254] has decreased or remained stable in all regions/countries under review, except for the UK. This component was negligible last year and is now negative in the Netherlands in 2022, because residential consumers (E-RES and E-SSME) can be refunded (*Belastingvermindering*) by a fixed amount of 681,63 EUR/year, which increased significantly from the level of 461,62 EUR/year in 2021 and 435,68 EUR/year in 2020. Therefore, for the E-RES profile in the Netherlands, this negative tax allows to offset the increase of the commodity component. This component clearly has a big impact on the overall position of Belgium compared to the other regions/countries. Germany is the most expensive region in 2022, having the highest “all other costs” together with the UK, where the increase compared to last year is mainly explained by the increase in commodity price as this is used to calculate the “Energy company obligation” tax. In Belgium we have made a distinction between the regional and federal all other costs and we observe that the regional costs are the biggest

[252] While this methodology to estimate commodity costs provide a fair view of the market situation in the respective countries and regions, one must be aware that it does not provide a full overview of the market prices as only three to five products were considered.

[253] (OFGEM, 2022)

[254] This cost includes taxes, levies and certificate schemes.

part of the “all other costs” component. The decrease in regional costs in Flanders can be mainly explained by the purchase of 147 million euros in green energy certificates by the Flemish government.[255] Regarding the federal costs, we observe a slight decrease only in Brussels, while this component is slightly increasing in Flanders and Wallonia, despite the implementation of the same federal excise duty in 2022 in the three regions. This slight increase in Wallonia and Flanders compared to 2021 could be because the 2021 tariffs approved by the regulator were only included in the distribution sheets as of March 2021.

Finally, we also must take the ***VAT*** into account since this is a residential profile and we do not assume that this is deductible for them. The VAT rate is similar across all regions and countries, except the UK with a rate of 5%, and thus mainly depends on the total invoice of the region/country.[256] The UK has the lowest VAT because of the low rate they apply on energy, followed by France that has the lowest total invoice. It is important to mention that, as explained in the general assumptions, we did not consider for this analysis any change in VAT levels happening during the first months of 2022, such as the government decision in Belgium to decrease VAT from 21% to 6% on electricity and gas. In fact, we took the VAT levels effective on the 1st January 2022 to ensure time consistency and comparability between the regions/countries under review.

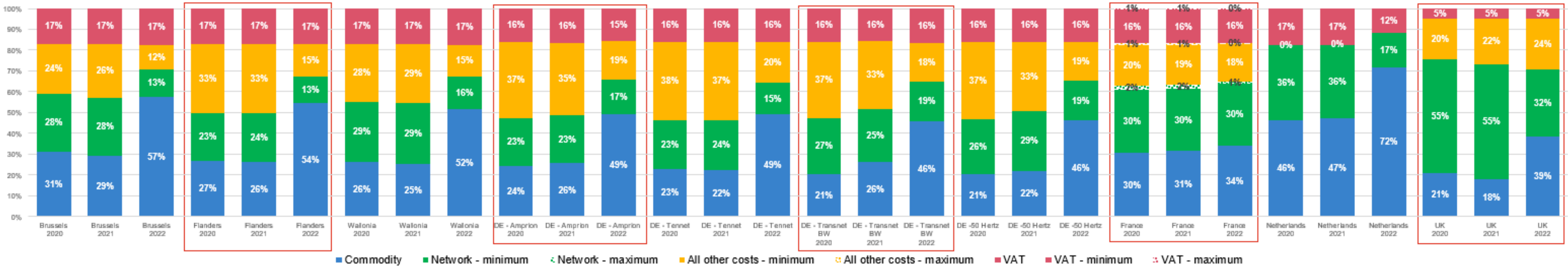
[255] Source: https://www.vreg.be/sites/default/files/press-release/pers-2021-09_distributienettarieven_2022.pdf

[256] The VAT rate is not always applied on the whole total invoice since some tariffs are exempted.

Proportional component analysis

The percentages of the costs for each component can be found in the figure below.

Figure 30: Proportional component analysis for electricity (profile E-RES)



The graph above represents the weights of each component in the total invoice and it is interesting to see how the countries/regions are similar or differ when not looking at the absolute values. Regarding the Netherlands we show the weights of the commodity, network and VAT components **before** deducting the all other costs reduction, since in 2022 the other costs are below zero (- 446 EUR) and act as a “discount” of 33% over the total invoice.

A few things stand out when observing the graph. Firstly, compared to previous years we observe that the share of network cost component decreased in all countries and regions under review because of the increase of the commodity share. The region/country with the highest network cost is UK, 32% of the total invoice. Secondly, we see that even though the total invoice of Belgium is higher than the other countries the proportional repartition across the different components is quite similar to the other countries/regions. As stated above, for the Netherlands we do not show the “all other costs” component on the figure since it is below zero, acting as a reduction of 33% on the total price. Lastly, when looking at Belgium, we see that Flanders and Wallonia have the highest all other costs component. When comparing the components from the Belgian regions with the 3 cheapest countries/regions we see that there is not a remarkable difference regarding the relative importance of the “all other costs” component over the total bill, excluding the exceptional case of the Netherlands.

KEY FINDINGS

The profile of residential consumers (E-RES) suggests the following findings:

- The total invoices for the different regions/countries under review show quite some variation. Like last year, Germany is the most expensive country followed closely by Belgium, while France is the least expensive one. The total invoice in France (747 EUR/year) is less than half the total invoice of the average of the three Belgian regions (1.600 EUR/year). The low cost in the Netherlands can be explained by the tax refund from the government (*Belastingsvermindering*) which contributes to reducing the impact of the higher commodity price. We also note that France is the cheapest country because of the "Tarif bleu" regulated product, accounting for most of the market

- The relative position of Belgium did not change compared to last year. It is again the second most expensive country after Germany. Wallonia is the most expensive region in Belgium and the third most expensive region among the regions/countries under review.

- Differently from previous years, the **commodity component** has become an important component to determine the competitiveness of a region/country due to the peculiar market conditions since the last months of 2021. Countries that offer a regulated product at lower cost, like France and the UK, or can implement tax advantages that lower the energy bill, like the Netherlands, are the only ones that can partially absorb this increase. For Belgium, Germany, and the UK we observe an important increase of the proportion of the commodity component over the total bill, accounting for almost 50% of the total cost in Belgian and German regions.

- Compared to 2021 the **network costs** component has increased in all regions/countries except for some German regions. From a Belgian perspective, we observe that Flanders has the smallest network cost, followed by Brussels. The relative importance of this component is similar across all regions/countries, except for the UK and France where the networks costs account for almost one third of the total invoice. Because of the increase of commodity components in all regions and countries, the share of the network costs has decreased for all the zones under review.

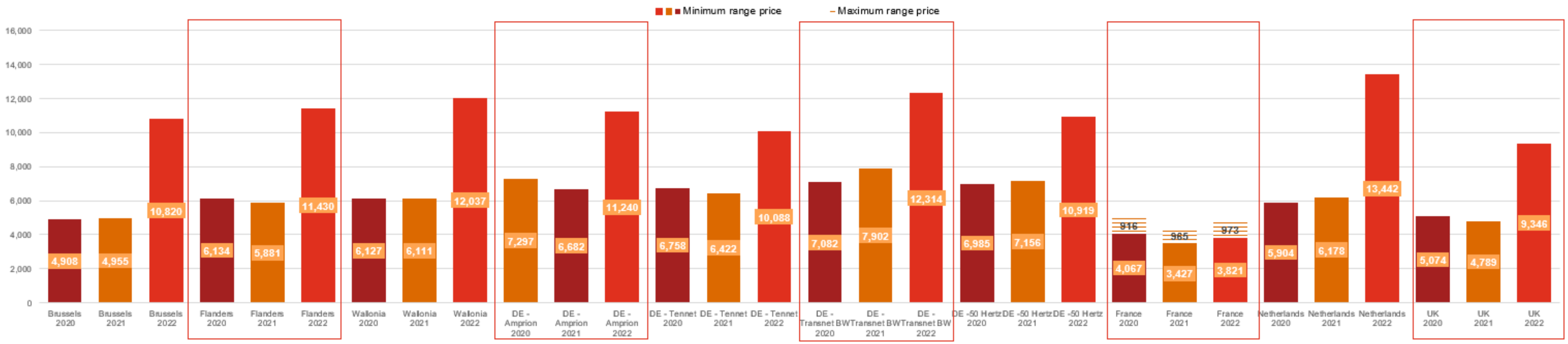
- The **all other costs component** plays a big role in the competitive position of the region/country, in particular the tax advantage lowering the total cost in the Netherlands and the very high cost in the German regions. In Belgium we have made a distinction between the regional and federal all other costs and we observe that the regional costs have decreased only for Flanders. Flanders is now the cheapest Belgian region, and this is mainly thanks to the lower regional all other costs. The Belgian all other costs component is very high, in absolute terms, compared to the two most competitive regions for E-RES, namely France and the Netherlands.

Profile E-SSME (Electricity)

Total invoice analysis

The figure below provides a comparison of the total yearly invoice paid by a small professional consumer (E-SSME) in the different studied countries and regions. The results are expressed in EUR/year.

Figure 31: Total yearly invoice in EUR/year (profile E-SSME)



Differently from the annual invoice of the E-RES profile, the Netherlands becomes the most expensive country, because the all other costs component cannot offset the sharp increase in commodity price. France is again the cheapest zone, while Belgium and Germany are the second and third most expensive ones. The total invoice has increased in all the observed regions/countries compared to 2021. The biggest increase (more than 7 kEUR) is observed in the Netherlands. In Belgium the cost has increased in all the three regions, with Wallonia being the most expensive one. The breakdown per component below will detail which components have the most influence on the total invoice.

Breakdown per component

The previous results are further detailed for profile E-SSME in the figure below, which provides a closer look at the breakdown of the different price components.

Figure 32: Electricity price by component in EUR/MWh (profile E-SSME)

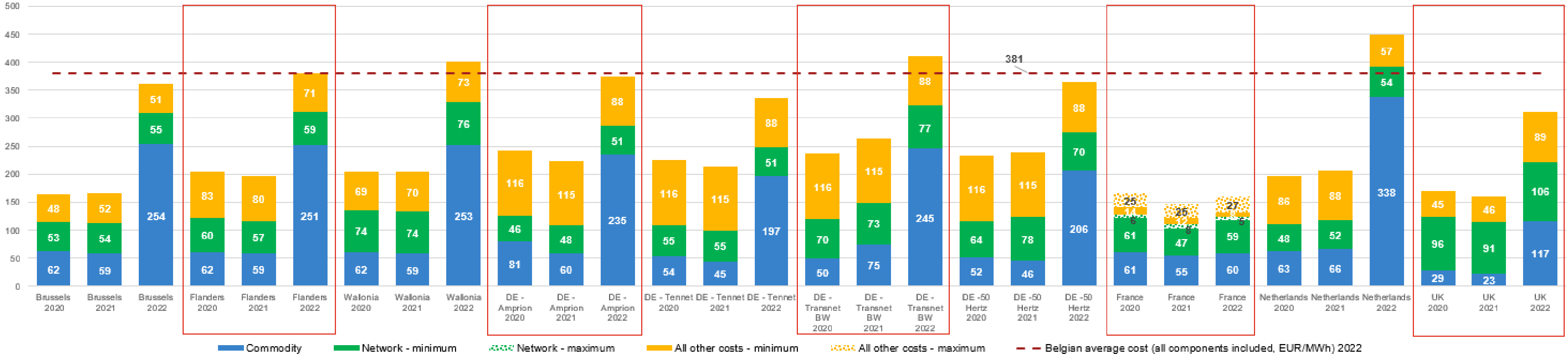
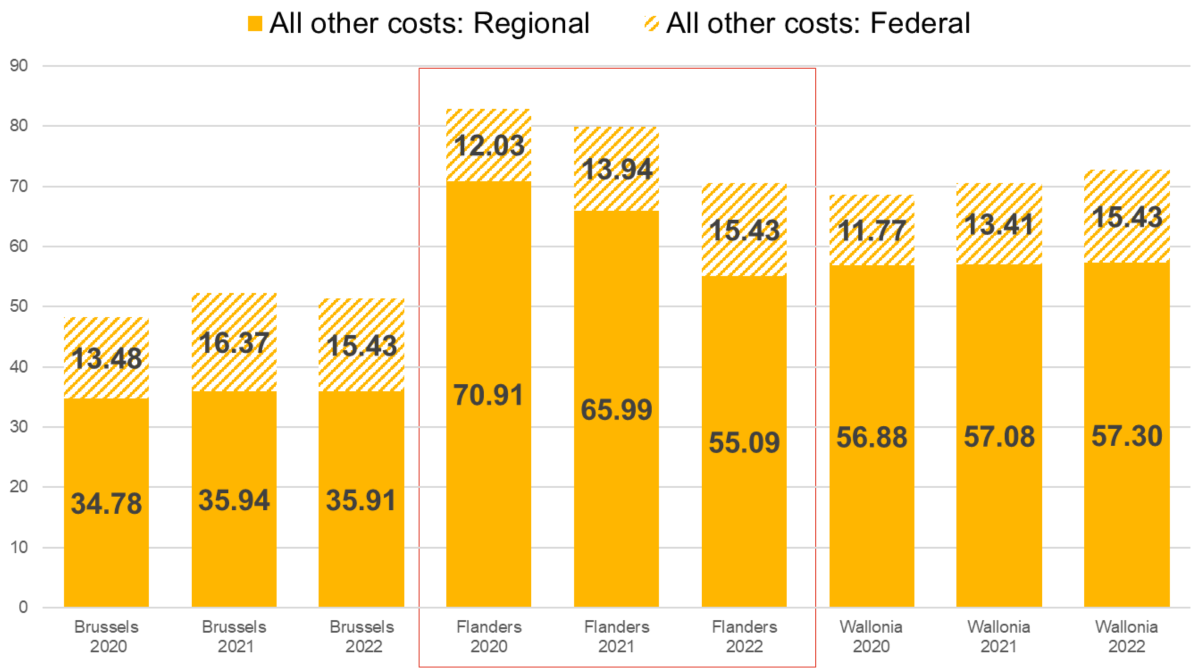


Figure 33: Regional and Federal all other costs in Belgium in EUR/MWh (profile E-SSME)



The **commodity component**[257] has increased in all regions/countries under review, with the Netherlands being the country with the highest increase compared to the previous year. The commodity component is overall similar across the Belgian regions and it is always higher than the values observed for the German ones, while France can offer the cheapest price because of the regulated product "tarif bleu". After France, the UK is the 2nd cheapest region, even if we observe a sharp increase of this component in 2022, costing 94 EUR/MWh more than previous year. Like E-RES profile, in the UK the E-SSME profile benefits from the price cap introduced by the OFGEM that limits the increase of the energy bill. As for the E-RES profile, the difference between 2021 and 2022 is mainly explained by the increase of the commodity price in all the regions.

For the **network component** we can see that it increased for most of the regions under review (8 out of 10), except for German Tennet and 50 Hertz regions where there was a slight decrease. The largest increase can be observed in the UK where the network component increased by 14 EUR/MWh. For all the other regions the increase is limited to a maximum of 5 EUR/MWh. The UK is again the country with the highest network cost, being almost double the one of Belgium and the Netherlands. The network cost per MWh is on average slightly less expensive than the cost of the E-RES profile. Lastly, we see that the ranges of the network costs in France are starting to increase compared to E-RES.

The **all other costs component**[258] is the lowest in France and highest in Germany and the UK. Similar to the network costs we observe that the range in France is growing compared to E-RES. When taking the maximum range of France into account we see that France is still a lot less expensive than the UK, the 2nd cheapest region for this profile. In Belgium we see that the regional component of the all other costs is still very important, even if we observe a relevant decrease in Flanders of 11 EUR/MWh compared to the previous year. Similar to E-RES, this is mainly explained by the purchase of 147 million euros in green energy certificates by the Flemish government from the DSOs.[259] Like E-RES, the increase of federal costs in Wallonia and Flanders compared to 2021 could be because the 2021 tariffs approved by the regulator were only included in the distribution sheets as of March 2021.

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[257] While this methodology to estimate commodity costs provides a fair view of the market situation in the respective countries and regions, one must be aware that it does not provide a full overview of the market prices as only three to five products were considered.

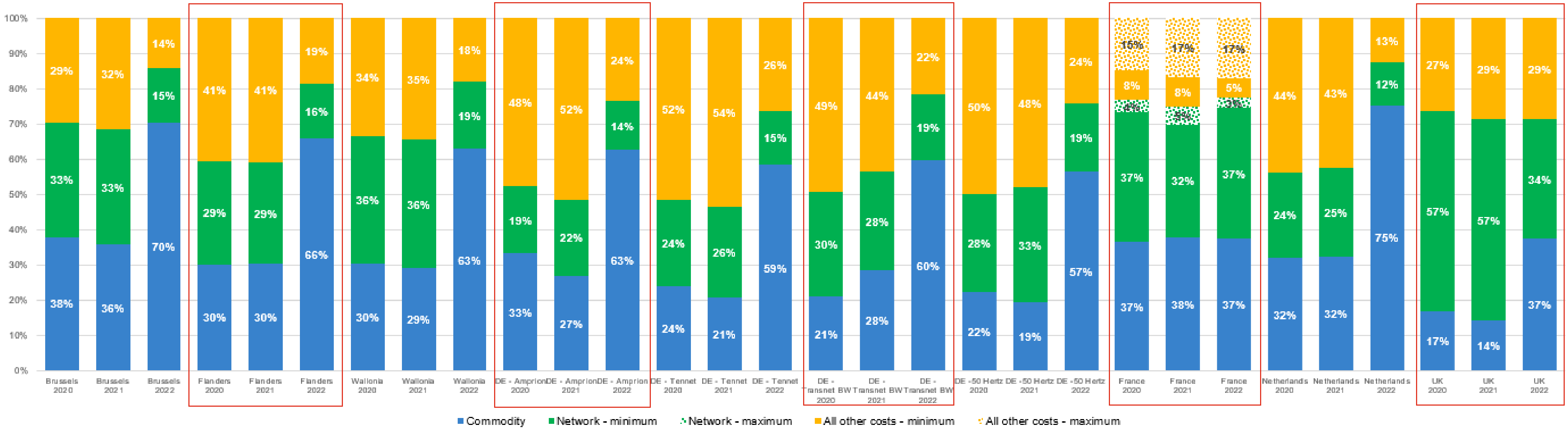
[258] This cost includes taxes, levies and certificate schemes.

[259] Source: https://www.vreg.be/sites/default/files/press-release/pers-2021-09_distributienettarieven_2022.pdf

Proportional component analysis

The percentages of the costs for each component can be found in the underneath figure.

Figure 34: Proportional component analysis (profile E-SSME)



The relative importance of the **commodity component** has increased in most regions/countries under review. This component is the most important in the Netherlands (75%). In contrast, the UK and France are the two only countries where the **network cost** component makes up more than one third of the total invoice in 2022. Lastly, we observe that the **all other costs component** accounts for a smaller proportion of the total invoice compared to last year, except for the UK where it remained quite stable. This can be explained by the fact that the all other costs did not change as much as the commodity component did in the past year, thus losing its weight in the total bill against the commodity one. The percentual analysis also shows the convergence of the weight of the all other costs over the total bill between the three Belgian regions, with Flanders and Wallonia both having 18% of their bill as other costs.

KEY FINDINGS

The results reported above suggest the ensuing key findings regarding profile E-SSME:

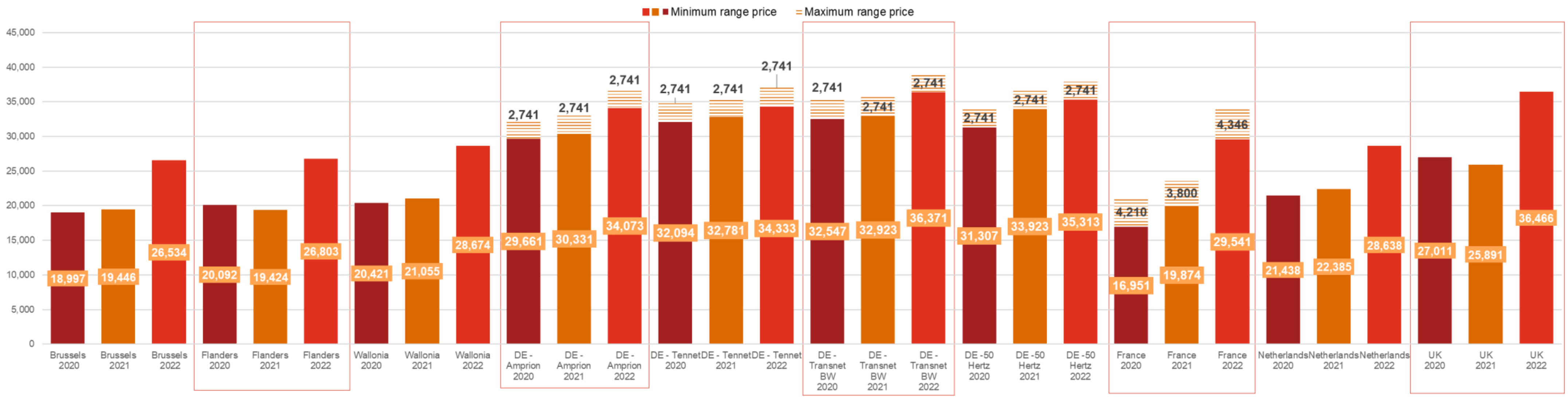
- The Netherlands becomes the most expensive region in 2022, while it was among the three cheapest zones in 2020 and 2021. The total invoice is between a minimum of 10 kEUR/year to a maximum of 12 kEUR/year in the Belgian and German regions. The lowest bill in Germany is observed in the Tennet region, where the lower price of the “Grundversorgung” drags down the weighted average among the products selected. France is the cheapest country, and it is the only one where the increase of the commodity component has not followed the general market trend because of the regulated product. The second cheapest region is the UK (9.346 EUR/year), but the gap between France and the UK is still significant.
- Brussels is the most competitive Belgian region, becoming one of the most expensive regions among the zones under review. Again, the more competitive position of Brussels is mainly thanks to a lower (regional) all other costs component.
- Compared to the previous years, this year the **commodity component** represents the biggest part of the energy bill for all the zones under review, reaching even more than 50% in all Belgian and German regions and the Netherlands. In the UK we observe the highest increase in terms of relative weight, reaching more than one third of the total energy bill. The Netherlands is clearly the region with the highest commodity price in 2022.
- We observe quite some variation regarding the **network component**. The UK is an outlier, but we see that the component is quite similar between the other regions. In most of the regions under review, the relative weight of the network component over the total bill decreased mainly due to the increase of the commodity share. We observe regional differences in Germany with regards to the network component, ranging from 51 to 77 EUR/MWh.
- The **all other costs component** is higher in Germany, Wallonia and the UK, where we observe the highest increase compared to 2021 because the tax component depends on the commodity price, thus following the same upward trend. In France we observe that the minimum and maximum ranges start to play an important role with the E-SSME profile with regards to the all other costs component.

Profile E-BSME (Electricity)

Total invoice analysis

The figure below provides a comparison of the total yearly invoice paid by a big professional consumer (E-BSME) in the different studied regions and countries. The results are expressed in EUR/year.

Figure 35: Total yearly invoice in EUR/year (profile E-BSME)



First off, we observe that for the E-BSME profile (and larger profiles) we also must take a range into account in Germany, because of a possible reduction of the *Konzessionsabgabe*. While this does not change their competitive position compared to other regions/countries for this profile it will have an impact for the bigger consumers as detailed below.

Secondly the total yearly invoice has increased in all the regions/countries under review. The biggest change is an increase in France (9.667 EUR/year) and in the UK (10.575 EUR/year). Brussels and Flanders are the two cheapest regions/countries in 2022. The sharp increase in the total bill for the UK is mainly explained by the higher commodity price compared to the previous year.

The competitive position of all the Belgian regions have improved compared to the E-SSME profile. While Wallonia is still the most expensive Belgian region, it is the third most competitive region along with The Netherlands (after Flanders and Brussels).

Breakdown per component

The previous results are further detailed for profile E-BSME in the following figure, which provides a closer look at the breakdown of the different price components.

Figure 36: Electricity price by component in EUR/MWh (profile E-BSME)

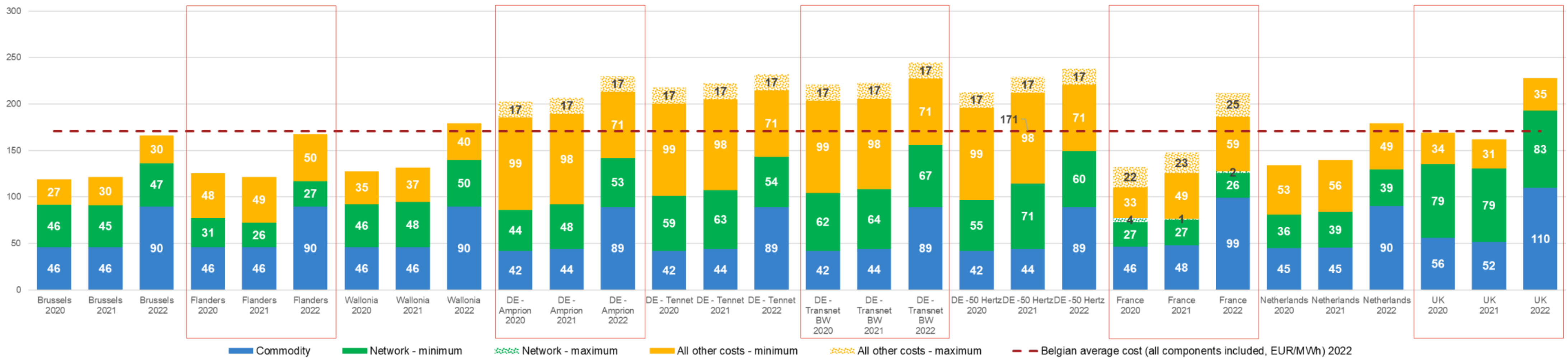
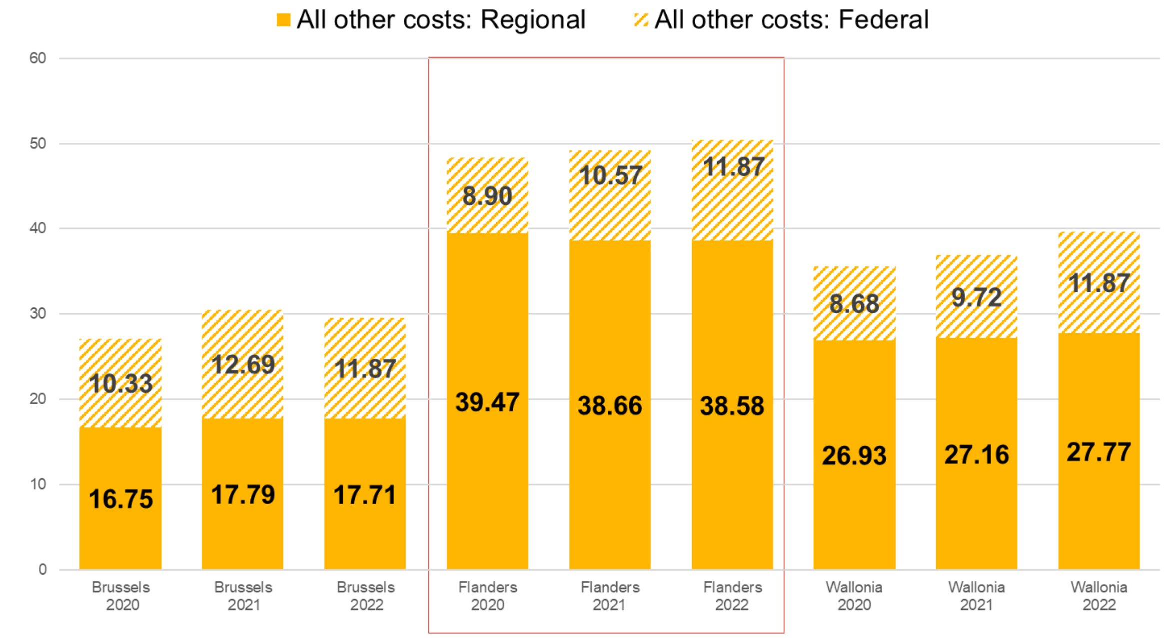


Figure 37: Regional and Federal all other costs in Belgium in EUR/MWh (profile E-BSME)



The **commodity component** increased for all the regions/countries under review, even doubling the amounts of the previous year. The highest increase can be observed in the UK where the commodity price has more than doubled compared to 2021. Since the price is now computed according to a formula and no longer by using comparison websites, in each country it remains the same for all bigger industrial profiles in EUR/MWh, except for E3 and E4 where the formula is slightly adapted to consider a 7 days working week. In France the commodity component is adjusted according to the ARENH principle, hence showing some variation between the industrial profiles.

The **network cost** has slightly increased or remained stable in most regions/countries under review. We observe a relevant decrease of 9 EUR/MWh in the German 50 Hertz and Tennet regions. The UK is again the country with the highest network costs, reaching the maximum of 83 EUR/MWh in 2022. In the regions/countries where we observe an increase, this is limited to 2 to 5 EUR/MWh. Belgian position with regards to the network component is similar to previous years. Wallonia is the most expensive Belgian region with network costs of 50 EUR/MWh in 2022. The higher network costs in the UK deteriorates its competitiveness even more.

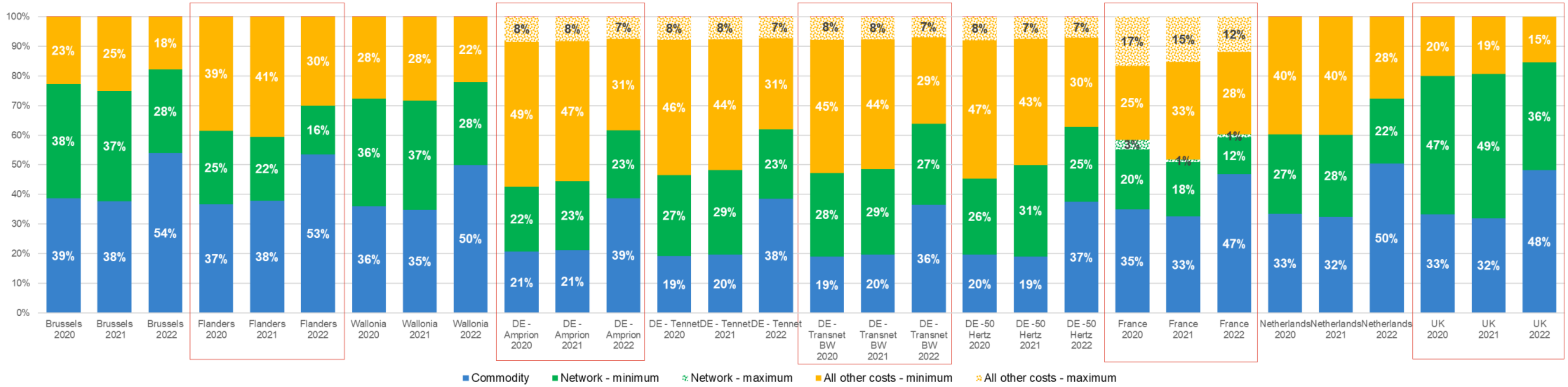
The **all other costs component**[260] is very large in Germany and the German reduction possibility will not impact their overall competitive position. However, we observe a general decrease in the all other costs component for all German regions, being 17 EUR/MWh less expensive than last year. When the reduction applies in the German regions, their total bills become just slightly less expensive than the UK. While Flanders has the highest all other costs component in Belgium, this is compensated by the lower network costs. The all other costs price per MWh decreased compared to the small professional profile (E-SSME) apart from Germany where it is the same cost, but with a potential reduction of 17 EUR/MWh. Like E-RES and E-SSME, the slight increase of federal costs in Wallonia and Flanders compared to 2021 could be because the 2021 tariffs approved by the regulator were only included in the distribution sheets as of March 2021.

[260] This cost includes taxes, levies and certificate schemes.

Proportional component analysis

The percentages of the costs for each component can be found in the figure below.

Figure 38: Proportional component analysis (profile E-BSME)



Like the previous profiles, the most relevant change we observe for the E-BSME profile in 2022 is the proportional increase of the **commodity component** over the total electricity bill. The commodity component accounts for 36% to even more than 50% of the total invoice. This increase explains the relative decrease in weight for the other components in all the regions/countries under review, even if we observed previously some slight increase in the **network cost** for most regions under review. On the Belgian level we observe that Flanders has a higher all other costs, but they remain competitive because of the lower **network costs** in Flanders compared to the other two Belgian regions. The **all other costs component** is still very important in Germany where it accounts for around 30% of the total invoice.

KEY FINDINGS

As for the E-BSME profile, the results demonstrate the ensuing key findings:

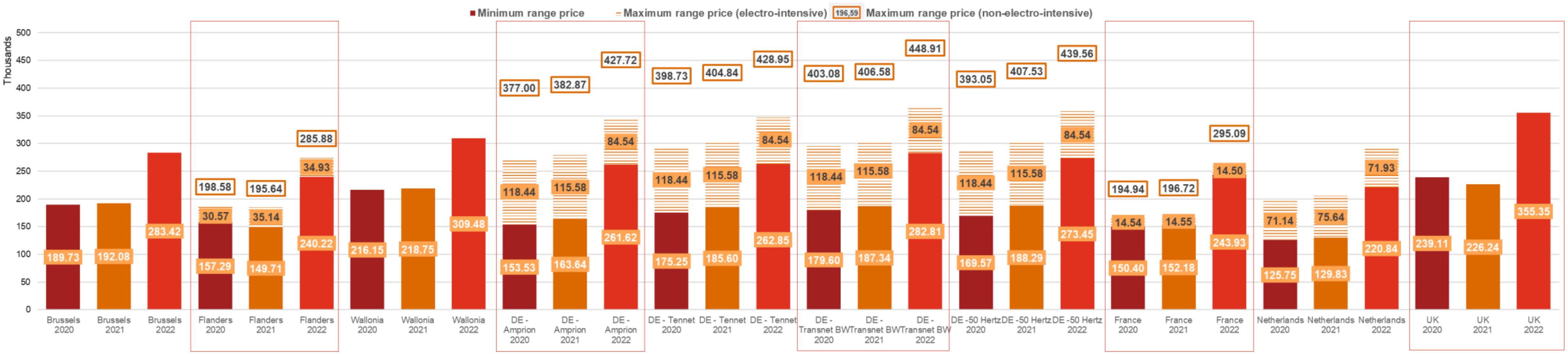
- The total invoice has increased in all the regions/countries under review and ranges from 26 kEUR/year (Brussels) to 39 kEUR/year (Maximum range Germany, Transnet BW). Flanders and Brussels are the cheapest regions followed by Wallonia and the Netherlands. On the other hand, the German regions and the UK are still far behind the other countries regarding the E-BSME profile.
- In Belgium, Brussels is the least expensive region, followed closely by the Flanders, where the higher all other costs are compensated by lower network costs. All the Belgian regions are less expensive than the German ones, France and the UK in 2022. The lower network and all other costs in Belgium are mainly responsible for their competitiveness compared to Germany and the UK.
- The **commodity component** has become a major part of the total bill, accounting for approximately half of the total invoice in some regions/countries under review. Nevertheless, except for the UK, the price of the commodity does not vary a lot across the countries, thus not impacting a lot the competitiveness of a region against the other ones.
- The **network costs component** varies across the reviewed regions/countries and goes from 27 (Flanders) to 83 EUR/MWh (UK). Flanders has a much lower network cost than the other two Belgian regions, but is comparable to the French minimum range network cost (26 EUR/MWh).
- The **all other costs component** and the reductions that can be applied are the most important factor when determining the competitiveness of a region/country. Germany's competitive position changes slightly compared to the UK when we take the minimum or maximum level of all other costs. However, in France the potential reduction will not impact its ranking, since it remains more expensive than the Netherlands and the Belgian regions which are the cheapest ones.

Profile E0 (Electricity)

Total invoice analysis

The figure below provides a comparison of the total yearly invoice paid by an industrial profile E0 in the different studied regions and countries. The results are expressed in kEUR/year.

Figure 39: Total yearly invoice in kEUR/year (profile E0)



Because of regional differences, Belgium is split into three regions and Germany into four regions. The other countries under review – France, the Netherlands and the UK – are represented as one single result. Below, we compare each region and country's yearly bill with the average Belgian price, which is set at 100. The Belgian average is computed as the mean between Brussels' and Wallonia's single price as well as Flanders' minimum and maximum prices (maximum for non-electro intensive consumers). We have also added a box with the total maximum price range for non-electro-intensive consumers since some reductions/exemptions will start applying on electro-intensive consumers from this profile onward.

Figure 40: Total yearly invoice comparison in % (profile E0; Belgium Average 2022 = 100)

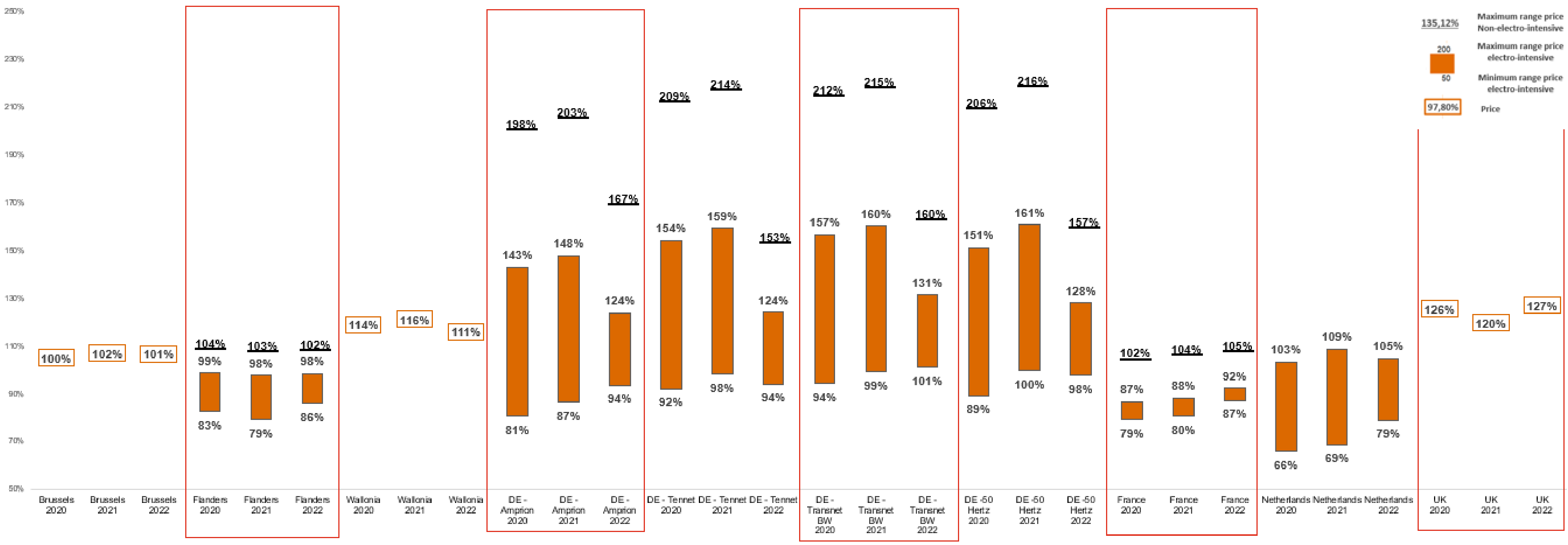


Figure 39 and Figure 40 above give us a lot of information about the total invoice and the competitiveness of the different regions/countries depending on which reductions and/or exemptions are considered. Because of the large number of ranges different regions/countries have the possibility to be the most competitive. What is sure is that the UK, Wallonia and Brussels will never be the cheapest region.

The competitive position of Germany has completely changed with the introduction of reductions for electro-intensive consumers. Depending on the region it has the possibility to be cheaper than the UK and Wallonia, while it remains more expensive than France and the Netherlands. The total invoice for non-electro-intensive consumers in Germany is still way above the other regions/countries.

France has the smallest range for consumers that qualify as electro-intensive while the Netherlands can have the lowest price of all regions/countries for the E0 profile (220,84 kEUR/year) with Flanders following (240,22 kEUR/year). Overall, all the countries, except the UK and the German Transnet BW region, have the possibility to be under the Belgian average.

Also in 2022 the competitiveness of Belgium is quite average and on the better side for Flanders, which offers reductions for GC and CHPC. Flanders has the possibility to be the most competitive region if the reduction applies and if there is no reduction in France, while the Netherlands remain the least expensive one. The competitive position of Flanders and Belgium has thus become much less clear compared to the E-BSME profile.

If we only consider the maximum ranges of the electro-intensive consumers, Flanders would still be less competitive than France, but more than the other regions/countries. Compared to last year, it is important to mention that the UK deteriorated its competitiveness because of the sharp increase in the commodity component. Only German non-electro intensive consumers are more expensive than the UK in 2022.

Breakdown per component

The previous results are further detailed for profile E0 in the figure underneath, which provides a closer look at the breakdown of the different price components.

Figure 41: Electricity price by component in EUR/MWh (profile E0)

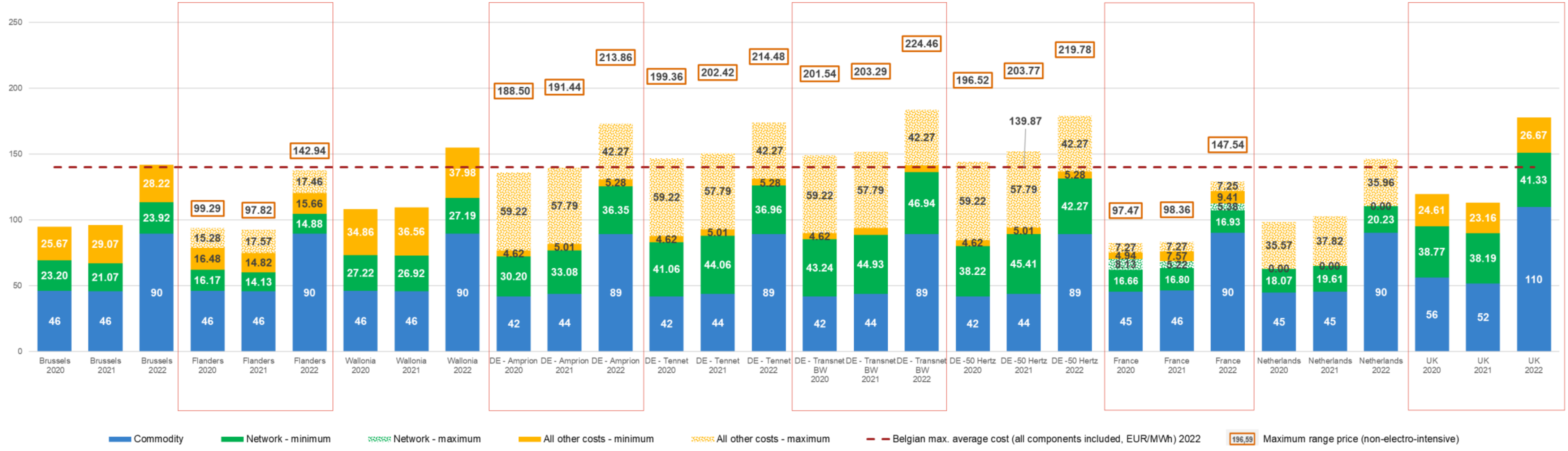
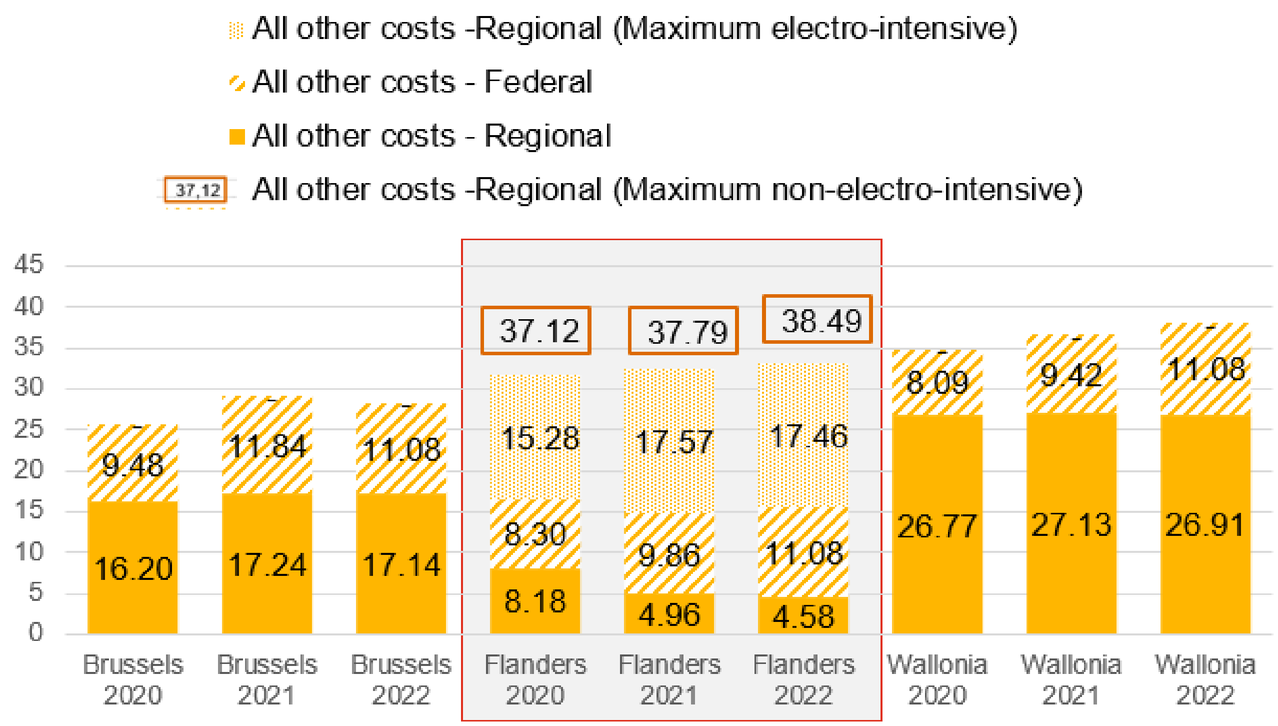


Figure 42: Regional and Federal all other costs in Belgium in EUR/MWh (profile E0)



The **commodity costs component** is relatively similar across all the regions/countries, except for the UK where it reaches a maximum of 109 EUR/MWh. Like the other profiles examined before, also for the E0 profile we observe a significant increase of the commodity price compared to the previous years. Even without applying exemptions/reductions, the commodity component accounts for more than half of the total invoice in 2022 for some regions/countries.

The **network costs component** varies across the regions/countries and we see a clear distinction between regions/countries with relatively low network costs, such as Flanders or France, and those with higher network costs, such as the UK or some German regions with network costs above 40 EUR/MWh. Like the other profiles previously mentioned, the network costs have slightly increased for most regions/countries under review. However, the relative weight of the network costs over the total invoice has not changed significantly compared to 2021 for the zones analysed. The German region Transnet BW is the zone with the highest network cost (47 EUR/MWh), even when exemptions/reductions are not applied. In France the network cost depends on the price option (i.e. CU fixed peak, CU mobile peak, LU fixed peak or LU mobile peak).

Lastly, the **all other costs component**[261] shows the most variation across regions/countries and even in their respective region/country since there are multiple reduction/exemption schemes that affect this component. Except for Brussels, Wallonia and the UK, all the regions/countries present a range, which is the largest in Germany, namely 42,27 EUR/MWh. This range has decreased in Germany compared to previous year, but still does not make the German regions more competitive when reductions are not applied. The different pricing schemes for electro- and non-electro-intensive consumers are also abundantly clear in Germany. We also note that the height of the all other costs component and the ranges has remained quite similar to last year, except for Germany where the reduction by 50% of the EEG-Umlage diminished the all other costs component. The variations in this component makes the competitive position of the countries less clear and much will depend on which consumers will be entitled to a reduction/exemption. Like previous profiles, the slight increase of federal costs in Wallonia and Flanders compared to 2021 could be because the 2021 tariffs approved by the regulator were only included in the distribution sheets as of March 2021.

[261] This cost includes taxes, levies and certificate schemes.

Impact of Flanders' combined cap on profile E0

The cost of green certificates can have a big impact on the energy price of large industrial consumers. To limit these costs, Flanders introduced two caps, in 2018, on the cost of financing of renewable energies. These caps are proportional to the Gross Value Added (GVA) of the company and thus vary from company to company. Previously this cap was only applicable on GC but since 2021 it is a combined cap that is applicable on GC and CHPC. In the following example, we attempt to illustrate the potential impact of these caps on industrial consumers.

There are two different caps according to the undertaking type of the industrial consumer:[262]

- **Case 1:** Undertakings belonging to sectors listed in annexe 3 or 5 of the EEAG[263] with an electro-intensity above 20%, the amount due for the costs related to the financing of renewable energy and qualitative combined heat and power is capped at 0,50% of the average gross value added (GVA) over the last 3 years;
- **Case 2**: Undertakings belonging to sectors listed in annexe 3 of the EEAG, the amount due for the costs related to the financing of renewable energy and qualitative combined heat and power is capped at 4% of the average gross value added (GVA) over the last 3 years.

Since the cap's financial impact differs according to the last 3 years' average gross value added, it also differs between companies. Therefore, this analysis focuses on identifying the maximum GVA from which each profile (E0 to E4) no longer benefits from the caps (i.e. a reduction in the total cost of GC and CHPC). The computation of GC and CHPC is explained in Section 5.

The results for E0[264] are synthesised in the following table:

Table 120: Flanders' cap on profile E0

	Case 1	Case 2
NACE codes[265]	Annexe 3 or 5 EEAG	Annexe 3 EEAG
Electro-intensity	> 20%	No threshold
Cap (% of GVA)	0,50%	4%
Average yearly consumption (E1)	2 GWh	
Scheme cost (without cap)	34.928,29 EUR	
Maximum gross value added to benefit from the cap	6,99 MEUR	873,21 kEUR

Considering only Profile E0 companies with NACE codes from Annexe 3 or 5 from the EEAG and with an electro-intensity above 20% (case 1), a company benefits from the application of the cap as long as its gross value added is less than 6.985.659 EUR.

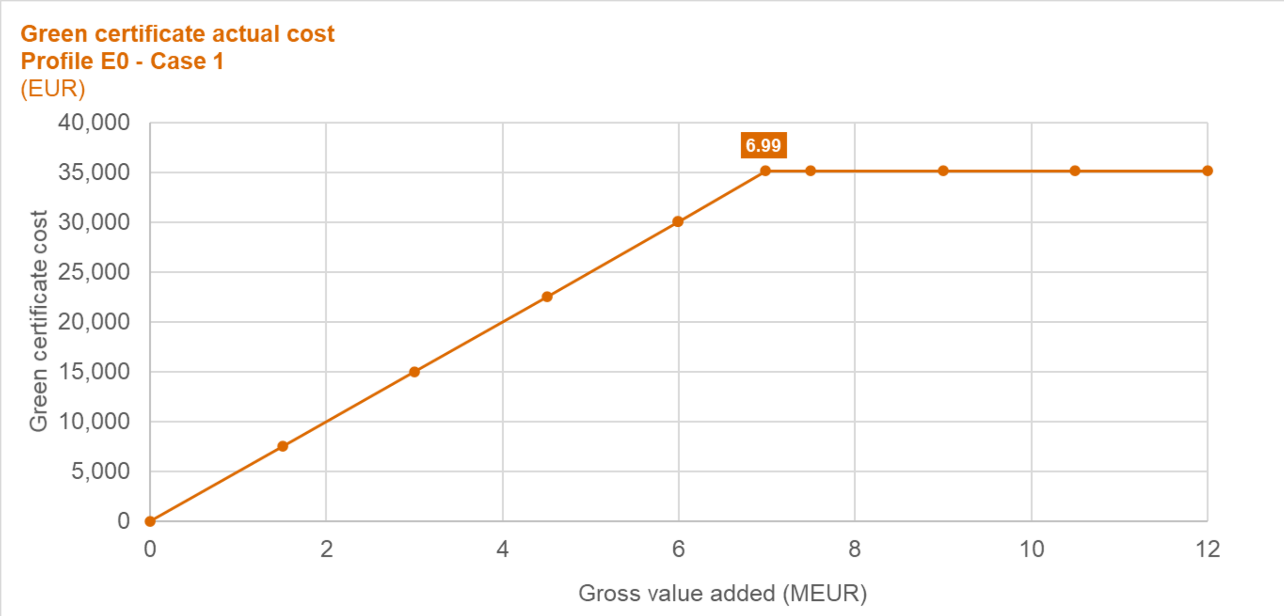
[262] The companies listed in Annexe 3 and 5 of EEAG correspond to the companies listed in the Energiedecreet except for Nace 3832 (Recycling of waste) which is listed in Annexe 3 EEAG but not in the Energiedecreet.

[263] (European Commission, 2014-2020)

[264] One must be aware that it is less likely that E0-like consumers would fall under the cap application scheme. However, for the sake of the report consistency and the latter analyses, we reflect potential impacts it would have on this consumer.

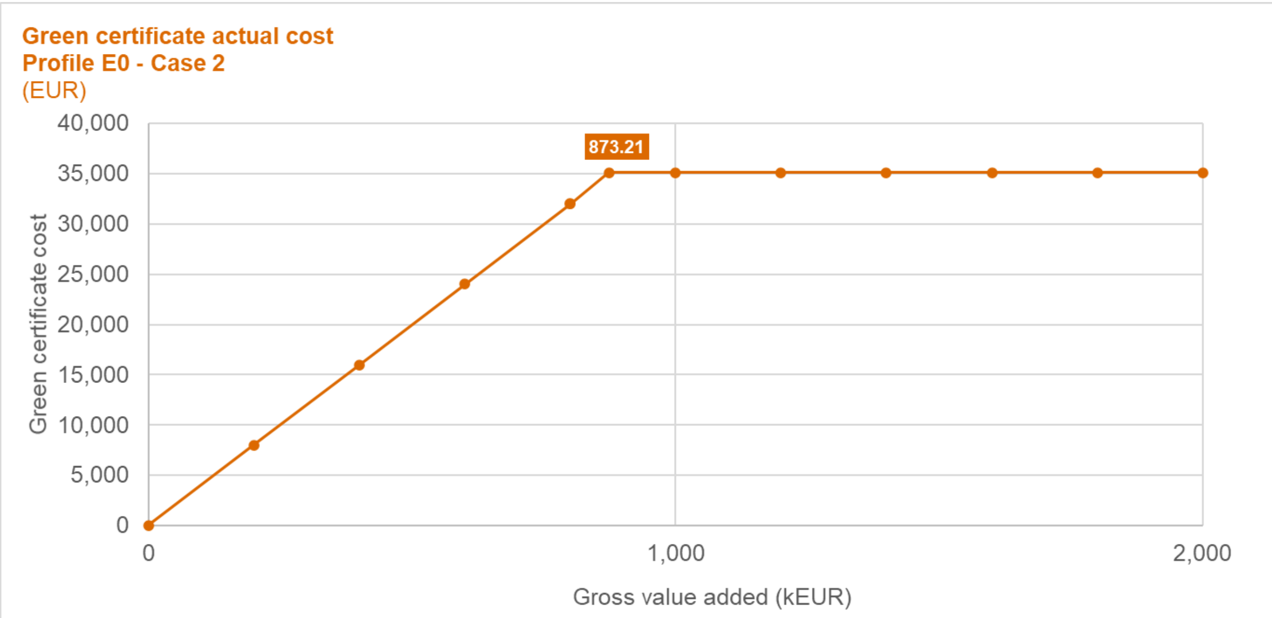
[265] The companies listed in Annexe 3 and 5 of EEAG correspond to the companies listed in the Energiedecreet except for Nace 3832 (Recycling of waste) which is listed in Annexe 3 EEAG but not in the Energiedecreet.

Figure 43: CHPC and GC actual cost for E0 profile (Case 1)



Considering only Profile E0 companies with NACE codes from Annexe 3 from the EEAG (case 2), a company benefits from the application of the cap as long as its gross value added is less than 873.207 EUR.

Figure 44: Green certificate actual cost for E0 profile (Case 2)



KEY FINDINGS

The analysis of the E0 profile leads us to the following findings:

- The competitiveness of the regions/countries is no longer as clear cut as it was for the smaller profiles. A clear conclusion that can be drawn compared to previous year is that the general increase of the commodity cost makes it even more difficult for some regions to be more competitive when reductions are applied. In fact, we observe a convergence between regions/countries in terms of total electricity bill for this profile. For example, the German regions are not far from the Belgian average when reductions are applied. The UK is an outlier in this case because there are no exemptions/reductions there, thus making it the most expensive zone when reductions are applied in the other regions/countries.

- Flanders is still in a good competitive position thanks to the GC and CHPC reduction schemes, but Wallonia’s and Brussels’ position has deteriorated. Overall, the Netherlands has the possibility to have the lowest total invoice of all regions/countries.

- The **commodity component** plays a bigger role than previous years due to the increase observed in 2022 and even makes up more than 60% of the total invoice in some cases. This component is very similar between regions, with the UK being a bit more expensive.

- The most expensive **network cost** is found in the German Transnet BW region (46,94 EUR/MWh) and the cheapest in Flanders (14,88 EUR/MWh). The network cost in Flanders has always been the lowest and this helps Flanders in being among the three cheapest regions also in 2022, especially when minimum prices are considered.

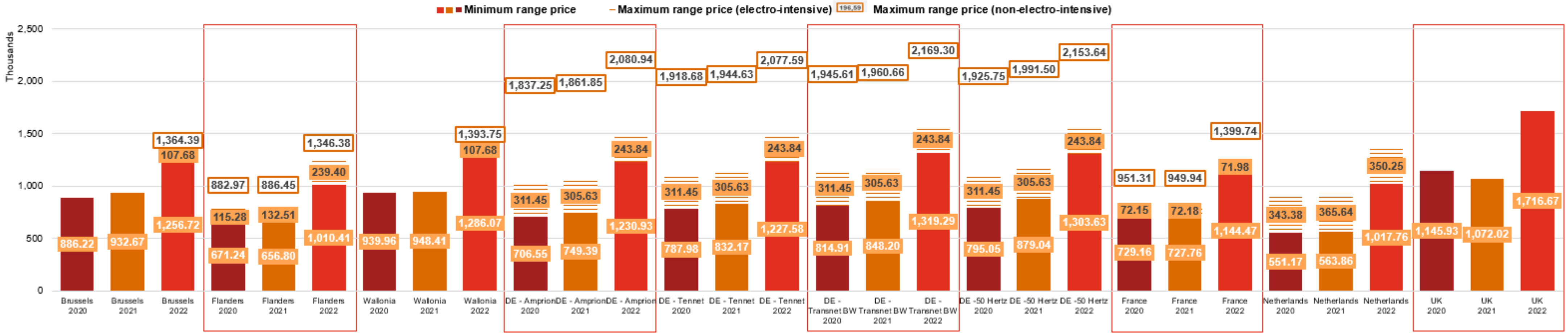
- In Belgium, Flanders always had the highest **all other costs component,** but this is no longer necessarily the case because of the potential GC and CHPC reduction for larger consumers. This component has the biggest impact on the competitiveness and the positioning of all the regions/countries. In Germany in particular the reductions make a big change, up to 42,27 EUR/MWh less for electro-intensive consumers.

Profile E1 (Electricity)

Total invoice analysis

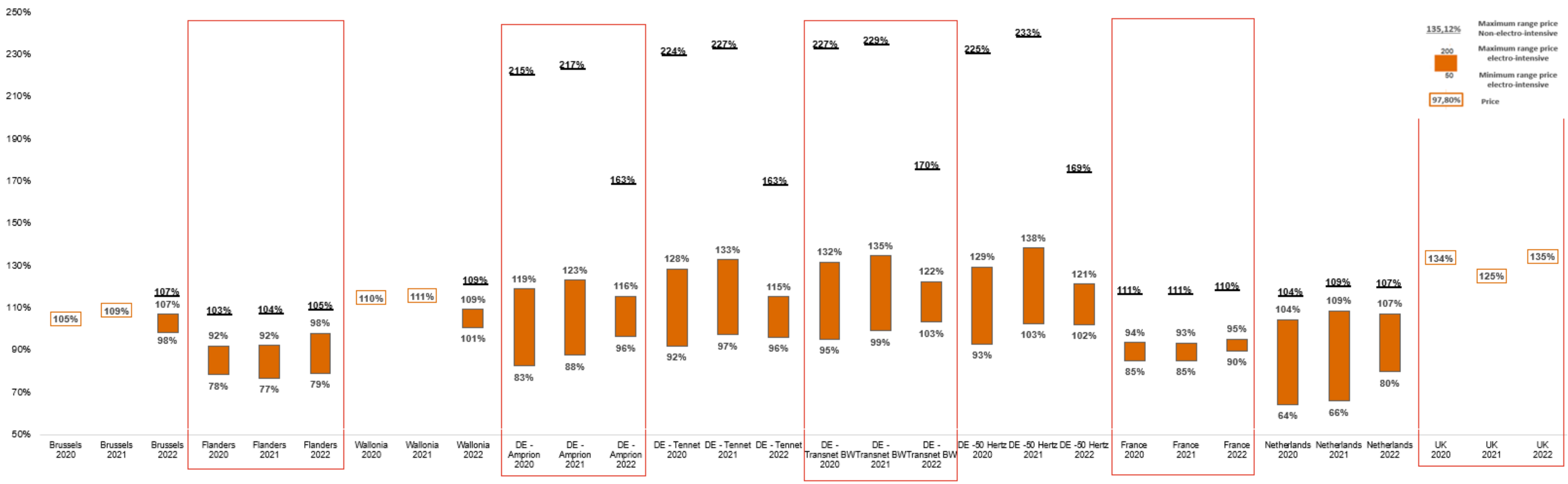
The first figure below provides a comparison of the total yearly invoice paid by an industrial profile E1 in the different studied regions and countries. The results are expressed in kEUR/year. The second figure gives the Belgian average of 100% to easily compare the percentual price differences with other countries.

Figure 45: Total yearly invoice in kEUR/year (profile E1)



Below, we compare each region and country's yearly bill with the average Belgian price, which is set at 100. The Belgian average is computed as the mean between Brussels', Wallonia's and Flanders' minimum and maximum prices.

Figure 46: Total yearly invoice comparison in % (profile E1; Belgium Average 2022 = 100)



As depicted in Figure 45 the total invoice has increased in all the regions/countries under review. We have once again big ranges to consider, but like E0 UK does not have price ranges. In 2022 we show a range of prices also for Brussels and Wallonia for profiles from E1 to E4, because of the exemption to the special excise duty that these profiles could receive.[266] Flanders has the potential to have the lowest price (1.010,41 kEUR/year) followed by the Netherlands (1.017,76 kEUR/year).

Compared to Belgium the competitive position of Germany is deteriorating compared to previous years due to the increase in commodity price. Even when reductions/exemptions are applied, the German regions are only slightly less expensive than the Belgian average. When all reductions are applied, Flanders is the cheapest zone, followed by the Netherlands and France. It is again important to note that the UK is the most expensive country if the non-electro intensive profiles in Germany are excluded.

The difference between electro- and non-electro intensive consumers is also important to note. While the distinction is particularly important in Germany it also has a significant effect on the competitiveness of France.

[266] According to Art. 429.§ 1er of the law from 27th December 2004[266] an exemption is foreseen when electricity and gas are not used only for heating and transport, but also for metallurgic or chemical industrial procedures, thus being considered as “double usage

Breakdown per component

The previous results are further detailed for profile E1 in the figure underneath, which provides a closer look at the breakdown of the different price components.

Figure 47: Electricity price by component in EUR/MWh (profile E1)

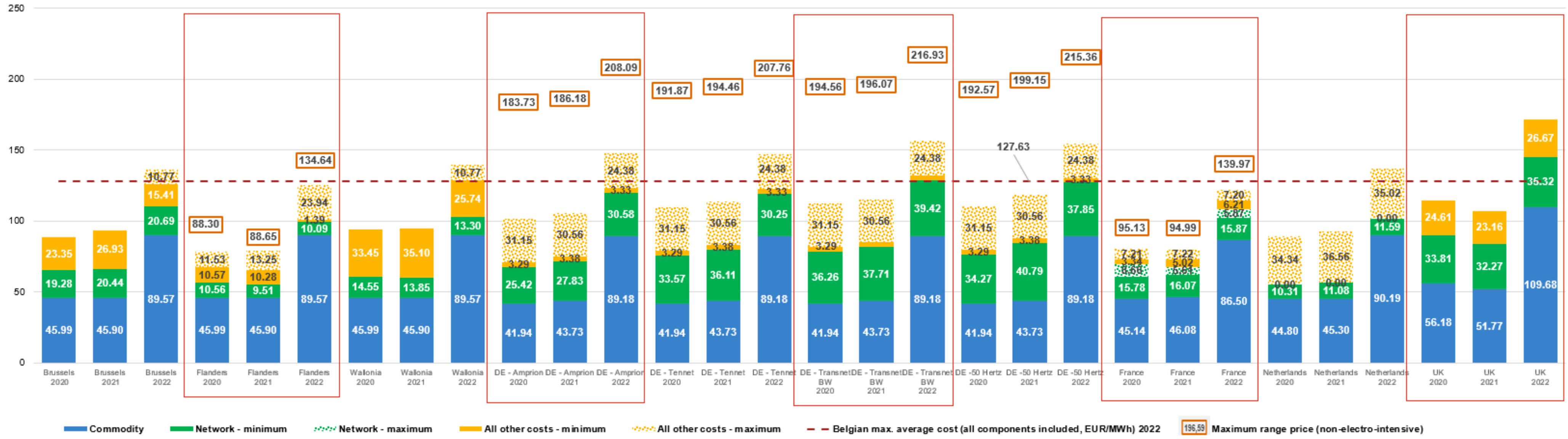
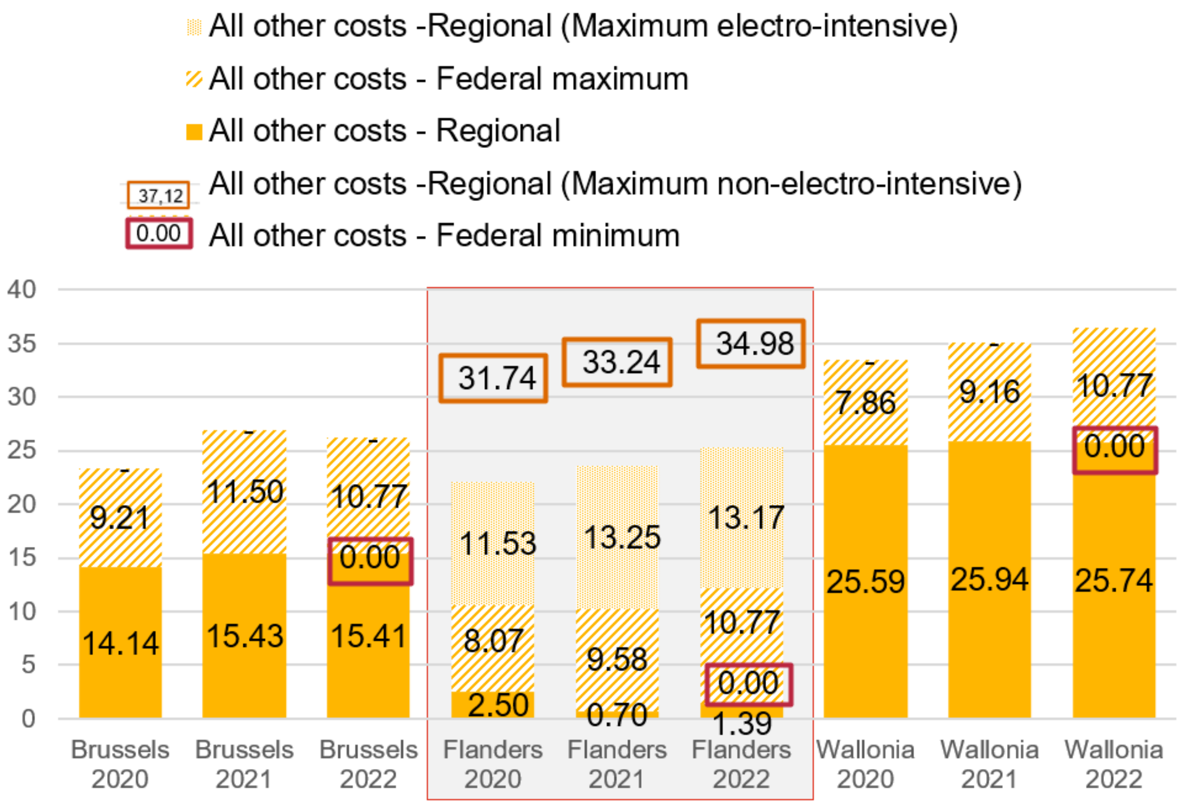


Figure 48: Regional and Federal all other costs in Belgium in EUR/MWh (profile E1)



Like E-BSME and E0, the **commodity component** increases for all regions/countries and does not vary much across zones. The UK is the only country that is more expensive (109,68 EUR/MWh). As previously said, also for E1 profile, this increase in commodity prices does not allow some regions to become more competitive than others using the reductions/exemptions available, which is the case for some German regions when compared to Belgian ones or UK.

The importance of the **network cost** is steadily decreasing as the profiles become larger and larger but is still significant in Germany and the UK. Flanders has the lowest network cost (10,09EUR/MWh) followed by the Netherlands (11,39 EUR/MWh). For most of the regions we observe a slight increase in network costs, but this is not significant in affecting the competitiveness of the different zones under review.

The **all other costs component**[267] shows a lot of variation across regions/countries. The range in Germany has significantly decreased compared to previous year, the range is now 24,38 EUR/MWh, while 30,56 EUR/MWh of the previous year, this implies that there is less difference between electro intensive and non-electro intensive consumers due to the decrease by 50% of the EEG Umlage tax. In the Netherlands there is still a possible full exemption of the all other costs component. The qualification as electro-intensive consumer is still very important in Germany and France. The UK still do not offer any reductions. In Belgium, the application of the federal excise duty as of 1st January 2022 and its consequent possible exemption for industrial profiles (E1-E4)[268], allows to reduce to 0 the federal costs for the profiles (E1 to E4) when the full exemption is applied. Like previous profiles, the slight increase of federal costs in Wallonia and Flanders compared to 2021 could be because the 2021 tariffs approved by the regulator were only included in the distribution sheets as of March 2021.

[267] This cost includes taxes, levies and certificate schemes.

[268] According to Art. 429.§ 1er of the law from 27th December 2004[268]. In fact, an exemption is foreseen when electricity and gas are not used only for heating and transport, but also for metallurgic or chemical industrial procedures, thus being considered as "double usage".

Impact of Flanders' combined cap on profile E1

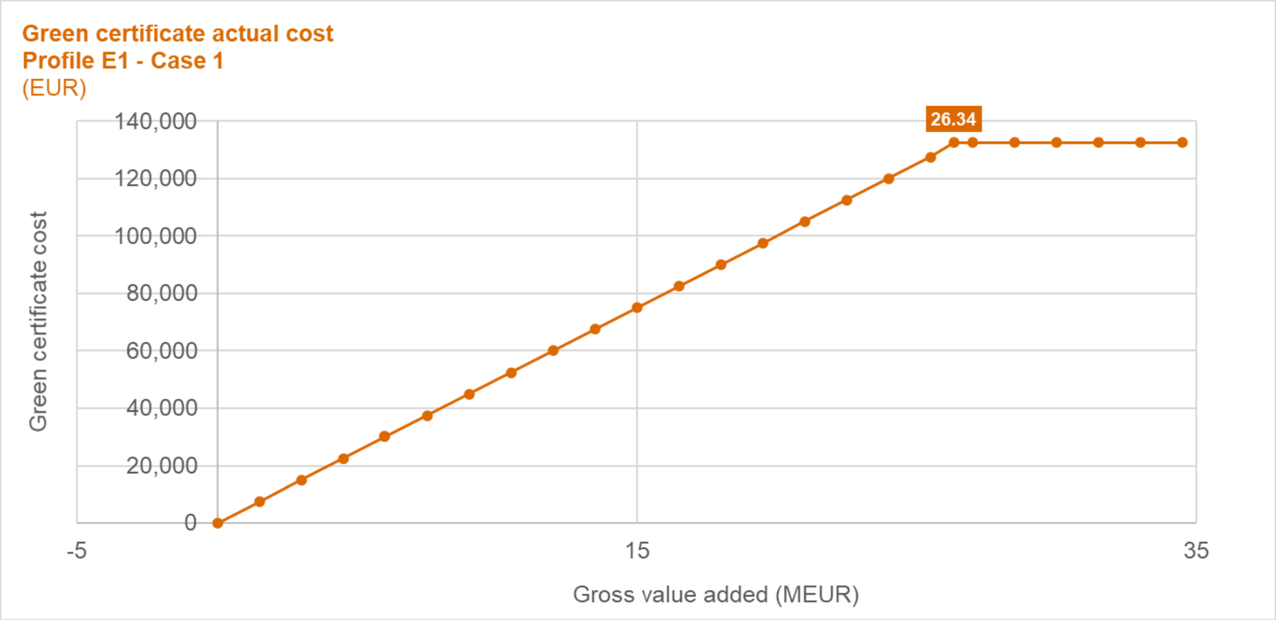
The cost of green certificates can have a big impact on the energy price of large industrial consumers. To limit these costs, Flanders introduced two caps, in 2018, on the cost of financing of renewable energies. These caps are proportional to the Gross Value Added (GVA) of the company and thus vary from company to company. In the following example, we attempt to illustrate the potential impact of these caps on industrial consumers. Previously this cap was only applicable on GC but since 2021 it is a combined cap that is applicable on GC and CHPC.

Table 121: Flanders' cap on profile E1

	Case 1	Case 2
NACE codes[269]	Annexe 3 or 5 EEAG[270]	Annexe 3 EEAG
Electro-intensity	> 20%	No threshold
Cap (% of GVA)	0,50%	4%
Average yearly consumption (E1)	10 GWh	
Scheme cost (without cap)	131.723,04 EUR	
Maximum gross value added to benefit from the cap	26,34 MEUR	3,29 MEUR

Considering only Profile E1 companies with NACE codes from Annexe 3 or 5 from the EEAG and with an electro-intensity above 20% (case 1), a company benefits from the application of the cap as long as its gross value added is less than 26.344.608 EUR.

Figure 49: CHPC and GC actual cost for E1 profile (Case 1)

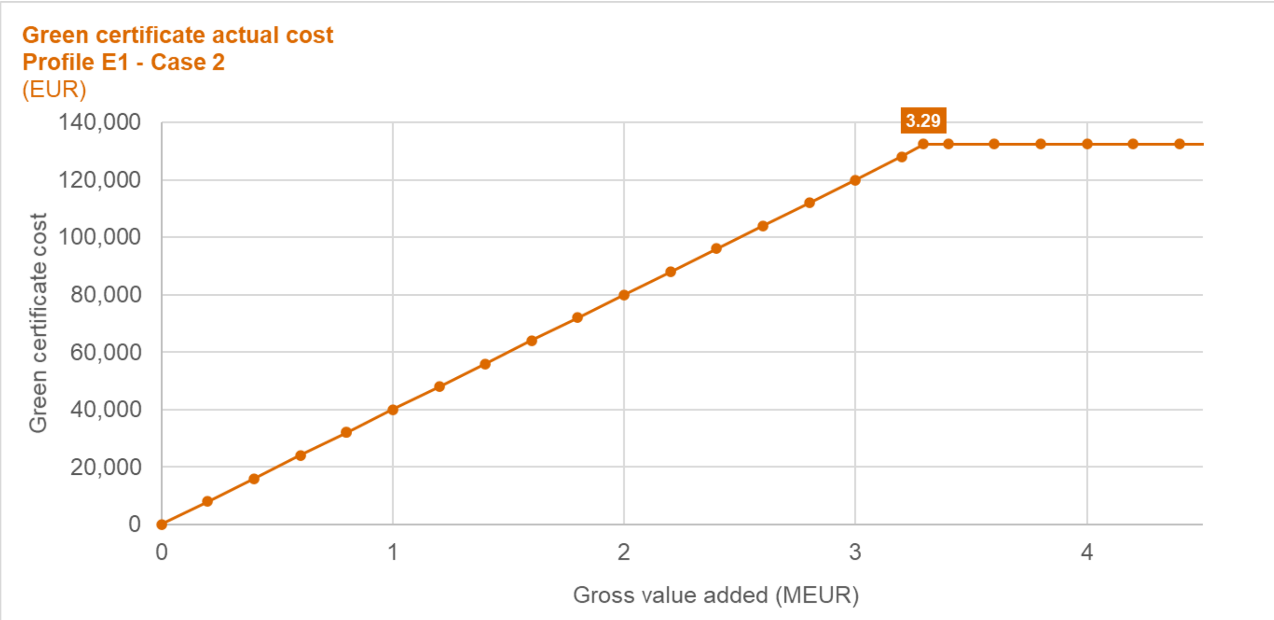


[269] The companies listed in Annexe 3 and 5 of EEAG correspond to the companies listed in the Energiedecreet except for Nace 3832 (Recycling of waste) which is listed in Annexe 3 EEAG but not in the Energiedecreet.

[270] (European Commission, 2014-2020)

Considering only Profile E1 companies with NACE codes from Annexe 3 from the EEAG (case 2), a company benefits from the application of the cap as long as its gross value added is less than 3.293.076 EUR.

Figure 50: CHPC and GC actual cost for E1 profile (Case 2)



KEY FINDINGS

The analysis of the E1 profile leads us to the following findings:

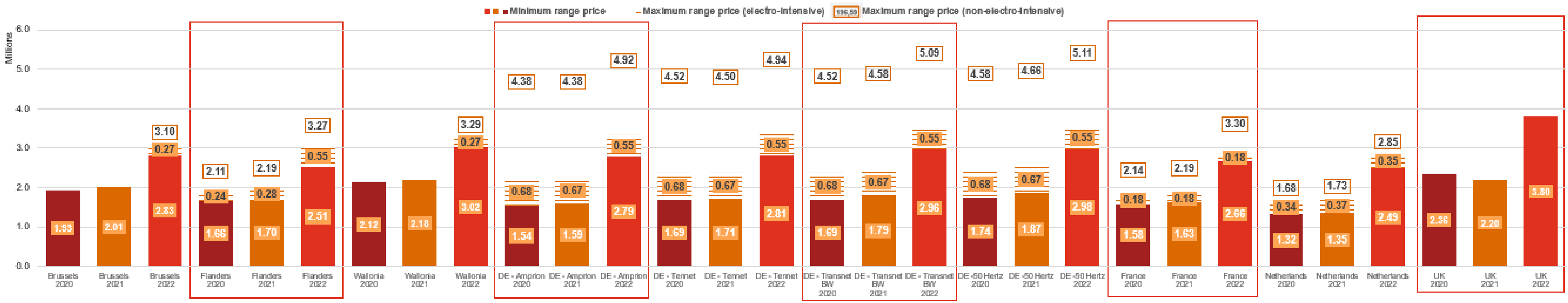
- Not taking the costs for non-electro-intensive consumers into account we still have a big range between the cheapest and most expensive region/country under review, namely between 1.010,41 kEUR (Flanders) and 1.716,67 kEUR (UK). The maximum range, taking non-electro-intensive consumers into account, is slightly above 2 MEUR in the German 50 Transnet BW region.
- In Belgium, Flanders is the most competitive region in 2022 only when reductions/exemptions are considered. This can be explained by lower network and all other costs components compared to the two other Belgian regions.
- The **commodity component** does not change significantly between profiles and is quite similar across the reviewed regions/countries with the UK being the most expensive with 109,68 EUR/MWh. All countries see a similar sharp increase in commodity cost.
- The Flanders has the most competitive **network cost** (10,09EUR/MWh). The other Belgian regions and France are in the middle group regarding the competitiveness of this component while Germany and the UK are clearly the most expensive countries regarding this component. France has a range (5,87 EUR/MWh) for the network costs but remains in the middle group either way.
- Lastly the component that varies the most is the **all other costs**. This can have an impact on the competitiveness of the regions/countries, even if it is less impactful than previous years because of the general increase of the commodity component. Non-electro intensive consumers in Germany pay the highest bill, while the UK becomes the most expensive when reductions for electro intensive consumers are considered. For the E1 profile the Netherlands displays the biggest range for electro-intensive consumers (35,02 EUR/MWh). Since the all other costs in France are very small to begin with, even if the reduction for electro-intensive consumers does not apply, they are in a very competitive position.

Profile E2 (Electricity)

Total invoice analysis

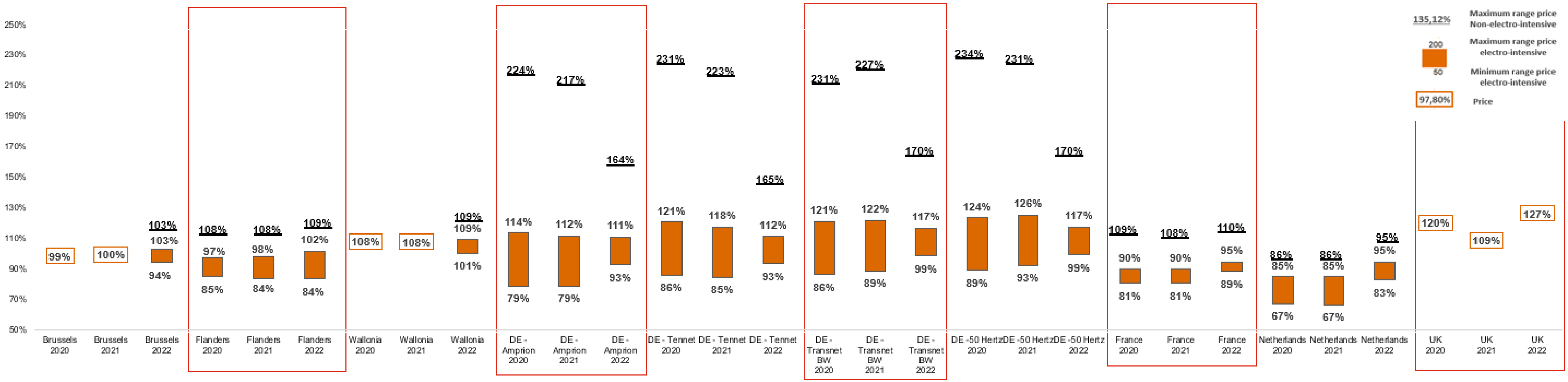
The figure below provides a comparison of the total yearly invoice paid by an industrial profile E2 in the different studied countries and regions. The results are expressed in MEUR/year. The second figure gives the Belgian average of 100% to easily compare the percentual price differences with other countries.

Figure 51: Total yearly invoice in MEUR/year (profile E2)



Below, we compare each region and country's yearly bill with the average Belgian price, which is set at 100. The Belgian average is computed as the mean between Brussels', Wallonia's and Flanders' minimum and maximum prices.

Figure 52: Total yearly invoice comparison in % (profile E2; Belgium Average 2022 = 100)



Before starting the analysis, we note that the price has increased in all the reviewed countries. This is because of a higher commodity component in 2022, similarly to what has been observed for the previous profiles.

Regarding the E2 profiles for the Belgian regions, we notice that Flanders is the most competitive region for electro intensive consumers, while Brussels is the cheapest one for non-electro intensive ones. Wallonia becomes the least competitive one when the E2 profile needs to pay in full the special excise duty.

The Netherlands still has the potential to offer the cheapest total invoice, namely 2,49 MEUR, while the German 50 Hertz region might have the most expensive total invoice regarding electro-intensive consumers, namely 5,11 MEUR. This year, there are no regions/countries that can be cheaper than the Netherlands. This is explained again by the general increase of the commodity component in all zones under review, thus reducing the impact of reductions on competitiveness of each zone.

Contrary to E1 the total invoice of the Netherlands will always be under the Belgian average, with a maximum 95%. As for Germany, their competitive position is still improving as it was the case between E0 and E1. The increase in commodity prices has led to a convergence of the German regions towards the Belgian average. This is also observed for France, but it is less evident than the German regions.

Breakdown per component

The previous results are further detailed for profile E2 in the underneath figure, which provides a closer look at the breakdown of the different price components.

Figure 53: Electricity price by component in EUR/MWh (profile E2)

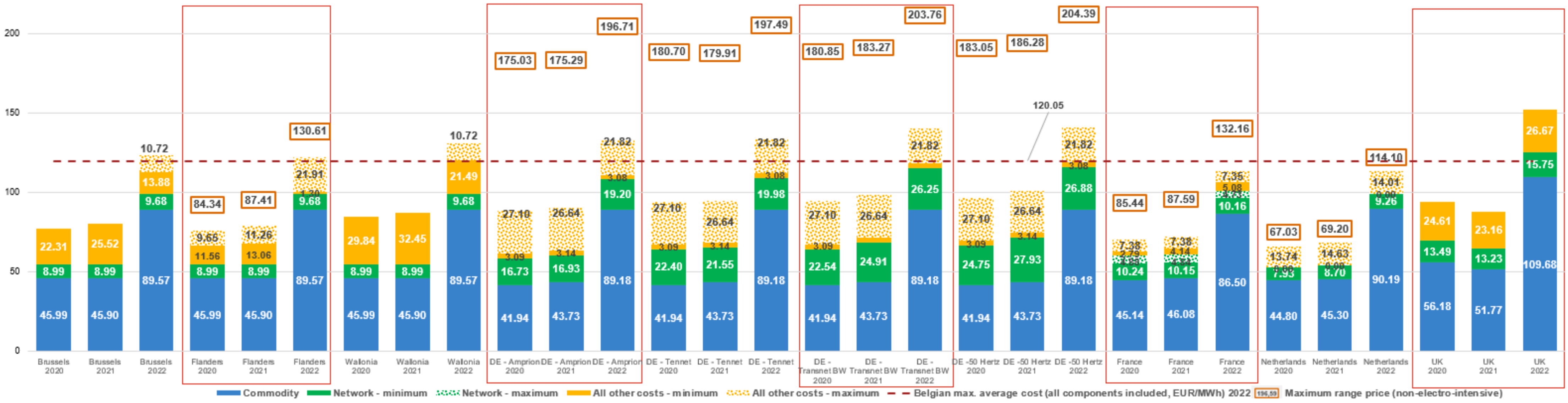
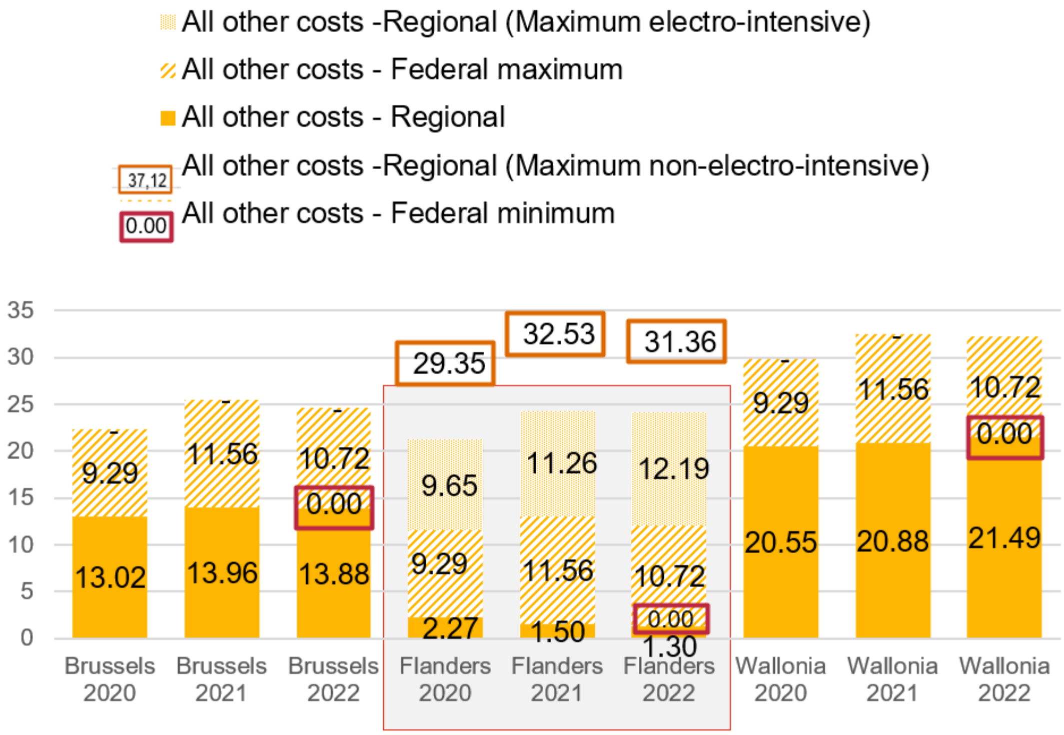


Figure 54: Regional and Federal all other costs in Belgium in EUR/MWh (profile E2)



The **commodity component** is similar across zones, except for the UK where it is slightly higher (109,68 EUR/MWh), like it was the case for the previous industrial profiles analysed so far. The commodity component has become the largest part of the total invoice in all regions.

The **network costs component** confirms the position of the Netherlands as the most competitive zone for this cost (9,26 EUR/MWh). Since the E2 profile is no longer connected to the distribution grid, starting E2 this cost is no longer present in the network cost and the cost is also the same in all the Belgian regions (9,68 EUR/MWh). For Belgium, given the fact that the transmission tariffs approved by the CREG are (almost) stable over the 2020-2023 period, the strong increase in the network costs component observed between 2021 and 2022 is a direct consequence of the strong increase in the commodity cost. Indeed, the costs of network losses on the federal transmission grid (380/220/150 kV) are, for the purpose of this study, considered as a component of network costs and suppliers usually bill these costs as a percentage (fixed every year by the TSO) of the commodity cost. Apart from the German regions and the UK, the network costs are quite similar across the regions/countries, between 9,26 and 10,16 EUR/MWh In Germany we observe a convergence of the network costs across regions compared to previous years, as Amprion and Transnet BW regions have higher network costs while they are decreasing for Tennet and 50 Hertz.

Finally, the **all other costs component**[271] varies greatly depending on the region/country and on the consumer profile (electro-intensive or not). Depending on the consumer they might be entitled to a reduction or even an exemption, as is the case in the Netherlands. In the Netherlands we do see that there is a maximum for non-electro-intensive consumers to consider, while it was not the case for the other industrial profiles analysed so far (E0 and E1). In the UK where there are still no reductions/exemptions to be applied for electro-intensive consumers, while for Brussels and Wallonia we see in 2022 that a range is available due to the possible exemption on the special excise duty for profiles E1 to E4. Like last year, depending on the reduction in France they might be more competitive than the Netherlands. While France will in any case at least bill 5,08 EUR/MWh to their consumers this is not the case in the Netherlands which puts France at a disadvantage regarding this component.[272]

[271] This cost includes taxes, levies and certificate schemes.

[272] In addition to the degressivity rules and limits that apply the larger profiles (E2 and higher) do not pay a part of the all other costs, namely the part billed through the DSO, which the smaller profiles do pay.

Impact of Flanders' combined cap on profile E2

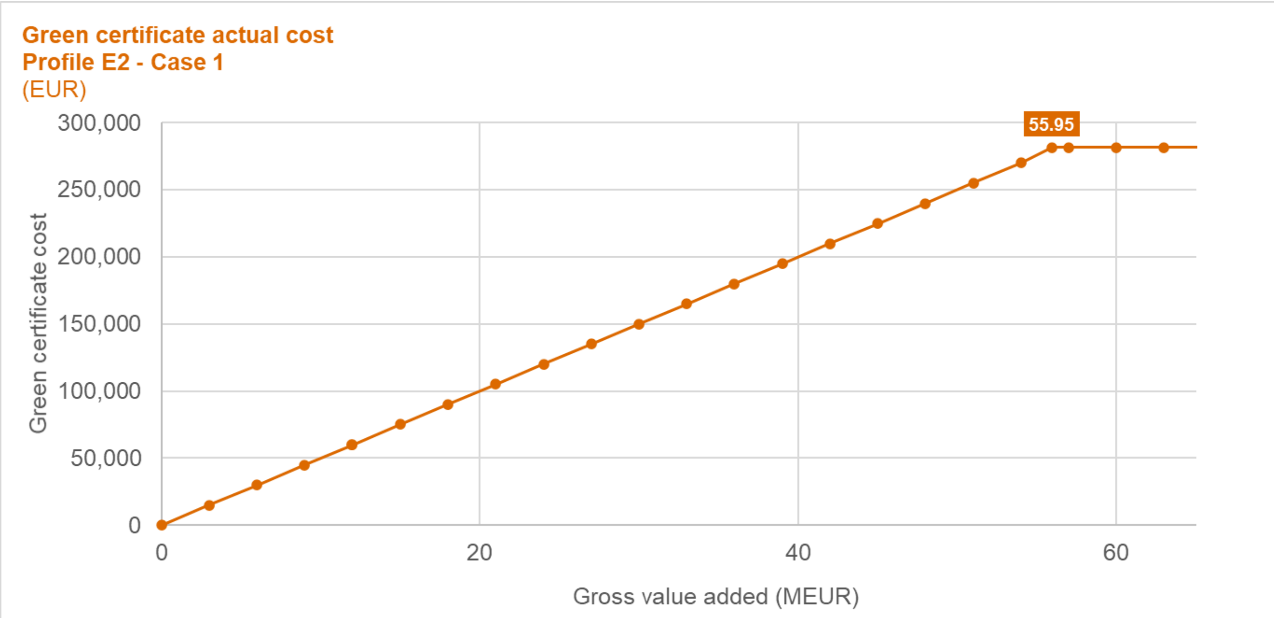
The cost of green certificates can have a big impact on the energy price of large industrial consumers. To limit these costs, Flanders introduced two caps, in 2018, on the cost of financing of renewable energies. These caps are proportional to the Gross Value Added (GVA) of the company and thus vary from company to company. In the following example, we attempt to illustrate the potential impact of these caps on industrial consumers. Previously this cap was only applicable on GC but since 2021 it is a combined cap that is applicable on GC and CHPC.

Table 122: Flanders' cap on profile E2

	Case 1	Case 2
NACE codes[273]	Annexe 3 or 5 EEAG[274]	Annexe 3 EEAG
Electro-intensity	> 20%	No threshold
Cap (% of GVA)	0,50%	4%
Average yearly consumption (E2)	25 GWh	
Scheme cost (without cap)	279.728,63	
Maximum gross value added to benefit from the cap	55,95 MEUR	6,99 MEUR

Considering only Profile E2 companies with NACE codes from Annexe 3 or 5 from the EEAG and with an electro-intensity above 20% (case 1), a company benefits from the application of the cap as long as its gross value added is less than 55.945.725 EUR.

Figure 55: CHPC and GC actual cost for E2 profile (Case 1)

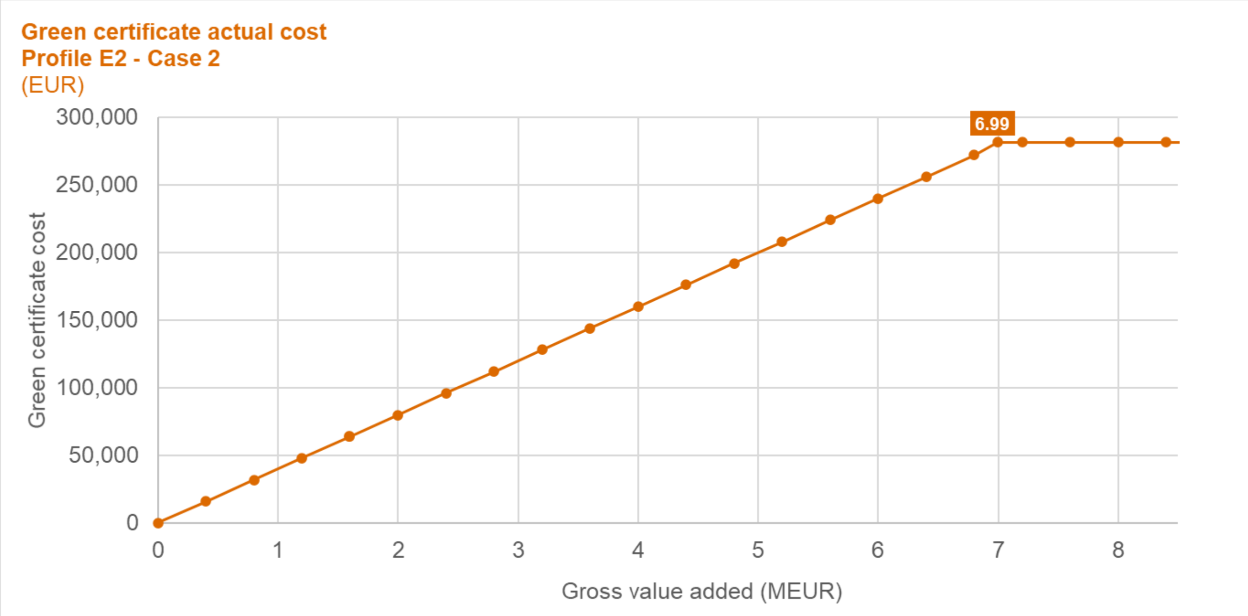


Considering only Profile E2 companies with NACE codes from Annexe 3 from the EEAG (case 2), a company benefits from the application of the cap as long as its gross value added is less than 6.993.216 EUR.

Figure 56: CHPC and GC actual cost for E2 profile (Case 2)

[273] The companies listed in Annexe 3 and 5 of EEAG correspond to the companies listed in the Energiedecreet except for Nace 3832 (Recycling of waste) which is listed in Annexe 3 EEAG but not in the Energiedecreet.

[274] (European Commission, 2014-2020)



KEY FINDINGS

The analysis of the E2 profile leads us to the following findings:

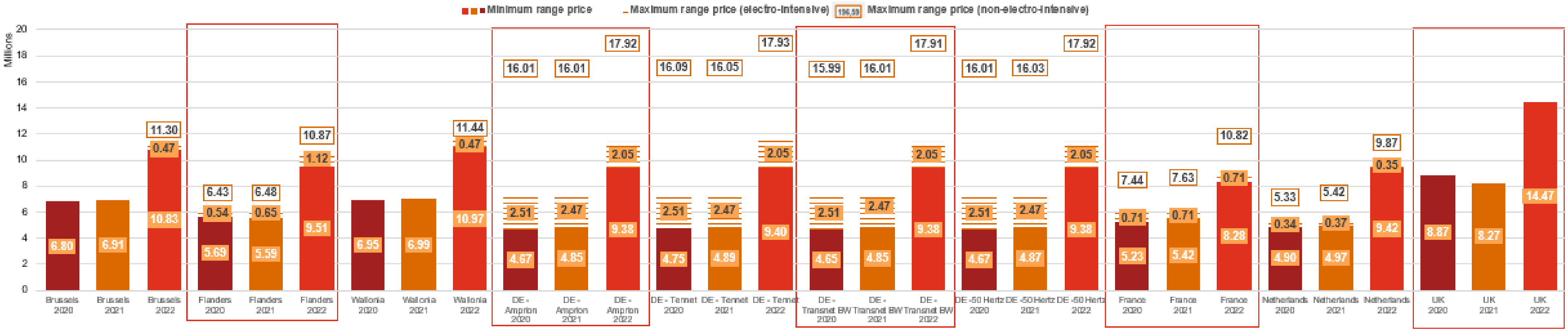
- The total invoices increased in all regions/countries under review and varies between 2,49 MEUR (minimum range the Netherlands) and 3,53 MEUR (maximum range German 50 Hertz region) when we do not take the non-electro-intensive consumers into account. The German 50 Hertz region also has the highest possible bill for the non-electro-intensive consumers, 5,11 MEUR.
- In Belgium, Flanders remains the most competitive region for electro-intensive consumers thanks to the reductions on the all other costs, while the Netherlands is the cheapest among the regions/countries under review. Since the E2 profile is no longer connected to the distribution grid the network cost has decreased and is now the same across all Belgian regions. However, Brussels and Wallonia are more competitive regarding non-electro-intensive consumers also in 2022.
- The **commodity component** stays the same as the smaller profiles (until E-BSME) and it also represents for the E2 profile the largest share of the invoice bill in 2022, accounting for even more than 50% in most regions.
- Compared to last year, we notice a general slight increase of the **network cost** components in all regions/countries, except the two German regions Tennet and 50 Hertz. The network cost is still significant in Germany and generally higher than the other regions/countries.
- The **all other cost component** still plays an important role in determining the competitiveness of the regions. Several regions/countries such as France, the Netherlands, Germany and Flanders support electro-intensive consumers by offering fares reductions. Not falling under these reductions will significantly increase the costs, certainly if you are not qualified as an electro-intensive consumer in Germany. The possibility to be completely exempted from the federal excise duty in Belgium can truly help the competitiveness position of the three Belgian regions.

Profile E3 (Electricity)

Total invoice analysis

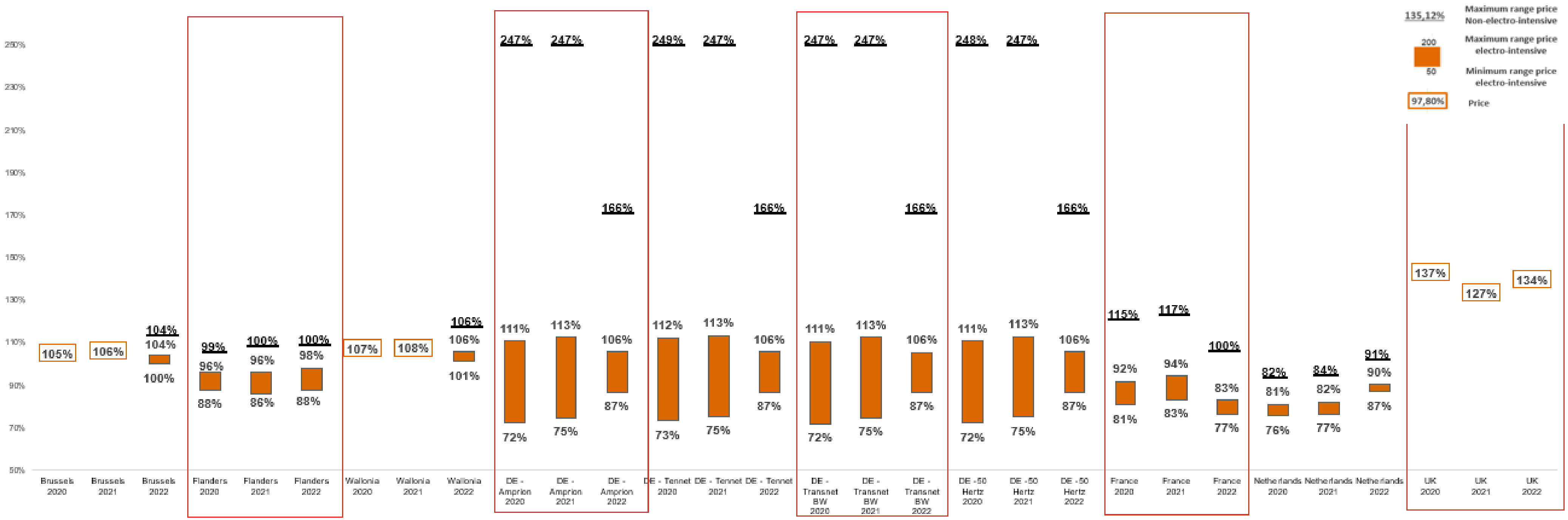
The figure below provides a comparison of the total yearly invoice paid by an industrial profile E3 in the different studied regions and countries. The results are expressed in MEUR/year. The second figure gives the Belgian average of 100% to easily compare the percentual price differences with other countries.

Figure 57: Total yearly invoice in MEUR/year (profile E3)



Below, we compare each region and country's yearly bill with the average Belgian price, which is set at 100. The Belgian average is computed as the mean between Brussels', Wallonia's and Flanders' minimum and maximum prices.

Figure 58: Total yearly invoice comparison in % (profile E3; Belgium Average 2022 = 100)



The total invoice has increased in all regions/countries under review. The position of the UK reflects the same trend observed for E1 and E2. It is still the most expensive country if we leave out the non-electro-intensive consumers. Furthermore, it is important to note that Flanders is undoubtedly the most competitive Belgian region even without taking reductions into account. Looking at all the regions/countries only Germany, France and the Netherlands have the possibility to be the cheapest region for electro-intensive consumers under the right circumstances, with France always being the cheapest one, no matter the reductions applied. Between the German regions and the Netherlands, the competitiveness depends on the reductions applied to the all other costs component. Similarly, to previous years, the larger the consumers become the more the competitive position of the German regions improves, even though it is still the country with the highest total invoice when also taking the non-electro-intensive consumers into account (up to 17,93 MEUR).

Lastly, we observe that whatever happens, both for electro and non-electro intensive consumers, the Netherlands is always below the Belgian average. France is also below the average of the three Belgian regions, except for the non-electro intensive profiles which are almost at the same level as the Belgian average. This implies that the reductions have gained more importance in determining the competitiveness of a zone, given the sharp increase of the commodity component. The German maximum electro-intensive range is now around the Belgian average.

Breakdown per component

The previous results are further detailed for profile E3 in the figure underneath, which provides a closer look at the breakdown of the different price components.

Figure 59: Electricity price by component in EUR/MWh (profile E3)

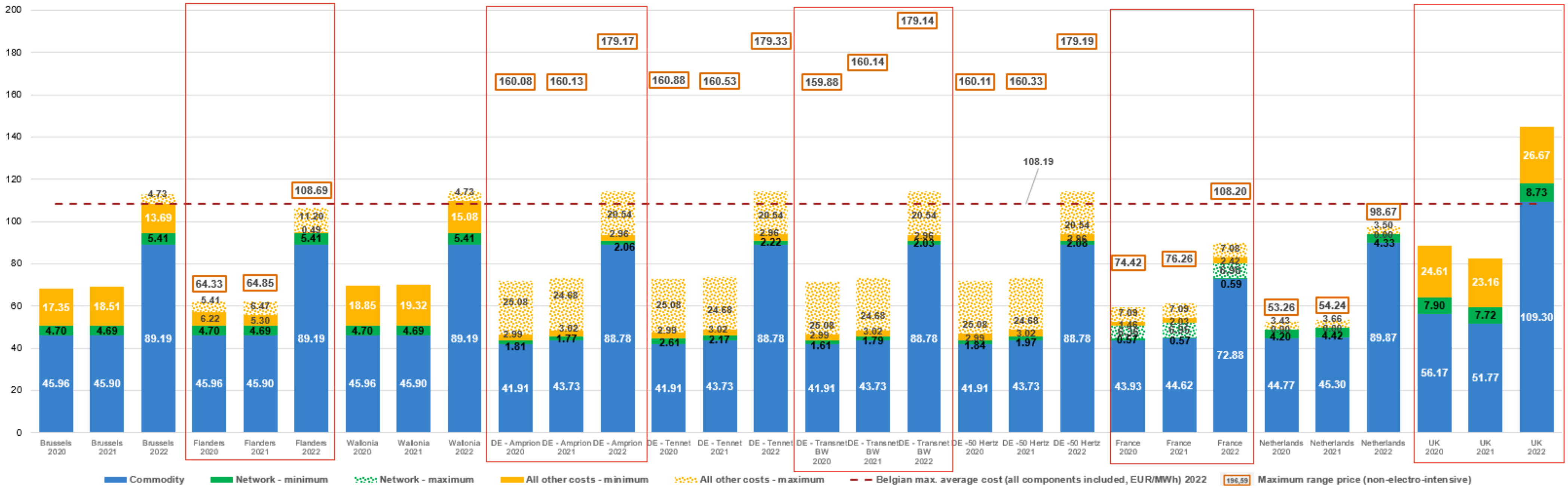
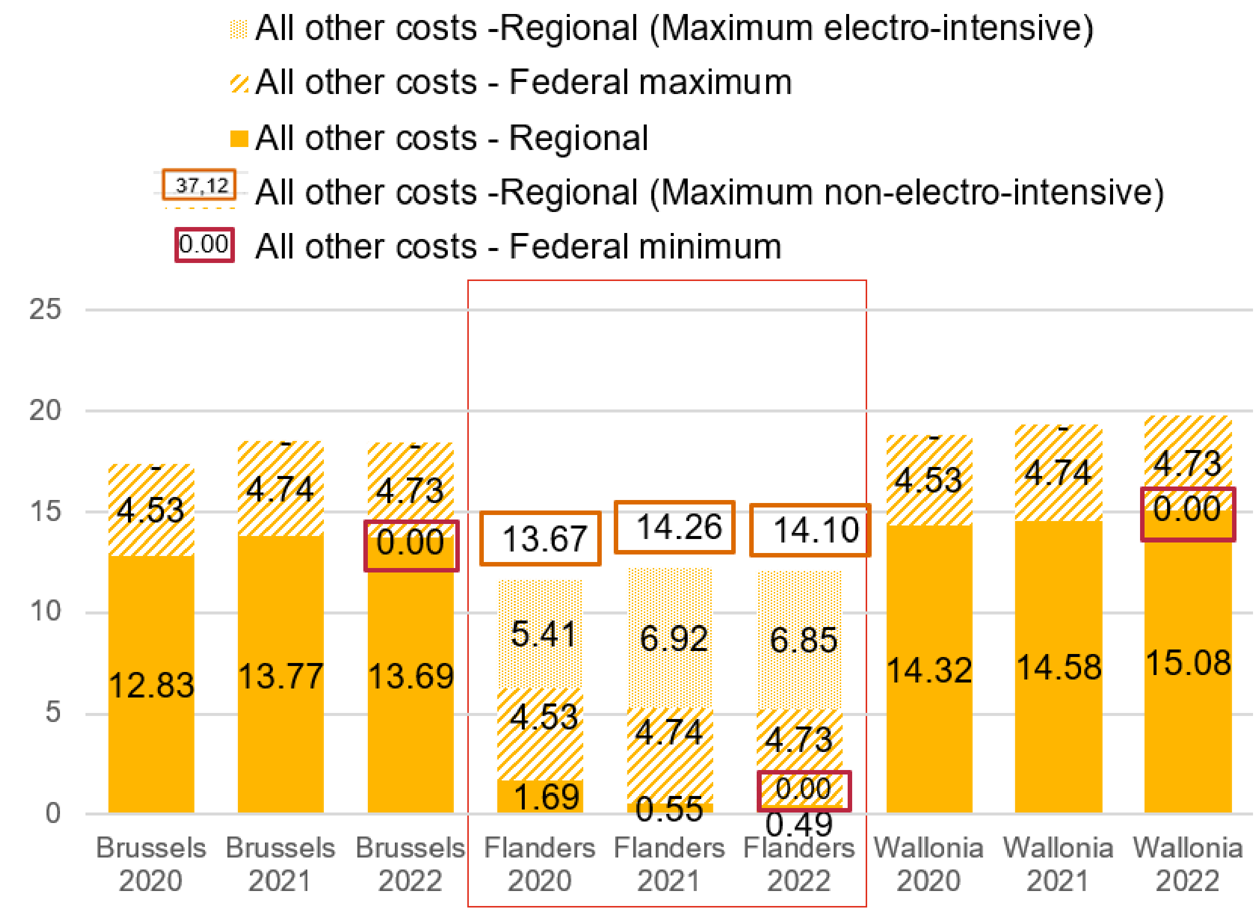


Figure 60: Regional and Federal all other costs in Belgium in EUR/MWh (profile E3)



In comparison to previous consumer profiles, the **commodity component** of consumer E3 differs as we assume that it constantly operates (24/24, 7/7). Consequently, commodity costs slightly differ compared to previous consumption profiles. Globally, a similar situation is encountered across regions/countries with the lowest cost in France followed by Germany. Due to the ARENH formula (explained in detail in section 5 chapter France), the commodity price for E3 profiles is lower than the previous industrial profiles. This explains why France is even more competitive than other regions/countries for this profile. On the other hand, the UK has the most expensive commodity cost (109,30 EUR/MWh). Like the other profiles, we observe that also for E3, the commodity component now accounts for most of the electricity bill.

The **network cost component** does not have a big impact on the total invoice and, as said for profile E2, these are now lower and harmonised in Belgium since they are directly connected to the transmission grid and no regional differences must be considered for this profile. The UK still has the highest network cost, 8,73 EUR/MWh. The low cost of this component for the E3 profile is due to varying reductions on transmission costs in several of the regions/countries under review, which greatly affects the countries' competitiveness. Among such countries are Germany (85% reduction), France (from 10 to 85% reduction) and the Netherlands (36% reduction). For most of the regions/countries under review we notice an increase of the network costs in 2022 compared to 2021, but the increase is minimal and not that significant on the total bill. For Belgium, given the fact that the transmission tariffs approved by the CREG are (almost) stable over the 2020-2023 period, the strong increase in the network costs component observed between 2021 and 2022 is a direct consequence of the strong increase in the commodity cost. Indeed, the costs of network losses on the federal transmission grid (380/220/150 kV) are, for the purpose of this study, considered as a component of network costs and suppliers usually bill these costs as a percentage (fixed every year by the TSO) of the commodity cost.

The minimum rate of the **all other costs component**[275] becomes smaller and smaller and is only still significant in Brussels (13,69 EUR/MWh), Wallonia (15,08 EUR/MWh) and the UK (26,67 EUR/MWh). In the Netherlands, important reductions are granted on taxes paid for consumption above 10 GWh, which makes it the country with the potentially lowest possible tax level together with France. Nonetheless, electro-intensive consumers do not see the European minimum tax level (0,50 EUR/MWh) yet applied at their consumption level since the reduction through the "Teruggaaf over energiebelasting en ODE" in the Netherlands is higher.[276]

Impact of Flanders' combined cap on profile E3

The cost of green certificates can have a big impact on the energy price of large industrial consumers. To limit these costs, Flanders introduced two caps, in 2018, on the cost of financing of renewable energies. These caps are proportional to the Gross Value Added (GVA) of the company and thus vary from company to company. In the following example, we attempt to illustrate the potential impact of these caps on industrial consumers. Previously this cap was only applicable on GC but since 2021 it is a combined cap that is applicable on GC and CHPC.

Table 123: Flanders' cap on profile E3

	Case 1	Case 2
NACE codes[277]	Annexe 3 or 5 EEAG[278]	Annexe 3 EEAG
Electro-intensity	> 20%	No threshold
Cap (% of GVA)	0,50%	4%
Average yearly consumption (E3)	100 GWh	
Scheme cost (without cap)	684.910,88	
Maximum gross value added to benefit from the cap	136,98 MEUR	17,12 MEUR

Considering only Profile E3 companies with NACE codes from Annexe 3 or 5 from the EEAG and with an electro-intensity above 20% (case 1), a company benefits from the application of the cap as long as its gross value added is less than 136.982.175 EUR.

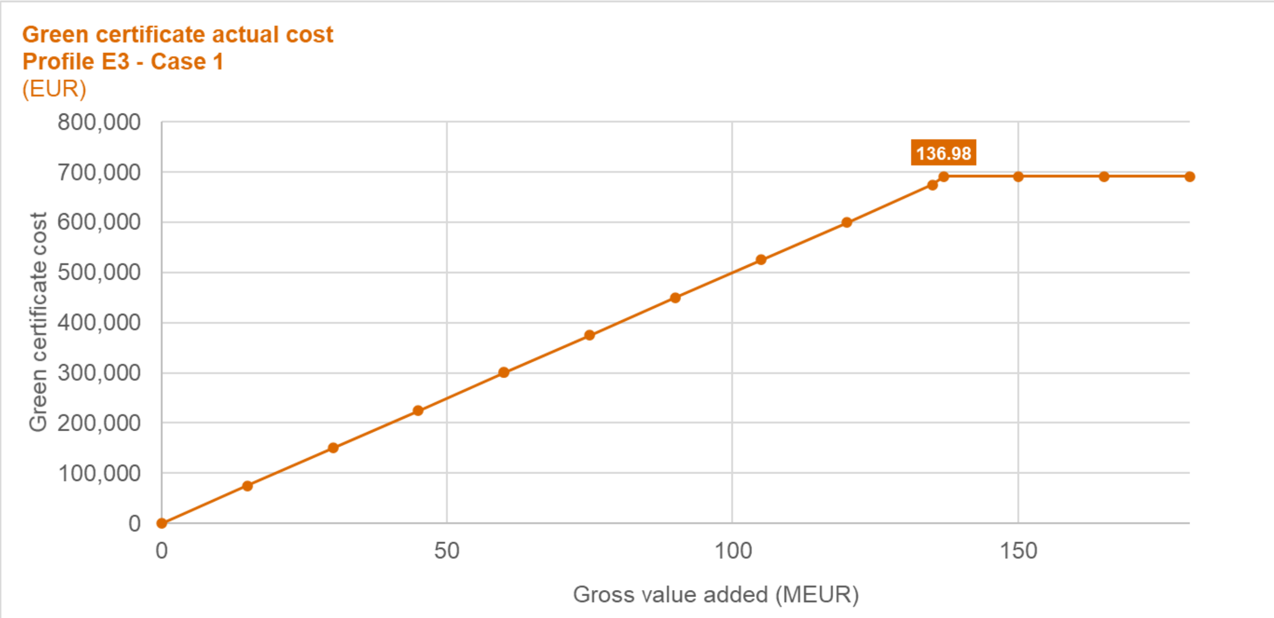
[275] This cost includes taxes, levies and certificate schemes.

[276] In addition to the degressivity rules and limits that apply the larger profiles (E2 and higher) do not pay a part of the all other costs, namely the part billed through the DSO, which the smaller profiles do pay.

[277] The companies listed in Annexe 3 and 5 of EEAG correspond to the companies listed in the Energiedecreet except for Nace 3832 (Recycling of waste) which is listed in Annexe 3 EEAG but not in the Energiedecreet.

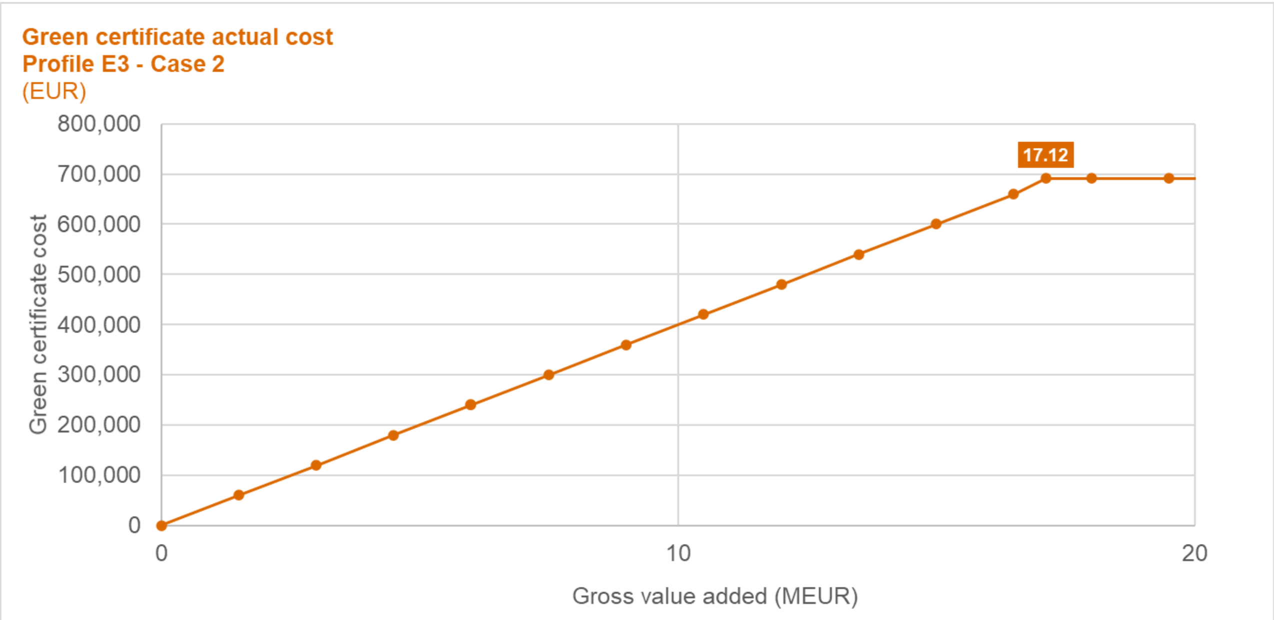
[278] (European Commission, 2014-2020)

Figure 61: CHPC and GC actual cost for profile E3 (Case 1)



Considering only Profile E3 companies with NACE codes from Annexe 3 from the EEAG (case 2), a company benefits from the application of the cap as long as its gross value added is less than 17.122.772 EUR.

Figure 62: CHPC and GC actual cost for profile E3 (Case 2)



KEY FINDINGS

The analysis of the E3 profile leads us to the following findings:

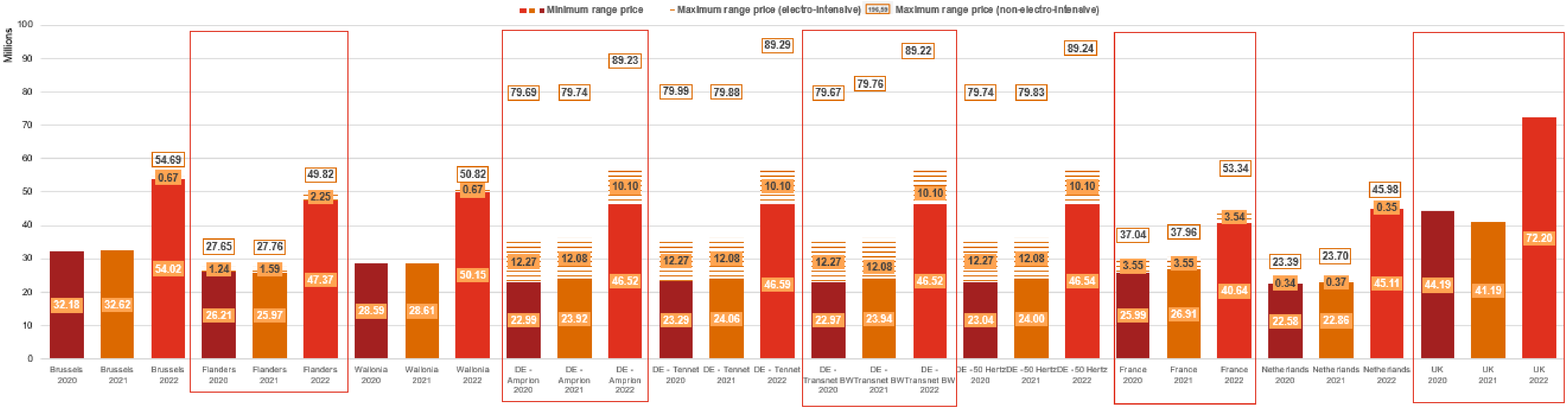
- The total invoice ranges from 8,28 (min. range France) to 14,47 MEUR/year (UK) when comparing electro-intensive consumers, while it can go up to 17,93 MEUR/year for non-electro-intensive consumers.
- In Belgium, we observe that Flanders will always be the most competitive region even for non-electro intensive consumers, which is in line with the result from last year. The total invoice has increased significantly in all regions/countries under review due to the increase of the commodity component. The difference between Brussels and Wallonia is small (0,14 MEUR/year), but in favour of Brussels.
- The **commodity cost** is different for this profile than E2 because we estimate the consumer to consume 24/7, but we still see the lowest cost in France. This component makes up most of the invoice, even for non-electro-intensive consumers in Germany where the commodity component now accounts for 50% of the invoice.
- The network cost is a small component in the total invoice, especially in Germany, France and the Netherlands. The reductions on transmission costs are based either on electro-intensity or consumption criteria. Consecutively, the comparison of network costs within countries is seriously impacted, given the high range of possible reductions. Ultimately, France (considering minimum price option) turns out to be the most competitive country because of these reductions.
- Lastly, the **all other costs component** is the highest in the UK (26,67 EUR/MWh), followed by Brussels and Wallonia. The other regions/countries consider reduction and even exemption schemes for certain types of consumers. Falling under one of these reduction schemes can have a big impact, for example a reduction up to 20,54 EUR/MWh for electro intensive profiles in Germany.

Profile E4 (Electricity)

Total invoice analysis

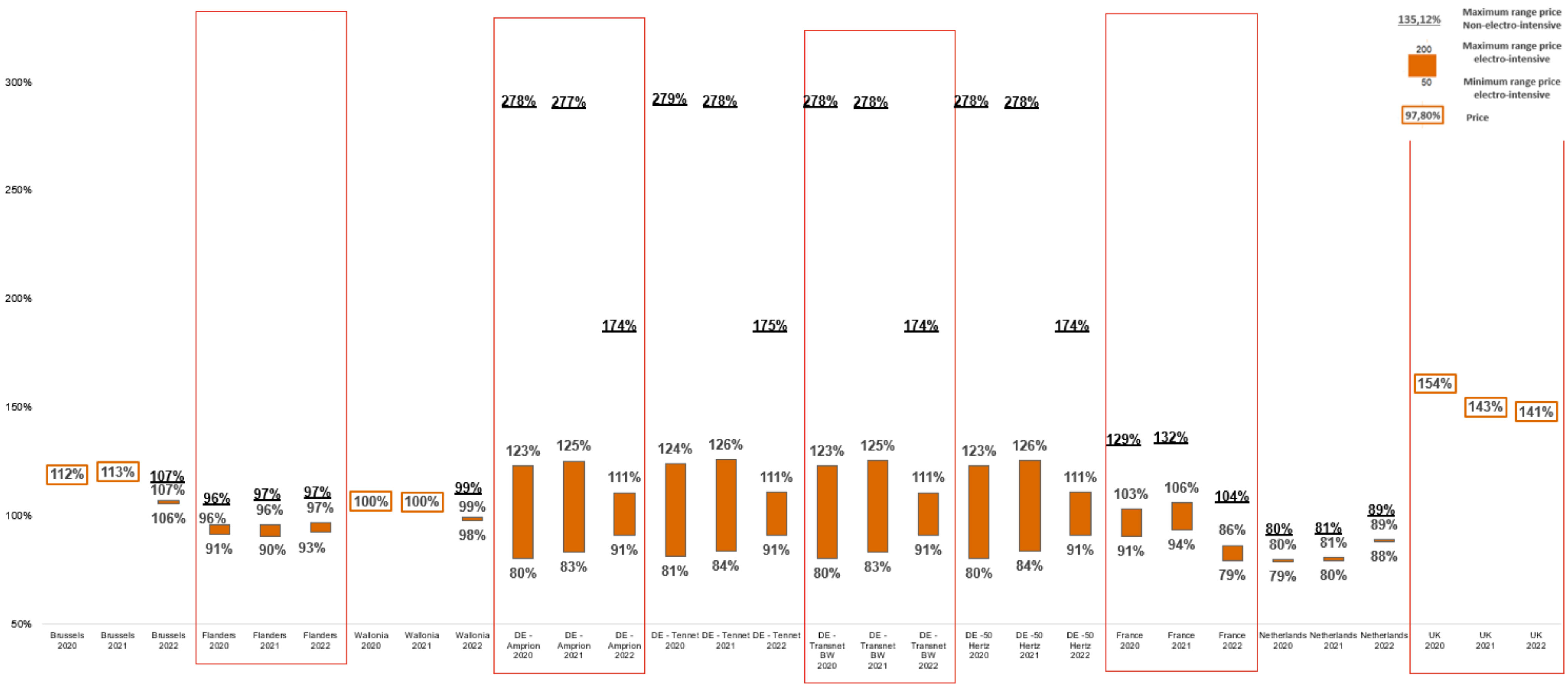
The figure below provides a comparison of the total yearly invoice paid by an industrial profile E4 in the different studied regions/countries. The results are expressed in MEUR/year. The second figure gives the Belgian average of 100% to easily compare the percentual price differences with other countries.

Figure 63: Total yearly invoice in MEUR/year (profile E4)



Below, we compare each region and country's yearly bill with the average Belgian price, which is set at 100. The Belgian average is computed as the mean between Brussels', Wallonia's and Flanders' minimum and maximum prices.

Figure 64: Total yearly invoice comparison in % (profile E4; Belgium Average 2022 = 100)



The total invoice has increased in all the reviewed regions/countries (between 65% to 94% increase compared to last year) and the total invoice ranges from 40,64 (minimum range France) to 72,20 MEUR (UK) for electro-intensive consumers. For non-electro-intensive consumers, the price can be up to 89,29 MEUR which is almost 25% higher than the electro-intensive consumers' maximum. Like the E3 profile, France can again offer the lowest price and the difference from the other regions is even more evident, being almost 5 MEUR cheaper than the 2nd cheapest region, the Netherlands. In Belgium, Brussels is again the most expensive region for the E4 profile in 2022, followed by Wallonia.

While there are a lot of ranges to consider it is quite clear that Flanders is the most competitive Belgian region even if we take the maximum range for non-electro-intensive consumers into account (49,82 MEUR/year), followed by Wallonia (50,82 MEUR) and Brussels (54,69 MEUR).

Differently from the previous year, it is not that evident which region/country can be the cheapest one. In fact, for electro-intensive profiles we can conclude that France is the cheapest zone, followed by the Netherlands. However, the situation changes for non-electro intensive profiles, where the Netherlands can offer the cheapest bill, followed by France.

With regards to the presumably lower competitiveness of Germany, for electricity costs, one should evaluate the situation carefully. The existing variance comes because of the relative size of power costs in the consumer's gross value added. When the average annual electricity cost over the last three years represents less than 14% of the gross value added of an industrial consumer, the consumer inevitably pays the maximum rate, thereby lowering its competitiveness. While we expect only a limited number of consumers under this profile to qualify as non-electro-intensive, it is worthwhile to mention that Belgium is the second most competitive country (after the Netherlands) for these consumers. We also note that the German competitive position (compared to Belgium average) has improved for E4, like it was observed for E3. The minimum and maximum ranges are now more around the Belgian average, between 92% to 112% of the Belgian average for 2022.

Breakdown per component

The previous results are further detailed for profile E4 in the figure below, which provides a closer look at the breakdown of the different price components.

Figure 65: Electricity price by component in EUR/MWh (profile E4)

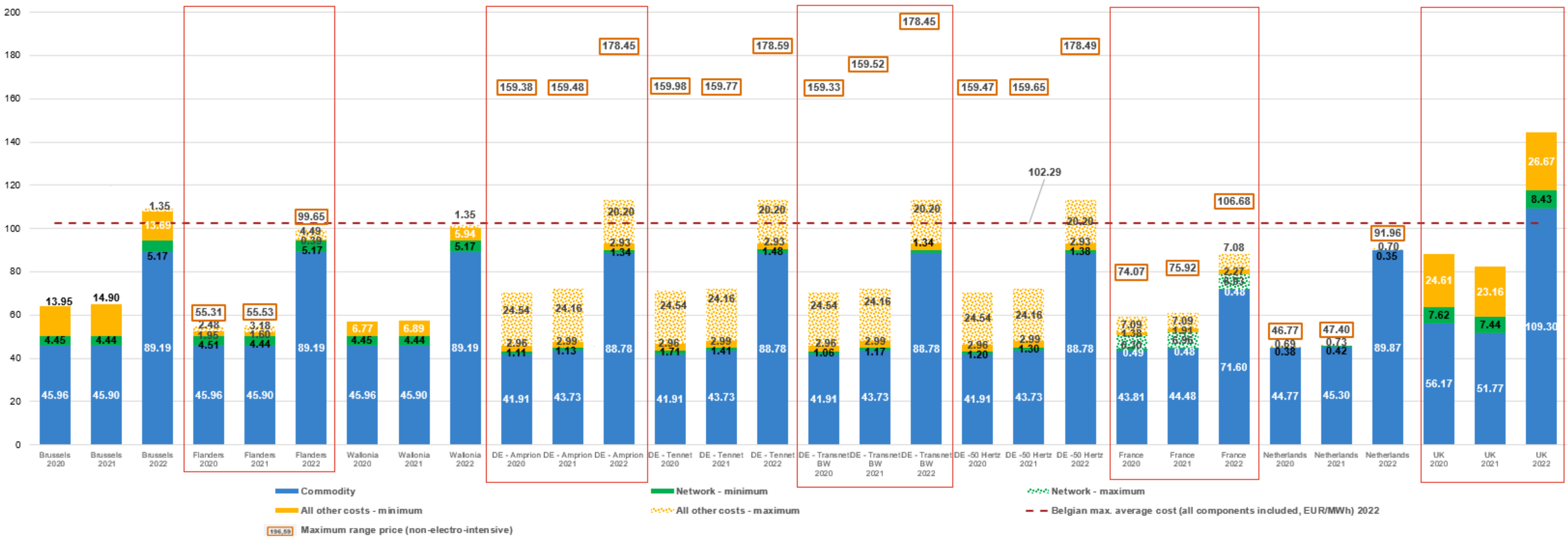
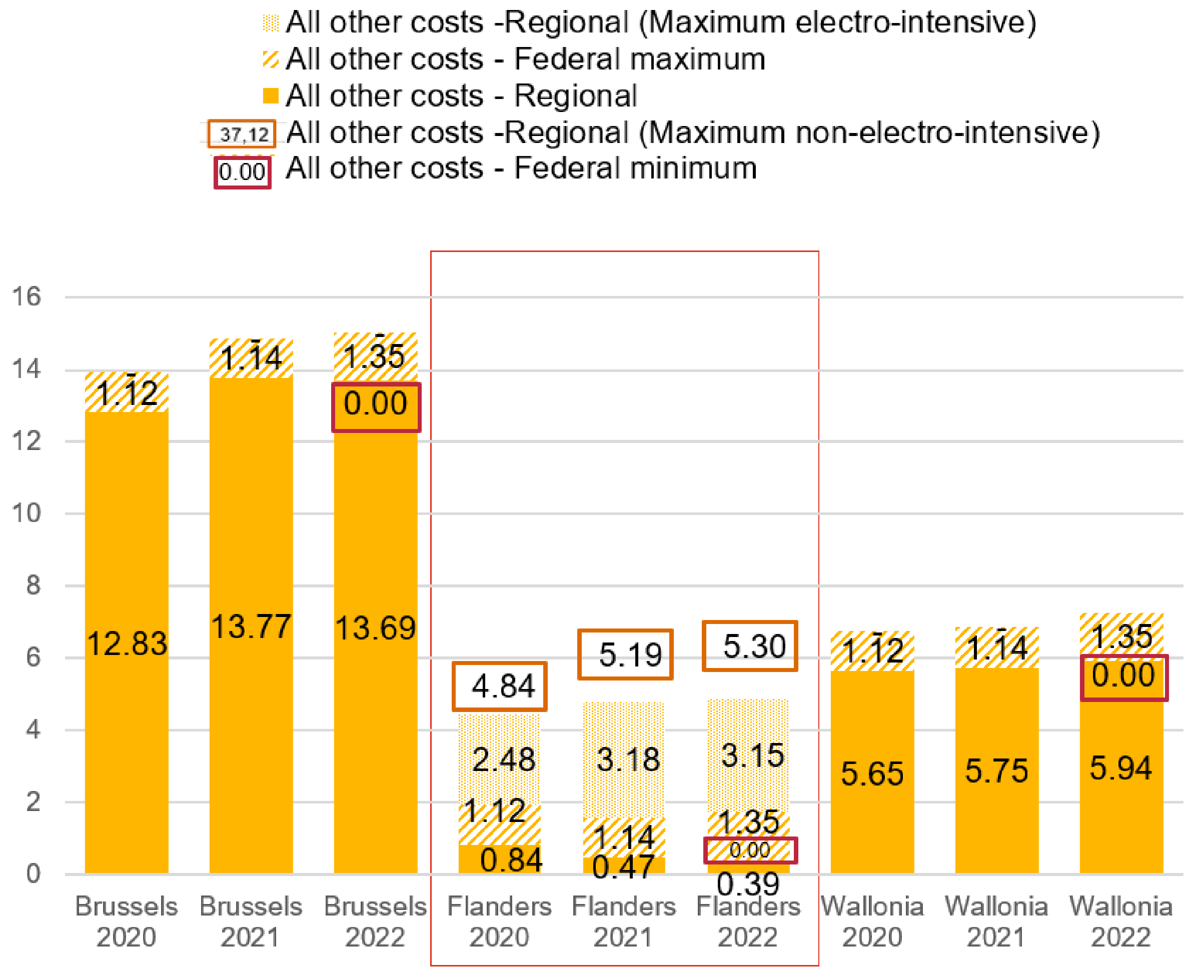


Figure 66: Regional and Federal all other costs in Belgium in EUR/MWh (profile E4)



Again, **commodity costs** are identical to costs displayed for E3. Therefore, an identical situation is observed across all the regions/countries. The lowest cost is found in France followed by Germany. Conversely, the UK comes as an outlier with 109,30 EUR/MWh. The commodity cost is the biggest component in the total invoice, even for the non-electro intensive profiles in Germany where this component accounts for almost 50% of the total invoice.

Network costs only represent a limited proportion of the final bill. However, countries such as Germany, France (minimum price option) and the Netherlands display lower transmission costs given the fact that reductions are granted to large consumers depending on electro-intensity or consumption criteria. Germany and the Netherlands opt for a direct 90% reduction fee whereas France's reductions vary from 20% to 90%. These reductions profoundly alter the comparison of network costs in between countries, and especially in the case of Germany, which would have the highest network costs otherwise. The UK has the highest network cost (8,43 EUR/MWh). For Belgium, given the fact that the transmission tariffs approved by the CREG are (almost) stable over the 2020-2023 period, the strong increase in the network costs component observed between 2021 and 2022 is a direct consequence of the strong increase in the commodity cost. Indeed, the costs of network losses on the federal transmission grid (380/220/150 kV) are, for the purpose of this study, considered as a component of network costs and suppliers usually bill these costs as a percentage (fixed every year by the TSO) of the commodity cost.

While the **all other costs component**[279] can have varying importance among countries, it is again mainly dependent on the (non-)electro-intensive nature of consumers. Significant reductions are potentially granted on taxes through a refund scheme which makes the Netherlands the country with the lowest possible tax level. However, electro-intensive consumers do not see the European minimum tax level (0,50 EUR/MWh) yet applied at their consumption level since the reduction through the "Teruggaaf over energiebelasting en ODE" in the Netherlands is higher. As observed previously, Flanders, Germany and France have all three implemented policies that enable electro-intensive consumers to benefit from significant reductions, with France being potentially the most competitive amongst these three regions/countries when it comes to this component. Furthermore, we observe different policies regarding the price differences for electro- and non-electro-intensive consumers. While Germany heavily taxes their non-electro-intensive consumers, this distinction is rather moderate in France (compared to Germany) and rather small in Flanders and the Netherlands. This observation is also the case for profile E2 and E3. Lastly it is interesting to note that Wallonia has a lower tax level than Brussels, which is certainly due to quota reductions on green certificates that do not exist in Brussels. Besides, Wallonia's tax level is like Flanders' in the case of non-electro-intensive consumers.[280] Similarly to the other industrial profiles under review, we now see a price range also for Brussels and Wallonia due to the possible exemption on the federal excise duty. The slight increase of federal costs in the Belgian regions compared to 2021 is related to the fact that, to comply with EU regulation, the cap at 250.000 EUR/year applied in 2021 to the federal contribution and to the federal PSO financing of green federal certificates has been replaced since January 1st, 2022 by a special excise duty with a rate of 0,5 EUR/MWh for the yearly consumption above 100.000 MWh.

Impact of Flanders' combined cap on profile E4

The cost of green certificates can have a big impact on the energy price of large industrial consumers. To limit these costs, Flanders introduced two caps, in 2018, on the cost of financing of renewable energies. These caps are in proportion to the Gross Value Added (GVA) of the company and thus vary from company to company. As depicted more extensively in section "Impact of Flanders' cap on profile E0**"**, the following exercise attempts to illustrate the potential impact of these caps on the industrial consumers.

Table 124: Flanders' cap on profile E4

	Case 1	**Case 2**
NACE codes[281]	Annexe 3 or 5 EEAG	Annexe 3 EEAG
Electro-intensity	> 20%	No threshold
Cap (% of GVA)	0,50%	4%
Average yearly consumption (E4)	500 GWh	
Scheme cost (without cap)	1.574.560,13	
Maximum gross value added to benefit from the cap	314,91 MEUR	39,36 MEUR

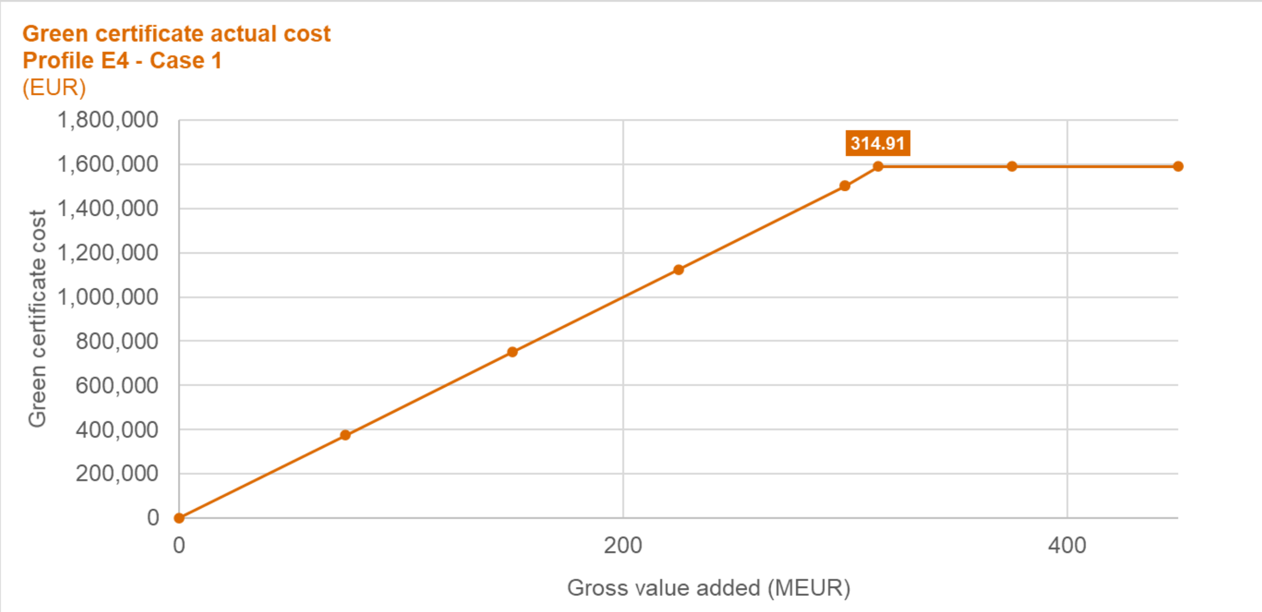
[279] This cost includes taxes, levies and certificate schemes.

[280] In addition to the degressivity rules and limits that apply the larger profiles (E2 and higher) do not pay a part of the all other costs, namely the part billed through the DSO, which the smaller profiles do pay.

[281] The companies listed in Annexe 3 and 5 of EEAG correspond to the companies listed in the Energiedecreet except for Nace 3832 (Recycling of waste) which is listed in Annexe 3 EEAG but not in the Energiedecreet.

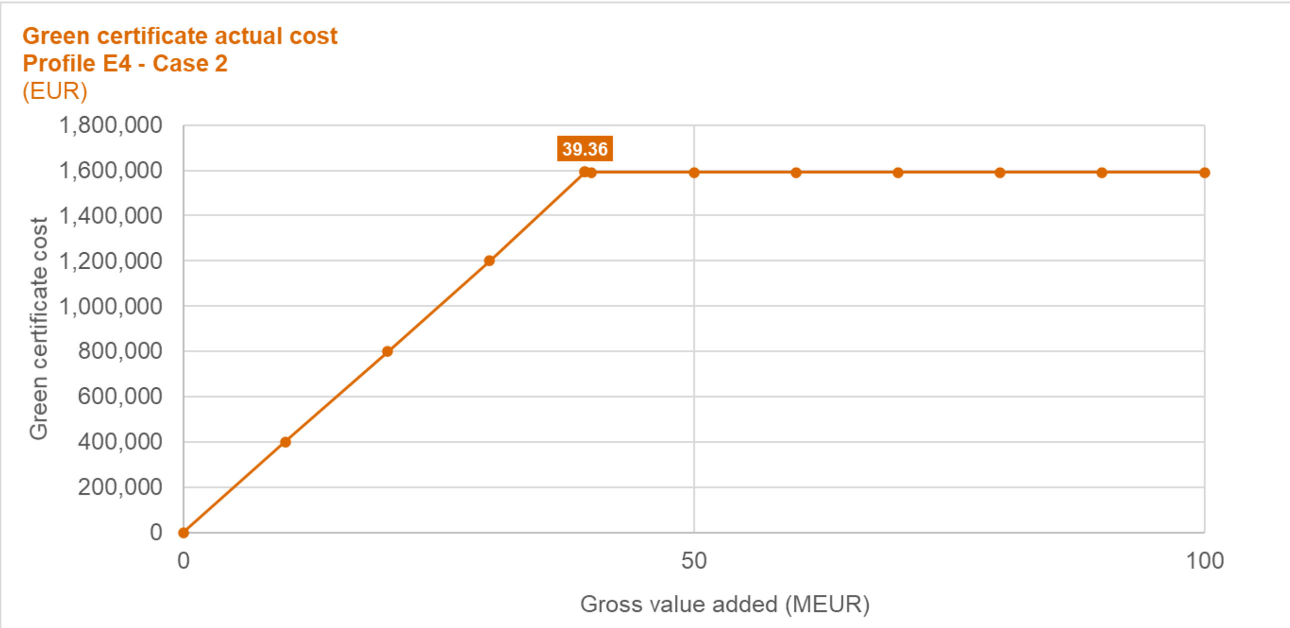
Considering only Profile E4 companies with NACE codes from Annexe 3 or 5 from the EEAG and with an electro-intensity above 20% (case 1), a company benefits from the application of the cap as long as its gross value added is less than 314.912.025 EUR.

Figure 67: CHPC and GC actual cost for profile E4 (Case 1)



Considering only Profile E4 companies with NACE codes from Annexe 3 from the EEAG (case 2), a company benefits from the application of the cap as long as its gross value added is less than 39.364.003 EUR.

Figure 68: CHPC and GC actual cost for profile E4 (Case 2)



KEY FINDINGS

The analysis of the E4 profile leads us to the following findings:

- The total invoice ranges from 40,64 (France) to 72,20 MEUR/year (UK) for electro-intensive consumers and up to 89,29 MEUR/year for non-electro-intensive consumers. The total invoice has increased in all the regions compared to 2021, explained by the sharp increase of the commodity component. Like last year, Flanders is again the cheapest Belgian region.
- **Commodity costs** represent the most significant component in E4 consumers' final bill, even for non-electro-intensive consumers in Germany where it can account for almost 50% of the total bill. While France has the lowest fares for the commodity component, the UK constitutes the most expensive country, similarly to the other industrial profiles.
- **Network costs** are a reduced constituent of the electricity invoice. Further reductions granted on large consumers by countries such as Germany, France and the Netherlands lead to competitive disadvantages for other countries. The UK has the most expensive network costs (8,43 EUR/MWh).
- **All other costs** span a vast range of potential levels all very different across regions/countries. However, specific attention is brought to Flanders, Germany, France and the Netherlands where electro-intensive consumers may benefit from substantial reductions. While the latter is certainly financed by non-electro-intensive consumers who are charged higher tax rates, countries such as the Netherlands pay attention to limited tax level variations between those different types of consumers.

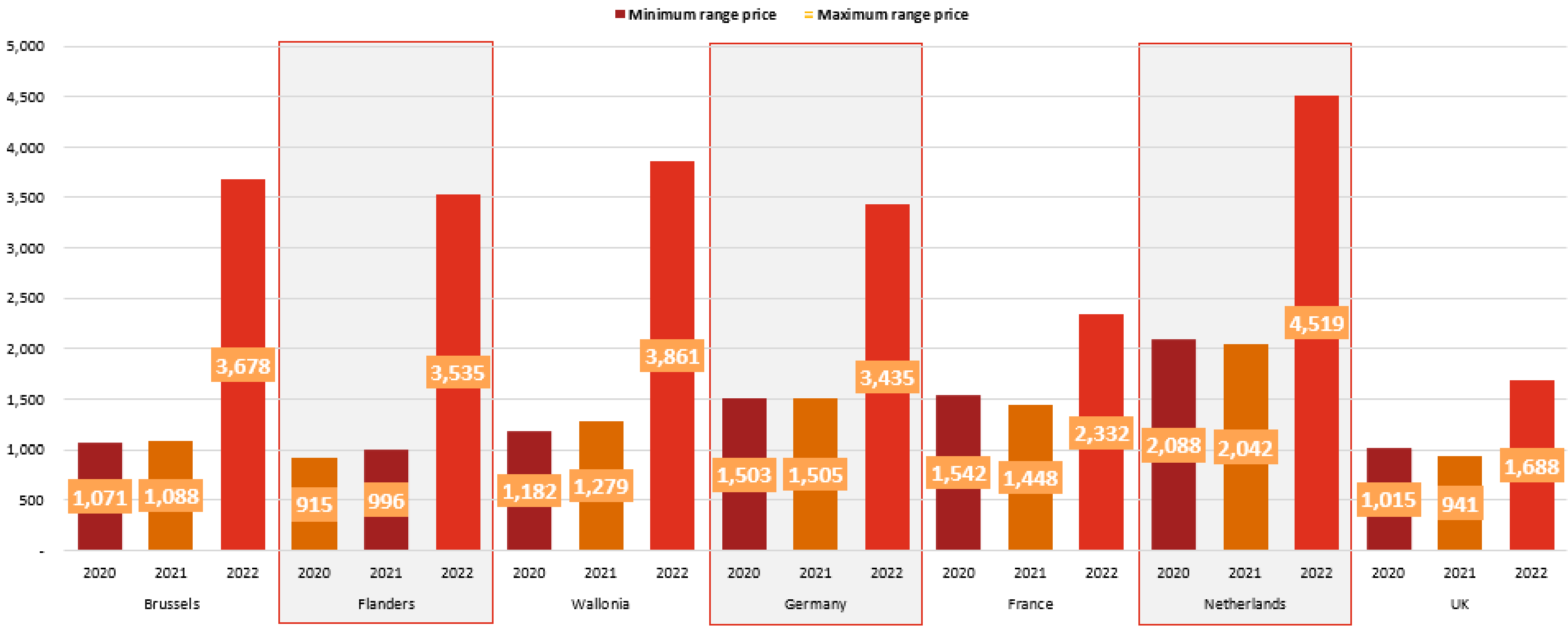
Presentation of figures (Natural gas)

Profile G-RES (Natural gas)

Total invoice analysis

The figure below provides a comparison of the total yearly invoice paid by a residential profile G-RES in the different studied regions and countries. The results are expressed in EUR/year.

Figure 69: Total annual invoice in EUR/year (profile G-RES)



Again, Belgium is split into three regions due to the existence of regional differences, but contrary to the electricity analysis we present Germany as one zone. Nevertheless, we have also taken regional differences into account for the other countries, but only one weighted average cost is presented in the table.

The figure above clearly shows that the total annual invoice has more than doubled compared to 2021 in almost all the countries and regions observed. The largest percentage change compared to last year being in Flanders, with a 255% increase. Furthermore, we observe that the Netherlands is still the most expensive country regarding natural gas consumption, which is the opposite of the observations we made for electricity, where they were among the cheapest countries together with France and the UK.

As in 2021, the UK remains the most competitive region with a total annual invoice of more than 25% less than the second most competitive region, France. While all countries and regions experienced an important surge in total annual invoice, France and the UK are the 2 regions where it proportionally remained the most stable. This is explained by the commodity component which increased proportionally less in those 2 countries than it did in the others. In France the regulated tariff is cheaper than the market price and accounts for almost half of the G-RES consumers, according to the methodology set out in Section 4. In the UK, like the E-RES profile, the energy regulator OFGEM has implemented an energy price cap since 2019. This system allows to limit the increase in the market price of the commodity to be paid by final customers, thus explaining a lower gas bill for the UK than the neighbouring countries.

Breakdown per component

The previous results are further detailed for profile G-RES in the figure underneath, which provides a closer look at the breakdown of the different price components in EUR/MWh.

Figure 70: Natural gas price per component in EUR/MWh (profile G-RES)

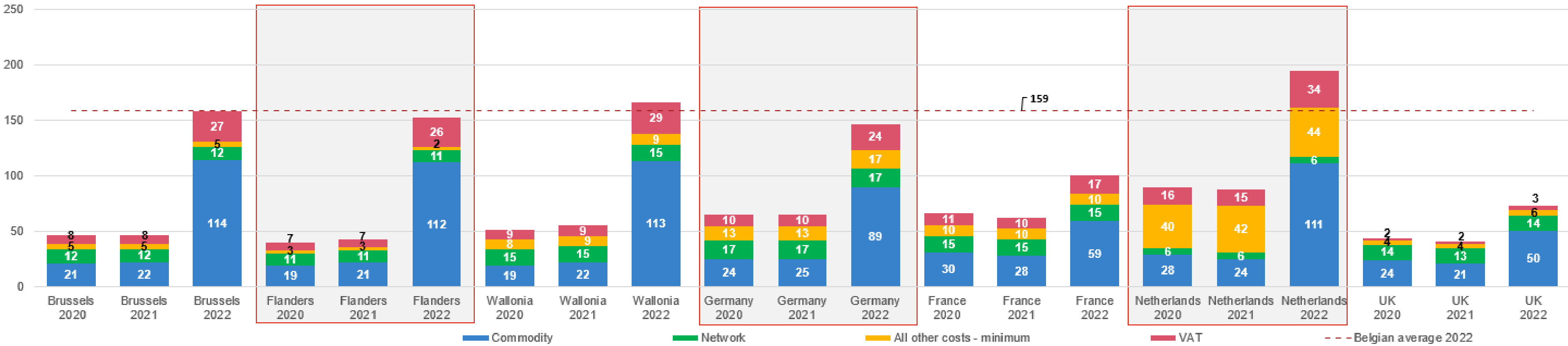
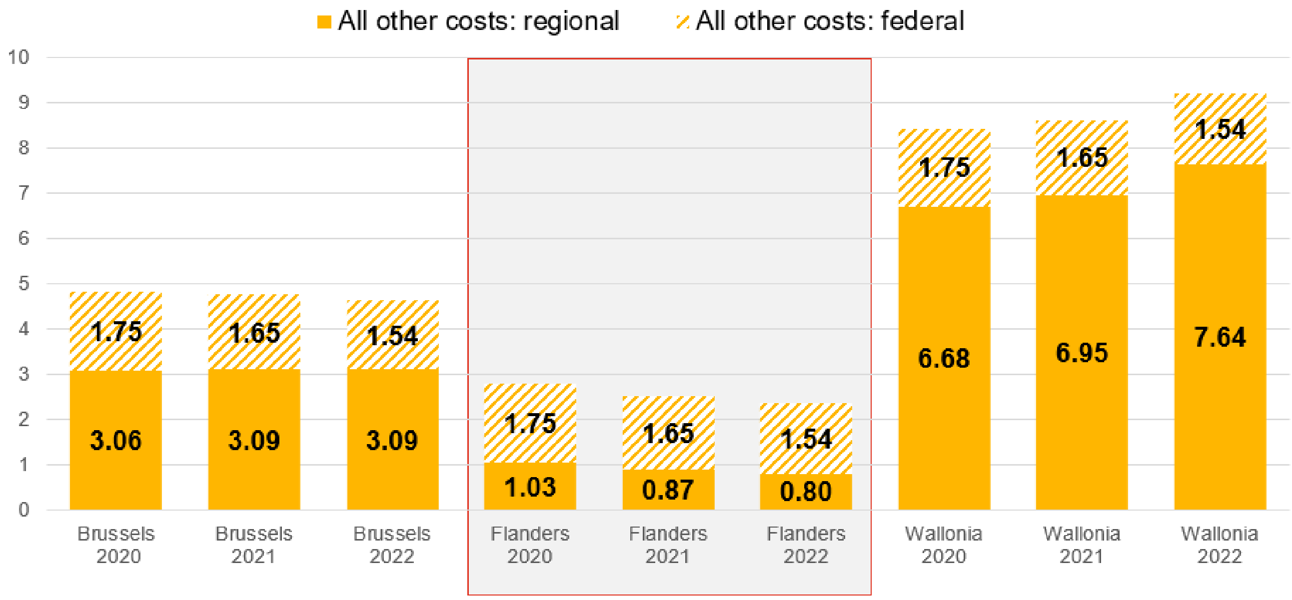


Figure 71: Regional and Federal all other costs in Belgium in EUR/MWh (profile G-RES)



The lowest **commodity component**[282] is observed in France and the UK. The commodity component has increased in all countries and regions, with the largest changes observed in Belgium and the Netherlands. The Belgian average commodity cost for 2022 is 113 EUR/MWh, a 423% increase compared to the price of last year.

The second most important component after commodity in most of the reviewed regions is the **VAT component** which primarily depends on the total invoice. The VAT rate[283] lies between 19 and 21% for most regions/countries except for the UK that applies a rate of 5% on natural gas. It is thus no surprise that the VAT is the lowest in the UK, because of the rate, and the highest in the Netherlands, because of the high total invoice. Furthermore, we note that France also uses a 5% VAT-rate but only on the consumer's subscription and CTA[284].

Except for the Netherlands, the **network component** is the third most important component after commodity and VAT. Flanders (11 EUR/MWh) is the second most competitive, after the Netherlands (6 EUR/MWh), regarding this component. The network cost has remained very stable between 2021 and 2022. While the Netherlands is the most expensive country for the G-RES profile, it has the lowest network cost. Germany still has the biggest network cost of all the regions/countries under review. In Belgium the difference between the regions regarding this component is quite large. Brussels is the second cheapest region overall (12 EUR/MWh) and Wallonia is one of the most expensive regions (15 EUR/MWh) regarding this specific component.

The component where we see the most fluctuation between countries is the **all other costs component**[285]. Considering the Netherlands, the height of their all other costs component, in particular the energy tax, easily makes them the most expensive country under review. This component has remained quite stable compared to 2021 except in Germany and in the UK where it increased respectively by 4 EUR/MWh and 2 EUR/MWh, representing a 30% and 50% increase compared to last year. In Belgium we made the distinction between regional and federal all other costs and it is clear that the regional component makes a big difference in the competitiveness between the Belgian regions. The regional all other costs component in Wallonia (7,64 EUR/MWh) is more than twice as high as Brussels (3,09 EUR/MWh) which is almost 4 times higher than the regional all other cost of Flanders (0,80 EUR/MWh).

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[282] While this methodology to estimate commodity costs provides a fair view of the market situation in the respective countries and regions, one must be aware that it does not provide a full overview of the market prices as only three to five products were considered.

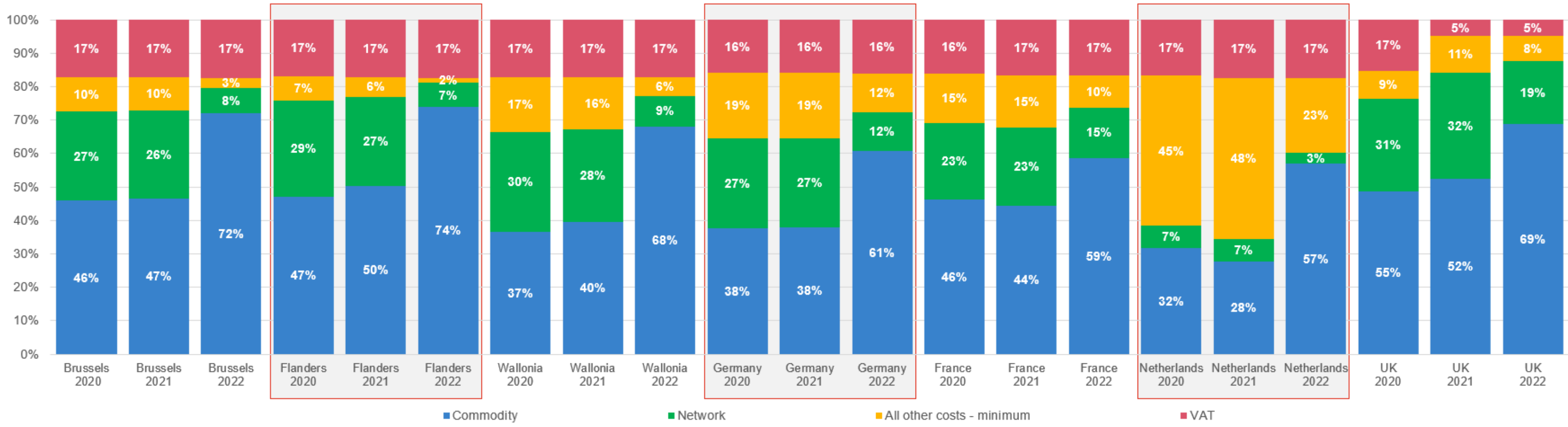
[283] As stated in the "General assumptions" section, we did not include in the calculations any change of the VAT levels that were effective after January 2022, such as the lowering of VAT to 6% on electricity and gas in Belgium as of 1st March 2022.

[284] Contribution tarifaire d'acheminement

[285] This cost includes taxes, levies and certificate schemes.

Proportional component analysis

Figure 72: Proportional component analysis (profile G-RES)



As of 2022, the **commodity component** is the most important component in all the regions/countries. The weight of the commodity component lies between 57% and 74% in 2022.

Furthermore, we see that the importance of the **network cost component** varies significantly between regions/countries. It falls between 3% and 19%, with on one hand the UK being the country where the **network cost component** is proportionally the most important. And on the other hand, the Netherlands, which remains the country where this component is proportionally less important. This is explained by the proportional difference in the increase of the commodity component in these 2 countries.

We do see that the importance of the **all other costs component** differs between regions/countries, but Belgium remains the country where the weight of this component is the lowest among the regions under review, with Brussels, Flanders and Wallonia being the three regions where this component is the least important, accounting for 2% to 6%. The Netherlands is clearly an outlier regarding this component since it makes out 23% of the total invoice.

The weight of the **VAT** component is very similar through all the countries except for the UK because they use a reduced rate of 5%.

KEY FINDINGS

The results reported above suggest the ensuing key findings regarding profile G-RES:

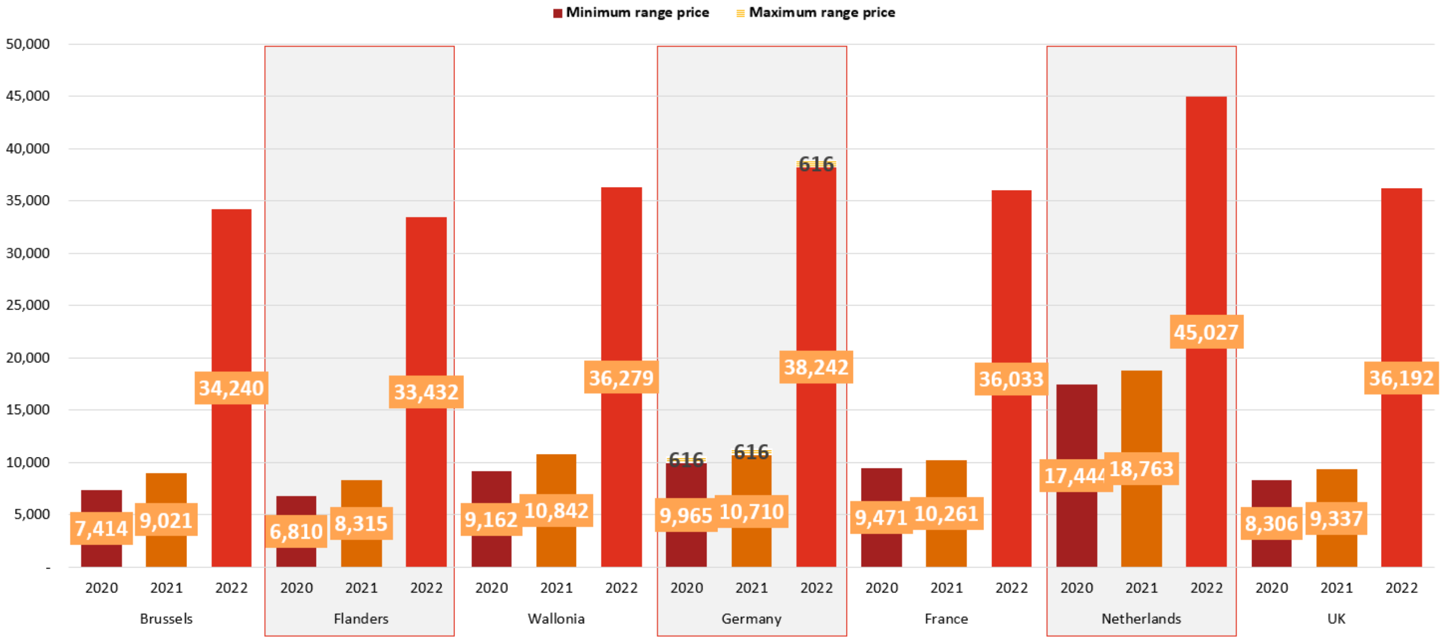
- Comparing 2021 and 2022 we see that the total invoice has increased substantially in all countries and regions with the biggest change being an increase of 2,587 EUR/year in Brussels. The increase in the commodity price is the main responsible of this trend in all the regions/countries under review.
- The UK has kept its position as the cheapest country for the G-RES profile and this is mainly due to a relatively small increase of the **commodity cost** compared to other countries and regions.
- Flanders is the cheapest Belgian region, because the **regional all other costs component** is (much) higher in the other two Belgian regions.
- As of 2022, the **commodity component** makes up the biggest part of the total invoice of all countries. In the cheapest country (UK) it even makes up 69% of the total invoice. Overall, Brussels has the highest commodity component.
- The **network cost component** varies importantly between regions/countries and makes up between 3 and 19% of the total invoice of the regions/countries under review. However, this component is almost negligible in the Netherlands
- Lastly, the **all other cost component** plays a key role, together with the commodity component, in determining the competitiveness of a region/country regarding the G-RES profile. The low network cost in the Netherlands is largely compensated by a high all other costs component. In addition, due to the increase in the commodity component, we observe a convergence between the regions/countries under review.
- Looking at Belgium, we see that the regional all other costs component greatly impacts the position of the regions.

Profile G-PRO (Natural gas)

Total invoice analysis

The figure below provides a comparison of the total yearly invoice paid by a professional profile G-PRO in the different studied regions/countries.

Figure 73: Total annual invoice in EUR/year (profile G-PRO)



The annual invoice has increased substantially for all regions/countries under review, slightly impacting the overall ranking compared to 2021. While the Netherlands, Flanders and Brussels kept their 2021 position, all the other regions either won or lost a place in the ranking. When comparing to the G-RES profile, the cases of France and the UK stand out. In fact, both countries are still competitive for the G-RES profile because they offer regulated prices to households, while their competitiveness deteriorate with the G-PRO since the market price is used to calculate the commodity component. The annual invoice has increased by 25.117 EUR/year (Flanders) to 27.532 (UK) EUR/year compared to 2021.

We also observe that Germany now has a price range which is the result of a possible reduction on the *Energiesteuer*. The application of the reduction in Germany does not affect its position compared to the other regions/countries.

As it was the case for the G-RES profile, the Netherlands is still an outlier because of the all other costs component, in particular the energy tax, which will also become more apparent in the figure below detailing the different components. Furthermore, we also see that there are clearly some regional differences in Belgium, with Wallonia being the most expensive region in Belgium, but also the third-most expensive region overall.

Breakdown per component

The previous results are further detailed for profile G-PRO in the figure underneath, which provides a closer look at the breakdown of the different price components.

Figure 74: Natural gas price per component in EUR/MWh (profile G-PRO)

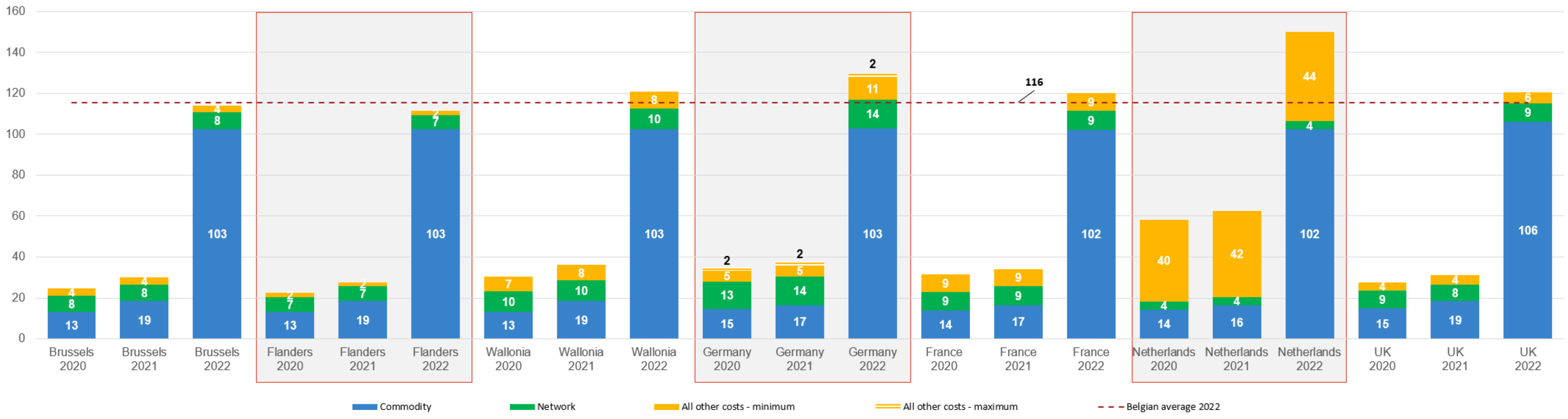
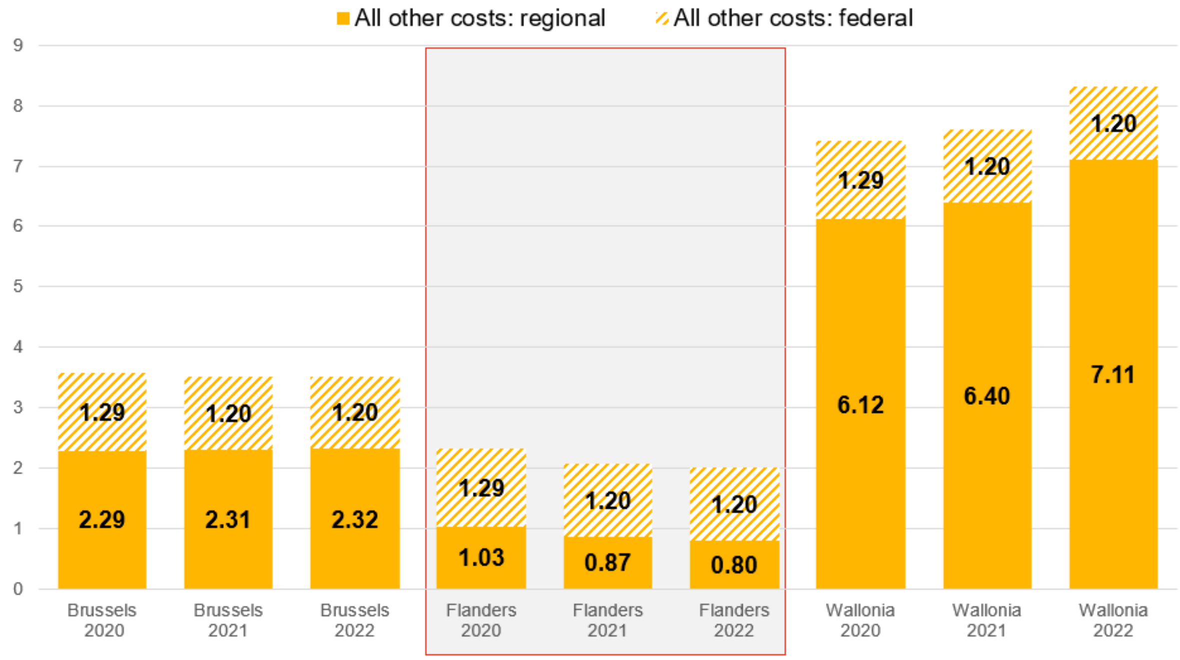


Figure 75: Regional and Federal all other costs in Belgium in EUR/MWh (profile G-PRO)



The first component we will analyse is the **commodity component**[286] which has been computed according to the market price and not through comparison websites which is why the commodity cost does not alter between the Belgian regions for the G-PRO profile and onwards. After the substantial increase of the commodity component cost in 2022 (average of 475% increase between 2021 and 2022, among the regions under review), the Netherlands has kept its position as the country with the lowest commodity cost even though it has the highest total invoice. As in previous years, the commodity component is very similar from one region to another. The UK is the country in which the commodity component is the highest with 106 EUR/MWh.

There are a few observations that can be made regarding the **network cost component**. Firstly, this component is the smallest in the Netherlands and is also Netherlands' smallest component overall. Secondly, there is a noticeable difference between the network cost of the Belgian regions. The most expensive network cost (Wallonia) is 3 EUR/MWh higher than the cheapest network cost (Flanders). Thirdly, Germany's network cost is the highest of all regions/countries under review and plays a major role in Germany being one of the less competitive regions/countries. Lastly, we see that the network cost component has remained really stable between 2021 and 2022 for all countries and regions reviewed.

Lastly, we have the **all other costs component**[287] which is one of the components that has the most effect on the overall position of the region/country except for Germany where the network cost plays a big role. The regions/countries, in order, that have the lowest all other costs are Flanders, Brussels and the UK. This component is high in the Netherlands and average across Wallonia, Germany and France. Two additional observations must be made regarding Germany and the Belgian regions. First, in Germany the range on the *Energiesteuer* has not changed between 2021 and 2022 because the taxes and the reductions have stayed the same. However, the introduction of the "*CO2 Steuer*", or carbon tax, (5,461 EUR/MWh) is the main responsible for the large increase of the all other costs component compared to 2021[288]. Even taking the reduction into account it is one of the more expensive regions for G-PRO profiles. Secondly, in Belgium we have made a distinction between the regional and federal all other costs and we see that the regional cost in Wallonia is much higher (7,11 EUR/MWh) than in Flanders (0,80 EUR/MWh) and Brussels (2,32 EUR/MWh) which is mainly because of the regional PSO.

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[286] The large increase of the commodity component in Belgium compared to 2020 is the result of the adapted methodology that takes the natural gas price of January which is inconsistent with the yearly average. The methodology behind the natural gas commodity price will be updated next year as detailed in Chapter 5: Large industrial consumers (p.190).

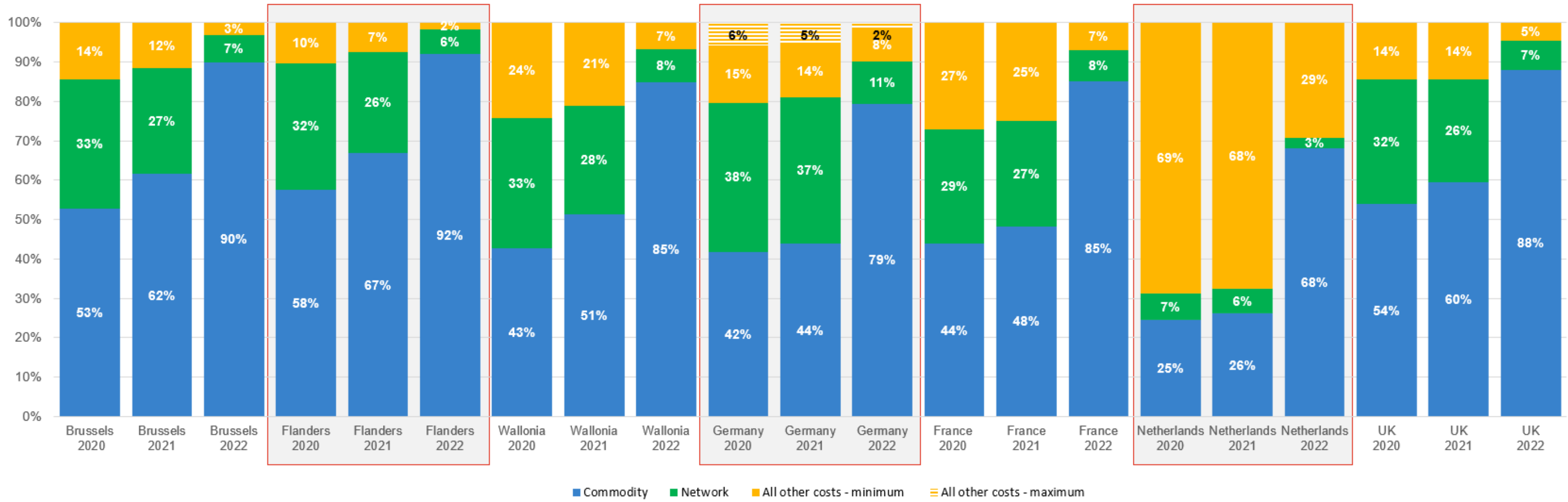
[287] This cost includes taxes, levies and certificate schemes.

[288] This tax is effective since January 1st, 2021, but it was not included in the previous version of this report, thus explaining the difference with 2021.

Proportional component analysis

The percentages of the costs for each component can be found in the underneath figure.

Figure 76: Proportional component analysis (profile G-PRO)



The figure above clearly shows that the commodity is the dominant component in all regions/countries even in the Netherlands, where the all other costs component was the dominant component last year. It makes up more than 85% of the total invoice in 5 of the 7 observed regions/countries and even up to 92% in Flanders. Because of an immense increase of the commodity component compared to last year it maintains its position as the prime component of the total invoice.

The weight of the network cost and all other costs component have both decreased because of the increase of the commodity component. The network costs are more important in Germany than in any other region/country while the all other costs component makes up 29% of the total invoice in the Netherlands. In Belgium we see that the weight of the all other costs makes up 7% of the invoice in Wallonia while this is more around 3% or less in Brussels and Flanders, highlighting again the regional differences.

KEY FINDINGS

The results reported above suggest the ensuing key findings regarding profile G-PRO:

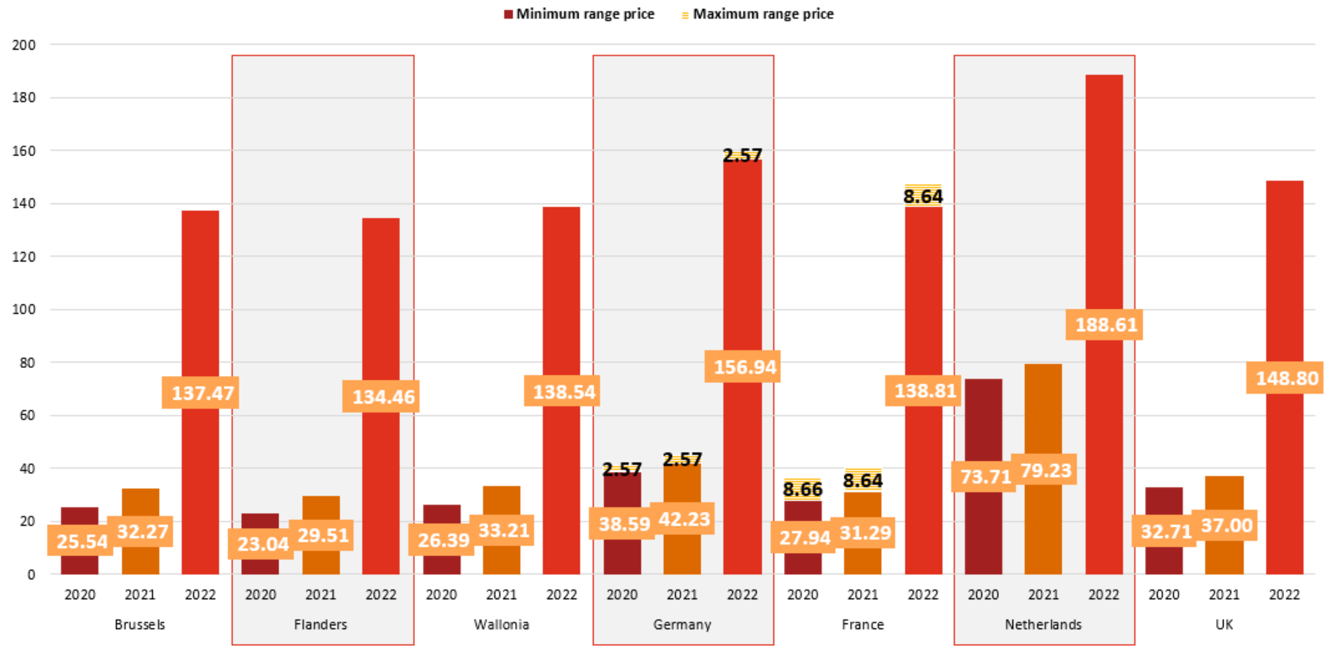
- The total invoice has seen a significant increase of 250% on average in all regions/countries compared to last year and the commodity component played a major role in the increase as the other components remained fairly stable compared to last year.
- The Netherlands is the most expensive country under review and is thus the least competitive regarding the G-PRO profile. This is mainly due to the very high all other costs component. On the other hand, Flanders is the least expensive region for 3 years in a row with a total annual invoice of 33.432 EUR in 2022.
- The **commodity component** is now more than ever the most important component in all countries and regions, regarding the total invoice. It represents 90% or more of the total invoice in Brussels, and Flanders.
- The **network cost component** varies across all the regions/countries, going from 4 EUR/MWh in the Netherlands to 14 EUR/MWh in Germany. The importance of this component also is quite similar to the G-RES profile. They make up 6% to 11% of the total invoice.
- Lastly, we have the **all other costs component** which has a big impact on the positioning of the regions/countries, whether we look at all regions/countries or in Belgium. We observe, for instance, that this is the main component due to which the UK is equally as competitive as Wallonia, despite the higher commodity cost in the UK. Furthermore, we also see that whether a reduction on this component applies in Germany or not will also have an impact on the competitive position of the country.

Profile G0 (Natural gas)

Total invoice analysis

The figure below provides a comparison of the total yearly invoice paid by an industrial G0 profile in the different studied regions and countries. The results are expressed in kEUR/year.

Figure 77: Total yearly invoice in kEUR/year for industrial consumers (profile G0)



First, like the other profiles, we do see that the total invoice has increased in all the regions/countries under review. Furthermore, Germany is not the only region/country with a price range anymore since we take the possibility of a reduction of the TICGN in France starting with the G0 profile.

The overall positioning of the regions/countries is quite stable when comparing G-RES and G-PRO, but we are starting to see an evolution. Like G-PRO, Flanders is still the cheapest country for the G0 profile. Wallonia and Brussels are still behind Flanders, but they are among the cheapest regions. The Netherlands is still largely behind the other regions/countries.

Figure 78: Total yearly invoice comparison in % (profile G0; Belgium average = 100)

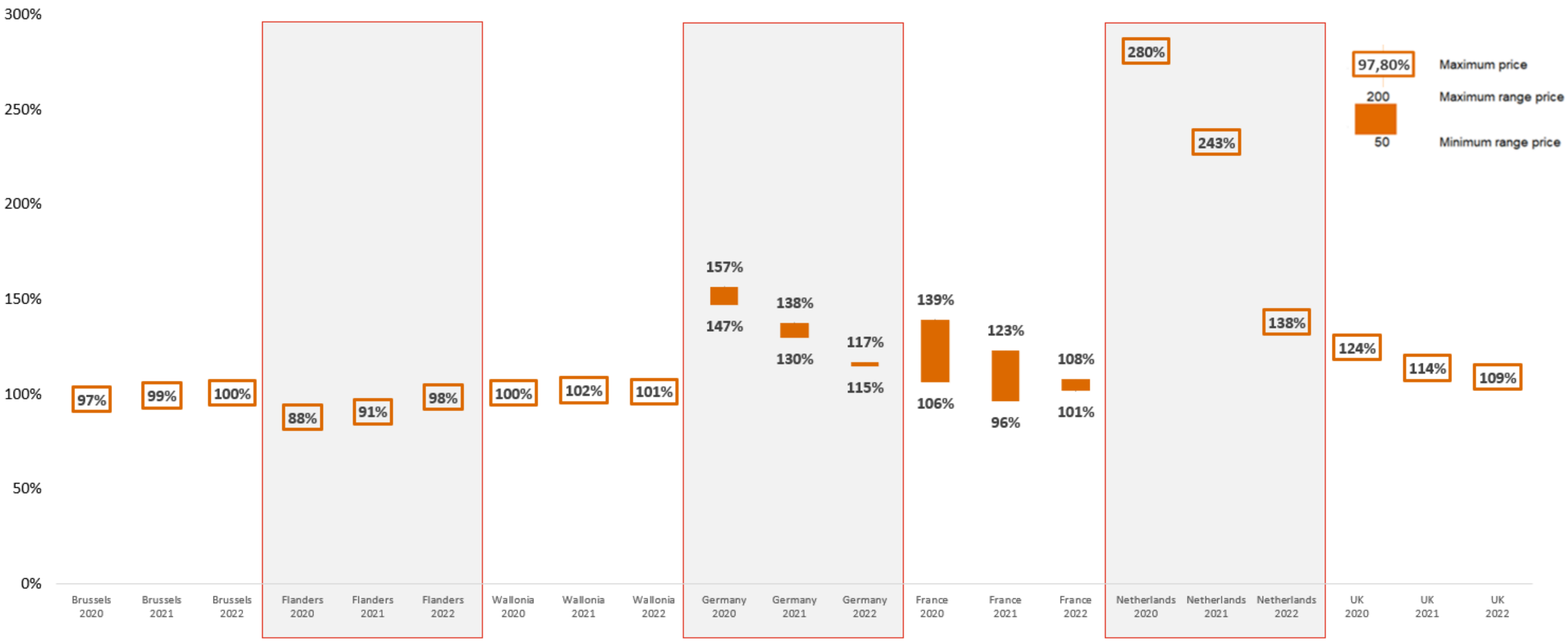


Figure 78 takes the Belgian average and positions the other regions/countries against this average to see if they are above or below or both if there is a range to consider. The figure shows the result from 2020 to 2022 and we have thus taken the Belgian average of their respective year into account. This figure gives a good idea of the competitivity of a region/country compared to Belgium. Overall, we see that the competitiveness of our neighbouring regions/countries has increased compared to Belgium since the percentual difference between the total invoice of the neighbouring country has dropped considerably compared to last year. France is now equally or more competitive than Belgium depending on the reduction in 2022. The Netherlands, which was by far the least competitive country under review last year, saw its total invoice go from 143% to 38% above the Belgian average. Most countries are still above the Belgian average by 1 to 38%. Overall, we observe a convergence between the regions/countries under review due to the general increase of the commodity price.

Breakdown by component

The previous results are further detailed for profile G0 in the figure underneath, which provides a closer look at the breakdown of the different price components.

Figure 79: Natural gas price by component in EUR/MWh (profile G0)

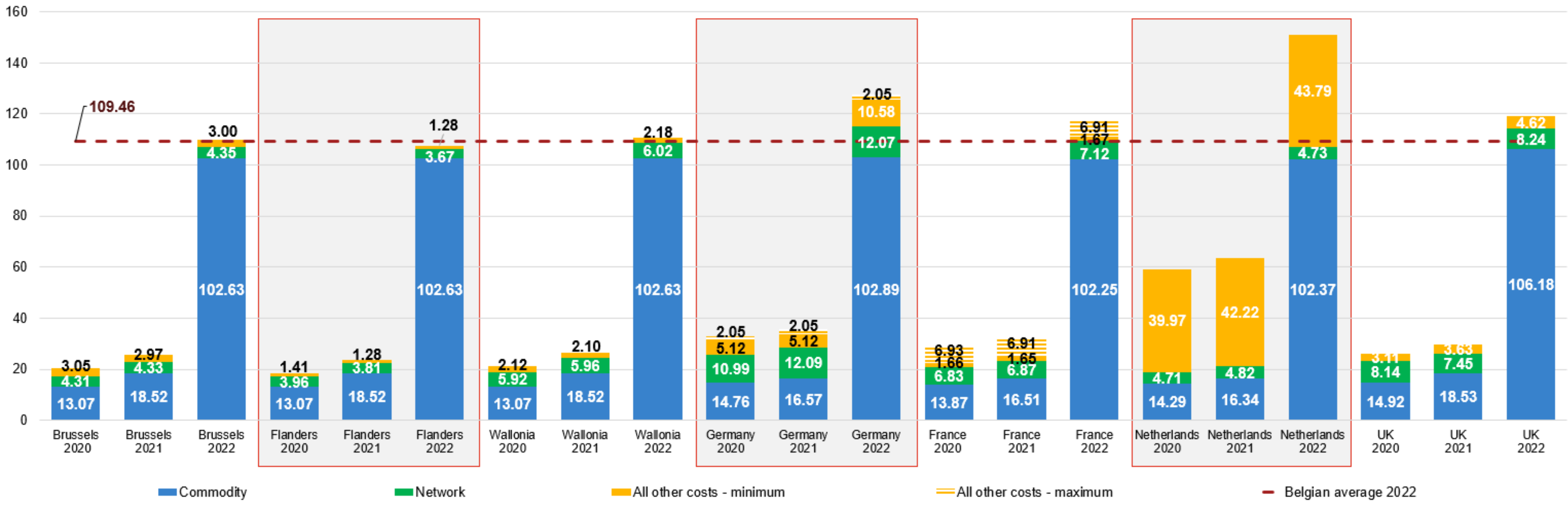
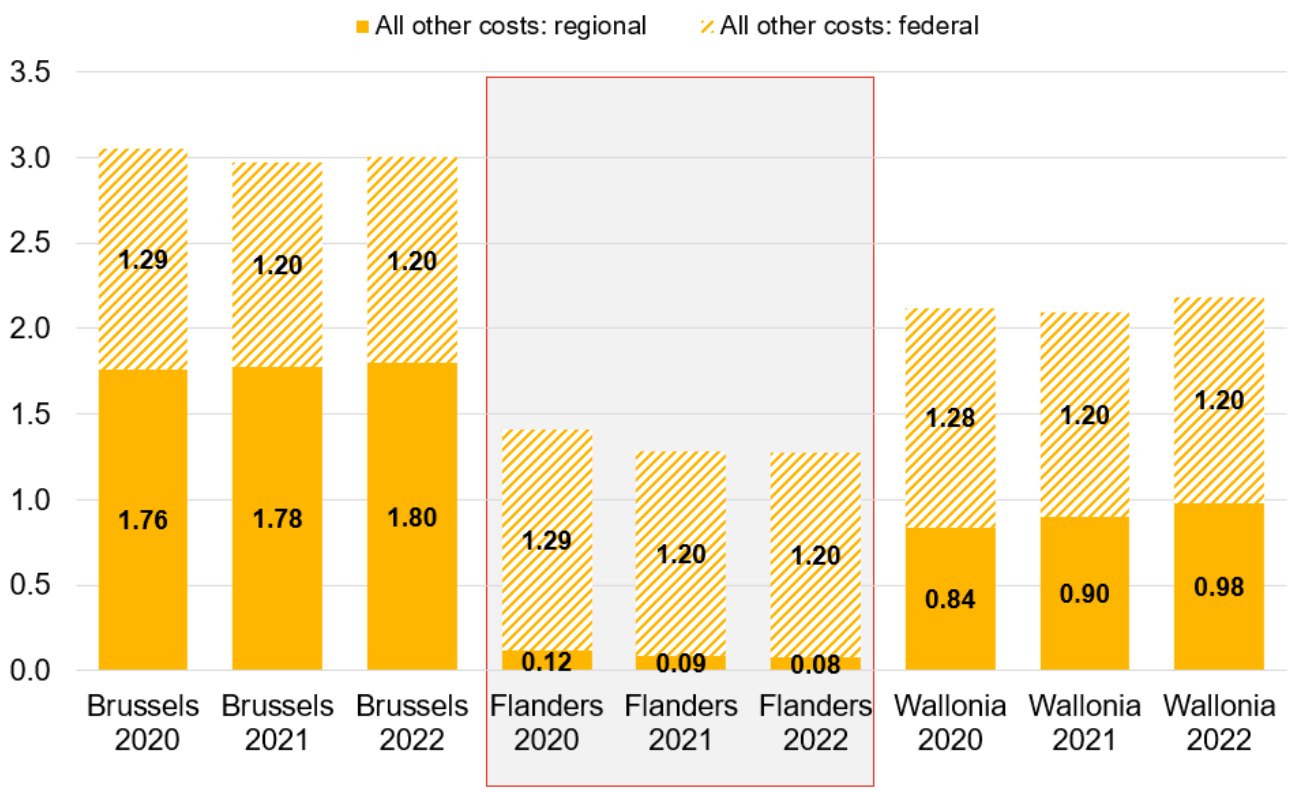


Figure 80: Regional and Federal all other costs in Belgium in EUR/MWh (profile G0)



Since the **commodity cost** is based on the market price and this is the same for all the bigger consumer profiles (G-PRO - G2) the price per MWh will remain the same. Nevertheless, the importance of this component in the total invoice bill will vary across countries and regions, as some may have cheaper network costs and/or reductions. The commodity component is a critical component and makes up more than 80% of the total energy bill in all countries and regions under review except for the Netherlands, where it makes up for around 60% of the total invoice.

The **network cost** is still an important component which has increased in 5 out of the 7 regions/countries compared to 2021. In the three Belgian regions we notice different trends. The distribution costs decreased more in percentage terms compared to 2021 for Flanders than for Brussels and Wallonia. On the other hand, the "commodity transport fee"[289] increased by the same rate for the three regions, as it is calculated as a percentage of the commodity cost, which is more than 5 times the level of 2021. As a result, the network costs decreased for Flanders, while it increased slightly for Brussels and Wallonia. We still see a strong fluctuation in the network cost across regions/countries going from 3,67 EUR/MWh (Flanders) to 12,07 EUR/MWh (Germany).

Lastly, the **all other costs component's**[290] has not experienced important variations since last year, making its proportional weight smaller in 2022 for all regions and countries reviewed. While both Germany and France have a price range, falling under the reduction scheme is much more beneficial in France. The competitive position of Germany compared to other regions/countries will not change whether the reduction is applied or not, but it can have a big impact on the competitive position of France. In Germany, the introduction of the "*CO2 Steuer*", or carbon tax, (5,461 EUR/MWh) is the main responsible for the large increase of the all other costs component compared to 2021[291]. In Belgium we observe that the regional factor in EUR/MWh becomes less important when comparing it to smaller consumer profiles.

[289] An adjustment has been made in this 2022 update to the network costs of 2020 and 2021 for Brussels, Wallonia and Flanders G0 profile due to a miscalculation in the commodity fee component.

[290] This cost includes taxes, levies and certificate schemes.

[291] This tax is effective since January 1st, 2021, but it was not included in the previous version of this report, thus explaining the difference with 2021.

KEY FINDINGS

The first industrial natural gas profile (G0) analysis leads to the following findings:

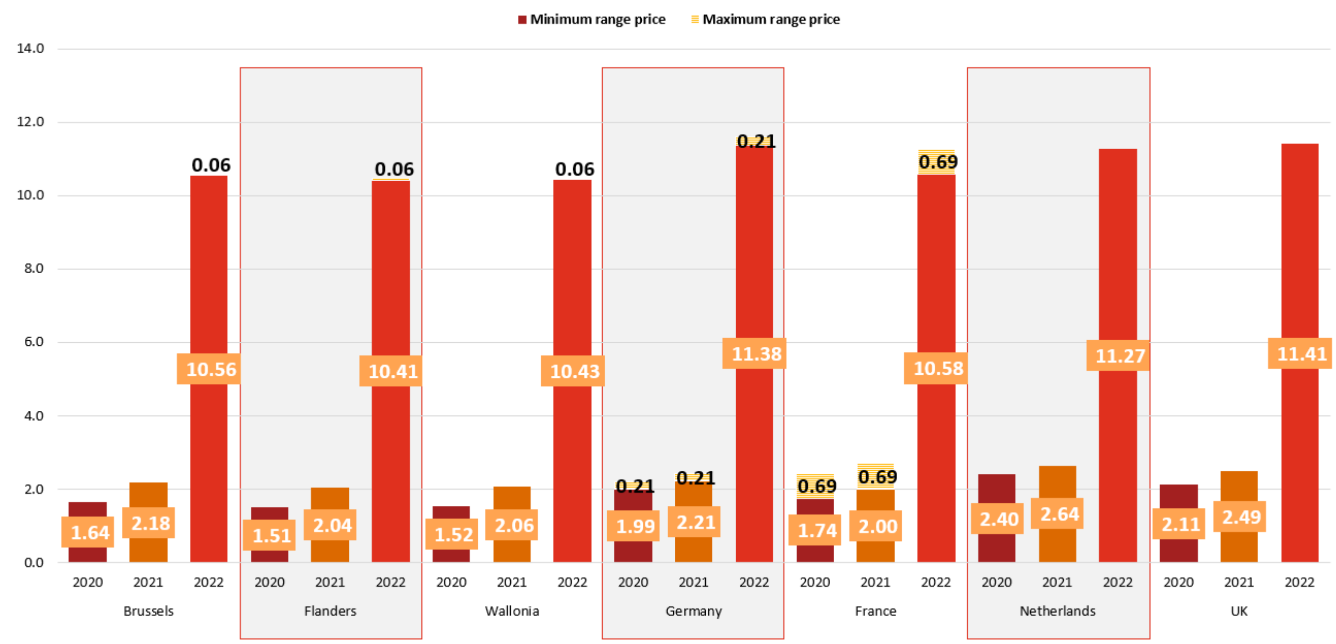
- Like the smaller profiles (G-RES and G-PRO) and last year's results the Netherlands is still the most expensive country regarding natural gas. This is because of the large amount of taxes regarding natural gas that have increased further compared to last year (42,22 to 43,79 EUR/MWh).
- Flanders and Brussels are still the cheapest and second cheapest regions overall, while Wallonia keeps its 3rd place, followed closely by France, in particular when reductions are applied in France.
- The **commodity component** makes up most of the total bill and the importance of the cost will keep increasing as the consumption augments.
- There is some variation regarding the **network cost component** and while this component is the second most important component in the total invoice in most of the regions under review, it is still a deciding factor due to the similarity of the commodity component in all regions. Despite a slight decrease compared to 2021, it is still a deciding element for the German competitive position as second most expensive country.
- The **all other cost component** is still a very large component in the Netherlands and makes them the least competitive country. Furthermore, it is important to note that the price per MWh remains the same between G-PRO and G0 in the Netherlands. While there is now a range for Germany and France, we see that only the possible reduction in France can change the competitive position of the regions/countries. The regional differences regarding this component are losing importance in Belgium compared to the G-PRO profile.

Profile G1 (Natural gas)

Total invoice analysis

The figure below provides a comparison of the total yearly invoice paid by an industrial G1 profile in the different studied countries and regions. The results are expressed in MEUR/year. The second figure gives the Belgian average natural gas invoice, presenting the percentual price differences with other countries.

Figure 81: Total yearly invoice in MEUR/year for industrial consumers (profile G1)



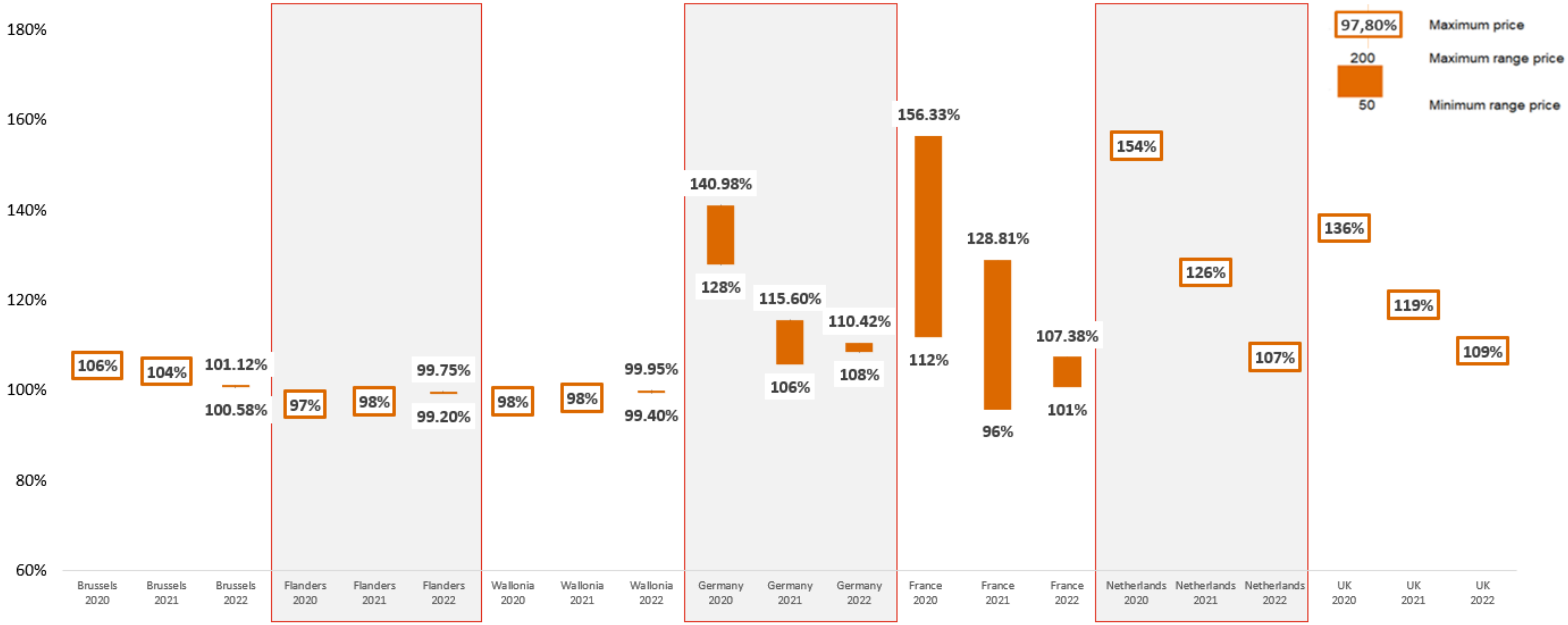
Like the other profiles analysed so far, we notice a big increase in the total invoice compared to 2021, mainly explained by the increase of the commodity cost. The three Belgian regions are now the cheapest regions overall, with France following closely when reductions are applied. Lastly when looking at the Belgian level, Brussels remains the most expensive of the three regions. Germany is now the most expensive country when no reductions are applied, followed by the UK.

As stated in Section 5, for profiles G1 and G2 in the three Belgian regions, we show a price range, due to the possible exemption of the federal excise duty. Therefore, the minimum price shown is the one taking the full exemption into account, while the maximum is including the full cost of this federal cost for these two profiles[292]. The Belgian average used in the following figures for G1 and G2, considers both the minimum and the maximum, as done for the industrial electricity profiles.

[292] According to Art. 429.§ 1er of the law from 27th December 2004[292] an exemption is foreseen when electricity and gas are not used only for heating and transport, but also for metallurgic or chemical industrial procedures, thus being considered as “double usage”. For the sake of this report, we assumed that profiles G1 and G2 could potentially benefit from this exemption, if they fall within the conditions specified by the law.

Below, we compare each region and country's yearly bill with the average Belgian price, which is set at 100. The Belgian average is computed as the mean value from each region's yearly bill and since the figure has the results of 2020 to 2022, we take the average of their respective year into account.

Figure 82: Total yearly invoice comparison in % (profile G1; Belgium average = 100)



Like the analysis for G0 we observe that the competitive position of Belgium keeps deteriorating compared to 2020 and 2021. We observe a convergence towards the Belgian average for all countries under review, being 1% to 10% more expensive than Belgium, due to the general increase of the commodity price. As stated above, there is now a price range for the three Belgian regions. When this profile is exempted from the Federal excise duty, the Belgian competitiveness improves even more compared to the other countries.

Breakdown by component

The previous results are further detailed for profile G1 in the figure underneath, which provides a closer look at the breakdown of the different price components.

Figure 83: Natural gas price by component in EUR/MWh (profile G1)

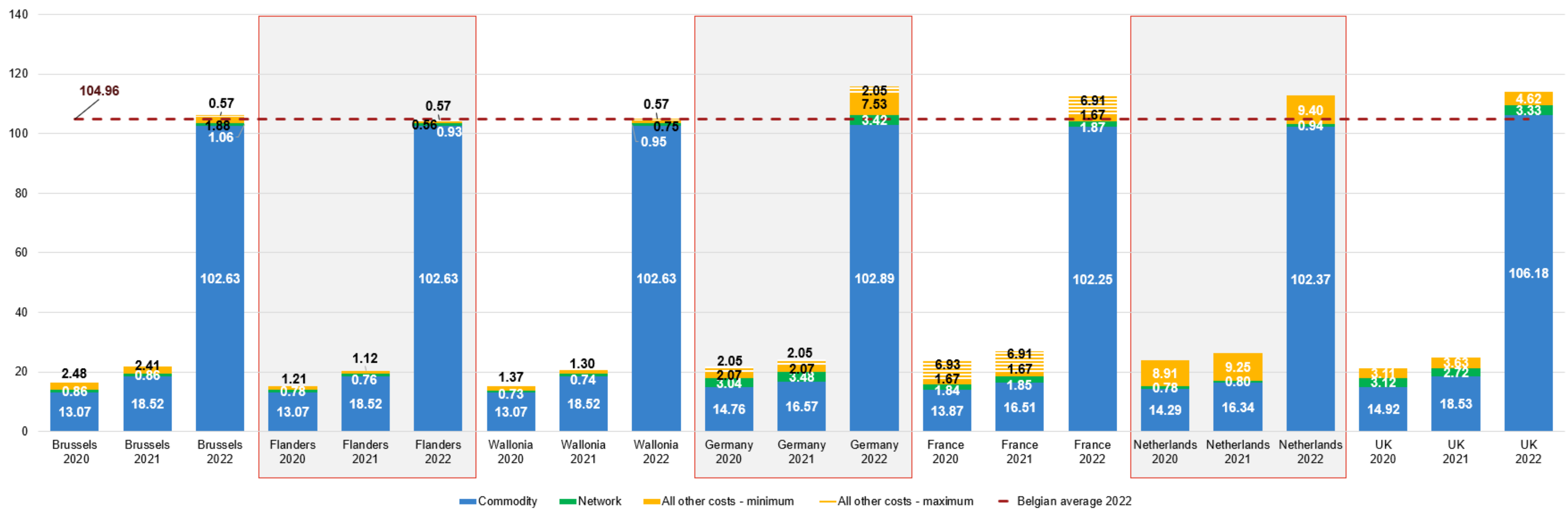
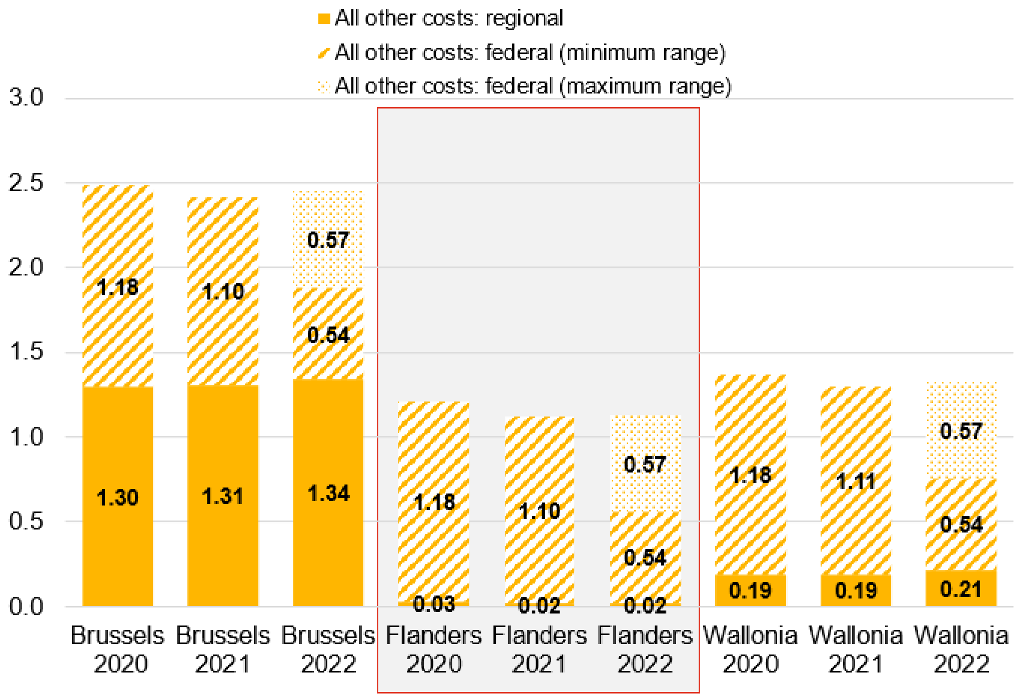


Figure 84: Natural gas price by component in EUR/MWh (profile G1)



The importance of the **commodity component**[293] has increased even further compared to the G0 profile. The commodity component costs are almost aligned in the 102-103 EUR price range between all the regions and countries reviewed. Germany is the only country with slightly higher commodity price, reaching 106,18 EUR/MWh.

Regarding the **network costs**[294], it is important to mention that this component has increased this year in Belgium because it contains a commodity transport fee calculated as a percentage of the commodity price, which increased proportionally more in Belgium than in most of the other countries under review. In Belgium we see that Flanders still has the lowest network cost of the three regions, followed closely by Wallonia. Despite a slight decrease compared to 2021, Germany is again the country with the highest network costs (3,42 EUR/MWh), followed by the UK (3,33 EUR/MWh).

The **all other costs component**[295] has vastly decreased in the Netherlands compared to the G0 profile which results in a much more competitive position in the Netherlands, which was still the most expensive or second-most expensive country under review last year. In France, the reduction on the TICGN still plays an important role in the overall positioning of the country compared to the other regions/countries. In Belgium, the distinction between federal and regional all other costs component makes it clear that the regional cost is almost non-existent in Flanders and Wallonia while in Brussels this cost is still greater than the federal all other costs component. This year, the possibility for G1 profile to be exempted by the federal excise duty can help the competitiveness of the Belgian regions. In Germany, the introduction of the "*CO2 Steuer*", or carbon tax, (5,461 EUR/MWh) is the main responsible for the large increase of the all other costs component compared to 2021[296].

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[293] The large increase of the commodity component in Belgium compared to 2020 is the result of the adapted methodology that takes the natural gas price of January which is inconsistent with the yearly average. The methodology behind the natural gas commodity price will be updated next year as detailed in Chapter 5: Large industrial consumers (p.190).

[294] An adjustment has been made in this 2022 update to the network costs of 2020 and 2021 for Brussels, Wallonia and Flanders G1 profile due to a miscalculation in the commodity fee component.

[295] This cost includes taxes, levies and certificate schemes.

[296] This tax is effective since January 1st, 2021, but it was not included in the previous version of this report, thus explaining the difference with 2021.

KEY FINDINGS

The second industrial natural gas profile (G1) analysis leads to the following findings:

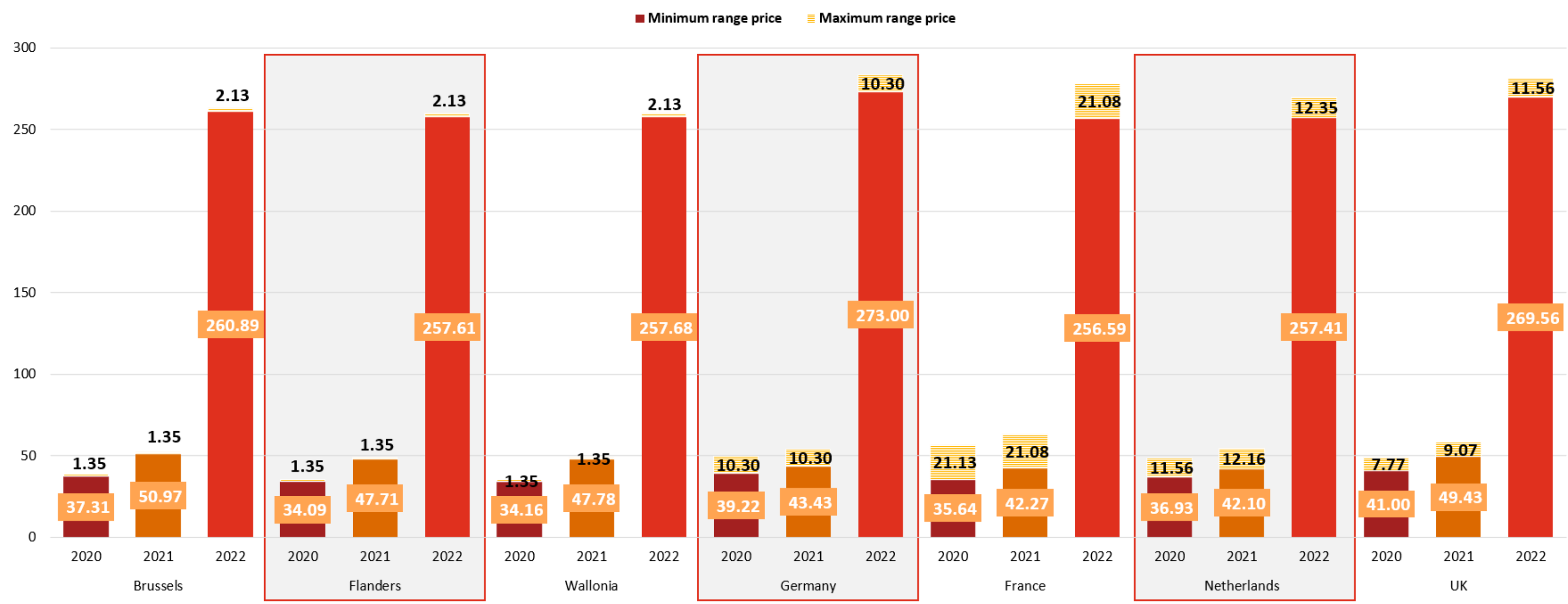
- Compared to last year, the total invoice has increased in all regions/countries and this is mainly due to much higher commodity costs.
- Flanders is the cheapest region in 2022, followed closely by Brussels and Wallonia, making Belgium the most affordable country for this profile. The UK is the second least competitive region after Germany. Overall, this year we observe a convergence of the total gas bill among the regions/countries under review due to the similarity of the commodity component in all regions/countries, with very negligible differences between them.
- The **commodity cost** is increasing rapidly compared to 2021, being on average between 5 to 6 times higher than 2021. In Belgium and the other countries under review it makes up to 90% or more of the total invoice.
- The **network cost** has slightly increased in Belgium, but it is still lower than the levels of the most expensive regions, Germany, and the UK. The highest increase compared to 2021 is observed in the UK (+22%).
- Lastly, the **all other costs component** is very important regarding the competitive position of the region/country. In the Netherlands there is a big decrease compared to the G0 profile, but it is still the country among the ones reviewed in which the all other costs component is the highest.
- Overall, the Belgian competitiveness can be further enhanced if this profile can get the full exemption for the federal excise duty.

Profile G2 (Natural gas)

Total invoice analysis

The figure below provides a comparison of the total yearly invoice paid by an industrial G2 profile in the different studied countries and regions. The results are expressed in MEUR/year. The second figure gives the Belgian average natural gas invoice, with the aim of presenting the percentual price differences with other countries.

Figure 85: Total yearly invoice in MEUR/year for industrial consumers (profile G2)



The G2 profile is the largest natural gas consumer under review and the first observation is that every region/country has a price range for this profile. The range in Belgium is the result of a possible exemption on the energy contribution for feedstock consumers and to the special excise duty. In the UK the G2 profile can benefit from an exemption from the climate change levy which is why they also have a range. Lastly, we have the Netherlands that always had the highest all other costs component that offers an exemption of the energy tax and ODE.

Now that every region/country has potential reductions and/or exemptions to consider the competitiveness of a region/country is more ambiguous since it depends on the profile of the consumer. This becomes clear in the figure below. This figure takes the Belgian average as a base and compares the total invoice of the neighbouring countries with the Belgian average. As we have done with all the previous profiles, the 2020 results are set out against the 2020 Belgian average and the same logic applies to 2021 and 2022.

Figure 86: Total yearly invoice comparison in % (profile G2; Belgium average = 100)

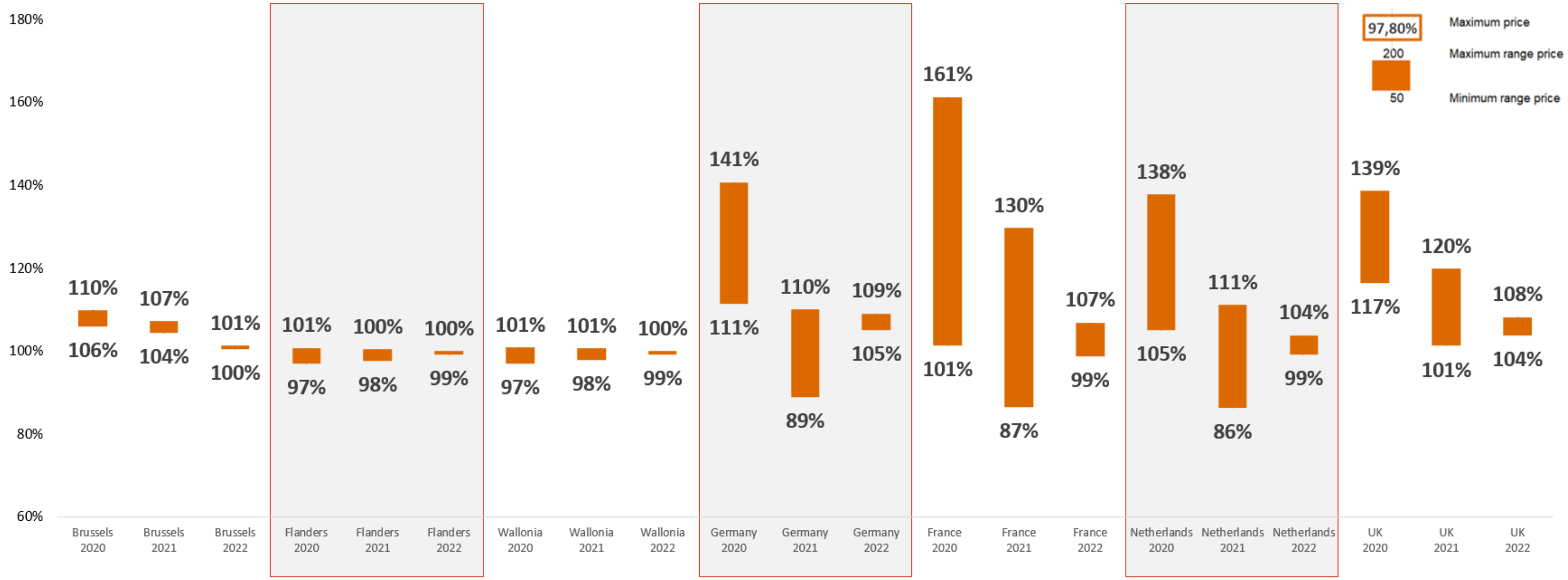


Figure 86 shows that France and the Netherlands have the possibility to be cheaper than the Belgian average. Furthermore, we also note that the range in France is very large for the G2 profile. Lastly, we observe that the position of the Netherlands has completely changed compared to the smaller profiles since for the first time it has the possibility to be the least expensive country under review for natural gas. Overall, we notice that there is a clear convergence between the regions/countries under review, due to the increase of the commodity cost, similarly to what we concluded for the other industrial profiles.

Breakdown by component

The previous results are further detailed for profile G2 in the underneath figure, which provides a closer look at the breakdown of the different price components.

Figure 87: Natural gas price by component in EUR/MWh (profile G2)

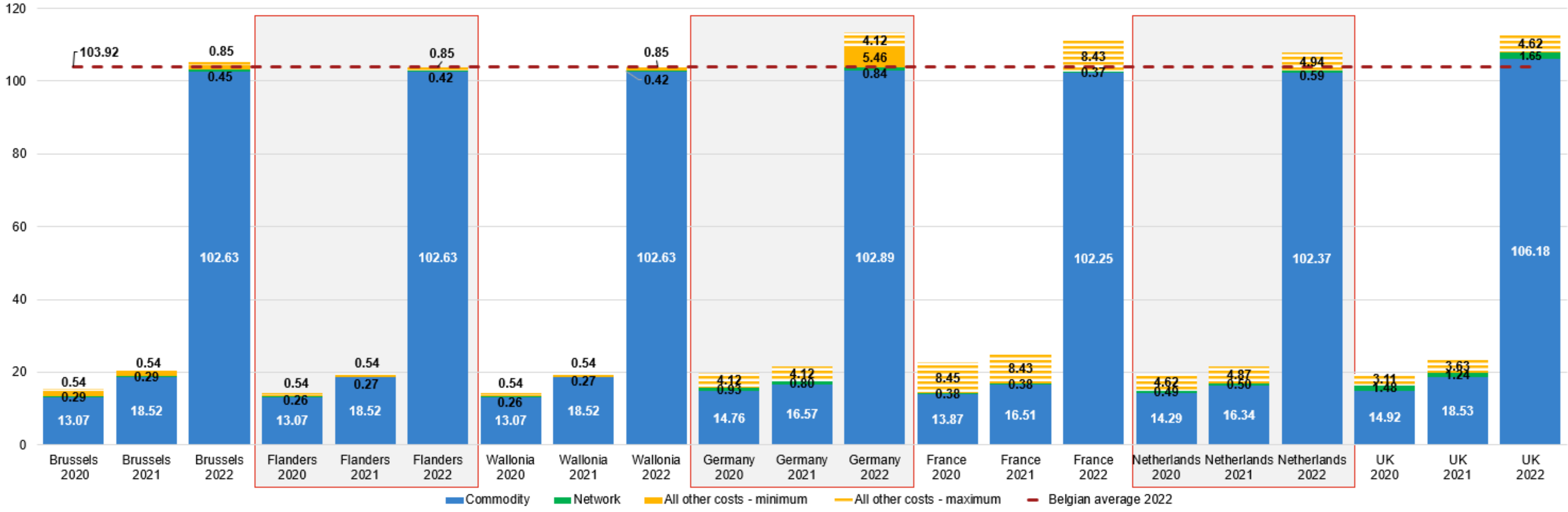
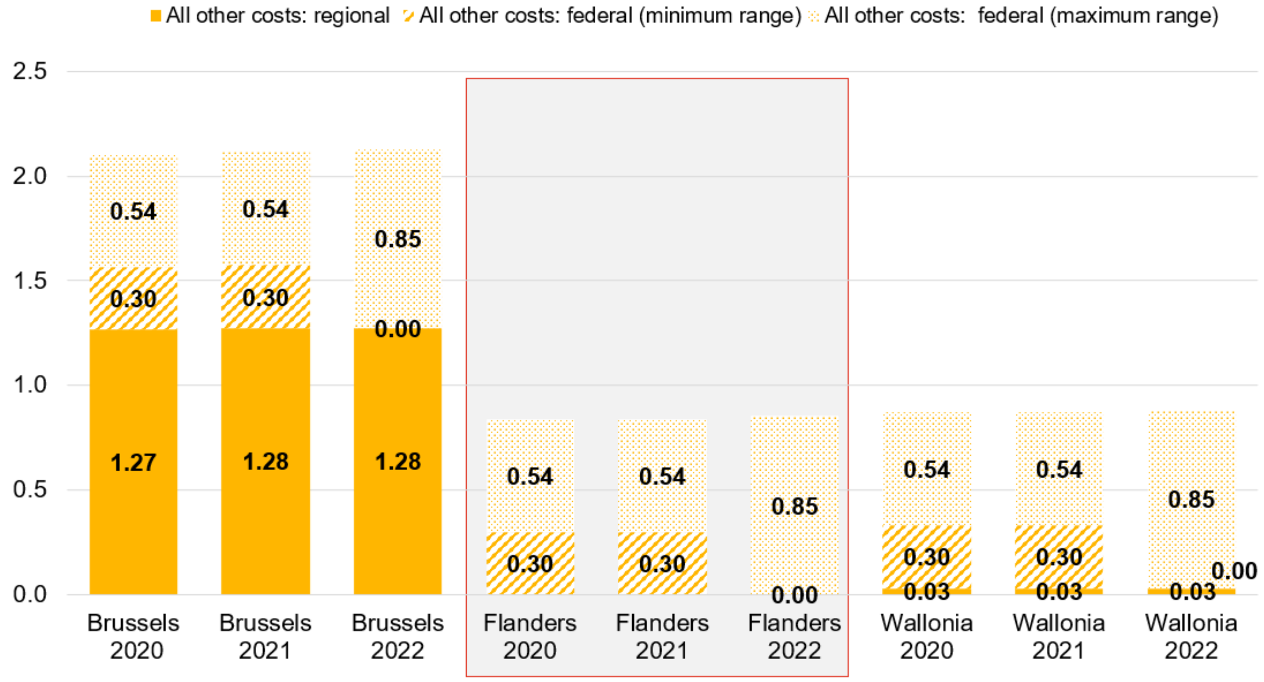


Figure 88: Natural gas price by component in EUR/MWh (profile G2)



The figure with the breakdown per component clearly shows that the **commodity component**[297] makes up most of the total invoice, more than 90% in all regions/countries under review. Once again, the commodity price is rather similar from one region to another except for the UK where the price is a bit higher than elsewhere.

When comparing the different components in EUR/MWh we observe that the **network cost** is almost negligible, and the UK has the highest cost with 1,65 EUR/MWh.

Lastly, the **all other costs component**[298] still plays a big role in defining the competitiveness of the regions/countries, in whether the reduction(s) applies or not. When the reduction applies this component becomes negligible in every region/country except Brussels where it still has a role to play (1,62 EUR/MWh). Like for G1 profile, we introduced this year the possible exemption for G2 profile with regards to the federal excise duty[299]. When this is applied, the overall Belgian competitiveness is even improved, with Flanders even giving the chance not to pay any other costs and Wallonia only a small regional part. In Germany, the introduction of the "*CO2 Steuer*", or carbon tax, (5,461 EUR/MWh) is the main responsible for the large increase of the all other costs component compared to 2021[300].

[297] The large increase of the commodity component in Belgium compared to 2020 is the result of the adapted methodology that takes the natural gas price of January which is inconsistent with the yearly average. The methodology behind the natural gas commodity price will be updated next year as detailed in Chapter 5: Large industrial consumers (p.190).

[298] This cost includes taxes, levies and certificate schemes.

[299] According to Art. 429.§ 1er of the law from 27th December 2004[299] an exemption is foreseen when electricity and gas are not used only for heating and transport, but also for metallurgic or chemical industrial procedures, thus being considered as "double usage". For the sake of this report, we assumed that profiles G1 and G2 could potentially benefit from this exemption, if they fall within the conditions specified by the law.

[300] This tax is effective since January 1st, 2021, but it was not included in the previous version of this report, thus explaining the difference with 2021.

KEY FINDINGS

The biggest industrial natural gas profile (G2) analysis leads to the following findings:

- In 2022, no region stands as clearly and consistently more competitive than the others. The competitiveness clearly depends on the possible reductions applied in each country/region. Overall, we observe a convergence between regions/countries due to rising commodity prices.
- The **commodity cost** had an impact on the competitive position of the regions/countries under review. Since this component becomes more and more important as the consumption augments and since France has the lowest commodity cost, they have a small advantage regarding this component. This also improves France's overall positioning. Conversely, the higher commodity cost in the UK has a negative impact on its competitive position.
- Overall, the **network cost component** no longer has a significant impact on the strategic positioning of a region/country for the G2 profile. The UK has the highest network cost, followed by Germany.
- The **all other costs component** shows large variations that will impact the competitive position of all regions/countries. Belgian regions can improve their competitive position if an exemption to the federal excise duty is obtained. On the other hand, Germany sees his competitiveness deteriorate due to the introduction of the carbon tax, which accounts for more than half of the all other costs component in 2022.

7. Energy prices: Conclusions

7. Energy prices: Conclusions

Electricity

Residential and small professional consumers

1. For all the regions and countries under review, the first differentiator compared to 2021 is the increase in the commodity cost and the impact that this has on the final consumers. The UK, the Netherlands and France are the only countries that could partially limit this increase for the E-RES profile thanks to energy price caps, government refunds, lower VAT rates or by offering a regulated product at lower price. This is also true for the E-SSME profile in France and UK, while it is not for the Netherlands since the government refund is not high enough to compensate for the increase of the commodity price for this profile. We notice a convergence for the E-BSME profile since we used the commodity market prices which are more similar across the regions/countries than the ones extracted from the web comparison tools.
2. Belgium is not very competitive for the E-RES and E-SSME profile but is for the E-BSME profile. Regarding E-RES, Wallonia is the third most expensive region, while Flanders and Wallonia are more expensive than France, UK, the Netherlands and Tennet, which is the cheapest German region. Brussels is the most competitive Belgian region for E-SSME because of the lower regional all other costs while Flanders and Brussels are the cheapest for the E-BSME profile. Wallonia is the most expensive region for all the residential and small professional profiles, and this is mainly because of their higher network and all other costs.
3. To compare the profiles, it is best to look at the €/MWh and then it becomes clear that small professional consumers usually pay less than residential consumers per MWh of electricity (except for the Netherlands, where the small professional consumers pay more than residential consumers per MWh of electricity). The reason for this is twofold, first the impact of the VAT. We take the assumption that VAT is deductible for professional profiles and since this amounts to ca. 17% of the total invoice in Belgium there is a big difference when we remove this component. When removing the VAT component, it appears that E-RES and E-SSME are quite close per MWh. Secondly some tariffs depend on connection levels which is why we see a difference between E-RES and E-SSME on one hand and E-BSME on the other hand. Additionally, we can state that the commodity and network cost both tend to decrease for larger consumers.

Industrial consumers

1. The commodity cost is a very important component for the industrial profiles even more so for the larger industrial consumers where reduction and/or exemptions are applied on network and all other costs. Like for residential and small professional profiles, the commodity is the component that increased the most compared to previous year also for industrial consumers, and this for all regions/countries under review. The commodity cost often makes up more than 60% of the total invoice except for Germany that has big ranges for the all other costs component and important network costs. For all regions/countries under review, the commodity costs accounts for a larger share of the total energy bill than in 2021 and the general increase of the commodity price explains the convergence between the regions/countries under review in terms of total costs. France has the lowest commodity cost while the UK has the highest. The commodity cost remains the same from E0 to E2, but changes for E3 and E4 since we assume that these profiles consume 24/7.
2. The reductions and exemptions on network and all other costs greatly vary between regions/countries and profiles and have an important impact on the competitiveness of the regions/countries. These reductions are especially important in Germany, which is the least competitive from E0 to E4 when consumers need to pay the maximum level. Flanders also offers reductions starting with E0 and this significantly improves their competitive position or at least decreases the difference with other regions/countries that offer large(r) reductions.

There is also a clear distinction between electro- and non-electro-intensive consumers. Numerous regions/countries (Flanders, France, Germany and the Netherlands) have designed a mechanism to support electro-intensive consumers by offering lower fares, the cheapest being France and the Netherlands. Compared to last year, the new federal excise duty allows to provide an exemption for profiles E1 to E4 to the three Belgian regions. Therefore, we notice a price range with regards to the all other costs also for Brussels and Wallonia in 2022.

3. Looking at the competitiveness of the Belgian regions, for electro-intensive consumers, compared to the other regions/countries we see that our most competitive region, Flanders, will only be able to be the cheapest for E1. The lack of competitiveness, especially for Brussels and Wallonia, can be explained by higher network and all other costs components compared to the most competitive regions, namely France and the Netherlands. However, this is not the only factor, certainly for the very large profiles (E3 and E4) where the commodity component plays a major role. When comparing the total invoices for the non-electro-intensive consumers Belgium's competitiveness is much higher, even if the Netherlands and France tend to always be cheaper.
4. The UK is an outlier for all the industrial profiles and the bigger the profile the more the difference between the UK and the other regions/countries is accentuated. They often display higher prices (except for the non-electro-intensive consumers in Germany) and while they are sometimes more competitive for the smaller industrial profiles if we take their maximum range into account this is no longer the case for the bigger profiles. This is even more evident in 2022 compared to 2021 as the electricity price more than doubled in the UK, while it increased by a smaller growth rate in the other regions/countries under review.

Summary

The figure below depicts the global trend followed by yearly electricity bills once considered across all countries and regions simultaneously. In Figure 89, solid lines may represent three different kind of prices depending on countries: a unique price (e.g. the UK), a maximum price due to a range of possibilities in network and/or tax prices (e.g. France for residential and small professional consumers) or a maximum price for non-electro-intensive consumers - from profile E0. Dotted lines symbolise maximum prices for electro-intensive consumers (from profile E0) whereas dashed lines are minimum prices.

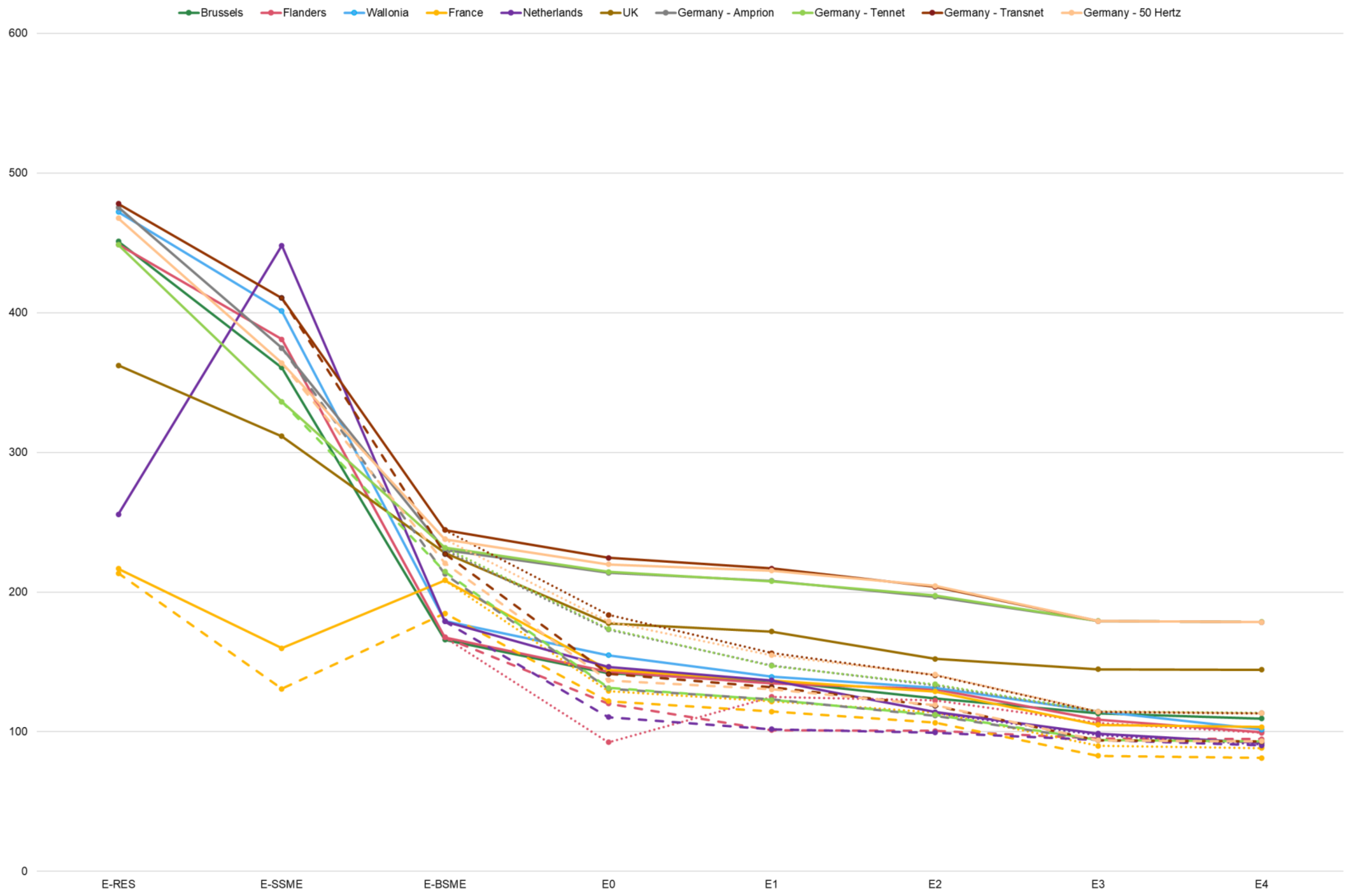
Compared to 2021, we notice the following relevant differences. First, regarding residential consumers E-RES and E-SSME, all regions/countries, except for France, see their energy bill rising sharply compared to last year, which is mainly explained by the increase in the commodity price. Secondly, the difference in electricity costs between E-RES and E-SSME with the larger profiles is increasing in 2022. Thirdly, due to the general increase of the commodity price, compared to last year we observe a convergence of the electricity bill between the regions/countries under review, in particular for larger industrial consumers.

The general decreasing trend seems to indicate that, in all countries, governments have chosen to allocate electricity consumption costs differently depending on the profile: the smaller the profile, the higher the price per unit of electricity consumed. The only exceptions lie in the Dutch E-SSME profile whose fares are higher than residential consumers E-RES and in the French E-BSME profile which is more expensive than E-SSME. This reflects a cost burden transfer from large consumers to small consumers but is also related to the network that the consumer is connected to. The higher the connection level of the consumer the lower the network cost.

The taxing mechanisms, as identified by the splitting of lines (i.e. multiple pricing possibilities) from profile E0, designed to support electro-intensive consumers also indicate a transfer of electricity costs from electro-intensive consumers to non-electro-intensive consumers as the former face much higher fares. Overall, France is the only country to differentiate all profiles as prices differ on selected pricing options as of consumer E-RES.

When looking at Belgium we do see a difference in the price (total energy bill in EUR/MWh) evolution for the residential and small professional profiles. The price steadily decreases from E-RES to E-SSME in all Belgian regions. For all three regions the price decreases much more between E-SSME and E-BSME. This mainly because the E-BSME profile is connected to a higher voltage level than E-SSME, from LS to MS, and the higher the voltage level the lower network costs.

Figure 89: Electricity yearly bill in EUR/MWh per profile



Natural gas

Residential and small professional consumers

1. Compared to 2021, the most significant difference in the gas bill for residential and small professional consumers is the large increase of the commodity price in all the regions/countries under review. In addition, the commodity cost is also more important for natural gas consumers than it is for electricity consumers, accounting in the Belgian regions in 2022 for more than 70% of the total bill for G-RES and more than 90% for G-PRO. The role of the other costs component is also quite similar between regions/countries, between 3% to 12% of the total invoice, except for the Netherlands, where it makes up a third to a fourth of the total invoice. In Belgium, Flanders is the most competitive region followed by Brussels and the regional all other costs play a role in this, similarly to the previous year. When comparing with the electricity conclusions, we see that Belgium is much more competitive regarding this energy source even though the total invoice has increased in all Belgian regions for G-RES and G-PRO. We also see that the Netherlands is by far the most expensive country, mainly because of their all other costs.
2. There are some regional differences in Belgium that have an impact on the competitiveness of the Belgian regions compared to each other, but also when comparing to the other countries under review. While Belgium is the second least competitive country for G-RES (after the Netherlands), when looking at G-PRO, we see that Flanders and Brussels are the two most competitive regions while Wallonia is in fifth place after France and the UK. The regional differences are the result of larger network and regional all other costs in Wallonia.
3. To further compare the two residential and small professional consumers, we must look at the price they pay per MWh. We see that the professional consumers pay less per MWh, except in the UK and France. The reason behind this is firstly the absence of VAT for the professional consumers. Secondly, we also see that the commodity and network cost is also less per MWh for professional consumers.

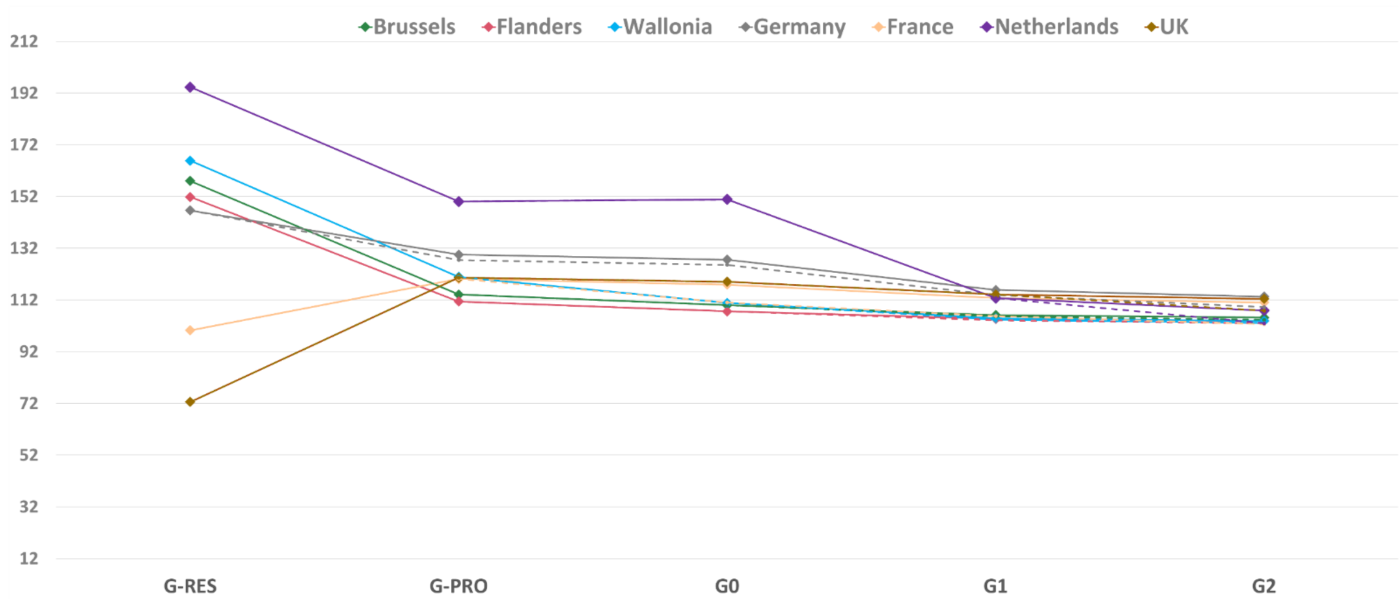
Industrial consumers

1. Like the residential profiles the commodity component is also very important for industrial natural gas consumers and the bigger the profile the more that the total invoice is determined by the commodity component. Also industrial natural gas consumers must face a large increase in the commodity cost compared to 2021, in all regions/countries under review. Because of the high increase of the commodity cost in all the countries, we observe also for gas consumers, like it was for industrial electrical ones, a convergence towards the Belgian average. For example, the Netherlands is in 2022 on average from 4% to 38% more expensive than Belgium for the three industrial profiles, while it was even two times more expensive than Belgium in 2021 for the G0 profile. In Belgium, the difference between the regions is smaller than it was for electricity. Flanders is the least expensive region in Belgium for all the industrial profiles. In the Netherlands, the all other costs component constitutes around 30% of the invoice for G0, but this cost undergoes a serious decrease when looking at the G1 and G2 profiles. Since the Netherlands are very competitive regarding electricity, we could assume that they want smaller industrial natural gas consumers to switch to electricity while not undermining the competitive position of the larger industrial profiles that use natural gas as a resource (feedstock consumers).
2. There is quite some variation regarding the competitiveness of the regions, while Belgium is still competitive for the smaller profiles G0 and G1, France is more competitive for G2. The application of the ranges of the all other costs will be very important in determining the competitiveness of the region.

Summary

Similarly, to electricity the figure below depicts the global trend followed by natural gas yearly bills once considered across all countries and regions simultaneously. Solid lines represent unique or maximum prices, whereas dashed lines constitute minimum prices.

Figure 90: Natural gas yearly bill in EUR/MWh per profile



Again, an overall decreasing trend can be observed, implying a bigger natural gas cost burden for small consumers compared to large consumers: the smaller the profile, the higher the cost per unit of natural gas consumed. However, we still notice some exceptions. In the Netherlands the G0 profile pays a higher fare than G-PRO, while for the UK and France the G-PRO profile pays more than G-RES. All countries offer reductions and/or exemptions for profile G2: if less clear than for electricity, consumers not benefitting from these reductions and exemptions may bear the financial costs to ensure lower prices for consumers eligible to these reductions and exemptions (i.e. feedstock consumers) – yet in a less pronounced fashion. Germany is the only country to offer different pricing options for all professional consumers, while France starts from G0 profile onwards and Belgium allows as of 2022 the G1 and G2 profiles to be exempted from the federal excise duty, even if this is not visible in the figure above as impacting very little on the EUR/MWh figures overall, with a difference of only 0,57 EUR/MWh for G1 and 0,85 EUR/MWh for G2.

Competitiveness score

Throughout this report, we addressed complex situations with a lot of nuances that we intend to present in a simplified manner. For this reason, we have drawn up competitiveness scorecards that give a clearer representation of how competitive Belgium/Brussels/Flanders/Wallonia is, regarding a certain profile, compared to neighbouring countries/regions.

Methodology

Results presented in this section were derived following two approaches: a national and a regional approach. The first method (national) compares figures obtained for Belgium with the other four countries from our study, namely Germany, France, the Netherlands and the UK. Belgian values were estimated by using the arithmetic average of all three Belgian regions. The second approach (regional) compares each Belgian region with the foreign regions and countries. While this leads Belgian regions to be compared with the same four countries previously mentioned for natural gas, seven countries and regions are used when it comes to electricity: Amprion (Germany), Tennet (Germany), Transnet BW (Germany), 50 Hertz (Germany), France, the Netherlands and the UK.

Electricity

Residential and small professional consumers

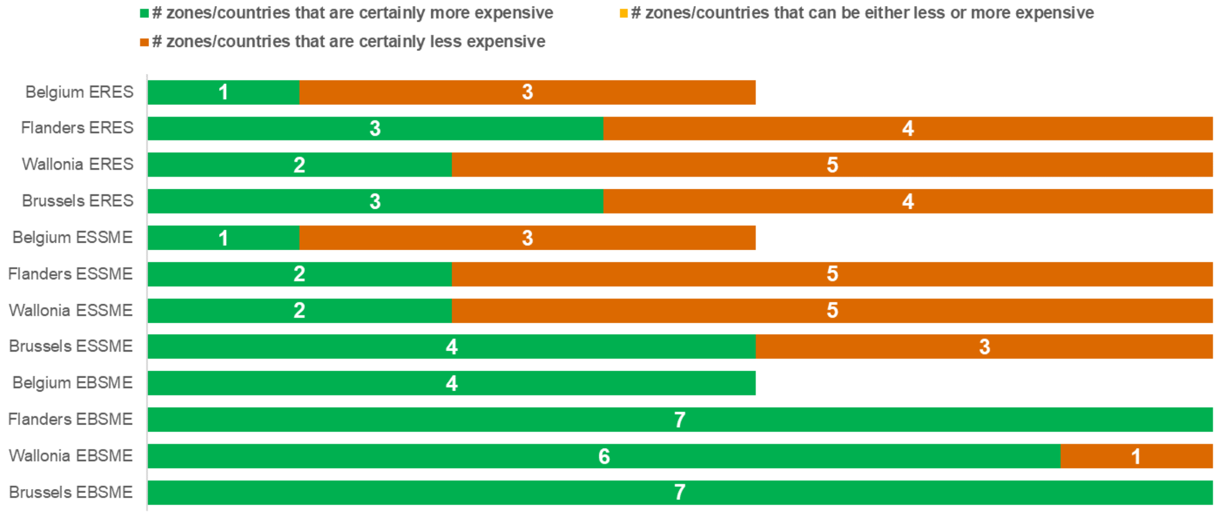
Firstly, we discuss the competitive position of the regions/countries for residential and small professional consumers under review. Before going more in-depth, we can already note that for the residential and small professional profiles the competitiveness of a region/country is clearly identifiable and does not depend on certain qualifications of the consumers as it can be seen under the industrial profiles.

On the national level, Belgium is not competitive regarding the E-RES and E-SSME profile, as only Germany is more expensive in E-RES (because of higher network and all other costs) and the Netherlands is more expensive in E-SSME (because of higher commodity costs). The other countries are less expensive. But as we move to the E-BSME the competitiveness improves and Belgium is competitive regarding this profile. For E-BSME, Belgium becomes the most competitive country as relatively lower all other costs in all three regions help Belgium's average bill getting smaller than in the other countries under review.

On the regional level, the prices are approximately similar even though Flanders is the cheapest Belgian region for E-RES due to lower commodity and network costs, while Brussels is the cheapest for E-SSME because of lower network and all other costs. Brussels and Flanders are both equally cheap for E-BSME. While Brussels' competitiveness is explained by their lower all other costs, Flanders' cheaper network costs makes them more competitive regarding E-BSME.

Compared to 2021, Flanders, Wallonia and Brussels have become less competitive for E-RES. The situation for the three regions in the E-SSME and E-BSME profiles has remained the same from 2021 to 2022, the only change is that 1 region/country, the Netherlands, has become less expensive than Wallonia for E-BSME in 2022.

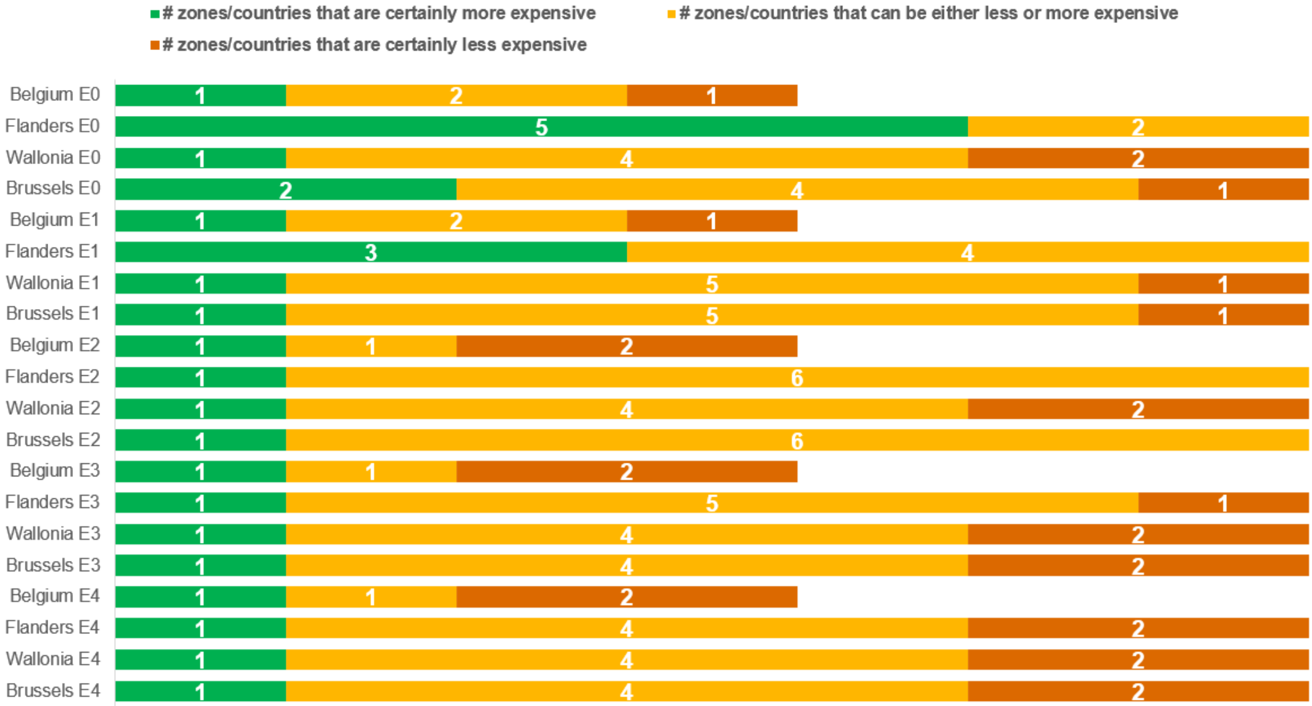
Figure 91: Competitiveness scorecard for residential and small professional electricity consumers (profile E-RES, E-SSME and E-BSME)



Large industrial consumers

Hereunder, we have set out the scorecards for every industrial profile (profiles E0 to E4), which gives an overall overview but also a specific one for electro- and non-electro-intensive consumers. The competitive position is more complex to grasp for our industrial profiles, compared to the residential and small professional profiles, the competitiveness of a region/country cannot always be determined in a binary approach (certainly less or more expensive). Comparing the scorecards of the industrial profiles we see that the complexity mainly stems from the electro-intensive consumers where there are different reductions to consider.

Figure 92: Competitiveness scorecard for industrial electricity consumers (profiles E0 – E4)



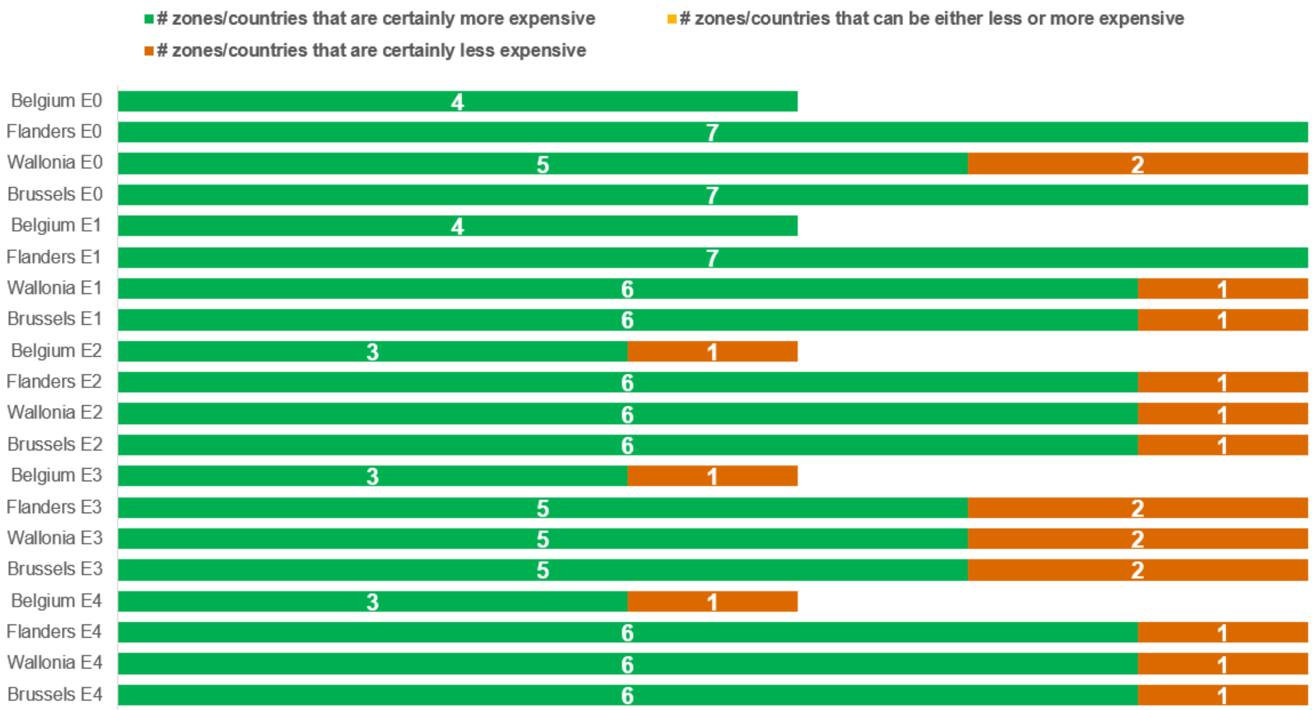
Before going into detail of Figure 92 we note that Belgium as a whole and each region is always cheaper than the UK. Another general observation we can make is that starting E0 France is always certainly less expensive than Belgium. This is the case whether we look on the national or regional level except when comparing to Flanders E0, Flanders E1 and Flanders E2, where Flanders can be cheaper than France. Apart from the two aforementioned statements, the competitive position of Belgium and its regions is very ambiguous for all the profiles. Regarding E0 and E1, the position of Belgium remains stable while we observe some changes on the regional level.

Given the large number of countries/regions that can be either less or more expensive, it is difficult to draw conclusions based on the previous figure: this is why we also present scorecards that detail the competitive position of Belgium and its regions for non-electro-intensive and electro-intensive consumers. We firstly analyse the competitive situation for the non-electro-intensive consumers.

Since there are no ranges for non-electro-intensive consumers the competitive position of each region and country is much clearer. Belgium and all its regions are very competitive regarding non-electro-intensive consumers. On the national level we see that for all the profiles there is always at least one country that is certainly less expensive, this is the Netherlands. France is also sometimes less expensive than Belgium and its regions for the largest profiles. Knowing this, the figure below is easy to read, Belgium and all its regions are always cheaper than the UK and the four German regions as depicted in the scorecard.

When comparing the scorecard on industrial non-electro intensive consumers from 2022 with the one from last year we notice that the competitive position of Belgium and its regions changed. For E3, we notice that the competitiveness of Belgium and its region deteriorate compared to 2021 due to the general increase of the commodity price which led to a convergence between the regions/countries under review. For this profile, there are more countries than last year which can be less expensive than Belgium and its regions.

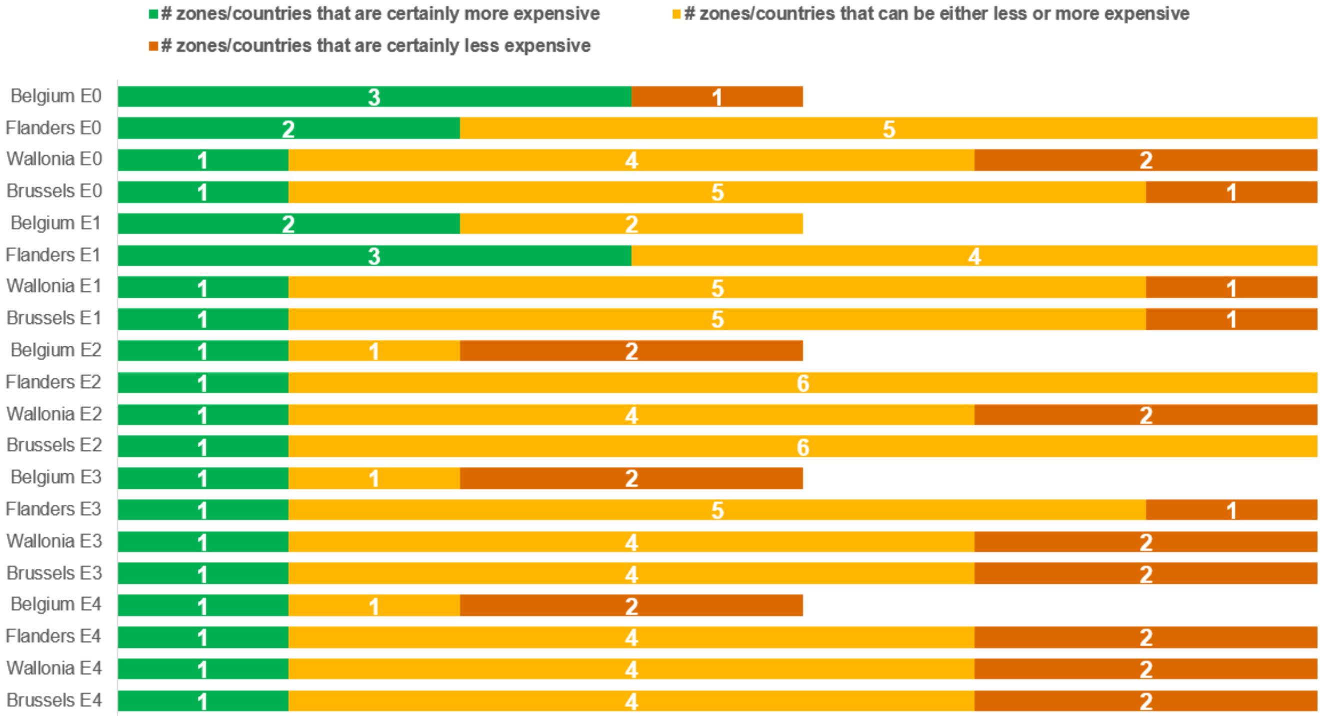
Figure 93: Competitiveness scorecard for industrial non-electro-intensive consumers (profiles E0 – E4)



As we noted before, the complexity and ambiguity of the competitive position of Belgium and its regions is mainly because of the potential reductions for electro-intensive consumers. Compared to Figure 92, Figure 94 makes it easier to see the regional differences. The country that is certainly more expensive is the UK, similar to the general scorecards. Regarding Germany, it is either more expensive or ambiguous depending on the price reductions. France and the Netherlands are cheaper for E2-E4.

When comparing the scorecard on industrial electro intensive consumers from 2022 with the one from last year we notice that the competitive position of Belgium and its regions did not change in the past year.

Figure 94: Competitiveness scorecard for industrial electro-intensive consumers (profile E0 – E4)



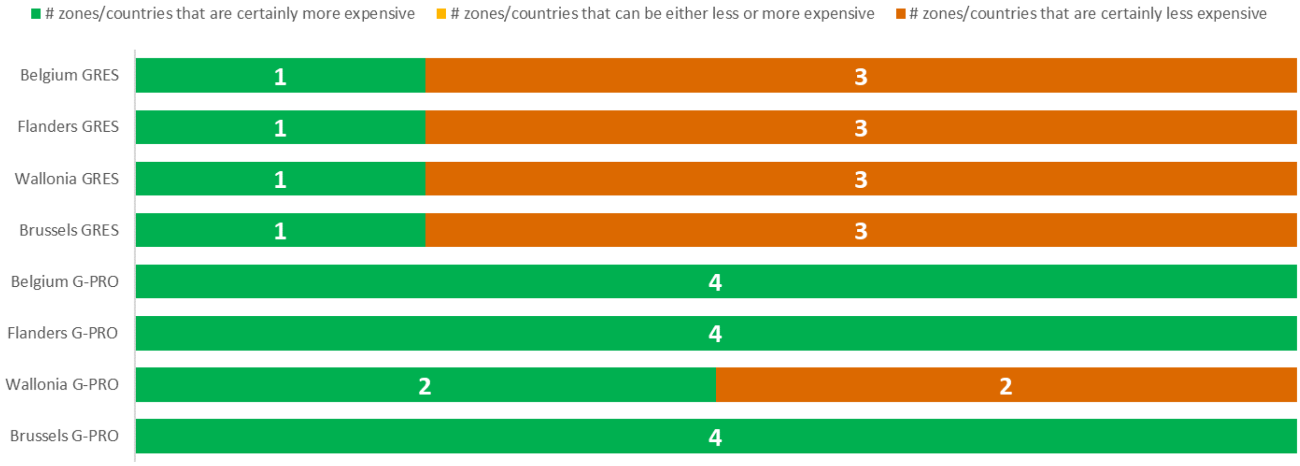
Natural Gas

Residential and small professional consumers

Figure 95 shows Belgium's competitiveness regarding natural gas. While for the G-RES profile, Belgium is the second most expensive country after the Netherlands, it is the most competitive country with regards to the G-PRO profile. On a regional level, for G-PRO, Flanders and Brussels are more competitive than all the other countries even though Brussels is 808 EUR/year more expensive than Flanders. Wallonia is clearly the most expensive Belgian region and is less competitive than France and the UK.

With the help of this scorecard, we can conclude that the competitive position of Belgium and its regions did not change compared to last year for these profiles.

Figure 95: Competitiveness scorecard for residential and small professional natural gas consumers (profile G-RES and G-PRO)



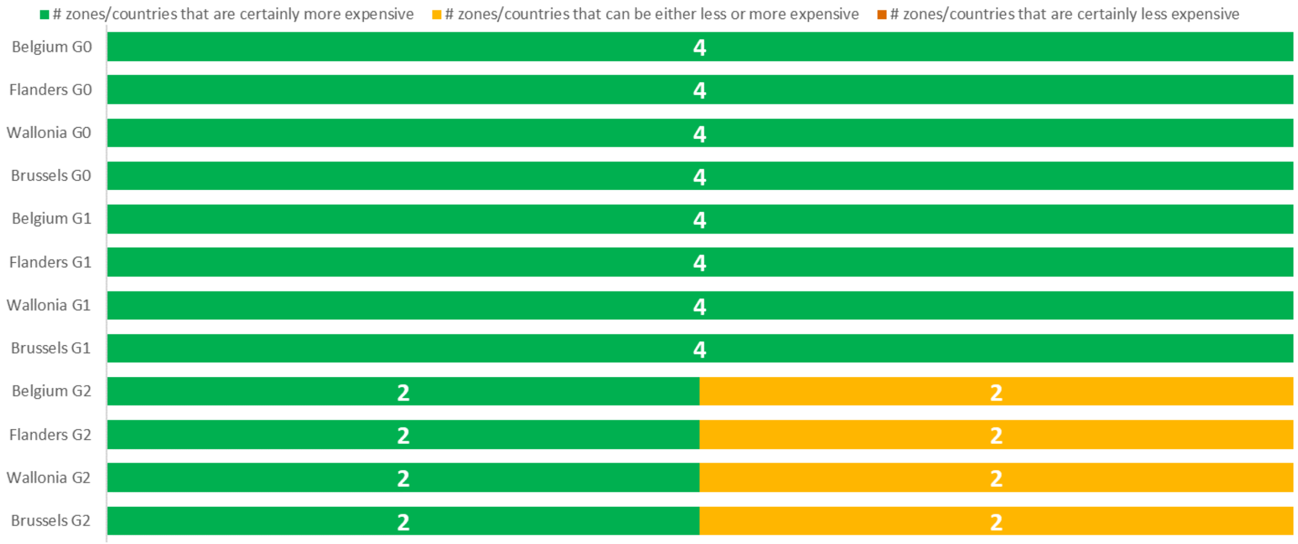
Large industrial consumers

For the G0 and G1 profiles, Belgium and its regions are more competitive than the other countries under review. Belgium is very competitive for G0 and G1 and in particular Flanders. While Brussels is cheaper than Wallonia for G0 (as it was for the residential and small professional consumers) this is no longer the case for G1 and G2. For G1 and G2 we note that the difference between Flanders and Wallonia is very small with Flanders being a bit cheaper.

As of this year, in Belgium there are exemptions/reductions to consider for both G1 and G2 while Germany and France already present ranges starting G0. The Netherlands and UK only offer reductions for G2. Differently from previous year France can be the cheapest country only for G2 when minimum range is considered.

Compared to 2021, all countries/regions are much closer to each other because of the general rise of commodity prices.

Figure 96: Competitiveness scorecard for industrial natural gas consumers (profile G0 – G2)



The tax burden for electricity and natural gas consumers

When presenting the results, the importance of the third component (all other costs) was already set forward. It is thus interesting to compare the variations of this component across countries and for all consumers and particularly, its evolution because of reductions.

Electricity

Residential and small professional consumers

The all other costs component bears a significant importance on residential and small professional consumers' bills, and great variances can be observed across regions/countries. The general trend seems to indicate that the larger the consumer, the lower the tax rate. If reductions apply in certain countries (Belgium, France and Germany), they are granted based on criteria directly related to consumers' annual offtakes or the nature of professional consumer's activity.

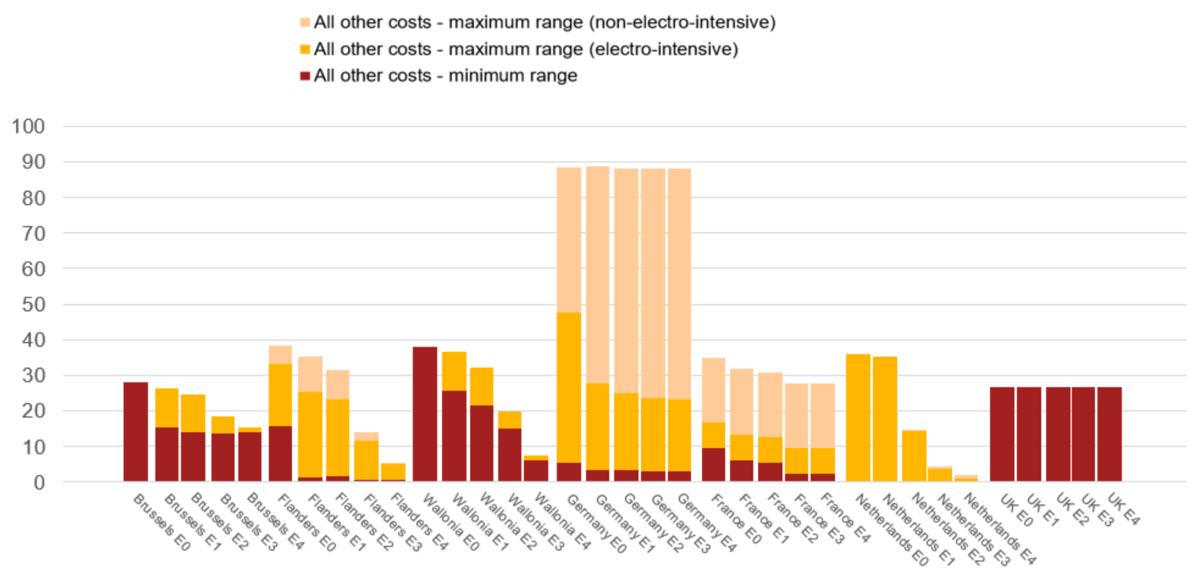
Large industrial consumers

It was observed that depending on the countries' tax regimes, electro-intensive and non-electro-intensive consumers could be charged differently. This differentiation entails competitive (dis)advantages across regions/countries when they introduced electro-intensity criteria to lower industrial consumers' tax burden. It is thus interesting to compare the variations of this component across regions/countries from our studied panel.

In the figure below, the full red bars represent the minimum amount of taxes that each consumer profile must pay in the specific country/region. The full yellow bar indicates the minimum-maximum cost range where different options are possible. Lastly, there is a transparent orange bar which represents the difference between the minimum and maximum cost for non-electro intensive consumers. This last bar is only applicable in Flanders, Germany, France and the Netherlands.

For this 2022 update, we also added a maximum range for Brussels and Wallonia for profiles E1 – E4, since an exemption is available for the federal excise duty. For the sake of readability of the figure below, we considered the minimum, red bar in the figure below, the amount of all other costs without the excise duty, for the three Belgian regions. We included the full amount of the excise in the electro intensive range so that it is also included in the minimum for non-electro intensive profiles.

Figure 97: Variance of the all other costs component in EUR/MWh (profile E0 - E4)



Firstly, we observe that the component is different in all Belgian regions and that only Flanders displays variable prices between non-electro- and electro-intensive consumers, while the three Belgian regions are all impacted by the exemption on the federal excise duty in the same way for E1 – E4 profiles. While the extent of the reductions differs, we see a decreasing trend across all countries/regions, namely that the larger the consumption, the lower the tax burden. One exception exists for all the profiles in the UK. The UK's all other costs component does not vary between profiles as no specific threshold depending on consumption level exists. This explains, among others, the less competitive position of the UK compared to all other regions/countries under review. We also observe a shift towards electro-intensity criteria regarding the allocation of the tax burden, namely in Belgium, Germany, France and the Netherlands. The higher competitiveness of Flanders compared to the other Belgian regions results from this shift made by the region when implementing the cap on the costs related to the green certificate quota. In the Netherlands, qualifying as an electro-intensive consumer significantly lowers the importance of the component in the total electricity cost. If France remains quite competitive for non-electro-intensive consumers, German's fares might indicate that non-electro-intensive consumers could finance the cost of reductions granted to electro-intensive consumers as the taxes soar to a maximum that is more than 4 times greater than for electro-intensive consumers.

Belgian federal and regional authorities mainly grant reductions and/or exemptions on taxes, levies and certificate schemes based on the level of electricity offtake, and not on the level of electro-intensity of an industrial consumer, except in Flanders with the cap on the financing of renewable energy and at the federal level with exemptions of the special excise duty. This could entail that Wallonia and Brussels' taxes, but also federal taxes, favour consumers that are not particularly affected by a lack of competitiveness of electricity prices given the lower prices they benefit from in comparison with other countries, while consumers that are more at risk suffer from significant disadvantage compared to their electro-intensive counterparts in neighbouring countries. For Brussels, this must be nuanced as it is a very urban region where the number of large industrial consumers is limited.

In Belgium, delving further into this component composition highlights that for Brussels and Wallonia, the cost of regional green certificates is the top-most tax component – apart from profile E4 in Brussels.[301] This also the case for Flanders if we consider the non-electro-intensive consumers. This tends to emphasise that regional strategies largely support the financing of renewable energies through taxes included in the electricity bill. In Brussels the "Levy for occupying road network" is one of the two most important components for profile E3 and E4.

Natural gas

Residential and small professional consumers

The weight of taxes' weight on residential and small professional natural gas consumers is, by far, less important than on the electricity's annual invoice. Comparing E-RES and G-RES for example we see the biggest differences in Flanders and Germany. For electricity they respectively have all other costs of 69 EUR/MWh and 88 EUR/MWh while this component for this region/country is 2 EUR/MWh and 17 EUR/MWh for natural gas. Germany is the only country to have designed reductions on natural gas taxes depending on the use made of natural gas. Again, tax rates seem to follow a decreasing trend when larger profiles are considered – apart from the Netherlands and the UK where flat tax rates apply.

Large industrial consumers

Like residential and small professional consumers, tax rates imposed on industrial consumption of natural gas are relatively low compared to rates charged on electricity. If reductions and exemptions may be granted on taxes, one can observe that taxes are less numerous, and conditions of applications are less complex.

[301] See 5.1 Electricity: Detailed description of the prices, price components and assumptions Belgium Component 3 – all other costs (p.162)

Impact of reductions on network costs

Electricity

When presenting the results of the electricity and natural gas costs, it was observed that network costs are quite small, but might play a significant role when comparing the overall competitiveness of a country/region. As such, we detail below the importance reductions on network costs may have for countries.

Residential and small professional consumers

There is no reduction in force on network costs for electricity residential and small professional consumers.

Large industrial consumers

The figures below set out the reductions that can be granted in the regions/countries under the review and which might affect their global competitiveness. The dark orange bar represents the full transmission tariff while the yellow bar represents the transmission tariffs after reductions.

Belgium and the UK do not offer any reduction on the network cost component, but in the other countries under review, large baseload consumers such as E3 and E4 from this study can benefit from a transmission tariff reduction up to 90% (Germany). It should be clear from the figures below that these reductions have a significant impact on the network costs eventually paid by industrial consumers.

Figure 98: Network costs reduction in EUR/MWh (profile E3)[302]

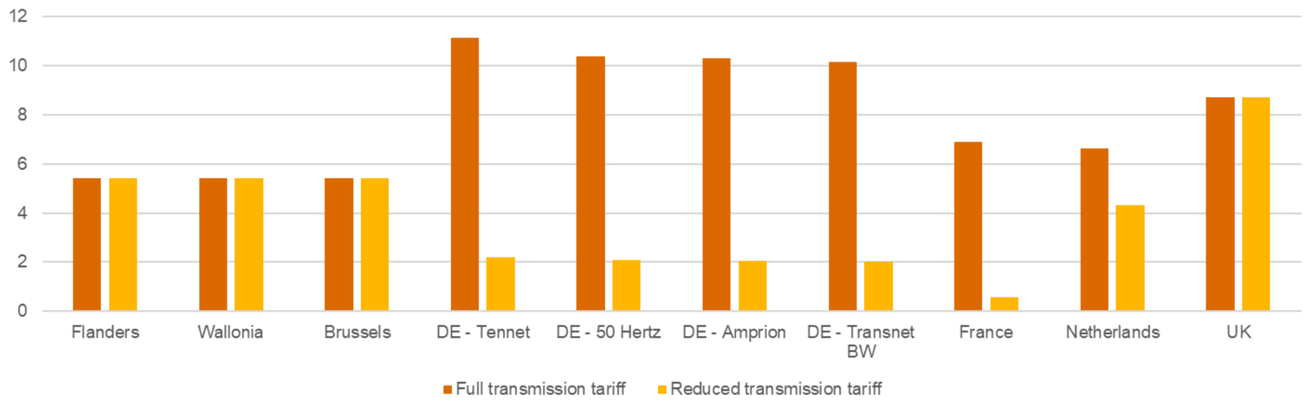
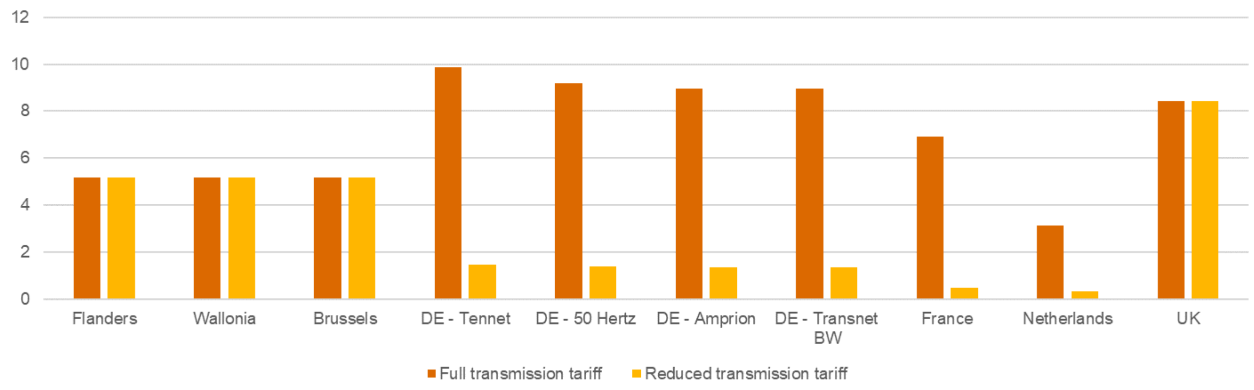


Figure 99: Network costs reduction in EUR/MWh (profile E4)[303]



[302] The hatched bar in France represents the range of prices for the network costs following reductions.

[303] The hatched bar in France represents the range of prices for the network costs following reductions.

The reductions in Germany, France and the Netherlands must be financed, and this is done differently in France and the Netherlands compared to Germany. While the Netherlands and France compensate these reductions with the transmission tariff itself (through regulatory accounts, for instance), Germany created a separate levy (the “StromNEV §19- Umlage”) to pay for the reduction. This levy is due by all consumers, but the large consumer profiles benefit from a large reduction. We can, therefore, state that high transmission tariffs in Germany are not the consequence of the reductions, but rather the cause. This reduction also explains the higher competitiveness of Germany when it comes to larger consumers. It is also interesting to note that the German Tennet region is significantly more expensive than the other regions.

Natural gas

There exists no reduction for natural gas’ network costs for residential, small professional consumers and industrial consumers as identified by this study.

8. Comparison of social measures for residential consumers

8. Comparison of social measures for residential consumers

Impact of social measures

For all countries under review, we provide an extensive analysis of social measures that were implemented to financially support households that are exposed to energy poverty, which develops “as a result of energy-inefficient buildings and appliances, high energy expenditures, low household incomes and specific household needs”[304]. Depending on the country, the concept varies but globally targets households with difficulties to afford their energy bills. As social measures are most frequently designed to tackle energy as a whole, we consider financial measures applying as such, and therefore including both electricity and natural gas. This chapter explores the impact of potential reductions on total energy bills for residential consumers (E-RES and G-RES) across countries and regions under review.

[304] (European Commission, 2020)

Methodology

The cross-country comparison of social measures is based on a three-step approach:

1. An extensive research is conducted to identify all measures that are offered to households in the situation of energy poverty. While measures in most countries are considered at the national level, measures in Belgium are looked at the federal and regional level.
2. The aggregated energy bill, electricity and natural gas, are compared between countries and regions. Results are then adjusted by the disposable income of each country. To eventually assess the share of residential consumers' revenues allocated to pay for energy bills, the latter is weighed compared with the gross disposable adjusted income[305,306]. This can be understood as a household's energy effort rate[307]. Moreover, the share of housing costs is deducted from one's gross disposable adjusted income to stress the remaining income once a major basic need is excluded. In this section, we refer to disposable income as the income we estimated via this methodology. All data was extracted from Eurostat at the national level and are figures for 2020 – most recent data available.
3. Based on the above-mentioned research, all social measures that can be quantified are deducted from the total energy bill of residential consumers to evaluate the possible reductions applying in each country from our panel. Once reductions are applied, the final bill is compared to the living income from which low-income consumers may benefit in each country. Depending on one's situation (isolated person or couples, with or without children, jobless or with limited financial revenues, etc.), the support granted may vary. To limit the extent of this exercise, two hypotheses are taken. Firstly, it is assumed that households have a maximum of two children[308]. Then, given that we have no information on our consumers' economic conditions, it is assumed that they do not benefit from incomes related to professional activities to stress the maximum intervention level that could be granted for vulnerable people. This way, we intend to grasp the extent of the potential living wage varying more easily only based on age and household composition. Accordingly, we present a range from a minimum to a maximum potential living income. All data were extracted from countries' governmental websites and depict figures for 2022.

As this exercise is based on the assessed energy bills from this study, it is important to mention that the objective of this task is not to reflect real consumer profiles. The residential profiles (3.500 kWh of electricity and 23.260 kWh of natural gas) from this study are usually considered as "standard" consumption profiles for a 2 parents-family with 2 children[309]. Clearly, this does not necessarily correspond to credible consumption profiles for people in the situation of energy poverty, especially considering an isolated person without children, for instance. However, the ultimate objective is, for a given profile, to determine each consumer's effort rate with or without reductions and finally compare across countries the impact of governmental interventions on consumers' energy financial burden. Figures reported with regards to the living income always refer to a four-members household including 2 parents and 2 children.

[305] This gross disposable adjusted income reflects the purchasing power of households and their ability to invest in goods and services or save for the future, by accounting for taxes and social contributions and monetary in-kind social benefits. It is calculated as the adjusted gross disposable income of households and Non-Profit Institutions Serving Households (NPISH) divided by the purchasing power parities (PPP) of the actual individual consumption of households and by the total resident population".

[306] In this study, this indicator was extracted from Eurostat already corrected from the PPP factor to adjust for variable disposable income in the studied countries. This prevents from double counting by neutralising initially considered adjustments between countries.

[307] In France, the ONPE defines the energy effort rate as the "share of total energy expenditure in the household's disposable income". (ONPE, 2020)

[308] In most countries, specific allowances are granted based on the number of children, for which limits do not necessarily apply.

[309] (CREG, 2018)

Identification of social measures and living income within studied countries

Belgium

Social measures

Residential consumers may benefit from several measures to lower their energy bills. The present section covers all social measures existing in Belgium while distinguishing common federal measures from specific regional ones. In Belgium, the support granted to households mainly depends on the granting of a specific status: federal or regional protected consumer, which is broader. This status opens the possibility for households to meet eligibility criteria to benefit from social measures.

Federal level - Belgium

At the federal level, residential households meeting the below-listed criteria are recognised as "**federal protected consumers**":

- **Category 1**: households benefiting from one of the below allocations from the Public Social Welfare Centre (PSWC)[310]:
  - Social integration income;
  - Financial social assistance equivalent to the social integration income;
  - Social assistance partially or fully covered by the State;
  - An advance on the income guarantee for the elderly or a disabled person's allowance.
- **Category 2A[311]**: households benefiting from one of the below allocations from the FPS Social Security:
  - Allowance for the disabled due to permanent work incapacity of 65%;
  - Income replacement allowance;
  - Social integration allowance;
  - Allowance for third party assistance;
- **Category 3**: households benefiting from one of the below allocations from the Federal Pension Service:
  - Income guarantee for the elderly (GRAPA/IGO);
  - Allowance for assistance to the elderly;
  - Allowance for the disabled due to permanent work incapacity of 65%;
  - Allowance for assistance from a third party.
- **Category 4** (only for natural gas): households are tenants of a social apartment whose natural gas heating depends on a collective installation, in a building managed by:
  - A social housing corporation;
  - Regional housing corporations;
  - Social housing companies approved by the regional governments (Vlaamse Woningfonds, Fonds du Logement des Familles nombreuses de Wallonie, Fonds du Logement de la Région de Bruxelles-Capitale)
  - Public Social Welfare Centre.
- **Temporary category:** consumers benefiting from the increased intervention of the social security on medical expenses ("intervention majorée"[312]) and having signed a contract for the electricity and/or natural gas for their own use (households) are temporarily eligible to the social tariff until 30th September 2022, as the temporary category of beneficiaries from the increased intervention of the social security has been extended until that date due to the current rising trend of energy costs[313].

[310] Centre public d'action sociale (CPAS) / Openbaar Centrum voor Maatschappelijk Welzijn (OCMW)

[311] There is a category 2B and 2C but these are regional protected consumer categories.

[312] The increased intervention on medical expenses is granted by the social security body ("mutuelle") to beneficiaries of social allocations or based on specific status (widow, invalid, retired person, handicapped person, unemployed or long-term incapacity, single-parent family, etc.). See more detailed explanations on https://www.inami.fgov.be/fr/themes/cout-remboursement/facilite-financiere/Pages/intervention-majoree-meilleur-remboursement-frais-medicaux.aspx (only in French or Dutch)

[313] Source : https://economie.fgov.be/fr/themes/energie/prix-de-lenergie/tarif-social-pour-lelectricite

In February 2022, the Belgian Federal government agreed on a reduction to the VAT from 21% to 6% for residential consumers on electricity for the months of March until September included and gas from April until September included. Since we only consider yearly consumptions without taking monthly variations in consumption into account, we assumed that every month they consume the same amount of electricity and gas over the whole year, thus calculating the social tariff with 6% VAT for 7 (March to September) out of 12 months for electricity and 6 (April to September) out of 12 months for natural gas[314] This approach may not be reflecting reality accurately as the months that are calculated with a lower VAT rate are the ones with longer days and higher temperatures, hence we could predict that are also the months during which households consume less MWh for lighting and heating. However, we consider this as a limitation to this average and the difference being negligible on a large scale, thus we still include this reduction to compare the impact of measures taken at Belgium level with the other countries.

On 23rd December 2021, the Federal government adopted a Royal Decree granting a **one-off € 80 discount on their electricity bills** to consumers falling under all above-mentioned categories of federal protected consumers, including the temporary category, to protect them against the rise in energy prices on the markets that has been observed since the 3rd quarter of 2021[315]. In addition, the Federal government also agreed on a “heating bonus” (“Prime de chauffage”) of 100€ for all residential households having an electricity contract, enacted as a credit note on their annual bill[316].

In December 2021, the Federal government also granted an **extra 16 M€ allowance to the Electricity and Gas Fund 2022 budget.** This fund is described in the below table.

In addition, the “**federal protected consumer” categories** listed above are also exempted from the federal excise duty on electricity and gas, according to art 429 § 2 of the law from 27th December 2004.[317]

Common social measures that apply at the federal level are detailed below:

Table 125: Belgium (federal) social measures

Federal social measures		
Measures	**Explanation**	**Eligibility criteria**
Social tariff	The social tariff for electricity and/or natural gas is a reduced tariff reserved for specific categories of households. It corresponds to the lowest commercial tariff on the market and is the same for all energy suppliers and distribution system operators. As it is set every three months, we consider the social tariff in force for January 2022. Besides the reduced tariff, households do not pay any rental charges on electricity and/or natural gas meters and do not pay for the energy contribution (cotisation énergie) and the Special excise duty.	Meeting the conditions to be eligible as a federal protected consumer.
Electricity and Gas Fund	A fund supporting material or financial assistance by PSWCs to households having difficulties in paying for their electricity and/or natural gas bills. This fund enables PSWCs to negotiate payment plans, clear invoices, intervene in the buying of low-consumption appliances, provide training on how to lower one’s bill or reduce one’s energy consumption, etc.	Any household facing financial difficulties that submit its application to benefit from such help. The latter may be granted once PSWCs has conducted a preliminary inquiry of the household’s situation. As the help provided depends on each PSWC’s policies, this social measure is presented in this study in a qualitative manner.

314 Source : https://www.premier.be/fr/le-gouvernement-prend-de-nouvelles-mesures-de-lutte-contre-la-hausse-des-prix-de-l-energie

315 Source: https://www.ejustice.just.fgov.be/eli/arrete/2021/12/23/2021034461/moniteur

316 Source : https://www.premier.be/fr/trois-boosters-pour-soutenir-le-pouvoir-dachat-des-familles

317 Source: https://www.ejustice.just.fgov.be/eli/loi/2004/12/27/2004021170/justel#LNK0154

Regional level - Brussels

Brussels may grant a “**regional protected consumer”** status to households in debt with their current energy supplier and which have received a formal notice. In Brussels, households must apply to be granted this regional status. Depending on the institution by which the status is wished to be obtained, households also must be engaged in a debt mediation process, have revenues below a fixed threshold or be subject of a social inquiry by a PSWC.

If you receive the following regional allocations, you can also benefit from the social tariff (category 2B and 2C[318]):

- Allocation for the elderly (IRISCARE)
- Additional family allowance for children with a physical or mental disability with a minimum score of 4 points in pillar 1 of the medical-social scale.

If the consumer/household falls under one of the aforementioned categories, they can benefit from the below-listed measures:

Table 126: Brussels social measures

Brussels Social Measures		
Measures	**Explanation**	**Eligibility criteria/Conditions of application**
Social tariff	The social tariff for electricity and/or natural gas is a reduced tariff reserved for specific categories of households. It has the lowest commercial tariff on the market and is the same for all energy suppliers and distribution system operators. As it is set every three months, we consider the social tariff in force for January 2022. Besides the reduced tariff, households do not pay any rental charges on electricity and/or natural gas meters. The social tariff granted to additional regional categories – in comparison with federal categories – is financed by DSOs PSO's tariffs.	Federal and regional protected consumers can benefit from the social tariff. For regional protected consumers, the social tariff can only be granted if they are supplied by the DSO
Payment plan	A payment plan can be planned when a household faces financial issues to pay for its electricity and/or natural gas bills.	Such a mechanism can be activated either: • Upon household's demand; • Upon the supplier's initiative in the event of formal notice following the non-payment of an invoice. A 2.300-watt power limiter is placed on the meter for a minimum of 6 months in case the household does not agree on a payment plan or fails to respect it. As the payment plan depends on each household's situation, this social measure is presented in this study in a qualitative manner.[319]

[318] Categories considered for social tariffs,https://economie.fgov.be/fr/themes/energie/prix-de-lenergie/tarif-social-pour-lelectricite

[319] The power limiter itself is not a social measure but is a necessary step an energy supplier must make to continue the end of contract procedure before the justice of the peace ; Payment plan is concluded for free, and the procedure costs are limited at 55€.

Regional level - Flanders

In Flanders, residential households can only be recognised under the **federal protected consumer** status as no additional regional categories of consumers exist to benefit from the social tariff.

However, if you receive the following regional allocations, you can also benefit from the social tariff (category 2B and 2C[320]):

- A care budget for older people in need of care (Zorgkas)
- Additional family allowance for children with a physical or mental disability with a minimum score of 4 points in pillar 1 of the medical-social scale.

Besides that, households facing financial difficulties may be granted the below-listed measures:

Table 127: Flanders social measures

Flanders Social Measures		
Measures	**Explanation**	**Eligibility criteria/Conditions of application**
Pre-paid meters[321]	Meter that works as a conventional meter but with a prepayment function. The consumer is either subject to the maximum social tariff or a fixed price (average price of commercial suppliers).	Such meter is placed when: • DSO is the energy supplier, and consumer is in payment default;[322] • DSO becomes an energy supplier as a commercial supplier terminates the contract due to payment default, and consumer does not have a new supplier after 2 months. As of 1st July 2022, this delay is reduced from 2 months to 45 days. Minimum energy supply for pre-paid meters: • Electricity: pre-paid meters for electricity are equipped with a 10 Ampere function that switches on when all credit (including emergency credit) has been used. This function can, however, be switched off permanently when a household fails to charge his meter for a certain amount of time. • Natural gas: during the winter months (1/11 – 31/03), PSWCs can be asked for financial help to have a minimum natural gas supply. The decision to grant financial help is discretionary to each PSWC and based on a review of each applicant's profile. If granted, financial help is provided every two weeks, and the extent of the help depends on the consumer status (protected customer or not) and house.
Payment plan	A payment plan can be planned when a household faces financial issues to pay for its electricity and/or natural gas bills.	Such a mechanism can be activated either: • Upon household's demand; • Upon the supplier's initiative in the event of formal notice following the non-payment of an invoice. As the payment plan depends on each household's situation, this social measure is presented in this study in a qualitative manner.
Payment exemptions	Consumers recognised as federal protected	Meeting federal protected consumers conditions.

[320] Categories considered for social tariffs, https://www.creg.be/fr/consommateur/tarifs-et-prix/tarif-social#h2_2

[321] (Vlaamse overheid, 2020)

[322] This will change from the 1st July 2022. From then on, the prepayment function will be activated in the distribution for electricity for everyone who contacts the DSO directly.

	consumers are exempted from paying the: ● Bijdrage energiefonds (or Energieheffing)[323]; ● Costs related to reminders or notices of default.	

When a consumer is in payment default, is supplied by the DSO and does not have a federal protected consumer status, then they would also pay a different price based on a market average.

Regional level - Wallonia

Wallonia may grant a "**regional protected consumer**" status to households which are in:

- Educational guidance of a financial nature from the PSWC;
- Debt mediation with a PSWC or an approved debt mediation centre;
- Collective debt settlement.

Furthermore, if you receive the following regional allocations, you can also benefit from the social tariff (category 2B and 2C[324]):

- A care budget for older people in need of care (AVIQ)
- Additional family allowance for children with a physical or mental disability with a minimum score of 4 points in pillar 1 of the medical-social scale.

Table 128: Wallonia social measures

Walloon Social Measures		
Measures	**Explanation**	**Eligibility criteria/Conditions of application**
Social tariff	The social tariff for electricity and/or natural gas is a reduced tariff reserved for specific categories of households[325]. It has the lowest commercial tariff on the market and is the same for all energy suppliers and distribution system operators. As it is set every three months, we consider the social tariff in force for January 2022. In addition to the reduced tariff, households do not pay any rental charges on electricity and/or natural gas meters. The social tariff granted to additional regional categories – in comparison with federal categories – is financed by DSOs PSO's tariffs.	Federal and regional protected consumers can benefit from the social tariff. For regional protected consumers, social tariff can only be granted if they are supplied by the DSO.
Pre-paid meters	Meter that works as a conventional meter with a prepayment function.	Such meter is placed: ● Upon any consumer's demand;

323 (Vlaamse Overheid, 2020)

324 Categories considered for social tariffs, https://www.creg.be/fr/consommateur/tarifs-et-prix/tarif-social#h2_2

325 As detailed previously, 4 households categories exist. The 4th category can only benefit from the social tariff on natural gas. A temporary category based on different criteria exists for electricity and/or natural gas from February 1st, 2021 to August 31st, 2022 included.

	The prepayment meter is free of charge if requested by the PSWC or in case of a move if the consumer had a prepayment meter in his former place. Pre-paid meters placement costs are free for: ● Unprotected consumers with payment default from 100 euros (electricity or natural gas) or 200 euros (electricity and natural gas). ● Federal or regional protected consumers.	● Upon PSWC's demand; ● Upon supplier's demand in case of payment default from 100 euros (electricity or natural gas) or 200 euros (electricity and natural gas). Federal or regional protected consumers who have pre-paid meters: ● Are directly provided in electricity and natural gas by their DSO; ● Are provided with meters equipped with a power limiter (only for electricity) to ensure a minimum supply. The guaranteed minimum supply is only activated at the request of the PSWC; ● Can receive financial assistance to recharge their natural gas budget meter during the winter period if they encounter payment difficulties. The decision to grant winter assistance is overseen by the local energy commission.
Payment plan	A payment plan can be planned when a household faces financial issues to pay for its electricity and/or natural gas bills.	Such a mechanism can be activated either: ● Upon household's demand; ● Upon the supplier's initiative in the event of formal notice following the non-payment of an invoice. The supplier must propose a reasonable payment plan to his customer and inform him that he can benefit from the assistance of the PSWC in his negotiation. The collection procedure is suspended if a reasonable payment plan is concluded or until the PSWC can make a socio-budgetary analysis of the customer and intervene, if necessary, in the payment of the customer's debt. No fee can be claimed for a reasonable payment plan. Furthermore, a limit is set on the collection costs that can be claimed by suppliers from customers under the non-payment procedure[326]. As the payment plan depends on each household's situation, this social measure is presented in this study in a qualitative manner.

[326] According to the March 30th, 2006 Walloon Government decrees on public service obligations in the electricity and natural gas markets (respectively Art. 30 ter and Art. 33 ter), the collection costs cannot exceed the sum of: the outstanding balance due on overdue invoices, any contractual interest, capped at the legal rate and any collection costs for unpaid invoices, capped at 7.5 euros for a reminder letter and 15 euros for a letter of formal notice. The total costs claimed for sending reminders and letters of formal notice or for non-payment may not exceed 55 euros per year and per energy.

Disposable income and living wage

According to Eurostat, Belgium's ***gross adjusted disposable income corrected for PPP*** for 2020 reached 26.401,00 EUR. This value is used to weigh energy's relative share in a residential consumer's income. From the latter, 17,80% are dedicated to housing that is deducted, resulting in a corrected gross disposable income of 21.701,62 EUR for all three Belgian regions.

In Belgium, the living wage ("revenu d'intégration") is under the responsibility of PCSWs. They may grant such revenues to low-income people that meet all the following conditions:

1. The person must be of Belgian ***nationality*** or:
    a. A European citizen (or a family member with European nationality), and have the right of residence for more than three months;
    b. a foreigner registered in the population register;
    c. a recognized refugee;
    d. a stateless person;
2. The person must ***live in Belgium*** and be legally resident;
3. The person must be of ***legal age*** (18) or:
    a. a minor emancipated by marriage;
    b. an unmarried minor who is responsible for one or more children;
    c. a minor who is pregnant;
4. The person must ***not have enough financial resources*** and not able to obtain them on his own;
5. The person must be ***willing to work*** unless health reasons or special reasons related to one's situation prevent from doing so;
6. The person ***must have asserted all his entitlement*** to other social benefits, such as unemployment.

The amount of this living wage varies depending on one's conditions as presented below:

- **Category 1**: a person living with one or more other people with whom they constitute a common household;
- **Category 2**: a person living alone;
- **Category 3**: a person responsible for a family with at least one unmarried minor child.

Conformingly to our hypotheses, this analysis assumes to cover two adults and two children household. Therefore, a monthly living income of 1.449,15 EUR (category 3)[327] is employed. In addition, child allowances are granted in Belgium to any household with children. These extra allowances increase the maximum potential living income perceived by Belgian low-income households. Depending on the region, these allowances might change as follows:

- **Brussels[328]**: for a two-children household, allowances for both children would reach a minimum of 464,70 EUR/month[329] to a maximum of 1.705,65 EUR/month[330]. For Brussels, we thus use a range from a monthly minimum of 1.913,85 EUR to a monthly maximum of 3.154,80 EUR.
- **Flanders**: for a two-children household, allowances for both children would reach a minimum of 481,13 EUR/month[331] to a maximum of 1.696,00 EUR/month[332]. For Flanders, we thus use a range from a monthly minimum of 1.930,28 EUR to a monthly maximum of 3.145,15 EUR.
- **Wallonia[333]**: for a two-children household, allowances for both children would reach a minimum of 449,26 EUR/month[334] to a maximum of 1.689,81 EUR/month[335]. For Wallonia, we thus use a range from a monthly minimum of 1.872,48 EUR to a monthly maximum of 3.020,72 EUR.

[327] Allocation for a couple in charge of minimum one minor child.

[328] (KidsLife, 2020)

[329] This situation is a minimum situation when the children are between 0-11 years old (+159,18 EUR/month per child). Plus, if parents have gross yearly revenues <31 kEUR, extra allowances are granted (71,4 EUR/month per child between 0 and 11). Finally, an additional age allowance is granted yearly and reaches 21,22 EUR/year per child between 0 and 5. Allowances for large households are not considered as this starts from 3 children.

[330] This situation is a maximum situation when the children are between 18-24 years old following higher education (+169,79 EUR/month per child). Plus, if parents have gross yearly revenues <31 kEUR, extra allowances are granted (81,6 EUR/month per child between 12 and 24), and in situation of severe physical and mental disability resulting in serious impacts on daily child management and private life (594,36 EUR/month per child). Finally, an additional age allowance is granted yearly and reaches 84,9 EUR/year per child between 12 to 24 years old registered in high school. Allowances for large households are not considered as this starts from 3 children.

[331] Considering the 2020 system, this situation is a minimum situation when the children are below 18 (169,79 per child). Plus, if parents have gross yearly revenues <31 kEUR, extra allowances are granted (53,06 EUR/month per child). An additional 137,96 EUR/year per child if (s)he goes to kindergarten school (kleutertoeslag), 21,23 EUR/year per child (schoolbonus) and lastly an additional 106,72 EUR/year (former “schooltoelage”).

[332] Considering the 2020 system, this situation is a maximum situation when the children are born before 2019 and above 18 (169,79 EUR/month per child). Plus, if parents have gross yearly revenues <31 kEUR, extra allowances are granted (53,06 EUR/month per child), and in situation of severe physical and mental disability resulting in serious impacts on daily child management and private life (571,3 EUR/month per child). An additional 63,67 EUR/year per child is granted if child goes to school as well as an extra 1156,98 EUR/year per child if (s)he is 3rd year of technical secondary education.

[333] (Agence pour une Vie de Qualité (AVIQ), 2020)

[334] This situation is a minimum situation when the child is between 0-18 years old (+164,49 EUR/month per child). Plus, if parents have gross yearly revenues <30 kEUR, extra allowances are granted as social supplement (+58,37 EUR/month per child). An additional 21,22 EUR/year per child is granted if children go to school and are between 0-5. Allowances for large households are not considered as this starts from 3 children.

[335] This situation is a maximum situation when the child is between 18-24 years old (+175,10 EUR/month per child). Plus, if parents have gross yearly revenues <30 kEUR, extra allowances are granted as social supplement (+58,37 EUR/month per child), in case of disability of one of the parents (+10 EUR/month per child) and in situation of severe physical and mental disability resulting in serious impacts on daily child management and private life (594,36 EUR/month per child). An additional 84,9 EUR/year per child is granted if children go to school and are at least 18 years old. Allowances for large households are not considered as this starts from 3 children.

Germany

Social measures

In Germany, extraordinary electricity costs or debts can be covered by the social welfare office/jobcentre in the following exceptional cases[336]:

- The threat of the electricity supplier to cut off the electricity.
- Electric heating systems, decentralised hot water production.
- If a subsequent payment from the annual electricity settlement cannot be made.

Cash payments for back payments or accrued electricity debts are generally made in the form of loans, in rare cases aid is granted, and partial loans and partial aid are also possible. A loan can only be refused if it can be proven that the high electricity costs are due to their own fault. High electricity costs imply higher costs than estimated by the law (Hartz IV).

If the water heating is operated with electricity, there is a claim for additional demand. In the case of a flat with electrically operated heating systems, only the actual, reasonable heating costs are covered.

These measures are difficult to quantify because they are discretionary and applicable on a case-by-case basis. Consequently, no social measures with regards to the reduction of electricity and natural gas bills can be used in this exercise. However, we do depict the difference in effort rates for low-income consumers compared with other consumers in more prosperous conditions.

Disposable income and living wage

Germany's ***gross adjusted disposable income corrected for PPP*** amounted to 29.539,00 EUR in 2020. As housing costs are estimated to be 29,70% of Germany's disposable income, we obtain a corrected gross disposable income of 20.765,92 EUR.

Regarding low-income consumers, Germany offers '*Arbeitslosengeld II*' – ALG II in short – (or Unemployment Benefit II) and '*Sozialgeld*' (or Social Security Benefit) as part of the benefits for securing living and thus part of the benefits for securing a decent minimum subsistence level[337]. ALG II and SGB II have been merged under the Hartz IV law.

The standard requirements for securing subsistence include requirements for food, clothing, personal hygiene, household effects, household energy (excluding heating and hot water) and requirements for participation in social and cultural life, for a monthly amount of 404,00 EUR for adults living with a partner[338].

The minimum amount that can be claimed by a household of this type is 1.378,00 EUR whereas the maximum amount reaches 3.062,08 EUR[339]. For the minimum amount, the ALG II allocation and the child allowance have been solely considered, as a higher allowance is pre-determined depending on specific cases, further detailed. The given amounts are based on a monthly period for a household of two adults and two children.

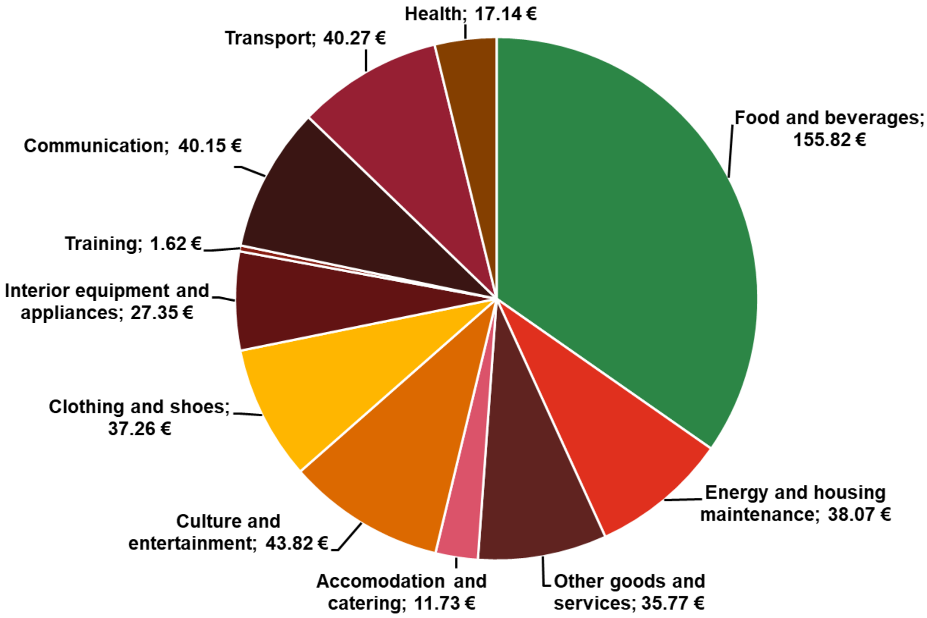
[336] (Betanet.de, 2019)

[337] Bundesministerium für Arbeit und Soziales, 2021

[338] HartzIV.org, 2022

[339] In very particular cases, this allocation can be more important but specific amounts are not defined in the German law.

Figure 100: Computation of 2022 maximum living income (449 EUR) under Hartz IV



Benefits according to the '*Sozialgesetzbuch*' (or Social Security Code) (SGB II) are paid to persons who meet the following criteria:

- have reached the age of 15 and have not yet reached the age limit pursuant to § 7a (67 years old maximum);
- are fit for work;
- are in need of help;
- have their habitual residence in the Federal Republic of Germany (eligible for benefits);
- Children who live with beneficiaries in a so-called needs-based community are also entitled to Hartz IV benefits.

Persons entitled to benefits receive the so-called standard rate ('*Regelsatz*'). The Hartz IV standard rate (or living income) is calculated based on statistically recorded data on income and expenditure from around 60.000 households. The level of the standard rate is based on the lower 20 per cent of households[340].

In addition to this basic allowance, a child allowance must be considered for our studied household. In the case of children, teenagers and young adults, needs for education and participation in social and cultural life in the community are considered separately in addition to the regular needs (§ 28 SGB II). – from 285,00 EUR up to 376,00 EUR per child, depending on their age, on a monthly basis.

[340] Bundesministerium für Arbeit und Soziales, 2021

Besides, additional financial supports can be granted under certain circumstances[341]. Still, on a monthly basis, these are specific cases where additional allowances per person are justified:

- Payment of health and long-term care insurance contributions for persons entitled to benefits which are obliged to pay insurance pursuant to § 5.1 no. 2a SGB V or § 20.1 no. 2a SGB XI (§ 251.4 SGB V, § 59.1 SGB XI) – max: 160,00 EUR[342];
- Grant towards insurance contributions for private health and long-term care insurance in accordance with § 26 SGB II – max: 384,58 EUR[343];
- Disabled people: Disabled persons who are able to work and who receive benefits for participation in working life, benefits for school and training within the framework of integration assistance according to SGB XII or other assistance to obtain a job are entitled to an additional requirement of 35 % of the standard requirement (148,40 EUR, § 21 para. 4 SGB II). Disabled children are not entitled to the additional requirement, disabled persons with reduced earning capacity are only entitled to it within the framework of education (§ 23 point 2 SGB II). – max: 156,10 EUR[344];
- Decentralised hot water supply: If the energy required to produce hot water is not already included in the heating costs because the hot water is produced separately from the heating by devices installed in the accommodation (e.g. instantaneous water heaters), an additional requirement is initially recognised in accordance with § 21 Para. 7 SGB II, the amount of which is between 0,8 and 2,3% of the standard requirement, unless there is a different requirement in the individual case or part of the reasonable hot water requirement is recognised in accordance with § 22 Para. 1 SGB II. – max: 10,26 EUR[345];
- Individual cases: In the case of persons entitled to benefits, additional needs are recognised if in the individual case there is an irrefutable, ongoing, not just one-off special need (§ 21 para. 6 SGB II). The additional need is irrefutable if it is not covered by the contributions of third parties and considering the potential savings of the beneficiaries and its amount deviates considerably from an average need. E.g. Care products for neurodermatitis, hygiene products for HIV infection; cleaning and household help for wheelchair users, costs of exercising rights of access, etc. – min: 40,10 EUR[346].

[341] Further financial support mechanisms exist but could not be quantified as this is discretionary depending on one's conditions: One-off benefits for initial equipment for the dwelling including household appliance, costly nutrition or supplementary loans for instance.

[342] https://www.lohn-info.de/krankenversicherung_freiwillig.html

[343] https://www.arbeitsagentur.de/datei/merkblatt-zuschusskvpv_ba01540

[344] https://www.hartziv.org/mehrbedarf/behinderte.html

[345] https://www.hartziv.org/mehrbedarf/warmwasser.html

[346] https://www.hartziv.org/mehrbedarf/haertefaelle.html

France

Social measures

France implemented social measures to help households considered in "energy poverty" ("précarité énergétique"). To be considered as vulnerable, a household or person must face "difficulties in obtaining the supply of energy necessary to meet his or her basic needs in his or her home because of inadequate resources or housing conditions"[347]. Objectively speaking, three criteria are defined to measure energy poverty:

1. Energy effort rate ("Taux d'effort énergétique (TEE)"):
    a. More than 10% of income is spent on energy;
    b. Households are part of the poorest 30% of the French population (first 3 income deciles).
2. Low income, high expenses indicator ("Indicateur bas revenus, dépenses élevées"): the household is considered in the situation of "energy poverty" if they have:
    a. An income below the poverty line or 60% of national median income;
    b. Energy expenditures, compared to their housing size (m²) or family composition, are higher than national median energy expenditures.
3. Feeling of discomfort: a subjective indicator that assesses people's feelings towards thermal (dis)comfort and economic vulnerability.

To counter energy poverty, France replaced social tariffs with an energy voucher ("chèque énergie") in 2018. This energy voucher is a direct financial help that households are to use to pay for their energy bills, regardless of their heating means (electricity, natural gas, fuel, wood, etc.). The amount perceived depends on the level of income and the composition of the household. Any household whose Reference Tax Income (RTI) is below 10.800,00 EUR per consumption unit[348] (CU) is automatically granted this energy voucher. The table below depicts the amount perceived in 2022.

In addition, France also granted a one-off payment of 100€/year to those households entitled to receive the energy voucher in 2022. This measure has been taken to limit the increase in cost of the energy bill for French households given the current volatility on the energy market.

Table 129: France energy vouchers amounts

Energy Voucher 2022				
Consumption Unit (CU)	**RTI < 5.600 EUR/CU**	**RTI between 5.600 and 6.700 EUR/CU**	**RTI between 6.700 and 7.700 EUR/CU**	**RTI between 7.700 and 10.700 EUR/CU**
1	194 EUR	146 EUR	98 EUR	48 EUR
Between 1 and 2	240 EUR	176 EUR	113 EUR	63 EUR
≥ 2	277 EUR	202 EUR	126 EUR	76 EUR

Given the variable potential value of this measure and the limited economic and private information on our residential profile, we use a range from the minimum value (48 EUR) to the maximum value (277 EUR)[349].

In France there is also a fund that helps people regarding different housing costs aspects. This help can take many forms, e.g. payment of first rent, payment of the costs regarding the opening of meters (gas, electricity, water), etcetera. However, this help is not quantified and is thus not considered for the computation of social measures.

[347] (Ministère de la Transition écologique et solidaire, 2020)

[348] Consumption units are computed as follows:

1 CU = first person of household

0,5 CU = second person of household

0,3 CU = other dependants of household

[349] Where we assume a family composed of 2 adults and 2 children (CU= 1+0,5+0,3+0,3=2,1).

Disposable income and living wage

The ***gross adjusted disposable income corrected for PPP*** for France was 25.991,00 EUR in 2020. Furthermore, we deduct housing costs that are deemed to be 17,50% of France's disposable income. Therefore, we estimate a corrected gross disposable income of 21.442,58 EUR.

France implemented a living income, called "Revenu de Solidarité Active" (RSA) since 2009, which targets low-income people. To benefit from this allowance, one must respect several conditions that are listed hereafter:

- Be over 25 years old or of 18 if the applicant has a dependent or unborn child or if he can prove 2 years of full-time equivalent professional activity in the last 3 years;
- No age requirement exists for people who are responsible for the care of one or more children (or unborn children);
- Permanent residence in France. Stays outside France must not exceed 3 months;
- For European Union nationals: a valid residence permit is required;
- For people of foreign nationality, the applicant must have been legally resident in France for at least 5 years;
- The average monthly income for the 3 months preceding the application of the entire household must be less than the amount of the RSA corresponding to the composition of the family;
- Entitlement to other aid (e.g. specific solidarity allowance) must have been claimed as a matter of priority.

Similarly to Belgium and Germany, the amount provided varies according to the person's conditions (e.g. isolated or not). Again, this amount increases with the number of children that we assumed to be limited to two, which means an RSA reaching 1.187,21 EUR/month. In addition, France also grants child allowances[350] to all households with a minimum of two children, which according to one's situation can rise from 132,74 EUR/month[351] to 2.519,65 EUR/month[352].

In France, we thus present a living wage ranging from a maximum monthly amount of 3.706,86 EUR to a minimum monthly amount of 1.319,95 EUR.

[350] (Centre des liaisons européennes et internationales de sécurité sociale, 2020)

[351] Only allowances perceived would be the basic family allowance for two children.

[352] This amount is computed as follows : basic family allowances (132,74 EUR/month for two children), an additional complement for children above 14 years old (66,37 EUR/month for the second child), education allowance for the disabled child (up to 1.126,41 EUR/month depending on disability severity) and the return to school allowance for children from 15 to 18 years old (406,31 EUR/year per child).

The Netherlands

Social measures

In the Netherlands, a temporary reduction on the VAT rate for electricity and natural gas has been agreed for six months (July-December 2022). This reduction is valid to all households, thus applying also to low income ones. Moreover, at the end of 2021 the Dutch government also introduced a one-off allowance to low-income households of 800€ per year on the energy bill[353].These measures have been taken to absorb the increase of the commodity price observed in the beginning of 2022.

In addition, as already introduced in chapter 4 (p.105) from this study, a reduction of the energy tax (681,63 EUR for 2022), for each electricity connection, has been considered when assessing the costs of our profile E-RES notably. If the yearly energy tax is inferior to the reduction, the surplus is deducted from the remainder of the electricity bill only. While this tax reduction lowers the final bill, this does not constitute a social measure.

Disposable income and living wage

According to Eurostat, the Netherlands' ***gross adjusted disposable income corrected for PPP*** reached 26.838,00 EUR for 2020. With a 22,30% share of disposable income for housing costs, the Netherlands has a corrected gross disposable income of 20.853,13 EUR.

Additionally, several financial support incomes exist for low-income people designed to address different basic needs. In this regard, four support incomes are here-below presented:

1. **Housing allowance ("*huurtoeslag*")**[354]: allowance granted to low-income people to help them pay for their rent. To be granted this allowance, the following criteria must be met:
    a. Rent is below 752,33 EUR (for people >23 years old or with a child) or 442,46 EUR (for people between 18 and 23 years old);
    b. The rent is a self-contained living space;
    c. The income of the person and his partner/co-inhabitants is not too high. This limit depends on the person's rent, age and composition of the household;
    d. Assets are below 31.340,00 EUR/person;
    e. The person must live in the Netherlands, be registered at the municipality and have (or the partner/co-residents) the Dutch nationality or a valid residence permit;
    f. The person must be ≥ 18 years old;
    g. The person must have a signed tenancy agreement, pays the rent and can prove it with bank statements;
    h. Other specific situations may slightly change applying rules if the person is under 18 years old, is cared for at home, has a large household, is disabled, etc.

    Depending on one's conditions and its children's', this allowance may range from a minimum of 2,00 EUR/month to a maximum of 377,00 EUR/month.

[353] Source: https://www.government.nl/latest/news/2022/03/21/measures-to-cushion-impact-of-rising-energy-prices-and-inflation

[354] (Belastingdienst, 2020)

2. **Care allowance *("Zorgtoeslag")*[355]**: this allowance is a contribution to help support the costs of people's Dutch health insurance. To be granted this allowance, people must meet the following criteria:
   a. Be ≥ 18 years old;
   b. Have Dutch health insurance;
   c. Have an income < 31.138,00 EUR (lone person) or < 39.979,00 EUR (partners);
   d. Have the Dutch nationality or a valid residence permit;
   e. Have a maximum (combined) assets of 118.479,00 EUR (149.819,00 EUR for partners).
   f. Other specific situations may slightly change applying rules be a military, detained, foreign student, not having a fixed address, etc.

   Partners would be granted a total monthly amount of 207,00 EUR.[356]

The Dutch government introduced a social minimum ("*sociaal minimum*")[357] that represents the minimum amount a person needs to make a living. In case a person who is entitled to the above-mentioned allowances does not reach the social minimum, a supplement can be granted[358] for low-income people to make up for the social minimum. For the year 2022 the social minimum is 1.724,99 and we assume that our protected customers do not reach this minimum, and we therefore take the social minimum. There are two allowances for children that can be added on top of the minimum:

1. **Regular child allowances** ("*kinderbijslag*") that can be of minimum 230,69 (children between 0 to 5 years) or maximum 329,56 EUR[359] (children aged between 12 to 17 years old) per child and per quarter[360]. In case of disability and the need for serious care, this allowance can be doubled, reaching a maximum amount of 659,12 EUR/month per child and per quarter.
2. **Child budget allowance *("kindgebonden budget")***: people having children benefit from this allowance under the same conditions applying for the care allowance and have 1 or more children under the age of 18. For a two-parents and two-children household, a minimum of 183,00 EUR/month to a maximum amount of 262,00 EUR/month can be reached if regular child allowances ("*kinderbijslag*") are granted.

We thus consider a living wage ranging from a minimum of 2.061,78 EUR/month to a maximum of 2.426,40 EUR/month.

[355] (Belastingdienst, 2021)
[356] This figure comes from the potential amount of 199 EUR/month per couple divided by 2.
[357] (Rijksoverheid, 2020)
[358] Toeslagenwet.
[359] https://www.svb.nl/nl/kinderbijslag/nieuws/kinderbijslag-1-januari-2021-gaat-omhoog
[360] (Sociale Verzekeringsbank, 2020)

The United Kingdom

Social measures

In the UK, in 2018, 2,40 million households (or 10,93 of the total population)[361] are considered to be energy poor, which happens when[362]:

- Energy costs are above average (> national median level)[363];
- If that amount was to be spent, households would be left with a residual income[364] below the official poverty line, which is of 60% of national median income.

To further delimit energy poverty, the UK also considers the average energy poverty gap, defined as the reduction in the energy bill that the average energy-poor household needs to not be classified as energy poor[365]. This amounted to 334 GBP in 2018.

Several measures exist in the UK to support households in a situation of energy poverty. The table below lists the existing measures.

Table 130: UK social measures

UK Social Measures		
Measures	**Explanation**	**Eligibility criteria/Conditions of application**
Warm Home Discount Scheme	Direct financial support to a lower energy bill. It was introduced to replace social tariffs in 2011. While some people are automatically granted this help, others must apply.	Mainly two groups of people are concerned by this measure that grants a 140 GBP rebate on energy bills: ● Core group: low-income pensioners that receive a Guarantee Credit via the Pension Credit[366], i.e.: ○ People have reached State Pension age (66 or 67 depending on birth date); ○ People over State Pension age are getting Universal Credit (help to pay for living costs[367]). ● Broad group households at risk of energy poverty. Five cases determine a person/household's belonging to the broad group[368]: 1. People receiving Income Support; 2. People receiving an Income-related Employment and Support Allowance; 3. People receiving an Income-based Jobseeker's Allowance; 4. People receiving child tax credit based on an annual income not exceeding 16.190 GBP. For these first four cases, in addition to allowances mentioned, people/households must either: - have parental responsibility for a child under the age of 5 who ordinarily resides with the people/household;

[361] (Department for Business, Energy & Industrial Strategy, 2019)

[362] This definition was introduced in 2013 and is in application in England. Officially, remaining countries part of the UK (Northern Ireland, Scotland and Wales) still use the old definition where a household is living in energy poverty if, to heat their home to a satisfactory standard, they spend more than 10% of their household income on fuel.

[363] Costs required to have a warm, well-lit home, with hot water and the running of appliances. An equivalisation factor is applied to reflect that households require different levels of energy depending on who lives in the property. This term encompasses various energy goods (e.g. natural gas).

[364] Residual income is defined as equivalised income after housing costs, tax and National Insurance. Equivalisation reflects that households have different spending requirements depending on who lives in the property.

[365] (Department for Business, Energy & Industrial Strategy, 2020)

[366] (UK Government, 2020)

[367] (UK Government, 2020)

[368] (OFGEM, 2018)

		- Or receive any one of the following:
		  - Child tax credit which includes a disability or severe disability element;
		  - A disabled child premium;
		  - A disability premium enhanced disability premium or severe disability premium;
		  - A pensioner premium, higher pensioner premium or enhanced pensioner premium.
		5. People are receiving Universal Credit or having earned income between zero and 1.349 GBP in at least one of the relevant assessment periods, a rolling one-month period. Besides, the person must meet one of the three following conditions:
		- Have limited capability for work and/or work-related activity;
		- Be in receipt of the disabled child element;
		- Have parental responsibility for a child under the age of 5 who ordinarily resides with the person.

Winter Fuel Payment	Direct financial support to lower energy bill aiming elderly people.	One-off payment of 100 to 300 GBP to reduce heating bills for people meeting both following conditions: ● Being born on or before 5 April 1954; ● Having lived in the UK at least one day during the "qualifying week" (16 to 22 September 2019). In case the person did not live in the UK for the qualifying week, the person must have lived in Switzerland or a European Economic Area (EEA) country and have a genuine and enough link to the UK (work, facility, etc.) to qualify for this payment. Considering the potential variable amount, which depends on the age, household composition and living situation (private or care home) we present a range from a minimum of 100 GBP to a maximum of 300 GBP[369].
The Cold Weather Payment	Direct financial support to lower energy bill only offered during periods of extremely cold weather.	Payments of 25 GBP/week when the temperature drops below 0°C between 1 November and 31 March. To qualify, households must be getting one of the following allowances: ● Pension Credit, ● Income Support, ● Income-based Jobseeker's Allowance, ● Income-related Employment and Support Allowance, ● Universal Credit, ● Support for Mortgage Interest. For all above-listed allowances, people/households must also meet the conditions listed for the Warm Home Discount Scheme. Considering the potential variable amount, we present a range from a minimum of 0 GBP (no days with temperature <0°C) to a maximum amount of 525 GBP (for 2019-2020, 21 full weeks with temperature <0°C).

[369] (Government, 2020)

Disposable income and living wage

The ***gross adjusted disposable income corrected for PPP*** for the UK amounted for 24.508,00 EUR in 2019[370]. Besides, housing costs that were 25,10% of the UK's disposable income are deducted. Consequently, we assess a corrected gross disposable income of 18.356,49 EUR.

The UK provides a living wage ("Universal Credit")[371] to help low-income people cover their living costs. To be entitled to this allowance, people must respect all below-listed criteria[372]:

- Have either no income or a low income, with a maximum of 16.000,00 GBP in savings;
- Not being in full-time paid work (<16 hours a week, and, if any, a partner working <24 hours a week);
- Not being eligible for Jobseeker's Allowance or Employment and Support Allowance;
- Living in England, Scotland or Wales;
- Be between 16 and legal pension age, and at least one of the following:
    - Pregnant;
    - A lone parent (including a lone adoptive parent) with a child under 5;
    - A lone foster parent with a child under 16;
    - A single person looking after a child under 16 before they're adopted;
    - A carer;
    - Be on maternity, paternity or parental leave;
    - Be unable to work and receiving Statutory Sick Pay, Incapacity Benefit or Severe Disablement Allowance;
    - Be in full-time education (not university), aged between 16 and 20, and a parent;
    - Be in full-time education (not university), aged between 16 and 20, and not living with a parent or someone acting as a parent;
    - Be a refugee learning English;
    - Be in custody or due to attend court or a tribunal.

The universal credit ranges from 416,45 GBP/month for couples below 25 to 525,72 GBP/month for couples 25 or over[373]. Besides, (severe) disability premiums can be added on top of the income support if the person, under the legal retirement age, is either blind or recognised as disabled. This can amount up to 354,28 GBP/month if one of the parents is eligible for the disability premium[374].

Based on the person's situation with regards to the status (single, lone parent or living with a partner) and the age, the living wage changes. Furthermore, child benefits[375] are granted to UK's households with, for a two-children household, a maximum of 36,25 GBP/week[376]. In case children are recognised as disabled, they can benefit from an additional allowance (Disability Living Allowance) of up to 151,40 GBP/week[377].

As a result, we make use of a living wage ranging from a minimum monthly amount of 548,93 GBP (or 657,40 EUR) to a maximum monthly amount of 1.543,85 GBP (or 1.848,91 EUR) for a two-parents and two-children household.

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370 In the 2020 report from the Eurostat the data from the UK is not available, thus taking the values from 2019

371 https://www.gov.uk/universal-credit/eligibility

372 (UK Government, 2020)

373 https://www.gov.uk/universal-credit/what-youll-get

374 https://www.gov.uk/universal-credit/what-youll-get

375 Computed as the sum of the two child benefit rates: 21,80 and 14,45 GBP/week respectively for the first and second child. (UK Government, 2022)

376 Computed as 21,15 GBP for the first child and 13,95 GBP for second child

377 Computed as the sum of the highest rates of the care (92,40 GBP/week) and mobility components (64,50 GBP/week). (UK Government, 2022) https://www.gov.uk/disability-living-allowance-children/rates

Energy effort rates comparison

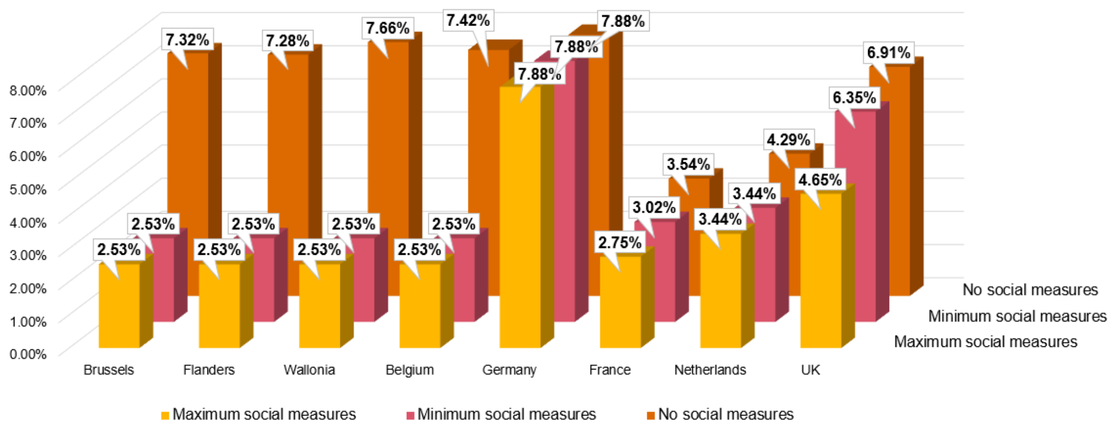
Based on the above-mentioned information, we present six charts designed to compare effort rates of residential consumers to pay for their energy bills. The energy effort rate can be understood as “the share of total energy expenditure in the household's disposable income” (ONPE, 2020). The higher this share is, the more effort one makes to pay for the energy and the less can be spent on other goods and services.

The first two charts (Figure 101 and Figure 102) look closer at the weight of electricity and natural gas bills in a household’s disposable income. The following two charts (Figure 103 and Figure 104) analyse the same effort rates in comparison with the maximum living income whereas the last two charts (Figure 105 and Figure 106) observe these effort rates in relation with the minimum living income. The rates, changing depending on the implementation (or not) of social measures and the level of interventions, are compared across countries.

Countries and regions’ effort rates compared to disposable income

As previously mentioned, disposable income reflects the purchasing power of households and their ability to invest in goods and services or save for the future, by accounting for taxes and social contributions and monetary, in-kind social benefits. In this case, the share of housing costs was retrieved for disposable income.[378]

Figure 101: Electricity effort rate compared to disposable income



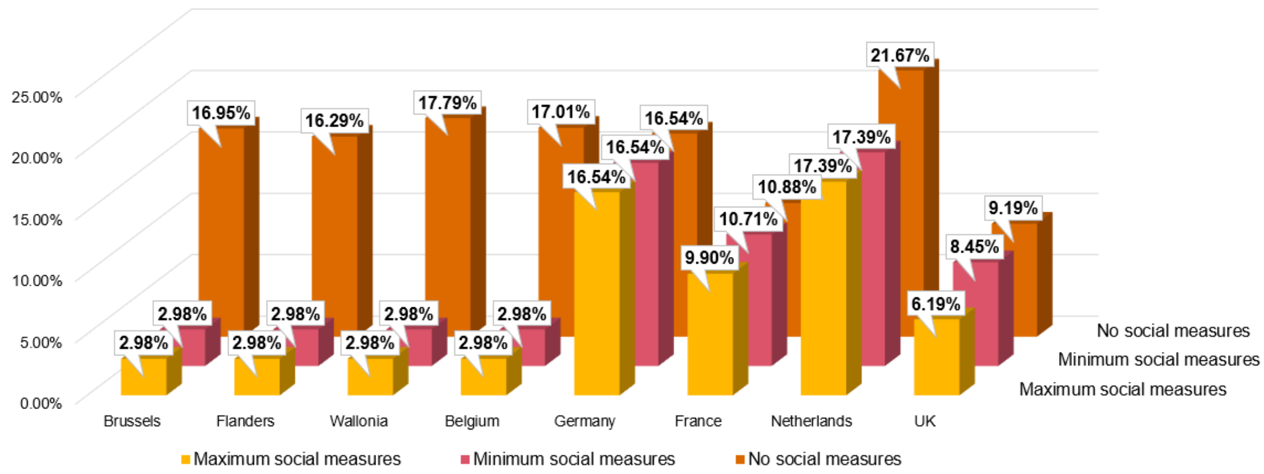
Germany has the highest effort rate of all regions/countries under review when social measures are applied, while all Belgian regions are the highest ones when there are no social measures. It is important to note that no specific quantifiable social measures, aiming at reducing electricity and/or natural gas bills could be considered for Germany. Flanders is the Belgian region with the lowest effort rate (7,28 %) and Wallonia with the highest (7,66 %). It is important to note that these values increased significantly compared to last year, because of the large differences we have this year between the commodity market prices for electricity and natural gas compared to the social tariffs. Last year the average effort rate for all the regions under review was 4,15 %, while this year, it represents 6,41 %.

When social measures enter into action, the positioning of the regions/countries changes and in particular for the Belgian regions. If we disregard Germany and take the minimum social measures into account, the UK shows the highest effort rate followed by the Netherlands and France. This ranking is also valid when maximum social measures are considered. In both cases the Belgian regions show a lower effort rate than every country under review. There is a significant difference between the effort rate of the UK and Belgium when the maximum social measures are considered, namely 2,17%.

As a whole, Belgian households face the lowest electricity effort rate when social tariff applies.

[378] This comparison must be nuanced since most consumers that have the possibility to benefit from social measures will, in most cases, have below average disposable income.

Figure 102: Natural gas effort rate compared to disposable income



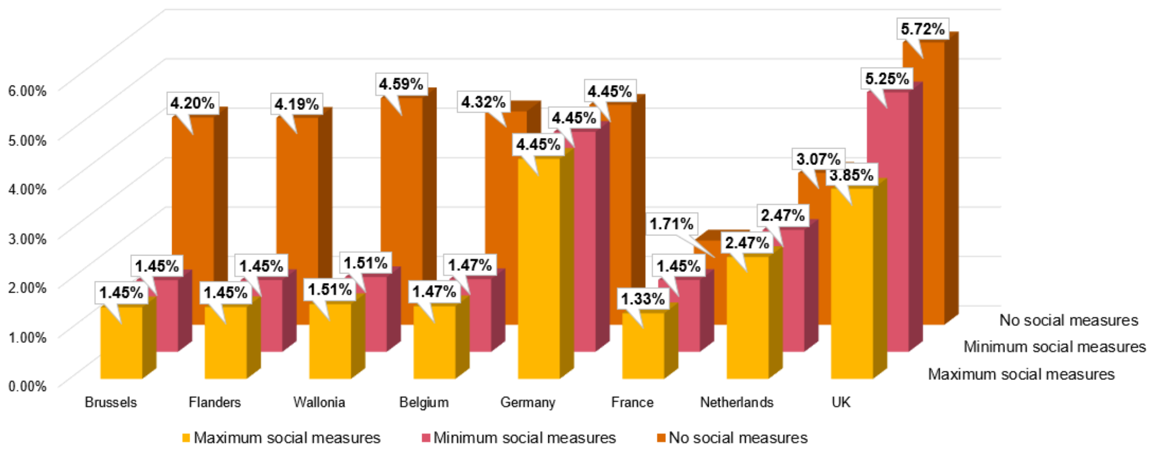
When comparing the natural gas effort rate with the electricity effort rate we do observe that this is much higher for natural gas consumers. There are a few observations to be made, firstly the regional differences in Belgium are similar than the ones observed for electricity. The Netherlands has the highest effort rate both when no social measures are considered and when they are considered. The Netherlands is also the country with the highest total invoice for G-RES. Wallonia has the second highest effort rate when social measures are not considered, followed by Brussels and Flanders. Lastly, like the effort rate for electricity we see a significant drop in effort rate when taking the social measures into account in the Belgian regions, making Belgium the country with the lowest effort rate in this category. Similarly to the conclusions drawn from the electricity bill, also for the gas bill we observe a drastic increase in effort rates when no social measures are applied between last year and 2022. For example, in Belgium the effort rate for the gas bill was 5,96% in 2021 when no social measures were applied, while it increased to 17,01 % this year. This is mainly explained by the huge increase in the commodity component.

Differently from previous years, the Belgian household consuming 3.500 kWh of electricity and 23.260 kWh of natural gas makes a relatively high effort to pay its bill compared to a similar household in foreign countries studied, except when social measures are applied. In fact, when no social measures are considered, in 2021, Belgium had the second lowest natural gas effort rate among the countries studied. This year, Belgium has the second largest rate behind the Netherlands. When maximum social measures are applied the effort rates in Belgium drastically decrease from 7 % for electricity and 17 % for gas, respectively to 2,5% and 3 %, going down from one of the most demanding countries to the least demanding.

Countries and regions' effort rates compared to a maximum living income

In this study, the maximum living income is considered as the potential maximum income one may be granted through allowances providing that several conditions are met (e.g. low-income household, children).

Figure 103: Electricity effort rate compared to a maximum living income

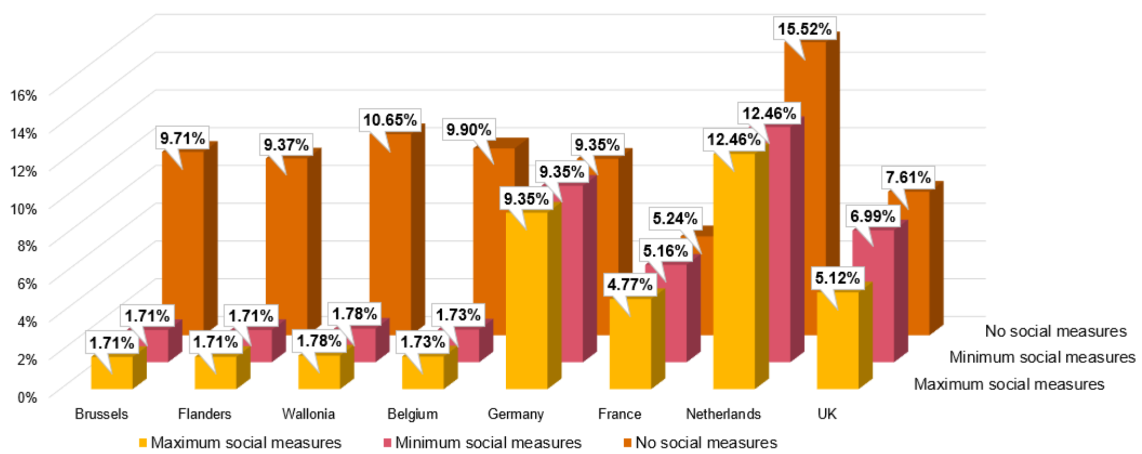


The figure above shows the effort rate of all the regions/countries under review compared to the living income that is granted. The height of the living income depends on different factors like health, family and financial situation. While there are some effort rate differences compared to Figure 101: Electricity effort rate compared to disposable income the positioning of the regions/countries remains similar, except for the UK that now shows the highest effort rate when no social measures are applied, followed by Germany and then Belgium. In Belgium, Wallonia still has the highest effort rate and is in second position overall after the UK. We do see that the effort rates of the UK and Germany are higher than Flanders when comparing to the maximum living income which was not the case when comparing to disposable income.

The UK has the highest effort rate when we take minimum social measures or no social measures into account, while Germany overcomes the UK and has the highest one when maximum social measures are considered. The effort rate in Germany and the Netherlands do not change depending on whether maximum or minimum social measures are considered.

Taking the social measures into account means a significant drop in the effort rate of the Belgian regions, with an important impact on their competitive position. In fact, similarly to what we observed with the disposable income, Belgium faces among the highest effort rates when no social measures are applied, while it has the second lowest ones after France with minimum or maximum social measures. This is again explained by the difference we observe in 2022 between the social tariff and the market prices in all Belgian regions.

Figure 104: Natural gas effort rate compared to a maximum living income



Again, we do see a big change between the electricity and natural gas effort rates when compared to the living income. The Netherlands has now the highest effort rate for the gas bill, whether social measures are applied or not being almost 5 times the one observed for the electricity bill. The 2nd highest effort rate is observed in Belgium and it is approximately 6% lower than the Netherlands. It is interesting to note that the Netherlands has the highest natural gas total invoice (for G-RES) and also the highest effort rate.

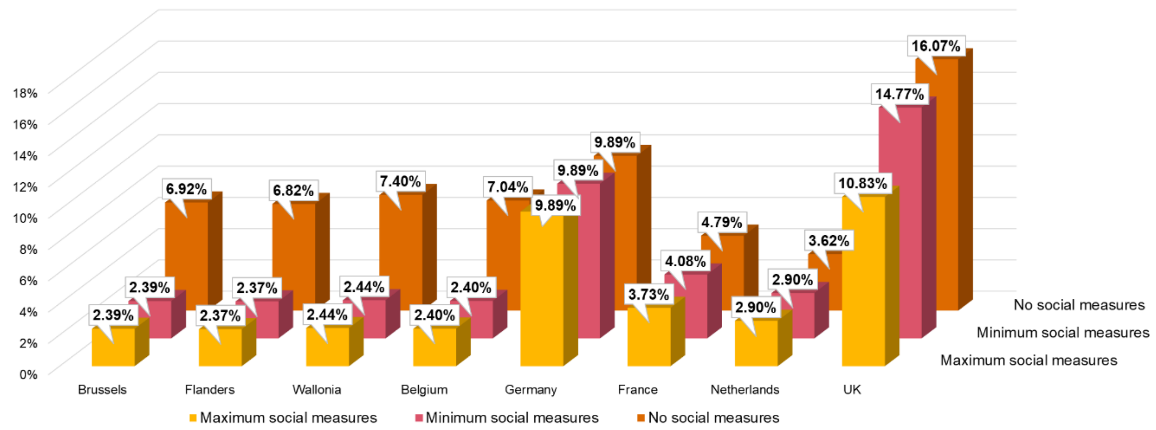
We do observe one other big change and that is the fact that while the UK was the country with the lowest effort rate when no social measures are considered (Figure 102) this is no longer the case. In fact, France has the lowest rate (5,24%) when there are no social measures. All the Belgian regions have a lower effort rate than the other countries under review when taking the maximum social measures into consideration. Wallonia is still the Belgian region with the highest effort rate.

Taking Belgium as a whole (average of the three regions), Belgium comes as the second most demanding country for gas and electricity when no social measure applies. On the other hand, once social measures are granted, Belgium has the lowest effort rates for both electricity and gas when the maximum living income is considered.

Countries and regions' effort rates compared to a minimum living income

In this study, the minimum living income is considered as the basic income one may be granted through allowances depending on one's conditions (e.g. low-income household, children).

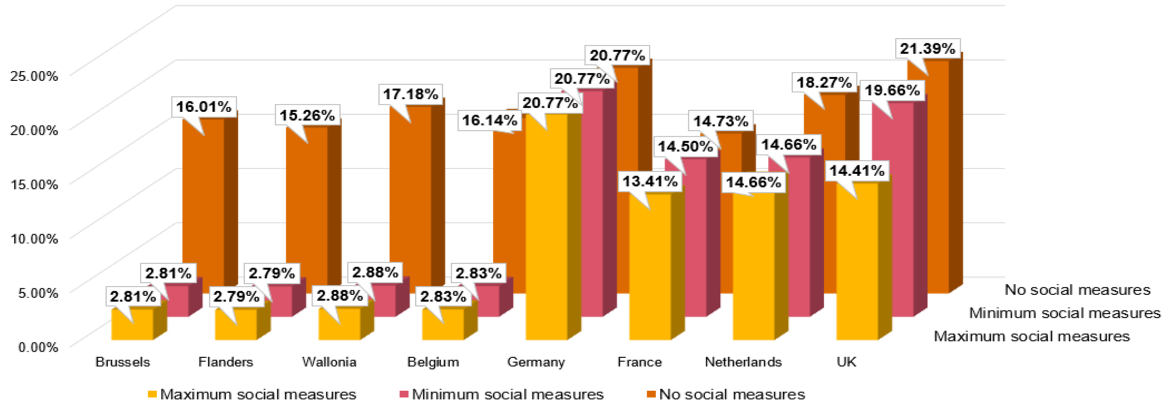
Figure 105: Electricity effort rate compared to a minimum living income



When comparing the effort made by governments to the minimum living income, we observe a few changes compared to the comparison with the disposable income and the maximum living income. While Belgium was the country with the highest or second highest effort rate for electricity this is no longer the case. The UK now displays the highest effort rate when taking no or the minimum social measures into account. Similar as before in the UK the highest effort rate is observed when the maximum social measures are considered. The Netherlands displays the lowest effort rate when there are no social measures, while the Belgian regions have again the lowest rates when the social measures are considered.

On the Belgian level we do see a high effort rate compared to last year (7,04 % compared to 3,87 % last year), but the country's position is better than when comparing the disposable income and maximum living income. While Belgium had the highest effort rates compared to the other countries, when no social measures were considered, this is not the case when comparing to the minimum living income, being behind the UK and Germany.

Figure 106: Natural gas effort rate compared to a minimum living income



Like the previous analyses we observe that the effort rate is higher for gas than for electricity. The UK again displays the highest effort rate, followed by Germany and the Netherlands. Contrary to what we observed in Figure 105 the effort rates of Germany, France and the Netherlands are much closer to each other. The lower effort rate in Belgium is very apparent when social measures are considered. Important to note is that the UK is also the country that displays the lowest total invoice for G-RES.

Conclusions

Energy poverty is defined differently across countries. Nonetheless, most countries do provide financial support and/or social measures aimed at attenuating the bill for consumers having difficulties in supporting energy costs. From our analysis, it appears that the position of Belgium seems better than other countries under review only when social measures are considered. On the contrary, when no social measures are applied, Belgian regions have among the highest effort rates for both electricity and gas. This is valid for all the levels of income considered for this analysis. However, there is an evolution depending on which kind of income is analysed: Belgium scores better effort rates for the minimum living income than for the disposable income.

An important difference to note for all countries/regions, is the increase of the effort rates in 2022 compared to 2021. This can be explained by the large increase of commodity prices. Furthermore, it is worth mentioning that Belgium generally has a better position in comparison to the other countries in this study regarding the applied social measures, in particular when we look at the disposable income. From our analysis it could be deducted that Belgian social measures (such as the extension of the temporary category of beneficiaries from the social tariff in 2022, the temporary reduction of VAT rates and one-off payments) have better outcomes against rising energy prices than the other countries of this study.

The governmental intervention through the granting of a living income and social measures aimed at reducing one’s energy expenses have a significant impact on lowering the financial burden for households. As Belgium displays one of the highest living incomes between the countries analysed, it directly helps dilute the efforts made to pay for energy. Besides, the existing and extended social tariff further supports vulnerable households as this significantly reduces their energy expenses. When looking at the effort rate for electricity in 2022 compared to disposable income, Belgium, Germany and the UK tend to have the highest effort rates when no social measures are applied. When looking at the results with the application of social measures, Germany and UK are still the countries with the highest effort rates. This might be the result of the absence or limited quantifiable direct financial support for energy costs in these two countries. On the other hand, we observed that the measures taken by the Belgian government are effective in reducing the pressure on the lower income households when it comes to the electricity bills. We observe higher effort rates for natural gas, and it is often the Netherlands that has the highest rate. This must be nuanced because the Netherlands also has the highest total invoice for our natural gas household consumer.

Within Belgium and considering both living incomes, a tendency can be highlighted as Flanders and Brussels tend to display lower effort rates than Wallonia for both electricity and gas. The effort rates of the three Belgian regions tend to converge once social measures are considered, for both electricity and gas.

Limitations of the analysis

This analysis has potential limitations that are outlined here. The study scope covers the comparison of households' energy effort rates depending on their income. Various scenarios were designed to take different incomes into account. Firstly employed, the disposable income constitutes a European macro-economic data measured uniformly across European countries. However, it is measured at a national level, preventing regional differences in disposable incomes. Then, minimum and maximum living incomes were estimated for each country. If a clear direction was given by considering all basic incomes and potential allowances for a two-adults and two-children household, no common measure exists between the countries and regions under study. This entails increasing comparison difficulties. Moreover, it was preferred to opt for a broad understanding of minimum and maximum living income by including potentially "extreme" cases (e.g. highest level of child disability). If this ensures a higher income range, it may not always be highly representative of a country or region's situation as few families might be concerned by all the measures in effect simultaneously. Lastly, we must note that when comparing to the living income the "no social measures apply" situation is purely theoretical since these consumers will always benefit from the social tariff in Belgium.

At the reading of this analysis' conclusions, one must bear in mind the limitations mentioned here before. In this regard, complementary research must be conducted to consolidate the results obtained. As such, conducting similar research based on the first deciles of the average household income from the E-SILC study could offer a harmonised measure to derive households' lower incomes. Besides, considering the number of households impacted by each governmental intervention would be necessary. We notably refer to studies from the CEER[379] to do so.

[379] (CEER, 2019)

9. Competitiveness of the Belgian industry in terms of energy and recommendations

9. Competitiveness of the Belgian industry in terms of energy and recommendations

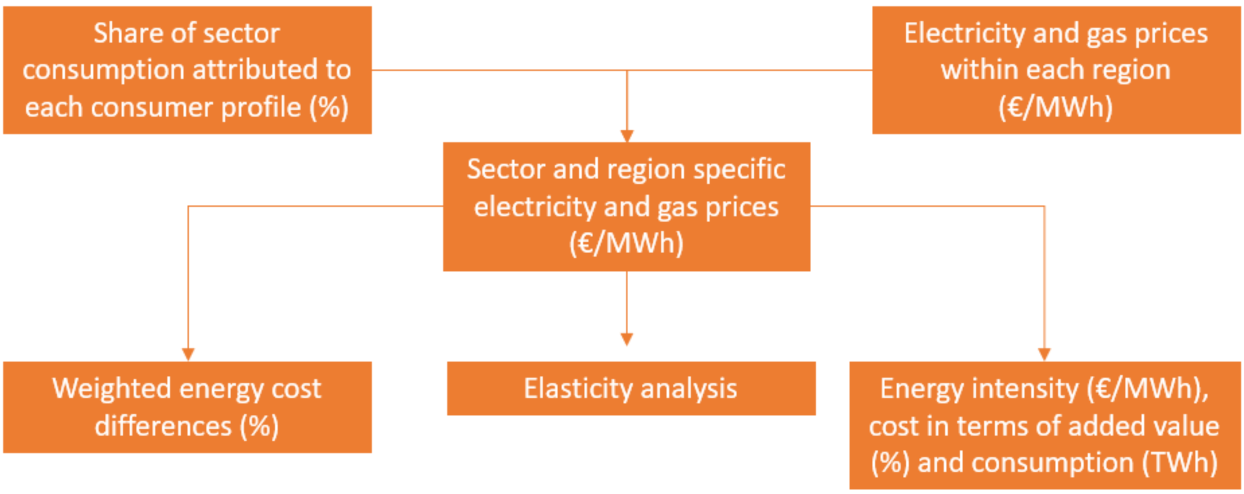
Competitiveness analysis

Methodology

In the 2020 report, the five most prominent industrial sectors in Belgium, in the framework of an energy price comparison, were selected: the chemical (NACE 20), the pharmaceutical (NACE 21), the basic metal (NACE 24), food & beverages (NACE 10-12) and the coke and petroleum products (NACE 23) industries[380]. In the previous chapters of this report, the gas and electricity prices were compared with those of Belgium's neighbouring countries: Germany, France, the Netherlands, and the United Kingdom.

In this chapter, the information gathered in previous parts is combined to analyse the competitiveness of the five most important sectors in Belgium and its regions. The reasoning behind the analysis is detailed in the following figure.

Figure 107: Methodology flowchart



As shown in the figure above, first, the electricity and natural gas prices in Flanders, Wallonia and Brussels are combined with the distribution of the different consumer profiles over the CREG data over the five most important sectors, resulting in sector- and region-specific electricity and natural gas prices. Then, these prices are used to calculate two important variables, through two separate pathways. The first pathway computes a weighted energy cost difference, which combines electricity and natural gas prices in one single measure that makes it possible to compare energy prices of a certain sector (within a certain region) with that of the European average, while the second pathway elaborates on the energy intensity, which expresses the energy cost of a certain sector and region in terms of added value.

This chapter is structured around this flow chart, which is further elaborated and detailed in the following sections.

[380] In this section, we will use this order to present the results, accordingly to the importance order of the mentioned sectors.

Sector- and region-specific electricity and natural gas prices

In the previous chapters, the electricity and natural gas prices for the Belgian three regions were collected. Since the aim of this chapter is to analyse the competitiveness of these prices for the five most important sectors, it is necessary to define a method which uses these regional prices and expresses them at the sectoral level. That is done by combining the regional electricity and natural gas prices with the breakdown of consumer profiles by sector. They are based on data provided by the CREG[381] and show how the consumer profiles are broken down by sector[382], which consumer profile is the most predominant within each sector and therefore has the greatest impact on electricity and natural gas prices for that sector.

The relative frequency of each consumer profile per sector (obtained by multiplying the absolute number of profiles by the consumption of each profile[383] [384] and dividing it by the total consumption per sector) is presented in the tables below. As it can be seen in the following table, E4 is the predominant profile in the food and beverages sector (NACE 10-12) and in the manufacture of chemicals (NACE 20), while it is E3 for the petroleum products (NACE 19), pharmaceuticals (NACE 21) and basic metals (NACE 24) sectors. The prices of these predominant consumer profiles have the largest effect on electricity prices for each of the first five sectors in each region. Table 132 shows that in all sectors, the G2 profile is predominant in the chemicals (NACE 20), the pharmaceuticals (NACE 21) and the basic metals (NACE 24) sectors, while G1 profile is preponderant for the food and beverages (NACE 10-12) and the petroleum products (NACE 19).

[381] The calculations were made based on the same data as in the 2021 report.

[382] To identify the proportion of E0 companies, we used a specific methodology. The "Tableau de bord des PME et des entrepreneurs indépendants 2019" states that SMEs represent 99,8% of the total companies (619.414) in Belgium. Thanks to this report, we extrapolated the number of big companies and thanks to the CREG data, we extrapolated the proportion of big companies in the E0 profile.

[383] The data in both tables based on billing data from the CREG for all consumers with an offtake of more than 2 GWh of electricity or 1,25 GWh of natural gas per year.

[384] For electricity – E0: 2GWh, E1: 10GWh, E2: 25 GWh, E3: 100GWh, E4: 500GWh; For natural gas – G0: 1,25GWh, G1: 100GWh, G2: 250 GWh

The first column, for each profile, of the table underneath refers to absolute frequencies (#), while the second column, for each profile, of the same table refers to relative frequencies weighted by consumption profiles (%).

Table 131: Distribution of electric consumer profiles per sector

Code NACE - Sector	E0 (2-10 GWh/year)[385]		E1 (10-17,5 GWh/year)		E2 (17,5-62,5 GWh/year)		E3 (62,5 -300 GWh/year)		E4 (>300 GWh/year)	
	#	%	#	%	#	%	#	%	#	%
NACE 20 - Manufacture of chemicals and chemical products	303	9,2%	19	3,7%	29	13,6%	15	42,7%	2	30,8%
NACE 21 - Manufacture of basic pharmaceutical products and pharmaceutical preparations	47	15,2%	1	2,6%	6	25,9%	3	56,2%	0	0,0%
NACE 24 - Manufacture of basic metals	149	6,2%	8	2,1%	9	5,5%	11	36,5%	4	49,7%
NACE 10-12 - Manufacture of food products; beverages and tobacco products	481	27,5%	51	19,6 %	47	40,7%	5	12,2%	0	0,0%
NACE 19 - Manufacture of coke and refined petroleum products	42	2,8%	1	0,5%	1	2,0%	2	13,5%	5	81,2%

Source: CREG (2019), PwC Computations

Table 132: Distribution of gas consumer profiles per sector

Code NACE - Sector	G0 (2-10 GWh/year)		G1 (10-17,5 GWh/year)		G2 (17,5-62,5 GWh/year)	
	#	%	#	%	#	%
NACE 20 - Manufacture of chemicals and chemical products	219	1,9%	43	29,5%	4	68,6%
NACE 21 - Manufacture of basic pharmaceutical products and pharmaceutical preparations	56	1,7%	11	14,0%	1	84,3%
NACE 24 - Manufacture of basic metals	75	2,3%	15	36,6%	1	61,1%
NACE 10-12 - Manufacture of food products; beverages and tobacco products	714	5,5%	153	94,5%	0	0,0%
NACE 19 - Manufacture of coke and refined petroleum products	126	3,0%	26	49,5%	1	47,6%

Source: CREG (2019), PwC Computations

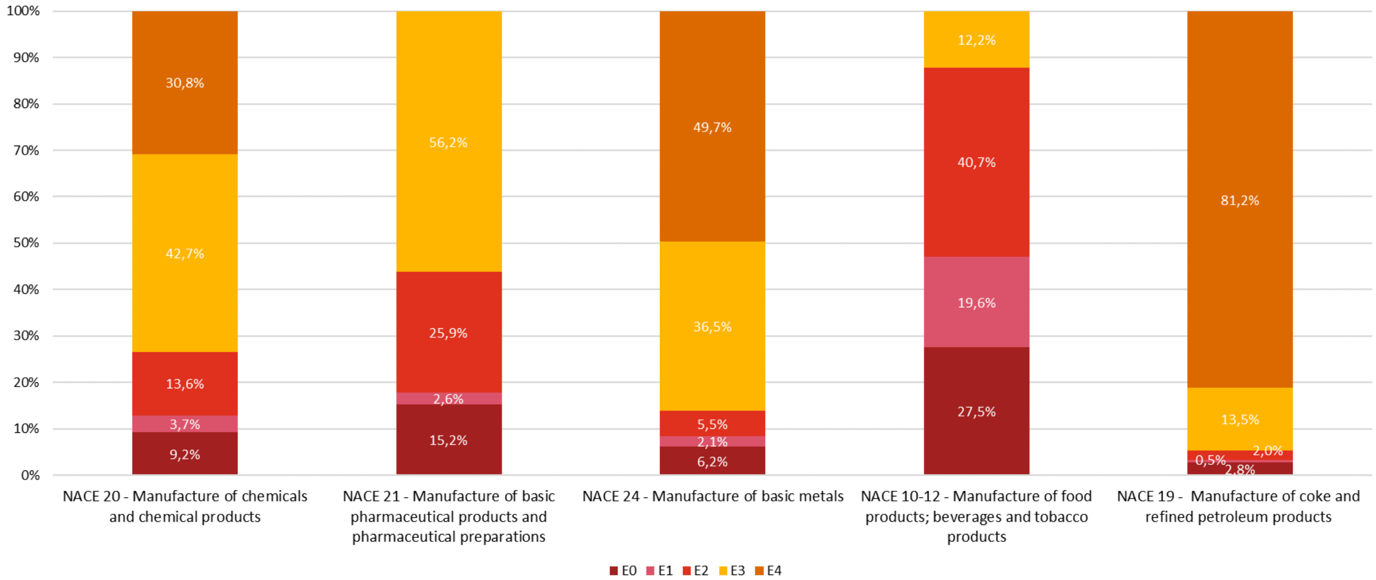
[385] The split between E0 and E1 is different from the other profiles split, due to a lack of data for companies consuming less than 10 GWh/year. We estimated the E0 number of companies and relative consumption based on the Belgian companies' landscape while the other profiles are based on data given by the CREG

As an example, the absolute frequencies for the food and beverage (NACE 10-12) sector are 481 for E0. This means that 481 consumers have a quantity of invoiced electricity like the consumption of profile E0, 51 consumers for E1, 47 consumers for E2, 5 consumers for E3 and 0 consumers for E4. Multiplying these numbers by their respective consumption and summing them, results in theoretical total electricity consumption on the sector level of 3.492 GWh. Expressed in relative frequencies, 27,5% of the total consumption is represented by profile E0, 19,6% by E1, 40,7% by E2, 12,2% by E3 and 0% by E4.

For natural gas, there are 714 consumers of profile G0, 153 for G1 and 0 for G2. Multiplying these numbers by their consumption and summing both up, results in total theoretical consumption for the sector of 16.192 GWh. This reflects a relative frequency of 5,5% for G0, 94,5% for G1 and 0% for G2.

Along with the same logic, the relative frequencies of the consumer profiles for the other sectors have been calculated and are presented again in the two following figures. As it is clear from the figure below, profile E3 is the predominant profile in most of the sectors (NACE 20, 21 and relatively predominant for NACE 24), while for the food and beverages sector (NACE 10-12) it is profile E2 and for the NACE 19 (petroleum products) it is profile E4, easily explained by the energy-intensity nature of the sector.

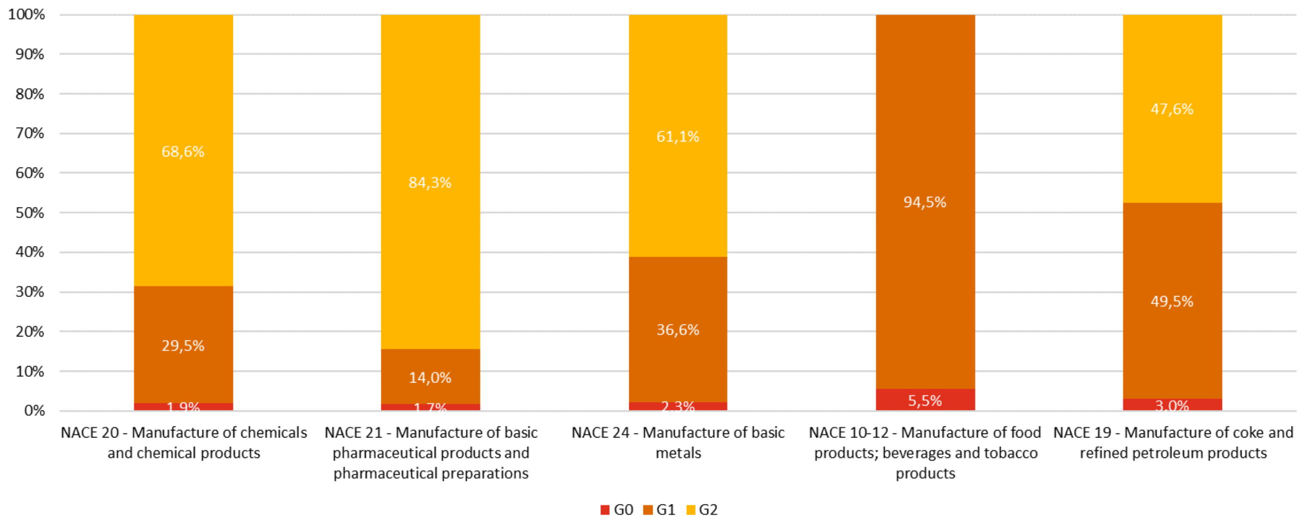
Figure 108: Share of sectoral electricity consumption attributed to each consumer profile



Source: CREG (2019), PwC Computations

From the figure below, it is observed that for half of the sectors, G2 is the profile with the highest relative frequency (NACE 20, 21 and 24). Although there are just a few G2 consumer profiles represented in the different sectors, they can have a substantial relative frequency, caused by their high volume of natural gas consumption; this is observed in the pharmaceuticals sectors where one company accounts for more than 80% of the total consumption of this sector.

Figure 109: Share of sectoral natural gas consumption attributed to each consumer profile



Source: CREG (2019), PwC Calculations

As previously stated, these relative frequencies can be used together with the electricity and natural gas prices for each region to calculate sector and region-specific electricity and natural gas prices (in EUR/MWh). This is done by summing the multiplications of the prices retrieved for each consumer profile and their relative frequencies according to the formulas below:

$$P_{elec}\ for\ Sector_i\ in\ Region_j = \sum_{X=0}^{4}(Price\ for\ E_X\ in\ Region_j * Relative\ frequency\ of\ E_X\ in\ Sector_i)$$

$$P_{gas}\ for\ Sector_i\ in\ Region_j = \sum_{X=0}^{2}(Price\ for\ G_Y\ in\ Region_j * Relative\ frequency\ of\ G_Y\ in\ Sector_i)$$

When comparing those regions and sector-specific prices to the European average[386], they can be expressed as price differences with the European average. We have calculated the average prices of electricity and natural gas in the neighbouring countries according to the following formulas[387]:

$$European\ average\ of\ P_{elec}\ for\ Sector_i = \sum_{X=0}^{4}(Average\ price\ for\ E_X\ in\ neighbouring\ countries * Relative\ frequency\ of\ E_X\ in\ Sector_i)$$

[386] The European average throughout this section refers to the average of Germany (average of the four regions for electricity in Germany), France, the Netherlands, and the United Kingdom, for both electricity and natural gas.

[387] We have used the same share of sectoral electricity and natural gas consumption attributed to each consumer profile to calculate the average price of electricity and natural gas in the neighbouring countries. This way we assume that the different consumer profiles are equally distributed in the sectors under scope of the neighbouring countries.

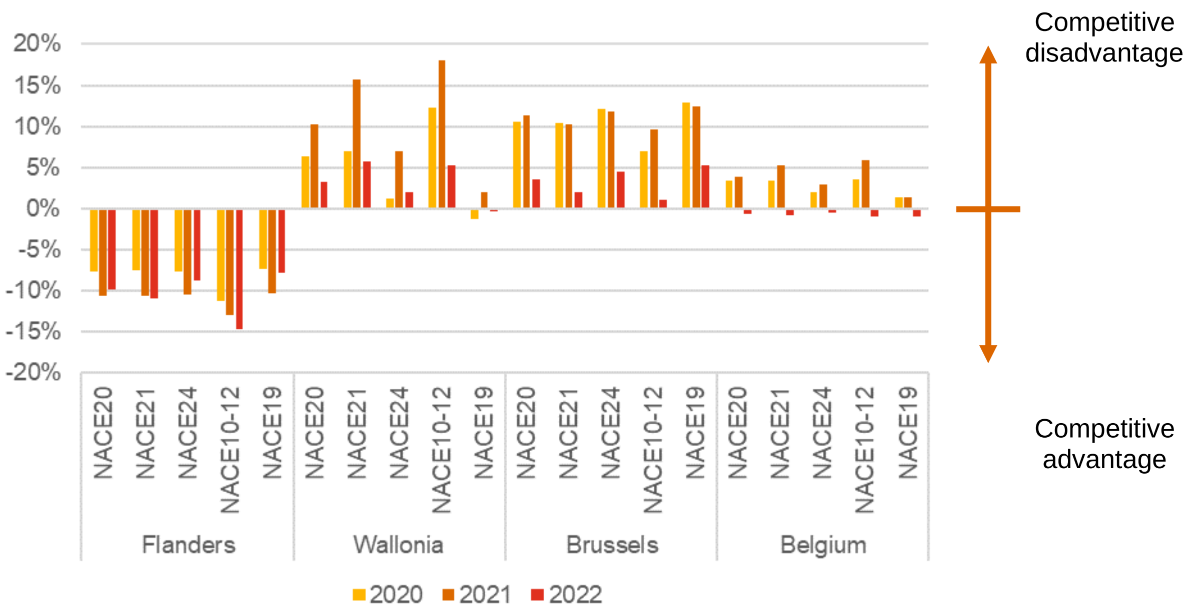
$$European\ average\ of\ P_{gas}\ for\ Sector_i = \sum_{X=0}^{2}(Average\ price\ for\ G_Y\ in\ neighbouring\ countries * Relative\ frequency\ of\ G_Y\ in\ Sector_i)$$

Electricity and natural gas price differences (in %) measure the difference in price for a certain sector *i* in a certain region *j* with the European average. These electricity and natural gas price differences in relation to the average in Belgium's regions and neighbouring countries, specific to a sector or region, are presented below and are illustrated in Figure 110 (for electro-intensive consumers), Figure 111 (for non-electro-intensive consumers) and Figure 112 for natural gas consumers.

$$X_{ij} = \left(\frac{P_{elec}\ in\ Sector_i\ in\ Region_j - European\ average\ of\ P_{elec}\ in\ Sector_i}{European\ average\ of\ P_{elec}\ in\ Sector_i}\right)$$

$$Y_{ij} = \left(\frac{P_{gas}\ in\ Sector_i\ in\ Region_j - European\ average\ of\ P_{gas}\ in\ Sector_i}{European\ average\ of\ P_{gas}\ in\ Sector_i}\right)$$

Figure 110: Electricity price differences for electro-intensive consumers compared with the average in the neighbouring countries

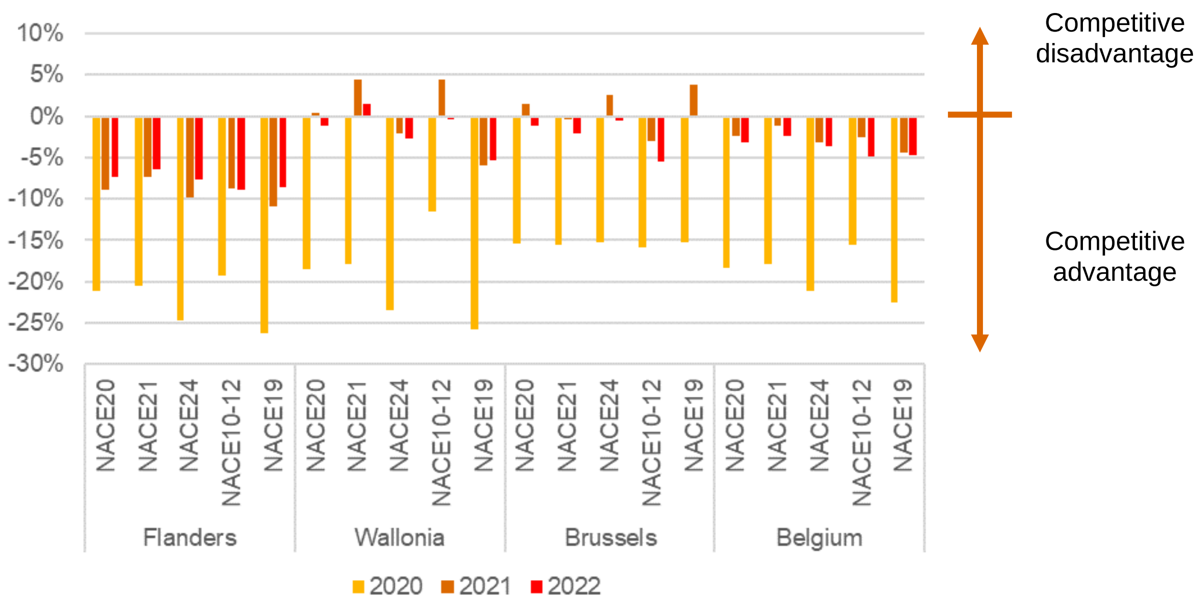


Source: CREG (2022), PwC Calculations

One can observe on the above figure, that electricity price differences differ substantially from sector to sector and region to region. Belgium globally faces a slight competitive advantage when it comes to comparing electro-intensive consumers. Flanders appears to be the most competitive region also in 2022 as it always faces a competitive advantage compared to our European average, because of the cap on the cost of the green certificates which helps in reducing the electricity bill in Flanders for the industrial profiles. The cap instituted in Flanders leaves the NACE 10-12 as the most significant advantage for Flanders whereas the NACE 19 sector is the smallest from all studied sectors. Flanders welcomes relatively more companies in the food manufacturing industry, compared to Wallonia and Brussels. Conversely, Brussels and Wallonia, regarding all sectors, are relatively non-competitive, with NACE 19 being the least competitive sector in Brussels and NACE 21 in Wallonia. In Wallonia the sector NACE 19 has a little competitive advantage in 2022. In the case of Brussels, this region is probably a theoretical case due to the limited number of industries on its territory.

Regarding the evolution of competitiveness[388], there is an important improvement in competitiveness for Wallonia and Brussels, while the competitiveness in Flanders remains stable overall with small increases or decreases depending on the sector. Like the conclusions already drawn in "Section 6 Presentation of results", in 2022 we observe a convergence among the European regions/countries under review because of the general increase of the commodity cost. Wallonia has seen its situation particularly deteriorate between the years 2020 and 2021, facing a higher competitive disadvantage in 2021, especially in the NACE 21 and NACE 10-12 sectors. In 2022, on the other hand, Wallonia has seen its situation improving again for all sectors.

Figure 111: Electricity price differences for non-electro-intensive consumers compared with the average in the neighbouring countries



Source: CREG (2012), PwC Calculations

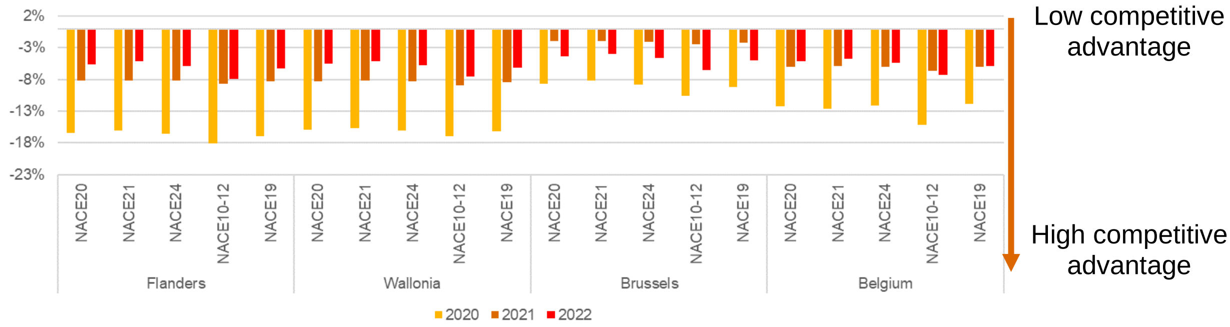
From the figure above, one can observe that Flanders still displays a competitive advantage in 2022, for all the studied sectors when looking at non-electro-intensive industries. However, its competitive position is deteriorating over the years for all sectors. In Belgium, Flanders remains the most competitive region among all, whereas Brussels is the least competitive. Overall, Belgium is still slightly more competitive than the neighbouring countries.

The most competitive sectors are identical for electro-intensive and non-electro-intensive industries in Flanders and Brussels: NACE 10-12. For Wallonia, NACE 21 is the most competitive sector for electro-intensive consumers while it is NACE 19 for non-electro-intensive consumers. Overall, Belgium's competitiveness has improved for non-electro intensive consumers. Like the conclusions drawn for the electro-intensive profiles, in 2022 we observe a convergence of the regions/countries under review due to the general increase of the commodity cost. Most sectors in Wallonia and Brussels see their competitive advantage improving in 2022 and they counterbalance the loss in competitiveness observed in the Flanders, thus improving the overall position for Belgium.

When comparing the two figures regarding the electricity price differences, we observe that electro intensive profiles in Belgium have now a slight competitive advantage, thanks to the improvements seen in both Wallonia and Brussels. Regarding non-electro intensive profiles, we see that competitiveness improves for most of the sectors under review.

[388] When possible data for 2020 and 2021 has been corrected to include UK in the European average, but other computation adaptations done in this year report might lead to some inconsistencies with the previous years when fixes were not possible to be done retroactively to compute the European average. This remark is valid for all the figures below where a comparison with previous years is shown.

Figure 112: Natural gas price differences for natural gas consumers in comparison with the average in the neighbouring countries



Source: CREG (2022), PwC Calculations

From the figure above, it can be observed that natural gas prices – generalised on a sectoral level - are more competitive in Belgium than in the neighbouring countries, for all sectors and in all regions. However, while Belgium retains a competitive advantage in all sectors, this advantage has decreased over the past three years. This can be explained by the overall convergence of the gas bill among the regions/countries under review due to the general increase in the commodity cost observed in the past year.

Electro-intensive and non-electro-intensive consumers

In the previous and following sections, two different results in terms of energy price differences are presented: one shows the comparison within electro-intensive consumers, and the other shows the comparison within non-electro-intensive consumers. The first, valid for the electro-intensive consumer, compares prices in each region of Belgium with the lower range of prices observed in neighbouring countries; assuming that, in each of the neighbouring countries, the 'competitors' of Belgian industrial consumers meet the national electro-intensity criteria and therefore benefit from significant reductions in several components of the electricity price, as shown in the following table.

Table 133: National electro-intensity criteria

Country/Region	Criteria
Germany	For consumers of most industrial sectors: when electricity cost >14% of gross value added. For consumers of a less extensive list of industrial sectors: when electricity cost >20% of gross value added [389].
The Netherlands	Industrial consumers classified as being energy-intensive and concluded a multiple-year agreement with the Dutch government to save energy by improving their energy efficiency[390].
France	Substantial reductions exist for industrial consumers where the CSPE (of 22,50 EUR/MWh) represents at least 0,50% of their value added. For example, for a consumer of 10 GWh/year, a value added of 45 MEUR or less in the annual accounts is necessary to qualify for this criterion (i.e. the CSPE is at least 0,50% of the value added).
Belgium	Flanders: Reductions exist for industrial consumers with an electro-intensity of more than 20 % for the sectors listed in Annexes 3 and 5 of the EEAG (cap of 0,50 % of gross value added) and for all consumers belonging to the sectors listed only in Annexe 3 of the EEAG (cap of 4 % of gross value added).[391] In addition, industrial consumers from the three regions for both electricity and natural gas can be exempted from the federal special excise duty. In fact, according to Art. 429.§ 1er of the law from 27th December 2004[392] an exemption is foreseen when electricity and gas are not used only for heating and transport, but also for metallurgic or chemical industrial procedures.

[389] These consumers have a significant reduction on some taxes for instance (e.g. EEG-Umlage)

[390] An energy-intensive enterprise is an enterprise for which energy or electricity costs represent more than 3 % of the total value of production or for which energy and mineral oil taxes represent at least 0,5 % of the value added. (Overheid.nl, 2020)

[391] Only for industry (NACE 5-33) and deep frost alimentary (46391 and 52100) and Cargo handling in seaports (NACE 52241).

[392] https://www.ejustice.just.fgov.be/eli/loi/2004/12/27/2004021170/justel

The second result, on the contrary, is valid for non-electro-intensive industrial consumers in Belgium. It compares prices in the three Belgian regions with the upper range of prices observed in neighbouring countries, assuming that, in each of the neighbouring countries, the 'competitors' of Belgian industrial consumers do not meet the national electro-intensity criteria and therefore pay the maximum price.

Whenever a series of results in neighbouring countries was available, we compared the prices in the three Belgian regions to the middle of the range of neighbouring countries.

At the Belgian level, there is a lack of publicly available information, making it impossible to identify the importance of electro-intensive enterprises in each of the industrial sectors studied. However, it is possible to give an indication at the purely macroeconomic level as to the electro-intensity (and natural gas intensity) of the sector. It must be made clear that behind these figures, at the macroeconomic level, lies a great complexity in terms of specific sub-sectors and consumer profiles. They do, however, highlight the sectoral energy intensity in Belgium and the severity of the criteria in neighbouring countries.

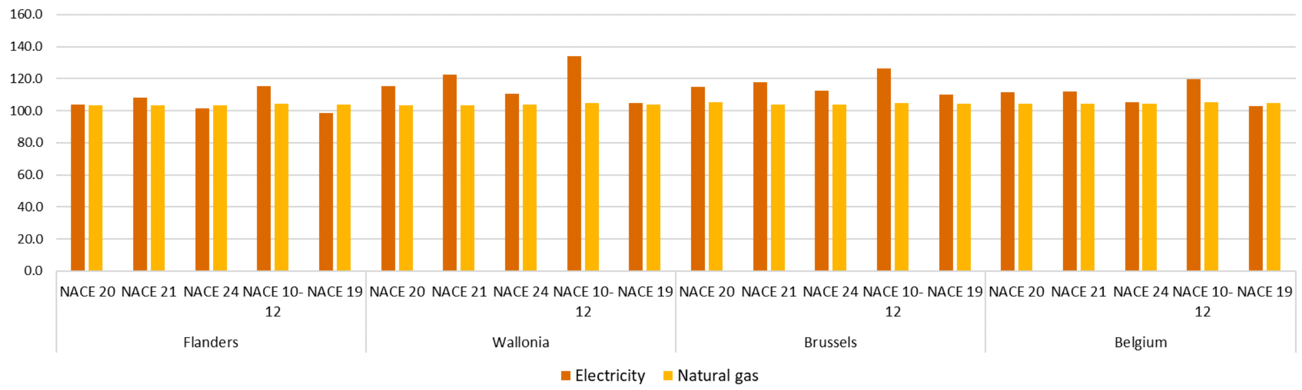
To get an idea of the relationship between the electro-intensity criteria of the neighbouring countries and the level of electro-intensity in Belgium and its 5 main sectors, we first introduce in this section the concept of energy cost based on:

- The electricity and natural gas prices for each sector and region (EUR/MWh) on the one hand (Figure 113);
- Energy intensity or MWh/EUR of value added for both electricity and natural gas per sector on the other hand (Figure 114).

The cost of energy reflects the cost of electricity and natural gas for the sector as a whole in terms of value added.

As can be seen in the following figure, electricity prices are the highest for the NACE 10-12, followed by NACE 21 due to important energy consumption with a high added value created per MWh for NACE 21. Natural gas prices present a flattened curve with similar price levels among sectors.

Figure 113: Sector and region-specific electricity and natural gas prices in 2022[393]

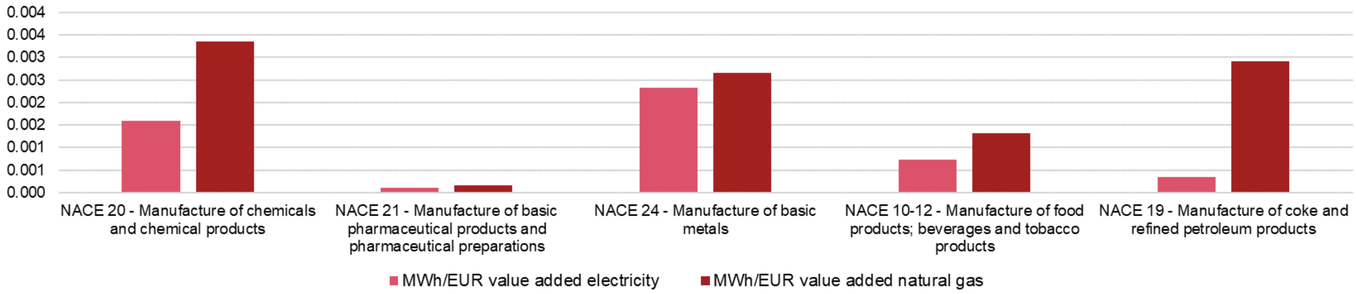


Source: CREG (2022), PwC Calculations

[393] This graph is based on average price values between electro-intensive consumers and non-electro-intensive consumers

As shown in Figure 114, the energy intensity is higher for natural gas than for electricity and varies depending on the sector. Sectors with high values in MWh/EUR value added are considered as energy-intensive, as is the case for NACE 24 and NACE 20 regarding natural gas. NACE 19 seems to be a contrasting case: it is the most natural gas-intensive sector, whereas it is one of the lowest electricity-intensive sectors when talking about these 5 sectors.

Figure 114: Energy intensity per sector in Belgium in 2022



Source: Federal Planning Bureau, Eurostat (2022), PwC Calculations

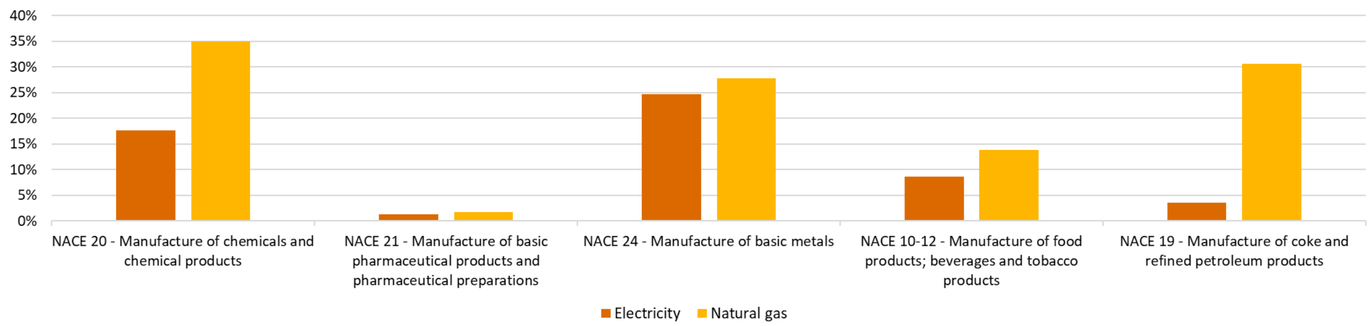
Combining sector- and region-specific electricity and natural gas prices with energy intensity figures produces a measure that represents the cost of electricity or natural gas as a percentage of value added (presented in

Figure 115). These data are extracted according to the following formulas:

$$Electricity\ cost\ for\ Sector\ i\ in\ Region\ j\ (\%\ of\ added\ value) \\ = P_{elec}\ for\ Sector\ i\ in\ Region\ j * Energy\ intensity\ (electricity)\ for\ Sector\ i$$

$$Natural\ gas\ cost\ for\ Sector\ i\ in\ Region\ j\ (\%\ of\ added\ value) \\ = P_{gas}\ for\ Sector\ i\ in\ Region\ j * Energy\ intensit\ (natural\ gas) for\ Sector\ i$$

Figure 115: Energy cost as % of value added in Belgium in 2022



Source: Federal Planning Bureau, Eurostat (2022), PwC Calculations

Differently from the previous year, the figure above shows that natural gas cost as a percentage of value added is now much higher than that of electricity, knowing that natural gas is relatively more consumed in the production process than electricity. This is due to the higher relative increase of prices for natural gas compared to electricity in 2022, and the fact that the consumption of natural gas per euro of value added is slightly higher than that of electricity. Furthermore, it can be observed that the cost of gas in relation to value added is highest for the NACE 20 and NACE 19 sectors in all regions, while the cost of energy, in general, is lowest for the NACE 21 sectors in Belgium.

As mentioned above, in Flanders, Germany, France and the Netherlands, certain industrial consumers can claim reductions or exemptions from their energy taxes, based on national criteria. Most of these criteria are related to the cost of energy as a percentage of value added. For example, in Germany, the criterion for a lower tax regime is the cost of electricity exceeding 14% of value added. As shown in the above figure, the sectors NACE 20 and 24 are the only two sectors in Belgium which achieve an electricity cost of more than 10% at sector level. However, as these are aggregated figures that hide information on the level of industrial consumers, some individual industrial consumers may have a higher-than-average electricity intensity and therefore must compete with the so-called electro-intensive consumers in neighbouring countries. As will be seen in the next section, these energy-intensive companies could be at a significant disadvantage compared to their European competitors.

Weighted energy cost differences

The graphical representation of the energy prices in the regions/countries under review are interesting to see what the origin of the cost differences are. However, they cannot tell us whether or not the cost of energy as a whole is advantageous. It depends on the amount of electricity and natural gas consumed throughout the production process. As this information is publicly available, we detail in this section how to combine the differences in electricity and natural gas prices with the consumption volumes of both types of energy into a single measure: the weighted energy cost difference. This measure compares the overall cost of energy in each sector and region with the European average[394]. If an industrial company consumes a lot of electricity and almost no natural gas during its process, it is highly likely that electricity prices will have a significant impact on its energy bill.

The weighted energy cost difference is calculated according to the below formulas[395]. The two first formulas are helpful to better understand the final computation, which is the relative energy cost difference expressed in percentage

$$Energy\ cost\ difference\ for\ Sector_i\ \ in\ Region_j\ \ (in\,\frac{EUR}{MWh})$$

$$= \frac{(European\ average\ of\ P_{elec}\ for\ Sector_i\ *\ X_{ij}) * \ C_i + (European\ average\ of\ P_{gas}\ for\ Sector_i * \ Y_{ij})}{C_i + 1}$$

$$Energy\ cost\ difference\ for\ P_{energy}\ for\ Sector_i\ \ (in\,\frac{EUR}{MWh})$$

$$= \frac{(European\ average\ of\ P_{elec}\ for\ Sector_i\ *\ C_i + European\ average\ of\ P_{gas}\ for\ Sector_i}{C_i + 1}$$

As mentioned previously, using the two formula above, we compute the energy cost difference thanks to the following formula:

$$Weighted\ energy\ cost\ difference\ for\ Sector_i\ for\ Region_j\ (in\ \%)$$

$$= \frac{European\ cost\ difference\ for\ Sector_i\ \ in\ Region\ _j}{European\ average\ of\ P_{energy}\ for\ Sector_i}$$

The relative consumption (C_i) used in the first equation to calculate the energy cost difference is the ratio of the total volume of electricity to the total volume of natural gas consumed in each sector. It represents which of the two types of energy is used more intensively during the production process. It is calculated based on the macro-economic data from the energy consumption accounts that we have recovered for each sector (from the Federal Planning Bureau). The following figure gives an overview of relative consumption by sector.

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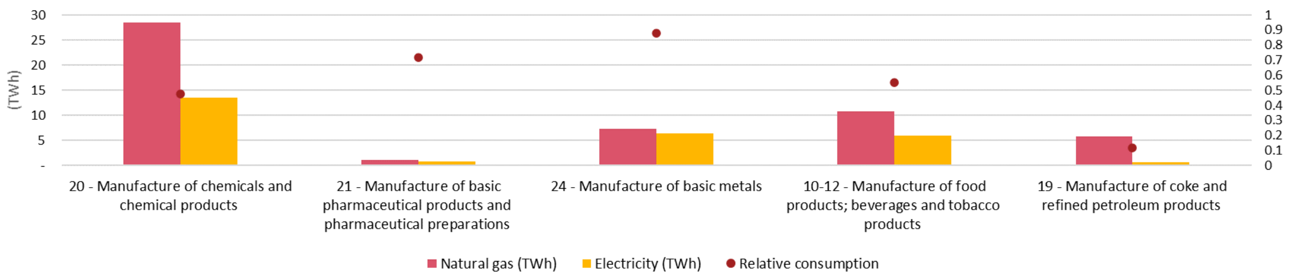
[394] The European average throughout this section refers to the average of the neighbouring countries under scope in this report: Germany, France, the Netherlands and the United Kingdom

[395] Where X_{ij} refers to the electricity price for Sector i in Region j and Y_{ij} refers to the natural gas price for Sector i in Region j

The volume of each energy type consumer by sector is presented on the left axis, while the relative consumption (volume of electricity divided by the volume of natural gas) is presented on the right axis. It is clear that the 5 most important sectors have a relative consumption of less than 1, which means that the 5 most important sectors consume more natural gas than electricity during the production process. For NACE 24, consumption is relatively balanced (relative consumption of 0,87), but within NACE 20 and NACE 19, natural gas consumption is almost double compared to electricity consumption.

Figure 116: Energy consumption per sector



Source: Federal Planning Bureau (2022), PwC Calculations

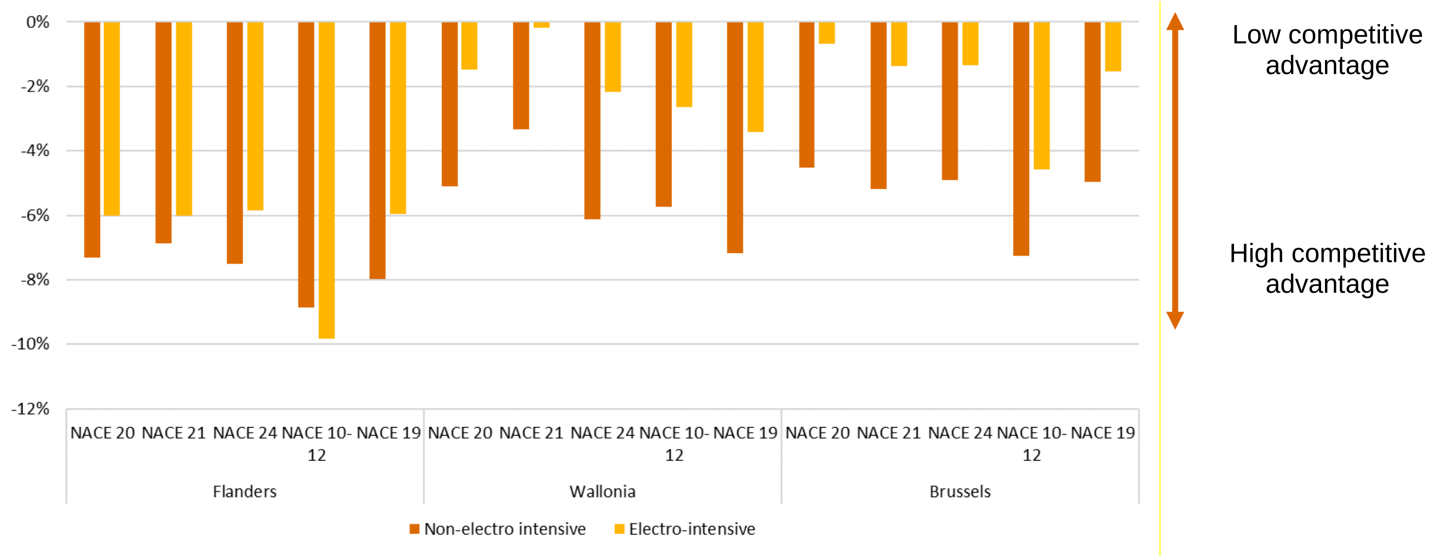
Relative consumption plays an important role in the calculation of the weighted energy cost differences since the lower the value of C_i (i.e. the more natural gas is consumed compared to electricity fed during the production process), the greater the importance of natural gas prices in the total cost of energy and in the calculation of the weighted energy cost differences is.

The results of the electricity and natural gas price differences for electro-intensive and non-electro-intensive consumers and the calculation of the weighted energy cost differences are presented in Table 134. These electricity and natural gas price differences have been calculated for the whole sector. As they are presented at a macro level, they may hide important differences between industrial consumers in the same sector.

Table 134: Results for every industrial sector in Flanders, Wallonia and Brussels compared to the average prices in Germany, France, the Netherlands and the UK (2022)

Region	Sector	Electricity price difference (electro-intensive)	Electricity price difference (non-electro-intensive)	Natural gas price difference	Relative consumption	Weighted energy cost difference (electro-intensive)	Weighted energy cost difference (non-electro-intensive)
Flanders	NACE 20	-10,08%	-7,49%	-6,01%	0,48	-6,01%	-7,31%
	NACE 21	-11,27%	-6,73%	-5,56%	0,72	-6,01%	-6,88%
	NACE 24	-8,94%	-7,81%	-6,25%	0,88	-5,86%	-7,51%
	NACE 10-12	-14,73%	-9,35%	-8,15%	0,55	-9,81%	-8,86%
	NACE 19	-7,91%	-8,64%	-6,68%	0,12	-5,95%	-7,96%
Wallonia	NACE 20	3,55%	-1,14%	-5,88%	0,48	-1,48%	-5,09%
	NACE 21	5,90%	1,24%	-5,46%	0,72	-0,17%	-3,34%
	NACE 24	2,26%	-2,58%	-6,10%	0,88	-2,17%	-6,13%
	NACE 10-12	5,45%	-0,51%	-7,82%	0,55	-2,65%	-5,72%
	NACE 19	-0,24%	-5,26%	-6,49%	0,12	-3,42%	-7,16%
Brussels	NACE 20	3,06%	-1,60%	-4,08%	0,48	-0,69%	-4,52%
	NACE 21	1,65%	-2,64%	-4,38%	0,72	-1,36%	-5,18%
	NACE 24	4,20%	-0,78%	-5,12%	0,88	-1,34%	-4,90%
	NACE 10-12	-0,56%	-5,89%	-7,13%	0,55	-4,57%	-7,25%
	NACE 19	5,13%	-0,26%	-5,57%	0,12	-1,53%	-4,95%

Figure 117: Sectoral weighted energy costs differences (electricity) between the Belgian regions and the average of 4 European countries (Germany, France and the Netherlands, including the United Kingdom) for electro-intensive and non-electro-intensive consumption



All sectors in Flanders, Wallonia and Brussels enjoy a competitive advantage in terms of differences in weighted energy costs when comparing electro-intensive consumers. For non-electro-intensive consumers, all sectors present a significant competitive advantage in Belgium, higher than electro intensive ones for all sectors and regions except for NACE 10-12 in Flanders.

- Electro-intensive consumers: industrial consumers in all sectors in Flanders who compete with electro-intensive consumers in neighbouring countries have a competitive advantage from 5.5% to almost 10%. Regarding Wallonia, electro-intensive consumers face competitive advantage in all sectors, with the highest advantage observed for NACE 19. In Brussels, NACE 10-12 has the highest competitive advantage, with the other sectors also being more competitive than the neighbouring countries.
- Non-electro-intensive consumers: for industrial consumers in the three Belgian regions which are in competition with non-electro-intensive competitors in Germany, France, the Netherlands and the United Kingdom, the situation remains particularly competitive. In Flanders, the manufacture of coke and other refined petroleum products (NACE 19) and the manufacture of food products (NACE 10-12) have the most advantageous weighted energy cost, while this is the manufacture of coke and other refined petroleum products (NACE 19) in Wallonia and the manufacture of food products (NACE 10-12) in Brussels. This is due mainly to the importance of the E4 profiles, less expensive profiles than E0-E3.

The differences in weighted energy costs for non-electro-intensive consumers are large and negative (advantageous) for all regions and sectors in Belgium. Compared with non-electro intensive consumers in neighbouring countries, weighted energy prices in Belgium are up to 8% lower than the average in neighbouring countries.

Both electro-intensive and non-electro-intensive consumers benefit from competitive advantages in Flanders, Wallonia and Brussels.

Weighted energy cost differences when excluding the UK

A comparison of energy prices in the Belgian regions in relation to the average of the four neighbouring countries studied enables us to address some of the complexity of the results presented in previous sections. Most importantly, we observed that the United Kingdom was a distinctive high-end outlier for all four electricity consumer profiles, particularly in the case of electro-intensive consumers. Therefore, it is also interesting and relevant to do the same exercise in terms of total energy price differences between the Belgian regions and neighbouring countries without taking the UK into account.

If the United Kingdom is excluded from the price comparisons, the situation at the sectoral level is very different for consumers in Belgium who are competing with the so-called electro-intensive consumers in neighbouring countries: Brussels and Wallonia face a competitive disadvantage, except a slight advantage for NACE 10-12 in Brussels, while in Flanders all sectors still display a competitive advantage. For consumers in Belgium who compete with non-electro-intensive consumers in neighbouring countries, the impact is less significant and does not affect the general conclusion that they enjoy a significant competitive advantage, even if the competitiveness is decreasing for all sectors and regions compared to the situation where UK is included.

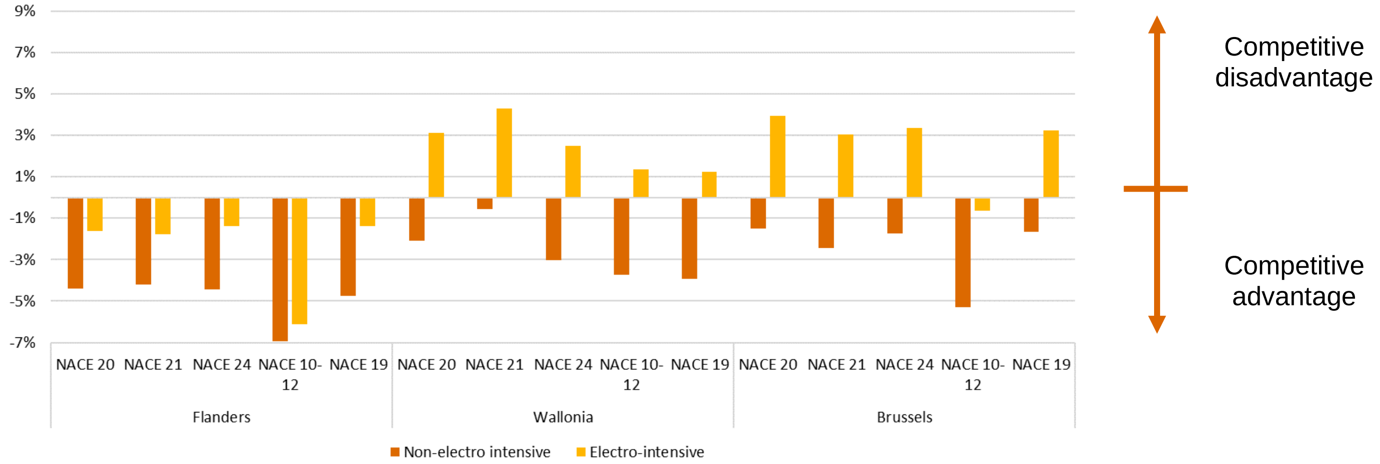
For both electro and non-electro-intensive industries, the competitiveness of all sectors in all regions is negatively affected when the UK is not considered, with a larger relative difference for electro intensive consumers.

The results of the comparison for (non-)electro-intensive consumers are shown in the below table. The differences in weighted energy costs for electro-intensive and non-electro-intensive consumers are shown in the below figure.

Table 135: Results for every industrial sector in Flanders, Wallonia and Brussels compared to the average prices in Germany, France and the Netherlands, excluding the United Kingdom (2022)

Region	Sector	Electricity price difference (electro-intensive)	Electricity price difference (non-electro-intensive)	Natural gas price difference	Relative consumption	Weighted energy cost difference (electro-intensive)	Weighted energy cost difference (non-electro-intensive)
Flanders	NACE 20	2,57%	1,29%	-6,01%	0,48	-1,63%	-4,38%
	NACE 21	-11,27%	0,93%	-5,56%	0,72	-1,79%	-4,19%
	NACE 24	4,55%	1,81%	-6,25%	0,88	-1,37%	-4,43%
	NACE 10-12	-4,84%	-3,76%	-8,15%	0,55	-6,10%	-6,94%
	NACE 19	6,35%	-4,44%	-6,68%	0,12	-1,40%	-4,76%
Wallonia	NACE 20	18,11%	8,24%	-5,88%	0,48	3,11%	-2,10%
	NACE 21	5,90%	9,56%	-5,46%	0,72	4,31%	-0,54%
	NACE 24	17,41%	7,59%	-6,10%	0,88	2,49%	-3,01%
	NACE 10-12	17,68%	5,62%	-7,82%	0,55	1,36%	-3,74%
	NACE 19	15,21%	3,52%	-6,49%	0,12	1,26%	-3,94%
Brussels	NACE 20	17,55%	7,74%	-4,08%	0,48	3,94%	-1,51%
	NACE 21	1,65%	5,36%	-4,38%	0,72	3,06%	-2,44%
	NACE 24	19,64%	9,57%	-5,12%	0,88	3,37%	-1,73%
	NACE 10-12	10,97%	-0,09%	-7,13%	0,55	-0,64%	-5,30%
	NACE 19	21,42%	9,10%	-5,57%	0,12	3,23%	-1,65%

Figure 118: Sectoral weighted energy costs differences (electricity) between the Belgian regions and the average of 3 European countries (Germany, France and the Netherlands, excluding the United Kingdom) for electro-intensive and non-electro-intensive consumption



Source: Federal Planning Bureau (2022), PwC Calculations

Elasticity

In this section, Belgium's relative competitiveness in terms of electricity and natural gas prices is further explored through the elasticity of demand. Previously, prices charged to industrial consumers in the 3 Belgian regions (Brussels, Flanders and Wallonia) and in 4 countries (France, Germany, the Netherlands and the UK) were estimated. The concept of elasticity of demand aims at depicting the expected reaction in terms of demand, following a change in prices or consumed quantities. This exercise becomes particularly interesting in order to help design efficient energy policies. The elasticity of demand, in this study, is evaluated from a price perspective. This reaction can be transcribed into the following equation[396]:

$$\text{The elasticity of demand} = \frac{\%\ \text{change in quantity demand}}{\%\ \text{change in price demand}} = \frac{\frac{\Delta\, Quantity}{Quantity} * 100}{\frac{\Delta\, Price}{Price} * 100}$$

Conceptually, the price elasticity of demand helps to assess how demand adapts to price variations. Changes can be looked at from two time-horizon perspectives: in the short term and in the long-term. In the short-term, price elasticity of demand attempts to reflect energy consumption changes resulting from new prices. In the long-term, price elasticity of demand, which generally tends to be higher (more elastic demand) aims at reflecting rather structural changes in behaviour from the considered industrial consumers. However, when prices are high and regardless of the elasticity and the short-term or long-term changes in behaviours, a limit to adaptation and adjustments in energy demand exists from where industries would potentially consider shutting down or relocating their activity elsewhere with lower prices.

This section aims at assessing industrial consumers' price elasticity with regards to energy demand. By doing so, it is assumed to observe how industrial consumers react to price and adapt quantities.

As such, regardless of other factors that may contribute to the decision, the objective of this exercise is two-fold: it intends to evaluate the likelihood for a company to either leave or come to Belgium[397] because of energy prices differences. Concretely, this section tries to answer the following questions:

[396] This formula means that for every increase in energy prices of 1%, energy consumption falls by the respective proportion identified.

[397] Given that the competitivity analysis highlighted the top five sectors in Belgium, it was decided to assess the impact of elasticity at the Belgium level. However, this exercise could be more nuanced, would it be conducted considering the economic fabric of each region specifically.

1. Is Belgium attractive to foreign industrial consumers with regards to power and natural gas prices?
2. Are other countries attractive to Belgian industrial consumers with regards to power and natural gas prices?

To that end, the elasticity of demand based on the price paid for both electricity and natural gas is used to observe the potential reaction of our industrial consumers. Based on the literature review that is later explained, it is assumed to consider the energy bills as a whole, thereby aggregating electricity and natural gas bills as both elasticity estimates (inelastic demand) are relatively similar. However, previously derived results led us to understand that significant price differences exist between non-electro-intensive and electro-intensive consumers.

When considering electricity, non-electro-intensive companies currently face relatively lower prices in Belgium than in other countries considered in this study. This means that these consumers should have, at the moment, high incentives to come to Belgium from an electricity price perspective only. With this in mind, we attempt to grasp the consumption variation they could face between Belgium and abroad, given the current price differences and up to what maximum price, they are expected to remain abroad. Conversely, electro-intensive consumers are here looked at as companies that could potentially relocate their activity from Belgium to neighbouring countries in case prices appear to be lower abroad. As several countries under study implemented financial measures to support such consumers, they often benefit from more advantageous conditions abroad than in Belgium. Concretely, we assess what consumption adjustments these consumers would benefit from if they were to leave Belgium and how important would their price change should they consider operating a move abroad.

Considering the two different questions we want to answer, which are to evaluate to what extent consumers are either inclined to come to Belgium or at risk of leaving Belgium, prices employed play a significant role[398]. Given the different observation angles, different prices derived from previously detailed results are used. Maximum applying prices are used to estimate the probability to come to Belgium due to sufficiently low prices. Therefore, we use maximum prices paid by non-electro-intensive and natural gas consumers for consumers potentially coming to Belgium. Inversely, we employ minimum applying prices for electro-intensive consumers and natural gas consumers for consumers at risk of leaving Belgium. Our approach thus distinguishes two types of consumers that are categorised into two consumers categories based on the prices paid:

- ***High range consumers***: maximum prices paid by non-electro-intensive consumers for electricity + maximum price paid for natural gas;
- ***Low range consumers***: minimum prices paid by electro-intensive consumers for electricity + minimum price paid for natural gas

In this context, Belgium's top five sectors used in the competitivity analysis are considered[399].

Methodology

This exercise was conducted through a four-step approach:

1. Through a literature review, presented below, elasticity rates are determined.
2. Based on existing results, the difference between countries in the average total energy bills is computed per sector. To do so, we aggregate the final electricity and natural gas bills as elasticity rates employed to apply for energy considered as a whole. The total consumption volumes and the distribution of companies per profile were identified through both data provided from the CREG and the Federal Planning Bureau. For each sector, each country's final bill was ultimately evaluated considering the average electricity and natural gas consumer weighted by the proportion of energy used per profile and the associated price per unit of energy (EUR/MWh)[400].

[398] One could assume that a company might only transfer part of its production volume or production assets to another country to benefit from more advantageous prices. However, given the macro-level of this analysis, we do not have enough information to consider partial transfers and consider the risk for a company to relocate.

[399] The identification of these five sectors was performed in chapter 3.3.

[400] Considering a specific sector - NACE 20 for instance - there are 19 E1-like consumers out of 368. Knowing that they consume about 247 GWh out of 6.616 GWh consumed by industrial consumers from the sector, it represents 3,7% of the total industrial consumption. With an estimated maximum price of 136,44 EUR/MWh in Brussels (see profile E1 in chapter 6) the electricity bill per company weighted by the profile's relative

3. Then, for each sector, we compute the magnitude of energy demand variation that would exist for the two consumer groups. This variation is estimated both in absolute and relative terms based on countries' price differences and considering the elasticity of demand. While results for high range consumers (i.e. non electro-intensive) depict their energy demand variation in Belgium if a foreign consumer were to leave Belgium, results for low range consumers (i.e. electro-intensive) represent Belgian companies' energy demand variation if they were to leave Belgium. In both cases, companies would face lower energy consumption, given the current price differences.
4. Finally, for each sector, we estimate the maximum price up to which a company is expected to remain in its current country following a variation in the quantity of consumed energy. As such, a high range of consumers' figures displays the maximum foreign price that foreign non-electro-intensive consumers are ready to accept while facing a decrease in their energy consumption. Conversely, we estimate the maximum rise in Belgian prices that Belgian consumers are willing to accept prior to considering leaving the country due to a decrease in their energy consumption. To derive the maximum price, a fixed threshold is set to determine the maximum decrease in quantity, which can be understood as the maximum acceptable company's consumption reduction due to multiple reasons such as energy efficiency, lower activity, etc. From that maximum price, it is assumed that industrial consumers start considering shutting down or relocating their activities in case they can find lower energy prices elsewhere.

Through this methodology, we expect to determine how sensitive companies are to price changes considering the sector they are active in and the existing prices in countries under study.

Literature review

Various academic papers have worked on energy price elasticity, providing a wide literature on the topic. While many research studies are relevant to this report, none identified could exactly meet our needs. Consequently, a selection of studies covering related topics was selected and used to derive values that could be used as proxies for this exercise. As research studies on elasticity are usually conducted at a macro-level and tend to aggregate large amounts of data from several countries, it was also decided to select papers covering industrialised or European countries in the priority given the considered countries for this study.

Most papers consider energy as a whole without narrowing it down to types of energy goods. As such, Labandeira et al. (2017)[401], a meta-analysis of 416 papers from 1990 to 2014, estimated price elasticity of demand for energy to be ranging from -0,22 to -0,224 in the short-term (ST), from -0,6 to -0,652 in the long-term (LT)[402]. However, the latter figures are not specific to industrial consumers whose energy price elasticity of demand would be of -0,166 on the short-term and of -0,508 on the long-term. Therefore, it can be understood that industrial consumers' price elasticity tends to be lower than when considering all consumers (e.g. households). Considering energy as a whole regardless of the time horizon, Trinomics (2018)[403] derive similar results with a relatively inelastic price demand for industrial consumers of -0,2 where Adeyemi & Hunt (2007)[404] estimate an elasticity of -0,22.

As this study focuses on both electricity and natural gas demand, it was decided to further detail elasticities to reflect differences in terms of industrial consumers' dependence towards both types of energy goods rather than sole energy. As no specific study could be found doing this, particularly for industrial consumers, figures were approximated from existing research studies. Labandeira et al. (2017)[405] observed short-term and long-term price elasticities for both electricity and natural gas. While the former is estimated to range from -0,209 to -0,231 (ST) or from -0,677 to -0,686 (LT), natural gas price elasticity is estimated to range from -0,216 to -0,239 (ST) or from -0,614 to -0,850 (LT). As mentioned here-above, this study reflects price elasticity on an economy-wide

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consumption in the total sector consumption is computed as follows: 136,44*(368/19)*3,7% or 977.772 EUR electricity bill. Replicating this for each industrial profile, the sector total energy (electricity and natural gas) bill is eventually computed by including the natural gas bill.

[401] (Labandeira, Labeaga, & López-Oteroa, 2017)

[402] While no specific definition is provided for short-term or long-term, it is assumed to be based on several papers to be of 1-2 years for the short-term and about 5 years for the long-term.

[403] (Trinomics, 2018)

[404] Adeyemi, O.I. and L.C. Hunt, 2007. Modelling OECD industrial energy demand: Asymmetric price responses and energy-saving technical change

[405] (Labandeira, Labeaga, & López-Oteroa, 2017)

perspective. Consequently, we expect those figures to be lower (i.e. relatively less elastic demand in the short run) for industrial consumers, as suggested in previously introduced papers. Both short-term tendencies can be confirmed through other studies such as Horáček (2014)[406], benchmarking 36 studies, which evaluates electricity price elasticities to range from -0,16 to -0,21 and Bilgili (2013)[407], conducted on OECD countries, that deems that price elasticity of natural gas on the economy is of -0,318 to -0,345.

Additional attention was brought to identify papers that would assess the elasticity of demand for industrial consumers specifically and on those making the distinction between energy-intensive and non-energy-intensive sectors when possible. In this perspective, Chang et al. (2019) conducted this analysis of data from 20 OECD countries in 16 industries. Authors classified industries as follows:

Table 136: Classification of industry according to energy-intensity by Chang et al. (2019)

Energy Intensity	Industry
Energy-Intensive	Non-ferrous metals; Iron and steel; Chemical and petrochemical; Non-metallic minerals; and Paper, pulp, and printing
Non-energy-intensive	Fishing, Mining and quarrying, Commercial and public services, Non-specified (industry), Wood and wood products, Agriculture/forestry, Transport equipment, Textile and leather, Construction, Machinery, and Food and Tobacco

Their estimates resulted in price elasticity for energy demand for:

- ***Energy-intensive group***: in the ST, values range from -0,029 to -0,200 and, in the LT, values range from -0,128 to -0,529.
- ***Non-energy-intensive group***: in the ST, values range from -0,078 to -0,165 and, in the LT, values range from -0,210 to -0,594.

As we observed, results differ from one paper to another. This can be due to models used, data employed or scope of the study. Even if absolute values are different, tendencies observed are similar and serve as the basis for our choices of parameters. The following table synthesizes study scopes and estimated values:

Table 137: Summary of elasticities of price demand from the literature review

Articles	Focus	Energy good	Energy-intensity	Short-term elasticity	Long-term elasticity
Labandeira et al. (2017)	Economy	Energy	All	[-0,224; -0,22]	[-0,652; -0,6]
	Economy	Electricity	All	[-0,231; -0,209]	[-0,686; -0,677]
	Economy	Natural Gas	All	[-0,239; -0,216]	[-0,85; -0,614]
	Industrial consumers	Energy	All	-0,166	-0,508
Trinomics (2018)	Industrial consumers	Energy	All	-0,2	/
Adeyemi & Hunt (2007)	Industrial consumers	Energy	All	-0,22	/
Horáček (2014)	Economy	Electricity	All	[-0,21; -0,16]	-0,43
Bilgili (2013)	Economy	Natural Gas	All	-0,318	-0,345
Chang et al. (2019)	Industrial consumers	Energy	Energy-intensive	[-0,2; -0,029]	[-0,529; -0,128]
	Industrial consumers	Energy	Non-energy-intensive	[-0,165; -0,078]	[-0,594; -0,210]

406 (Horáček, 2014)
407 (Bilgili, 2013)

From this literature review, it appears clear that setting a fixed value on elasticity is sensitive and largely variable. Therefore, to limit bias from the determination of parameters values, we use the average from values observed in the literature for both time-horizons. Estimated parameters are as follows:

- Average short-term price elasticity of demand: **-0,193**;
- Average long-term price elasticity of demand: **-0,525**.

As short-term price elasticity of demand appears to be relatively inelastic, companies are less likely to relocate because of energy price changes in the short run. While this statement does hold in the long-term as well, the suspected impact is already much more significant. Therefore, this exercise only makes use of the average long-term price elasticity value as the parameter. Concretely, this means that for every 1% increase in energy prices, energy consumption falls by 0,525%.

Results

Consumption changes due to price variations

First and foremost, the total energy bills for an average industrial consumer in each specific sector were computed. To do so, the distribution of companies per profile and per sector, the proportion of energy they consume in the total volume of energy consumed per sector and the associated cost per unit per profile were used. Table 138 indicates average energy bills that were identified both in absolute and proportional terms. For high range consumers, foreign prices are compared to Belgium's average bill as we evaluate Belgium's attractivity towards foreign consumers (i.e. a positive percentage indicates financial incentive to move to Belgium because of higher foreign prices). Conversely, we evaluate the risk for Belgian low range consumers to relocate due to lower foreign prices (i.e. a negative percentage indicates financial incentive to leave Belgium because of lower foreign prices compared to Belgium's). Colour codes are used to ease the reading of the table. Green highlights positive situations for Belgium – either a price-based interest to come to or remain in Belgium - whereas red depicts negative cases for Belgium – either a price-based interest to leave Belgium or to remain abroad.

Table 138: Total energy (electricity and natural gas) bills in absolute and relative terms (compared to Belgium average)[408]

Sector	Consumers range	Belgium (average)	Germany		France		The Netherlands		UK	
		(EUR)	(EUR)	%	(EUR)	%	(EUR)	%	(EUR)	%
Nace 20	High range	224.248.305	269.232.860	20%	236.690.651	6%	225.392.937	1%	253.977.999	14%
	Low range	221.272.373	228.015.519	3%	211.881.671	-4%	216.331.488	-2%	246.049.351	11%
Nace 24	High range	200.981.543	241.569.118	20%	212.238.174	6%	202.048.046	1%	227.860.501	13%
	Low range	198.417.054	204.485.670	3%	189.973.189	-4%	194.051.063	-2%	220.803.084	11%
Nace 10,11 & 12	High range	13.139.332	15.967.629	22%	13.857.489	5%	13.512.187	3%	14.716.717	12%
	Low range	12.741.803	13.568.110	6%	12.542.777	-2%	13.191.537	4%	14.716.717	15%
Nace 21	High range	317.207.136	348.681.547	10%	336.898.088	6%	326.750.456	3%	343.499.619	8%
	Low range	314.057.618	330.330.960	5%	310.109.703	-1%	311.805.286	-1%	329.847.569	5%
Nace 19	High range	174.271.915	217.625.967	25%	183.789.860	5%	173.364.079	-0,5%	201.740.863	16%
	Low range	171.971.916	175.724.558	2%	162.447.124	-6%	167.087.239	-3%	196.246.168	14%

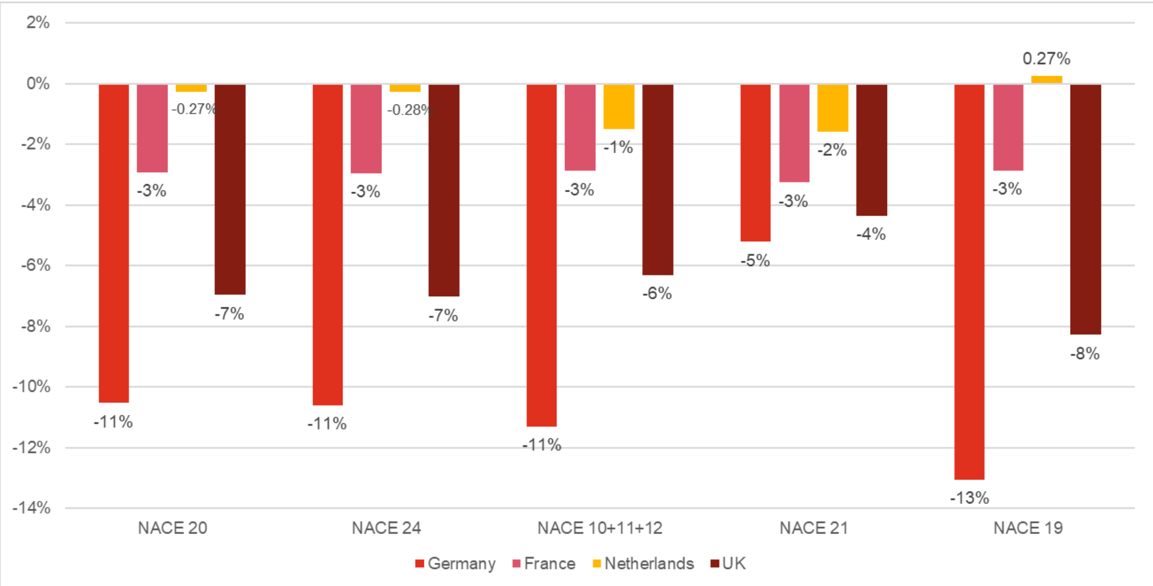
[408] As reminder, high range consumers are composed of non-electro-intensive and natural gas consumers for which we use the maximum applying prices. Low range are composed of electro-intensive and natural gas consumers for which we use the minimum applying prices.

Overall, Belgium seems to offer lower prices than other countries for high range consumers for all sectors, apart from sector 19 (coke products) in comparison to the Netherlands. For instance, Germany's prices are 20% higher than Belgium's with regards to sector 20 (chemicals). This statement holds as lower natural gas prices in Belgium drive down the total energy bill compared to countries such as the Netherlands that would display cheaper invoices if electricity was to be solely considered. Conversely, low range consumers would benefit from more interesting prices abroad than in Belgium only if they would move to France or the Netherlands, while Belgium is still more attractive than Germany and the UK in all sectors and the Netherlands in NACE 10-12.

Compared to 2021, the most noticeable difference is that low range consumers now benefit from more competitive prices in Belgium than Germany, while last year the German low range profiles could always have more competitive prices. In addition, like the conclusions drawn in the previous sections, the large increase in commodity costs across the regions/countries under review had therefore that there is in 2022 a convergence among the different territories with regards to the total energy bills. For example, high range German industries in NACE 19 have prices that were 81% higher than Belgium last year, while this figure drops to 25% in 2022. Similar conclusion can be drawn for the UK industries, whose prices are maximum 16% more expensive than Belgian ones, while the maximum observed last year was 27%.

From these price differences, we can derive consumption variation given the assumed price elasticity of demand of -0,525 (see Literature review from the elasticity section). Figure 119 attests for these variations (in %) for high range consumers (i.e., the maximum applicable price range for non-electro-intensive and natural gas consumers) whereas Figure 120 details consumption changes for low range consumers (i.e., the minimum applicable price range for electro-intensive and natural gas consumers) compared to Belgium average.

Figure 119: Change in energy (electricity and natural gas) consumption for "high range" consumers in the neighbouring countries compared to Belgium (i.e. maximum applicable prices for non-electro-intensive and natural gas consumers)



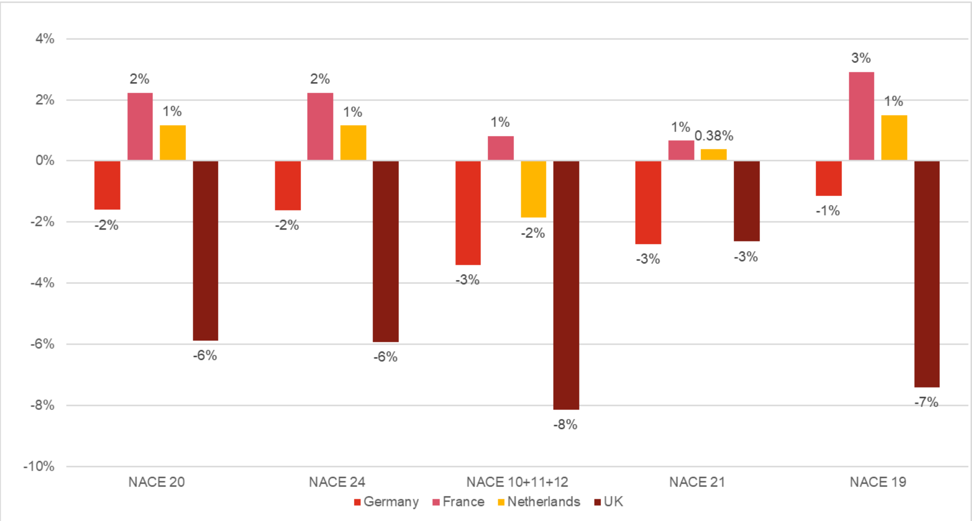
Results depicted here-above demonstrate a negative change in the high range of foreign companies' consumption. As prices are usually slightly lower in Belgium, foreign companies usually observe positive price differences compared to Belgium. Given that the elasticity term displayed preceding is negative, a negative change in consumption is expected for foreign high range consumers regardless of the sector considered.

Germany appears to be the country from where consumers are currently the most affected by higher German prices (from -5% to -13% change in demand depending on the sector) whereas the Netherlands constitute the least impacted as Dutch prices are more aligned to Belgium's (from -2% to +0.27% change in demand).

Clearly, it demonstrates that a high range of consumers would be better off in Belgium in most cases. Except in the Netherlands, it can be asserted that lower consumption levels are reached abroad compared to what they could consume in Belgium. In terms of sectors, results are variable depending on the country but, overall, sectors 19 would be one of the most affected (except in the Netherlands) whereas sector 21 (pharmaceuticals) would be the least impacted. Contrarily to last year, we observe more convergence between the countries under review. In fact, even if German industries are still facing the highest prices, these are less far away from the Belgian levels, mainly due to the large increase in commodity prices observed in 2022.

As opposed to high range results, low range results highlight the lower prices existing in France and the Netherlands, except for the Dutch NACE 10-12 sectors. If we consider all the sectors in the UK and Germany, all Belgian consumers would experience higher consumption price levels if they were to leave Belgium. France tends to be more attractive than Belgium for all the sectors analysed. Overall, sectors 10, 11 & 12 (food and beverages) appear as being the most impacted by such change as opposed to the other sectors. The below graph depicts the situation with regards to the low range of consumers. Compared to 2021, we observe also for this figure a convergence of energy bills among the regions/countries under review. For example, the UK is still less competitive than Belgium, but the variation in consumption is now between 3% to 8%, while it was between 2% to 11% last year. Regarding Germany, low range consumers from all sectors were actually more competitive than Belgian ones in 2021, while they are now slightly less competitive. Thus, Belgian firms from these profiles would reduce their demand in 2022 if they were to relocate to Germany.

Figure 120: Change in energy (electricity and natural gas) consumption for "low range" consumers in the neighbouring countries compared to Belgium (i.e., the applicable minimum price for energy-intensive and natural gas consumers)



The potential relocation of high/low range consumers

So far, we have derived potential consumption change because of price variations. This was estimated through the price differences in energy bills across countries and the application of the elasticity term based on the elasticity formula previously detailed. The opposite exercise is now conducted.

From a determined change in consumption, we estimate the maximum prices that are acceptable for one consumer prior to deciding to leave their country. In addition to short-term and long-term adjustments of consumption, it is considered that a demand reduction limit applies, above which we assume that the industry will start considering shutting down activities or relocating, provided that a location with lower prices exists. Therefore, we identify the maximum acceptable demand reduction limit, from which a bigger reduction in demand would imply more than energy efficiency measures and output adaptation changes. As Figure 119 and Figure 120 identify the resulting change in consumption from the currently estimated energy bills, we assume that it also indicates the maximum acceptable change in consumption. Taking the average from values displayed in Figure 119 and Figure 120, we obtain -3%. Therefore, we decided to set a consumption reduction threshold of 4% (i.e. a consumer is ready to accept a 4% reduction in consumption before deciding to leave the country).

Since we intend to determine structural price differences resulting from reductions granted by public authorities on taxes or transmission tariffs as observed in this study, the applicable elasticity for this exercise is the long-term price elasticity of demand.

Consequently, both Belgian and foreign companies are expected not to relocate when the maximum acceptable prices reach an increase up to 9,5% of current prices:

$$Elasticity\ of\ demand = \frac{\%\ change\ in\ quantity\ demand}{\%\ change\ in\ price\ demand}$$

$$-0{,}525 = \frac{-4\%}{\%\ change\ in\ price\ demand}$$

$$\%\ change\ in\ price\ demand = \frac{-4\%}{-0{,}525} = 7{,}6\%$$

High range foreign consumers might consider it economically rational to relocate in Belgium because of lower energy prices. Foreign prices should be higher by more than 7,6% than Belgian prices as foreign consumers are likely to remain abroad up to that maximum acceptable price. Table 138 casts light on the current price differences across countries and Table 139 synthesises countries where high range consumers are likely to be inclined to move to Belgium. The latter countries are highlighted in green, whereas red indicates that Belgium has no relocation option for the considered country based on the 7,6% maximum acceptable price.

Table 139: Relocation possibilities for high range consumers

Sector	Germany	France	Netherlands	UK
NACE 20				
NACE 24				
NACE 10+11+12				
NACE 21				
NACE 19				

Contrary to what was observed in previous years, Belgium would now represent an attractive location for relocation for industries from all sectors in Germany and the United Kingdom. The convergence of the energy bill observed in the regions/countries under review in 2022, due to the general increase of the commodity price, would explain that French and Dutch industries now face prices that are not that much higher to justify a relocation to Belgium.

Conversely, low range consumers would relocate outside Belgium once they find a country where they can benefit from a price difference higher than 7,6% (i.e. prices abroad are at least 7,6% lower than in Belgium).

Table 140: Relocation possibilities for low range consumers

Sector	Germany	France	Netherlands	UK
NACE 20				
NACE 24				
NACE 10+11+12				
NACE 21				
NACE 19				

Differently from last year, in 2022 it appears that low range Belgian consumers do not have financial incentive to leave the country. In fact, the prices observed in the neighbouring countries are higher (for Germany and the UK) or not low enough (for France and the Netherlands) compared to the Belgian average to justify a relocation on a purely price-based decision. Table 140 shows, indeed, that none of the sectors in the neighbouring countries could benefit from prices 7.6% lower than the Belgian average. Like high range consumers, these conclusions can be explained by the convergence of energy bills observed at European level in 2022 due to the general increase of the commodity cost.

Conclusions

It results from this analysis that we can answer to our first two questions originally set:

1. **Is Belgium attractive to foreign high range industrial consumers?**

   Belgium appears to be more attractive for non-energy intensive industries than other countries since the price difference might be sufficient as a financial incentive to generate industry relocation towards Belgium, should this decision only be based on power and natural gas prices and ignoring all other potential decision factors. As such, high range consumers from all sectors in Germany and the UK are particularly likely to find prices lower enough in Belgium to consider relocating to Belgium as they all are getting closer to their maximum acceptable price. On the other hand, French and Dutch industries cannot justify a relocation to Belgium on a purely price-based decision.

2. **Are other countries attractive for Belgian low range industrial consumers?**

   Belgium can now benefit from more attractive fares for energy-intensive industries given that prices observed in neighbouring countries are higher or not lower enough to justify a relocation. This is valid for all sectors in all countries under review. Therefore, in 2022 low range industrial consumers in Belgium do not have enough financial incentive to relocate to any of its neighbouring countries.

Conclusions and recommendations

Conclusions on the competitiveness of the economy

We can draw some important conclusions from this total energy cost analysis.

While it is necessary to be cautious about the exact impact of these results, since they are based on a multitude of data at the macro level, some messages are very clear.

1. The most striking conclusion is the less beneficial situation for all important industrial sectors in Belgium when they are in competition with electro-intensive consumers in neighbouring countries than when they compete with non-electro intensive consumers in neighbouring countries[409]. However, it is important to mention that the price gap between Belgium and the other countries under review has largely decreased compared to the previous years.

   Different conclusions can be made for non-electro-intensive consumers and electro-intensive consumers. First, we will discuss the non-electro-intensive consumers. Industrial consumers in Belgium, that compete with non-electro-intensive consumers in neighbouring countries, including the UK, have a clear competitive advantage in terms of the total cost of energy (natural gas and electricity combined). This is the case even when excluding the United Kingdom (high outlier) from the equation, even if the competitiveness decreases for all sectors and regions. The situation in Belgium is beneficial for non-electro-intensive consumers.

   Secondly, we observe a different competitive situation when comparing the cost of electro-intensive consumers with their counterparts in neighbouring countries that benefit from reductions and/or exemptions. When the UK is excluded, in Brussels and Wallonia electro-intensive consumers suffer from a price disadvantage compared to those in neighbouring countries. In this situation, the more competitive the neighbouring countries, the greater the risk of relocation. This risk has decreased significantly between 2021 and 2022 due to the high growth rate of commodity prices in all countries. However, with and without the UK, Flanders offers a competitive advantage in all its sectors for electro-intensive consumers, even if this advantage has decreased compared to last year.

   Thirdly, Belgium’s competitive position subsequently changed compared to last year, the competitive advantage for Flanders is getting even smaller, but, at the same time, the competitive disadvantage for Brussels and Wallonia is decreasing.

   In countries where discounts are granted to electro-intensive consumers, the government shifts investment from non-electro-intensive to electro-intensive sectors, as required by the European Commission's Guidelines on State aid for energy and the environment. This change is the (indirect) result of an economic protection measure (authorised by the EC) aimed at electricity-intensive consumers. In the scenarios with entry criteria (German and Flemish systems), where individual electro-intensity targets at company level must be met, this change benefits only certain electro-intensive legal entities within Annexes 3 and 5 of the EEAG.

2. Regarding **natural gas**, we observe that the overall position of Belgium compared to its neighbouring countries is still advantageous in 2022 for professional customers, even if it deteriorated compared to 2021 for most sectors and notably for residential customers. In fact, this year Belgium can still offer lower prices than the other countries for the professional customers, but the overall increase in commodity cost of natural gas explains the convergence of the natural gas bills between the countries analysed.

3. The position of **Wallonia and Brussels** in terms of total energy costs for the industry generally remains **less advantageous than in Flanders**. This situation is particularly striking for industrial sectors with a large number of small industrial electricity consumers (E0-E1), such as the food and drink sector (NACE 10-12). Wallonia now faces a competitive disadvantage for most of its sectors.

[409] Although a cap and super cap on the cost of Green Certificates was introduced in Flanders in 2018.

Recommendations

The **problem of competitiveness** on the total cost of energy that we observe in this report applies to electro-intensive industrial consumers in all sectors and in all regions. As shown in the presentation of the results, its origin lies in the cost of electricity, and in the three components of the cost of electricity: commodity price, grid charges for the E3 and E4 profiles (mainly due to the reductions granted in Germany, France and the Netherlands) and taxes, levies and certificate systems.

As recommended above, the most direct and tangible impact can be exerted on the third strand: taxes, charges and certificate systems. Currently, in all three regions, significant efforts are being made to mitigate the impact of taxes, levies and certificate systems on competitiveness. In contrast to France, Germany and the Netherlands, these efforts are generally made without considering the electro-intensity of industrial consumers. In 2022, the quantity of electricity taken off the grid remained the overriding criterion that has been used at the federal level and at regional level (quota of green certificates, public service obligations) - to protect the competitiveness of the cost of electricity for industrial consumers. Nevertheless, Flanders now considers electro-intensity since the introduction in 2018 of a cap on the amount due to the costs related to the financing of renewable energy for electro-intensive consumers. In addition, as of 1st January 2022 electricity and natural gas industrial consumers from the three Belgian regions can also be exempted from the federal special excise duty when electricity and gas are not used only for heating and transport, but also for metallurgic or chemical industrial procedures that are by definition electro-intensive.

In other words, from a fiscal point of view, in addition to the cap system introduced in Flanders in 2018 and the exemption of special excise duty introduced by the federal State in 2022, the Belgian federal and regional authorities mainly grant tax reductions and/or exemptions based on the quantity of electricity taken off the grid, and not on the electro-intensity level of an industrial consumer.

Consequently, this results in significant competitive advantages for companies competing with non-electro-intensive consumers in France and certainly in Germany, while at the same time these reductions may not have a sufficient impact on the total cost of energy to protect electro-intensive industrial consumers in Wallonia and Brussels from competition from their counterparts in France, the Netherlands and Germany.

Our economic impact analysis leads us to support this assertion: **consumers that are not particularly affected by a lack of competitiveness of electricity prices are somewhat protected in Belgium given the tax schemes designed in Flanders, Brussels and Wallonia (also valid for federal taxes), while electro-intensive consumers are more at risk and they could suffer in Wallonia and Brussels from a disadvantage compared to their electro-intensive counterparts in neighbouring countries, even if this gap has narrowed compared to previous years due to the general increase in energy prices.**

It is therefore very interesting to reflect on the possibility of adapting the current tax reductions for industrial consumers that have been introduced by the federal and regional governments. The general objective should be to generate a move towards more competitive total energy prices for industrial electro-intensive consumers, while (partly) preserving the current competitive advantage for non-electro-intensive consumers. Considering the recent events, such as the economic turmoil due to the pandemic and the war in Ukraine, this objective should be further pursued as electro-intensive consumers are likely to be more impacted by the rise in energy prices.

We would like to reiterate a number of points and guidelines that have been stated previously, and that should be taken into consideration:

1. In the case of Belgium, in view of the competitive natural gas prices for the professional customers, it seems important to focus on electricity intensity and not on energy intensity as a whole.
2. The introduction of electro-intensity criteria can be combined with a minimum offtake condition under which no reduction is allowed.
3. The introduction of too many layers of different access criteria and levels of reduction (as is the case for the CSPE tax in France and the EEG-Umlage in Germany) may have a negative influence on the assessment of the effectiveness of the measures. This may also reduce the predictability of tax revenues.
4. One should be aware of possible negative side-effects. Granting access to certain reductions depending on the load profile (as is the case for reductions in network charges in Germany and the Netherlands) may have the negative effect of discouraging the development of demand response and energy efficiency.

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Appendix

Appendix

Industry reduction criteria and measures supporting the development of renewable energy sources

As an annexe to this report, we present the catalogue of criteria that can grant the possibility to reductions on transport tariffs, taxes, levies and certificate schemes for certain (groups of) electricity and natural gas consumers. In addition, it is specified whether each measure supports the development of renewable energy sources.

Electricity

Belgium

Federal level

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
All other costs	Federal special excise duty	Not directly	Annual consumption	The federal excise duty is applied to residential and industrial profiles with two sets of rates, depending on annual consumption levels. ***Residential profiles***: • 0 – 20 MWH/Year: 13,6 EUR/ MWH • 20 – 50 MWH /Year: 11,58 EUR/ MWH • 50 – 1000 MWH /Year: 10,9 EUR/ MWH • 1.000 – 25.000 MWH /Year: 10,23 EUR/ MWH • 25.000 – 100.000 MWH /Year: 2,40 EUR/ MWH • > 100.000 MWH /Year: 1 EUR/ MWH ***Commercial profiles***: • 0 – 20 MWH /Year: 14,21 EUR/ MWH • 20 – 50 MWH /Year: 12,09 EUR/ MWH • 50 – 1000 MWH /Year: 11,39 EUR/ MWH • 1.000 – 25.000 MWH /Year: 10,69 EUR/ MWH • 25.000 – 100.000 MWH /Year: 2,73 EUR/ MWH • > 100.000 MWH /Year: 0,5 EUR/ MWH
All other costs	Energy contribution	No	Annual offtake	The ***energy contribution*** has a base rate of 1,9261 EUR/MWh. However, consumers with an electric connection > 1 kV are exempted.

Regional level

Brussels

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
All other costs	Financing of regional energy policies	Yes	Connection capacity	Capped at 5.000 kVA

Flanders

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
All other costs	Certificate schemes – Green certificates	Yes	Annual offtake	Progressive reductions on quota: • 1.000-20.000 MWh/year: -47%* • 20.000-250.000 MWh/year: -80% • > 250.000 MWh/year: -98% * only for industry (NACE 5-33) and deep frost alimentary (46391 and 52100) and Cargo handling in seaports (NACE 52241). The companies listed in Annexe 3 and 5 of EEAG correspond to the companies listed in the Energiedecreet apart from Nace 3832 (Recycling of waste) which is listed in Annexe 3 EEAG but not in the Energiedecreet. Additionally, two caps were introduced in 2018: • The certificate cost is capped at 0,5% of gross value added (average last 3 years) for all consumers with an electro-intensity over 20% for consumers belonging to sectors that are listed in annexes 3 and 5 of the EEAG. • The certificate cost is capped at 4% of gross value added (average last 3 years) for all consumers belonging to sectors that are listed in annexe 3 of the EEAG. Since 2021 this is a combined cap on GC and CHPC.
All other costs	Certificate schemes – Combined heat/power (WKK)	Yes	Annual offtake	Progressive reductions on quota: • 1.000 - 20.000 MWh/year: -47%* • 20.000 - 100.000 MWh/year: -50% • 100.000 - 250.000 MWh/year: -80% • > 250.000 MWh/year: -85% * only for industry (NACE 5-33) and deep frost alimentary (NACE 46391 and 52100) and Cargo handling in seaports (NACE 52241).

Wallonia

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
All other costs	Certificate schemes – Green certificates	Yes	Annual offtake (condition: energy efficiency agreement)	Progressive reductions on quota: • 0 - 20.000 MWh/year: -25% • 20.000 - 100.000 MWh/year: -50% • 100.000 - 300.000 MWh/year: -85% • > 300.000 MWh/year: -90%

All other costs	PSO - Financing of measures supporting renewable energy in Wallonia	Yes	Annual offtake	Partial exemptions of the tariff for public service obligation financing support measures for renewable energy (only Elia), that has a base rate of 13,82 EUR/MWh:
				• **Exemption of 85%** for final consumers with a sector agreement, regardless of the level of consumption;
				• **Exemption of 50%** for final consumers connected to a voltage level higher than low voltage without a sector agreement and with an activity that falls under the NACE code 'culture and animal production' (01 - without distinction between principal and complementary activities);
				• **Exemption of 50%** for final consumers connected to a voltage level higher than low voltage without a sector agreement and with an annual consumption higher than 1 GWh, in so far as they fall under the following primary NACE codes:
				  ○ industrial enterprises (10 to 33);
				  ○ education (85);
				  ○ hospitals (86);
				  ○ medico-social (87-88).
				
				On the exempted part of the consumption, a surcharge of 2,55 EUR/MWh is due.

All other costs	Connection fee	No	Annual offtake	Connection fee (base rate: 0,75 EUR/MWh) has two reduced tariffs for high voltage clients: • **Reduced rate** for clients with yearly consumption **< 10 GWh/year**: 0,6 EUR/MWh; • **Reduced rate** for clients with yearly consumption **> 10 GWh/year**: 0,3 EUR/MWh

Germany

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
Transmission costs	Transmission tariffs reductions	No	Annual offtake + offtake hours	Reduction on the transmission tariff apply for all companies that exceed 10 GWh/year, if annual offtake hours is: • ≥ 7.000 hours/year: - 80% • ≥ 7.500 hours/year: - 85% • ≥ 8.000 hours/year: - 90%
All other costs	KWK-Umlage	Yes	Annual offtake + Electricity cost/gross value added	The ***combined heat and power surcharge*** has a base rate of 3,78 EUR/MWh. For users with an annual consumption that exceeds 1 GWh/year, two reduced rates exist: **A.** If consumption > 1 GWh/year and electricity cost is: • For an extensive list of industrial sectors (annexe 3 of EEAG): > 17% of gross value added • For a less extensive list of industrial sectors (annexe 5 of EEAG): > 20% of gross value added The rate is 0,57 EUR/MWh (85% reduction) but capped at: 0,5% of gross value added (average last 3 years) for all consumers with electricity cost >20% of gross value added, and 4,0% of gross value added (average last 3 years) for all consumers with electricity cost <20% of gross value added. **B.** If consumption > 1 GWh/year and electricity cost is: • For an extensive list of industrial sectors (annexe 3 of EEAG): between 14 and 17% of gross value added (avg. last 3 years) The rate is 0,76 EUR/MWh (80% reduction) but capped at 0,5% of gross value added (average last 3 years) for all consumers with electricity cost >20% of gross value added and 4% of gross value added (average last 3 years) for all consumers with electricity cost <20% of gross value added. **C.** For consumers meeting the conditions from option A or B and active in the aluminium, lead, zinc or copper production, can benefit from a bottom rate of 0,3 EUR/MWh.
All other costs	StromNEV §19 - Umlage	No	Annual offtake + electricity cost/turnover	The ***electricity network charges ordinance*** has a base rate of 4,37 EUR/MWh. It is applicable to the first GWh taken off on an annual basis. For offtake that exceeds 1 GWh/year two rates exists: • If offtake > 1GWh/year: 0,5 EUR/MWh • If offtake > 1 GWh/year and the consumer is part of the manufacturing

				industry with electricity cost > 4% of turnover: 0,25 EUR/MWh
All other costs	Offshore-Netzumlage	Yes	Annual offtake + Electricity cost/gross value added	The ***offshore liability overload*** is a levy to pay for offshore wind power generation units. It has a base rate of 4,19 EUR/MWh. For users with an annual consumption that exceeds 1 GWh/year, two reduced rates exist: **A.** If consumption > 1 GWh/year and electricity cost is: • For an extensive list of industrial sectors (annexe 3 of EEAG): > 17% of gross value added • For a less extensive list of industrial sectors (annexe 5 of EEAG): > 20% of gross value added The rate is 0,630 EUR/MWh (85% reduction) but capped at: 0,5% of gross value added (average last 3 years) for all consumers with electricity cost >20% of gross value added, and 4% of gross value added (average last 3 years) for all consumers with electricity cost <20% of gross value added. **B.** If consumption > 1 GWh/year and electricity cost is: • For an extensive list of industrial sectors (annexe 3 of EEAG): between 14 and 17% of gross value added (avg. last 3 years) The rate is 0,840 EUR/MWh (80% reduction) but capped at 0,5% of gross value added (average last 3 years) for all consumers with electricity cost >20% of gross value added and 4% of gross value added (average last 3 years) for all consumers with electricity cost <20% of gross value added. **C.** For consumers meeting the conditions from option A or B and active in the aluminium, lead, zinc or copper production, can benefit from a bottom rate of 0,3 EUR/MWh.
All other costs	EEG-Umlage	Yes	Annual offtake + Electricity cost/gross value added	The EEG-Umlage has a base rate of 37,23 EUR/MWh. For users with an annual consumption that exceeds 1 GWh/year, two reduced rates exist: **A.** If consumption > 1 GWh/year and electricity cost is: • For an extensive list of industrial sectors (annexe 3 of EEAG): > 17% of gross value added • For a less extensive list of industrial sectors (annexe 5 of EEAG): > 20% of gross value added The rate is 5,58 EUR/MWh (85% reduction) but capped at: 0,5% of gross value added (average last 3 years) for all consumers with electricity cost >20% of gross value added,

				and 4% of gross value added (average last 3 years) for all consumers with electricity cost <20% of gross value added. **B.** If consumption > 1 GWh/year and electricity cost is: • For an extensive list of industrial sectors (annexe 3 of EEAG): between 14 and 17% of gross value added (avg. last 3 years) The rate is 13,00 EUR/MWh (80% reduction) but capped at 0,5% of gross value added (average last 3 years) for all consumers with electricity cost >20% of gross value added and 4% of gross value added (average last 3 years) for all consumers with electricity cost <20% of gross value added. For consumers meeting the conditions from option A or B and active in the aluminium, lead, zinc or copper production, can benefit from a bottom rate of 0,5 EUR/MWh.
All other costs	Stromsteuer	No	Pension contributions + process criteria	The ***electricity tax*** in Germany has a base rate of 20,50 EUR/MWh, and a lowered rate of 15,37 EUR/MWh for all industrial companies. Initially implemented to fund employees' pensions, companies may be granted important reductions on the electricity tax if they have low pension contributions due to a limited number of employees. The maximum reduction is 90%. A company that uses electricity as a raw material is exempted from the tax.
All other costs	Konzessionsabgabe	No	(indirect) electricity cost/turnover	For the ***concession fee*** on electricity, all industrial consumers benefit from a basic rate of 1,1 EUR/MWh. If an industrial consumer's total electricity bill is below an annually fixed threshold (2018: 139,2 EUR/MWh) it is exempted from the concession fee. In other words: companies that pay the full rate on the EEG-Umlage will almost certainly pay the concession fee as well. The Concession fee can be seen as an amplifier of other reduction.

France

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
Transmission costs	Transmission tariffs reductions	No	Load profile + annual offtake+ offtake/value added + trade intensity	On transmission tariffs, several reductions apply: **<u>Group A:</u>** • Stable consumption profiles with annual offtake >10 GWh/year and over 7000 hours; • Anti-cyclical profiles with annual offtake >20 GWh/year and off-peak grid utilisation over 44%; • Large consumers with annual offtake >500 GWh/year and off-peak grid utilisation between 40-44%. Group A is granted: • 80% reduction when hyper electro intensive*; • 45% reduction when electro intensive**; • 30% reduction for power storage sites connected to the grid; • 5% reduction when none of both. **<u>Group B:</u>** • Stable consumption profiles with annual offtake >10 GWh/year and over 7000 hours; • Anti-cyclical profiles, annual offtake >20 GWh/year and off-peak grid utilisation over 48% Group B is granted: • 85% reduction when hyper electro intensive*; • 50% reduction when electro intensive**; • 40% reduction for power storage sites connected to the grid; • 10% reduction when none of both. **<u>Group C:</u>** • Stable consumption profiles, >10 GWh/year and over 8000 hours; • Anti-cyclical profiles, annual offtake >20 GWh/year and off-peak grid utilisation over 53%. Group C is granted: • 90% reduction when hyper electro intensive*; • 60% reduction when electro intensive**; • 50% reduction for power storage sites connected to the grid; • 20% reduction when none of both. *Hyper-electro-intensity is defined as > 6 kWh consumption per euro of value added, with a trade-intensity over 25%.

				**Electro-intensity is defined as >2,5 kWh of consumption per euro of value added with a trade-intensity over 4% and an annual offtake over 50 GWh.
All other costs	Contribution au service public d'électricité (CSPE)	Yes	Offtake/value added	The ***CSPE*** has a base rate of 22,5 EUR/MWh. Three reductions apply, based on consumption criteria: 1. For electro-intensive consumers where the CSPE would have been (without reductions and exemptions) at least equal to 0,5% of value added, the CSPE is equal to: • For consumers consuming above 3 kWh per euro of value added, CSPE is equal to 2 EUR/MWh; • For consumers consuming between 1,5 and 3 kWh per euro of value added, CSPE is equal to 5 EUR/MWh; • For consumers consuming below 1,5 kWh per euro of value added, CSPE is equal to 7,5 EUR/MWh. 2. For hyper-electro-intensive consumers, the tariff amounts to 0,5 EUR/MWh. To be very electro-intensive, consumers must satisfy both conditions: • its energy consumption represents more than 6 kWh per euro of value added • its activity belongs to a sector with a high trade intensity with third countries (> 25%). 3. Sectors with a high risk of carbon leakage are metallurgy, electrolysis, non-metal minerals or chemical sectors. For electro-intensive consumers described under (i) above with a high risk of carbon leakage linked to indirect carbon emissions, the CSPE amounts to: • for consumers consuming above 3 kWh per euro of value added, CSPE is equal to 1 EUR/MWh; • for consumers consuming between 1,5 and 3 kWh per euro of value added, CSPE is equal to 2,5 EUR/MWh; • for consumers consuming below 1,5 kWh per euro of value added, CSPE is equal to 5,5 EUR/MWh.
	Contribution tarifaire d'acheminement" (CTA)	No		The ***CTA*** for electricity is a surcharge for energy sector pensions. It amounts to 21,93% of the fixed part of the distribution tariff (that implicitly includes transmission costs) for consumers connected to the distribution grid. One reduction applies, based on grid level criteria: for consumers directly connected to the transmission grid (E2; E3 and E4), the CTA amounts to 10,11 % of the fixed part of the transmission tariff.

The Netherlands

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
Transmission costs	Volumecorrectie	No	Annual offtake + load profile	A substantial reduction ("volumecorrectie") on transmission tariffs is granted to large baseload consumers when they meet both the following criteria: • Annual consumption > 50 GWh/year; • Annual off-peak consumption > 65% of all 2.920 annual off-peak hours. Reductions are incremental and cannot exceed 90%
All other costs	Regulerende Energie Belasting (REB)	No	Annual consumption	The energy tax is a digressive tax with the applying rates: • 0 - 10 MWh/year: 36,79 EUR/MWh; • 10 - 50 MWh/year: 43,61 EUR/MWh; • 50 - 10.000 MWh/year: 11,89 EUR/MWh; • > 10.000 MWh/year: 0,57 EUR/MWh.
All other costs	Opslag Duurzame Energie (ODE)	Yes	Annual consumption	The ODE-levy is a digressive tax with the applying rates: • 0 - 10 MWh/year: 30,50 EUR/MWh; • 10 - 50 MWh/year: 41,80 EUR/MWh; • 50 - 10.000 MWh/year: 22,90 EUR/MWh; • > 10.000 MWh/year: 0,50 EUR/MWh.
All other costs	Teruggaafregeling	No	Annual consumption + taxes/value added + process criteria (condition: energy efficiency agreement)	The ***"teruggaafregeling"*** is destined for industrial consumers who are classified as being energy-intensive and who concluded a multiple-year agreement with the Dutch government to save energy by improving their energy efficiency. These consumers can apply for a refund of any tax paid above their consumption of 10.000 MWh after each financial year. Concretely, the payback potentially granted is computed as the positive difference between: a. The tax due on electricity consumption and; b. The highest amount between the tax normally due on the first 10 GWh consumption and the tax that would be due if all consumption was taxed at a rate equal to the European minimum level of taxation (0,5 EUR/MWh). This refund is to be computed on joined taxes amounts for the Energy tax and the ODE. An energy-intensive company is a company for which the costs of energy or electricity is more than 3% of the total value of production or the energy taxes and tax on mineral oils is at least 0,5% of the value added (Wet Belastingen op Milieugrondslag, Artikel 47, 1p). An exemption is also granted to those industrial consumers that use their electricity for chemical reduction, electrolytic and metallurgic processes.

United Kingdom

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
All other costs	Climate Change Levy	Yes	Energy efficiency	The ***Climate Change Levy*** has a base rate of 7,75 GBP/MWh. When users have signed up to a Climate Change Agreement (sectoral or individual), they can obtain a 93% reduction.
All other costs	Renewables Obligation	Yes	Annual offtake	A quota of 0,492 Renewable Obligation Certificate (ROC) applies per MWh. Companies missing this quota must pay 50,8 GBP/missing ROC.

Natural gas

Belgium

Federal level

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
All other costs	Federal special excise duty	Not directly	Annual consumption	The new federal degressive excise duty is applied to residential and industrial profiles with two sets of rates, depending on annual consumption levels. ***Residential profiles***: • 0 – 20.000 MWH /Year: 0,54 EUR/ MWH • 20.000 – 50.000 MWH /Year: 0,46 EUR/ MWH • 50.000 – 250.000 MWH /Year: 0,44 EUR/ MWH • 250.000– 1.000.000 MWH /Year: 0,34 EUR/ MWH • 1.000.000 – 2.500.000 MWH /Year: 0,18 EUR/ MWH • > 2.500.000 MWH /Year: 0,15 EUR/ MWH ***Commercial profiles***: • 0 – 20.000 MWH /Year: 0,66 EUR/ MWH • 20.000 – 50.000 MWH /Year: 0,56 EUR/ MWH • 50.000 – 250.000 MWH /Year: 0,54 EUR/ MWH • 250.000– 1.000.000 MWH /Year: 0,42 EUR/ MWH • 1.000.000 – 2.500.000 MWH /Year: 0,22 EUR/ MWH • > 2.500.000 MWH /Year: 0,15 EUR/ MWH
All other costs	Energy contribution		Energy efficiency + sector criteria	***Energy contribution*** with a base rate of 0,9978 EUR/MWh. Two other cases exist: • Companies part of an energy efficiency agreement pay 0,54 EUR/MWh. • Companies that use natural gas as a raw material are totally exempted.

Regional level

Wallonia

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
All other costs	Connection fee	No	Annual offtake	Digressive rates apply to the ***connection fee***. For the first 100 kWh, the rate is of 7,5 EUR/MWh for all consumers. Above that base rate, different rates apply to different consumers: • 0,75 EUR/MWh for consumers with an annual consumption below 1 GWh; • 0,06 EUR/MWh for consumers with an annual consumption from 1 to 10 GWh; • 0,03 EUR/MWh for consumers with an annual consumption equal to or above 10 GWh.

Germany

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
All other costs	Energiesteuer	No	Pension contributions + process criteria	The ***energy tax*** on natural gas in Germany has a base rate for industrial use of 5,5 EUR/MWh, and a standard reduced rate of 4,12 EUR/MWh. Further reductions are attributed based on the amount of pension contributions a company pays: the fewer pension contributions (on which the state has given some reductions) a company pays, the more right it has to reductions on the Energy tax. The minimum rate is 2,068 EUR/MWh. When a company uses natural gas for purposes other than fuel or heating, it is exempted from the energy tax on natural gas.

France

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
All other costs	Taxe intérieure sur la consommation de gaz naturel (TICGN)	No	Carbon market participation + sector criteria	The ***TICGN*** tax has a base rate of 8,43 EUR/MWh with potential reductions/exemption applying as follows: • companies that participate in the carbon market and that are energy intensive can pay a reduced rate: 1,52 EUR/MWh; • companies that belong to a sector with a high risk of carbon leakage and that are energy-intensive can pay a reduced rate: 1,60 EUR/MWh; • companies that do not use natural gas as a fuel (for example as a raw material) are exempted from the TICGN.
All other costs	Contribution tarifaire d'acheminement (CTA)	No	Grid level	The ***CTA*** is a surcharge for energy sector pensions. For clients connected to the distribution grid, the CTA amounts to 20,8% of the fixed part of the transmission tariff. One reduction applies: for clients directly connected to the transmission grid, the CTA amounts to 4,71% of the fixed part of the transmission tariff.

The Netherlands

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
All other costs	Regulerende Energie Belasting (REB)	No	Annual consumption	The ***energy tax*** is a digressive tax with the following applying rates: • 0 – 5.000 m³: 0,36322 EUR/m³; • 5.000 – 170.000 m³: 0,36322 EUR/m³; • 170.000 – 1.000.000 m³: 0,02417 EUR/m³; • 1.000.000 - 10.000.000 m³: 0,01298 EUR/m³; Companies that do not use natural gas as a fuel (for example as a raw material) are exempted from the energy tax.
All other costs	Opslag Duurzame Energie (ODE)	Yes	Annual consumption	The ***ODE-levy*** is a digressive tax with the applying rates: • 0 – 5.000 m³: 0,0865 EUR/m³; • 5.000 – 170.000 m³: 0,0865 EUR/m³; • 170.000 – 1.000.000 m³: 0,0239 EUR/m³; • 1.000.000 - 10.000.000 m³: 0,0236 EUR/m³. Companies that do not use natural gas as a fuel (for example as a raw material) are exempted from the ODE Levy.

United Kingdom

Component	Measure	Supports the development of renewable energy sources	Criteria	Reduction/exemption/caps
All other costs	Climate Change Levy	Yes	Energy efficiency + sector criteria	The Climate Change Levy has a base rate of 4,65 GBP/MWh for natural gas (January 2021). When users have signed up to a Climate Change Agreement (sectoral or individual), they obtain a 19% reduction. Companies that do not use natural gas as a fuel (for example as a raw material) are exempted from the Climate Change Levy.

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