Analysis of the price setting of energy products (electricity and natural gas) in retail markets (households and small enterprises) for Belgium, Netherlands, Germany, France and the United Kingdom

A report for CREG
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Executive Summary

During the past months substantial wholesale energy price increases have occurred across Europe. The impact of these increases on the retail energy bills (electricity and gas) of households and SMEs has differed significantly from country to country. Through empirical research including the latest data and recent interviews with suppliers, this report looks in detail at the price evolutions and drivers of five selected countries, namely Belgium, France, Germany, Great Britain and the Netherlands. In so doing, it identifies key reasons behind the differences between the markets, past and present and provides insight into how the impacts of such crises may be limited in future.

Among the five markets, during the five to six years before the energy crisis, Germany had by far the highest residential (all-in) prices for electricity and the Netherlands had the highest for gas. During the energy crisis however, electricity prices have so far risen the most in the Netherlands, Belgium and Great Britain, bringing them broadly in line with German prices. France has managed to largely buck the trend. For gas, the Netherlands has increased by far the most, but Germany, Great Britain and Belgium have also increased substantially. Once again, France has seen the least increase, albeit far more than for electricity. For SMEs, data is more limited but prices for electricity are (as of May 2022) clearly highest in Great Britain and lowest in France.

If we isolate the residential energy component of the bill, we see the biggest price increases in the Netherlands for both electricity and gas, and once again the smallest increases for France. Historically, Great Britain has had the highest prices. It is important to additionally note that all markets have been broadly following the same trends and for all, the current energy crisis has resulted in prices that are unprecedented in level and behaviour.

Looking at the most significant residential product types, namely fixed and variable tariffs, despite a general historical dominance of fixed contracts, during the crisis many suppliers are choosing not to offer fixed tariffs, especially in the Netherlands and Belgium, and where they are offered (except for Germany) they are now more expensive than variable contracts. Fixed tariffs are more expensive also for SMEs except in the Netherlands (where fixed are currently not offered) and Great Britain (where they are the only option).

Looking closer, it is further observed that during the current energy crisis, incumbent default prices have generally been both lower and less volatile than other prices in all five markets.

But what about the relationship between wholesale (spot) and residential retail prices (energy component)? The energy crisis has seen a major increase in the responsiveness of all five markets to spot prices. The level of correlation has increased, and the time lags decreased, dramatically in all cases, for both electricity and gas, and for different tariff types. The most responsive market for both electricity (by a significant margin) and gas is Belgium (Brussels), the least responsive is France (electricity) and Germany/Netherlands (gas). Concerning the relationship between wholesale (futures) and residential retail prices (energy component), there are close correlations for all the electricity markets except France and for all the gas markets. More specifically, Belgium (Brussels) again has the highest correlation for electricity and joint highest for gas, while France has the lowest for electricity and joint highest for gas.

There are also differences in the indicative gross margins of each market. While historically highest in Great Britain, followed by Germany, Netherlands, France and Belgium, during the energy crisis the situation has changed dramatically and as of May 2022 the Netherlands has had the largest margins, far ahead of Belgium and Germany, with France and Great Britain in negative territory. On closer inspection, while incumbent default prices historically deliver the highest indicative gross margins, during the energy crisis so far, competitors' margins have fared best except in France. Germany is however believed to have had (and to this day) the highest net margins.

The reasons for these differences are many.

Wholesale (spot) Volatility

Germany has experienced the largest increase in electricity wholesale volatility in recent years and France the least. For gas, the rates of change have been very similar across the target markets. However, in terms of sheer level of electricity wholesale volatility, France, Belgium and Germany respectively are significantly higher than the Netherlands and Great Britain. For gas the levels are similar for all markets. Since wholesale volatility is built into responsible retail pricing in form of a risk margin, it is expected that French, German and Belgian retail prices would incorporate the most wholesale volatility risk within bills, although in France a smaller share of procurement relates to wholesale.

Retail Volatility

While only a small proportion of wholesale (spot) volatility is passed onto retail prices in any of the markets, Belgium (Brussels) electricity retail prices have historically passed through more wholesale volatility to retail prices and done so most efficiently, whereas France has passed through the least and done so least efficiently. Belgium (Brussels) is also the leader regarding gas with France second.

Wholesale Liquidity

Wholesale liquidity is considered a substantial issue under normal circumstances by suppliers interviewed in all markets except Germany and France, but during the current energy crisis, it is also considered an issue in these two countries. Specifically in Great Britain, it is argued that electricity wholesale liquidity is worse than gas wholesale liquidity. The issue is considered even more problematic in the mid to longer-term-

Energy Procurement and Hedging

Belgium and Netherlands suppliers appear to follow a relatively safe procurement strategy with long-term (three year except for gas in Belgium) hedging, slightly weighted towards the near term (one year) to allow for competition risk. German suppliers, especially larger ones, tend to be more diverse in their procurement (often including own generation), assuming a large proportion of inactive customers on standard tariffs and a highly stable average retail price and therefore hedging extremely evenly, for electricity at least. For gas (in particular) Stadtwerke and other larger players may additionally have long-term agreements, placing less emphasis on hedging. In Great Britain, with traditionally the highest levels of competition and now a variable price cap that changes every six months (soon to be every three months), while it is important to hedge well, there is a relatively high need for price flexibility, and therefore, at least for electricity, a slightly shorter-term perspective to electricity hedging. By no means, however, could it be said that the market is poorly hedged. In France, the ARENH is the underlying source of baseload procurement and hedging, whereas procurement on the spot market and hedging on the futures market is more for profiling and therefore only part of the procurement and hedging picture. While these conclusions are necessarily general and simplistic and primarily representing the larger and / or incumbent suppliers, they nevertheless provide a contributing explanation for, and reflection of, retail price component behaviour.

Bill Component Mix

Each of the markets has very different levels for each component (different proportions of energy, network fees, taxes and VAT). The impact of any change in component prices (the component directly affected by wholesale prices) is therefore highly dependent on these proportions. A large electricity wholesale increase will have a far greater impact on residential bills in Great Britain and the Netherlands than the other markets. In the case of the Netherlands, this relative impact has increased heavily since 2020 due to a temporary reduction in taxes. In Germany, because of the EEG tax which decreases as wholesale prices rise, an increase in electricity wholesale is partially compensated. Gas wholesale increases will currently have the greatest impact on residential bills in Belgium (Brussels) and (recently due to the temporary reduction in taxes) the Netherlands.

Price Regulation

Four of the five markets have some form of permanent or long-term price regulation: France has a regulated default price; Great Britain has a price cap that applies to a standard tariff which all suppliers must offer; the Netherlands has standard variable 'model' tariffs - hitherto rarely chosen but heavily so during the energy crisis - which per se are not price-regulated but which can be adjusted at most twice yearly (more in 'exceptional' market conditions). Germany does not have regulated prices per se, but many stadtwerke have default prices which are influenced by local political decisions and changes to default prices are bound by regulations. Belgium does not have regulated prices, but does have social tariffs, explained further below. Without doubt, the above-mentioned regulations in Great Britain and France have kept prices lower than they would have otherwise been. In the Netherlands the impact has been muted by customers moving onto model tariffs. In Germany the impact is regional and is probably not reflected in the prices shown in this report. In Belgium, typical prices have not been impacted.

Additionally, there has been a wide range of social tariffs, short-term tariff-support and other support measures across the five markets. Some of these measures have an impact on prices directly (some more transparent than others) and some impact consumers' pockets. The later, as well as social tariffs are not apparent in international price comparisons, since mainstream tariffs are not directly affected. Likewise, measures that affect tariffs directly make prices look cheaper in the markets where they apply. This is the case in France, the Netherlands and Germany.

Regulations around tariff changes are also impactful on the way prices behave. Belgium appears to be the least flexible and the Netherlands the most flexible for variable tariffs, and apart from Germany, it is generally necessary for suppliers in all markets to honour fixed-price contracts for the duration of those contracts.

Tariff Mix

The energy crisis has changed the types of tariffs that customers are on. Especially in Great Britain, prior the price cap and the energy crisis, most customers had switched supplier (approximately 70% of the market), and a sizable proportion of the rest had fixed price contracts. At the time of writing this report (May 2022), we estimate that approximately 70-80% of all customers are on a standard variable tariff at or below the price cap. In the Netherlands, prior to the energy crisis, the vast majority of customers were on fixed price contracts. At present it is estimated that approximately half are on model tariffs, in addition to those on other variable price contracts. Since different tariff types have different prices, average weighted price levels are altered by the changing tariff mix.

Net Margins

Higher net margins in normal times help suppliers to weather the storms. Suppliers in Germany, particularly incumbent suppliers, have generally enjoyed relatively good margins on inactive incumbent customers (who make up most of their customers). Suppliers in Great Britain have endured low or negative net margins for several years. While suppliers in Great Britain have needed prices to rise even before the crisis in order to make a profit, many suppliers in Germany have at least had some buffer to play with. The price elasticity of German suppliers has therefore arguably been lower than that of suppliers in Great Britain.

Cross Subsidization

While some degree of cross subsidization could be said to exist in all markets, Germany appears to stand out as the market most impacted by it. A lack of ownership unbundling, major incumbent advantage and own generation combine to provide suppliers with a greater ability to muffle energy component or even all-in price rises.

Competition

Great Britain has long had the highest levels of competition in Europe - with some periods of exception. While not shown in the levels of switching (since the rate of switching may be higher if customers switch more often even if less customers switch), the Netherlands is the second most active market. What's more, in Great Britain prices, savings and margins of electricity (prices and savings for gas) are significantly influenced by switching, indicating that competition substantially impacts commercial fundamentals. This is not to say that there is not a relationship also in other markets, but the relationship is strongest in Great Britain.

Cost to Serve

Many factors impact cost to serve including supplier systems and efficiency, the cost of winning customers, economies of scale, the cost of defaulting customers, the nature of processes, the ability to tie-in customers, imbalance costs and many more. The sum of these forms a large share of the cost of the energy component, second only to the cost of procuring the energy, and therefore represents a substantial influence on prices. While it is not possible to quantify the sum or impact, and each market has pros and cons in this respect, it is believed that Great Britain has the highest costs, despite having generally good systems, processes and economies of scale, largely due to the regulatory obligations placed on suppliers. Germany is considered to have the second highest levels largely due to system and process inefficiencies, despite also having many advantages.

Pricing Strategies

Ultimately, unless regulated, suppliers can set their own prices. While a variety of different pricing philosophies, approaches and models by suppliers have been identified through the interviews and research conducted for this report, a remarkable degree of similarity has also been observed. Nevertheless, many differences exist. For instance, German suppliers tend to take a longer-term perspective to pricing - in contrast to the shorter-term perspective in Great Britain. In France, suppliers tend to benchmark against the regulated price. In the Netherlands, suppliers have until recently tended to only change prices twice per year. Where a biggest difference lies, however, is in the amount of risk that needs to be factored into prices. Many different risk factors are described in the research, but in general it appears that the greatest amount of factored risk exists in Great Britain and Belgium, with France and Germany having the least. But there are also strategic considerations that are peculiar to specific markets.

Combined impact

With so many diverse and complex factors impacting prices, many of which are impossible to quantify and many of which are barely transparent, it is not realistic to attempt to sum up the impact of all these factors for each market to explain the differences in prices between those markets. Nevertheless, it is clear the differences make sense in light of what has been identified in this report. Retail prices do closely follow wholesale markets, but there is a long way from wholesale price levels to retail price levels, most of which can be explained.

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1. Introduction

1.1. Background and objectives the report

During the past months, substantial wholesale energy price increases have occurred across Europe. The impact of these increases on the retail energy bills (electricity and gas) of households and SMEs has differed significantly from country to country. Through empirical research including the latest data and interviews with suppliers, this reports looks in detail at the price evolutions and drivers of five selected countries, namely Belgium, France, Germany, Great Britain and the Netherlands. In so doing it identifies key reasons behind the differences between the markets, past and present and thereby provides insight into how the impacts of such crises may be limited in future.

The writers stress, however, that this report does not in any way aim to judge markets in terms of how good or well regulated they are. Markets all have their own unique contexts underlying their different prices, price drivers and regulations. The report merely aims to understand what is behind the differences in prices and price behaviours. Any judgements made or inferred by interviewees were provided for additional perspective.

1.2. Colour coding used in the report

In order to facilitate a consistent understanding of the colours within the many graphs contained in this report, each country has been assigned a separate colour scheme as described below. For graphs where there are multiple shades per country, shades of the same colour have been used.

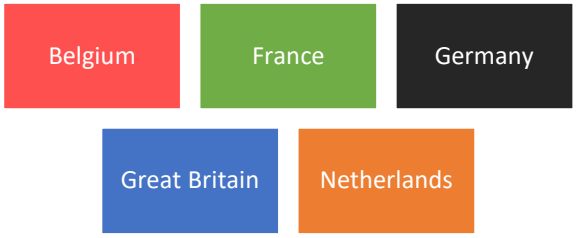


Figure 1: Analysed countries and colour-coding used throughout the report

1.3. Countries vs Capitals

Quantitative price data and analysis presented in this report relates to the capital cities of the respective countries unless stated otherwise. Discussion and insights concerning price drivers, including interview findings and market and regulatory characteristics relate to the countries and not just the capital cities. In the case of Belgium, to avoid confusion regarding which of the three markets the report is referring to, whenever referring to a specific Belgian market, that market is stated in parenthesis.

2. Research Methodology

2.1. Approach

The approach followed in this report incorporates a combination of quantitative analysis and qualitative insights to identify and explain the factors that have been driving retail price developments and differences in the selected markets. Quantitative analysis was used to identify patterns and relationships between prices and potential price drivers, while qualitative insights acquired by interviews with energy suppliers active in the analysed markets were used to cross-check the analysis findings and facilitate their interpretation.

Three types of retail price drivers were searched for, although not separated into the following categories:

Generic Price Drivers: Drivers of retail energy prices and price developments in general. Identification of common approaches for, and influences on the setting of retail energy prices. Consideration was also given, to varying degrees, of how prices setting differs according to regulation, product, customer, competition, company, and other factors.

Market Specific Drivers: Drivers of retail energy prices and price developments in each selected market. Diving deeper into the focus markets, identification of differentiated trends and relationships between the markets. Consideration was additionally given to country specific regulations and differences in the competitive and market environment.

Supplier Specific Drivers: Drivers of retail energy price developments at a supplier level: Using the material collected from supplier interviews, observations of supplier behaviour and existing supplier insight. Consideration was also given to supplier pricing approaches. Analysis and reporting of these drivers was limited however, by confidentiality requirements.

2.2. Sample

The analysis has been contacted using price data from Household Energy Price Index (HEPI) project[1], a public research project that provides granular updates on residential end-user prices and breakdown for typical consumers living in the capital cities of the analysed countries. HEPI data was combined with other datasets from VaasaETT's database, including spot prices and futures, average price per contract type, dual fuel prices, SME prices, prices for multiple regions of the selected countries and national price data from CREG.

Interviews with suppliers covered the following main driver categories: costs, margin containment, cross subsidisation, supplier model, product type, non-price incentives, customer segments, strategic orientation and corporate capability, market enablement and regulations. In total, interviews covered 17 suppliers, some of them in multiple markets.

Market	Related Interviews
Belgium	3
France	3
Germany	6
Great Britain	7
Netherlands	5

Confidentiality

All suppliers were interviewed on condition of confidentiality and anonymity. Most, though not all, suppliers, allowed us to reveal their name, but only in isolation from what they said and which market(s) they referred to. While this approach limited supplier descriptions and stereotypes, it also resulted in more open, extensive, and therefore insightful discussions with suppliers. We gratefully acknowledge the kind cooperation and support of all suppliers who participated in the interviews.

2.3. Data Analysis

Identification of relationships between variables

An important part of the conducted data analysis was the examination of relationships between prices and other variables, to identify the potential price drivers and assess their impact in end-user price and its energy component. Pearson's correlation coefficient was used for that; the statistical significance of the correlation has also been calculated, to correctly interpret the real impact. Although correlation coefficient does not allow the distinction between correlation and causation, to reassure the correct interpretation of the results we have used qualitative insights from the energy markets and information from the supplier interviews.

Identification of time-lags between wholesale and retail price

We have investigated the relationship of wholesale prices and energy component of retail price, taking under consideration the fact that some time is needed for fluctuations in the wholesale price to be reflected into retail price. We have tried to identify this time period for each market, by calculating the correlation between wholesale and retail energy price with different time delays (lags, in months). The selected lag for each market was the one that maximised the correlation coefficient.

Calculation of indicative gross margins

Indicative gross margins were calculated for each market, taking under consideration the time-lag between wholesale and retail price in the calculations. To reflect the changes in the behaviour of the markets due to the recent extraordinary circumstances (COVID-19, energy crisis, war in Ukraine), two time-lags were taken under consideration per market; one for the period 2016-2019 and one for the period 2020-2022.

[1] Household Energy Price Index project, funded by e-Control and MEKH, available at https://www.energypriceindex.com/ .

2.4. Limitations of the Research

Scope and Confidentiality

The complexity of retail energy price drivers is enormous, in terms of the number of drivers and the dynamics behind them. Given this complexity and the finite extent to which suppliers are willing to reveal their pricing secrets, the depth of research is naturally limited to what could be collected and analysed given the time and cooperation available to the researchers.

Correlation vs Causation

Extensive use of correlation analysis is used in the report. It is accepted that correlation does not in itself prove causation. For this reason, the correlation analysis results should be, and are, considered in light of other evidence, insight and reasoning.

HEPI data correspond to offer prices

Hepi price data used in the report relates to prices on offer in the market at the time of data collection. Prices that are currently paid by consumers in the market depend on the tariff they were provided at the time of agreeing their contract. For many customers, this price may be different from the 'offer price' at a given time. For instance, if a customer received a fixed price, fixed term contract in August 2021, they would still have that fixed price in May 2022 and that fixed price would be different from a similar fixed price, fixed term contract offered in May 2022. But since the Hepi offer price average for any given time includes a weighted mix regulated, standard variable and other variable contracts (which are representative of all customers on such contracts at the time of data collection) as well as fixed prices, Hepi price data does in fact represent a large proportion of customers in each market.

HEPI data correspond to prices for the country capitals

HEPI data used in the report relates to price data for capital cities. It is not a perfect representation of national price data. However, extensive analysis by VaasaETT (including analysis of multiple post codes in each market) has identified that the capital city data provides a good representation of average national prices. It is also a highly comparative approach. Nevertheless, analysis is provided in the report of differences between cities, towns and rural areas. Additionally, for Belgium, comparison of different regions is provided.

Interview Sample

The suppliers interviewed represent a sample. They are not intended to be statistically representative. They are, however, a broad mix of types of suppliers, and represent a large proportion of customers across the markets concerned.

3. National Retail Price Characteristics and Wholesale Relationship

3.1. Current and historical price levels for residential consumers

The all-in end user price for a residential customer of gas and electricity remained relatively flat for the five years prior to the COVID-19 pandemic in all the target markets. For electricity there was some volatility, especially in the Netherlands and Belgium (Brussels) in 2015, 2018 and 2019, mainly caused by nuclear outages, but nothing particularly excessive. During that time Germany consistently had the highest prices by a significant margin, with the other markets relatively like one another, although France had the most consistent price. Belgium (Brussels), the Netherlands and Great Britain swapped positions multiple times.

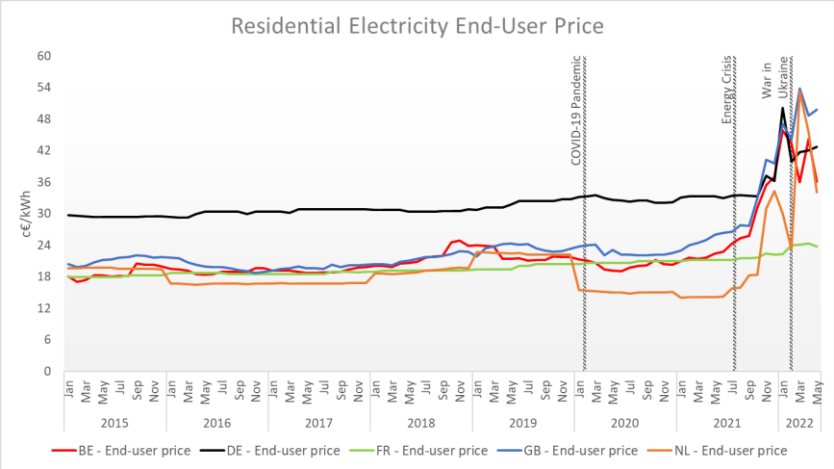


Figure 2: Comparison of end-user electricity price trend among analysed countries

During the COVID-19 pandemic, electricity prices dropped dramatically and suddenly in the Netherlands, continuing to fall slightly until the onset of the energy crisis. Prices in Belgium (Brussels) and Great Britain also fell slightly, so too in Germany but in the case of Germany only very slightly and only for a few months before bouncing back. Prices in France remained stable until the energy crisis. As a result, during the pandemic period, there was far more differentiation between the prices of each of the markets. So far (May 2022), during the energy crisis prices of all markets except France increased dramatically. The Netherlands changed the most, rising from cheapest to - momentarily – most expensive and then falling to second cheapest after France, as of May 2022. Prices in Germany also experienced an uncharacteristically sudden increase, but less than others except France. Great Britain increased so dramatically that it took over the leader position as the most expensive of the five markets by a significant margin in May 2022. So how do the electricity markets rank?

- If we look at long-term average all-in electricity prices between January 2015 and May 2022 (including also the crises periods until the time of writing this report), as shown in the following table, the Netherlands and France have had the cheapest prices, followed by Belgium (Brussels) and then Great Britain, 25% below Germany's prices.
- If we exclude the crises periods (COVID-19 and current energy crisis period from 2020 onwards), the ranking is the same but Great Britain (the second most expensive) is 30% cheaper than Germany.
- If we only look at the crisis periods from 2020-present, once again the ranking is the same, but the gap narrows between Germany and the other markets except the Netherlands which becomes relatively cheaper compared to the rest, although still close to France.

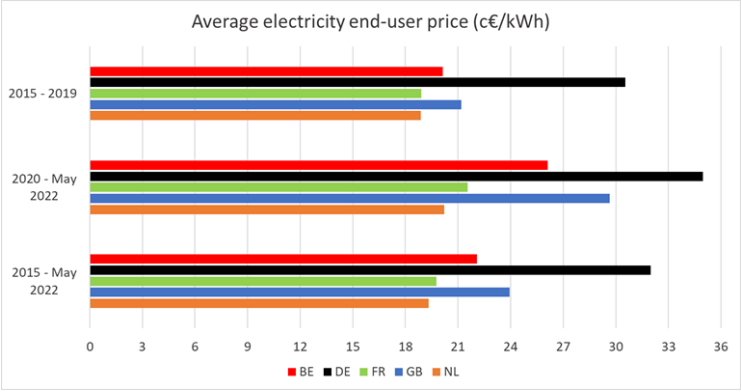


Figure 3: Comparison of average electricity end- user price in three time periods among analysed countries

For gas, prior to the COVID-19 pandemic the level of volatility was quite similar to electricity, but the Netherlands had higher prices than the other markets, increasingly so, especially since 2019.

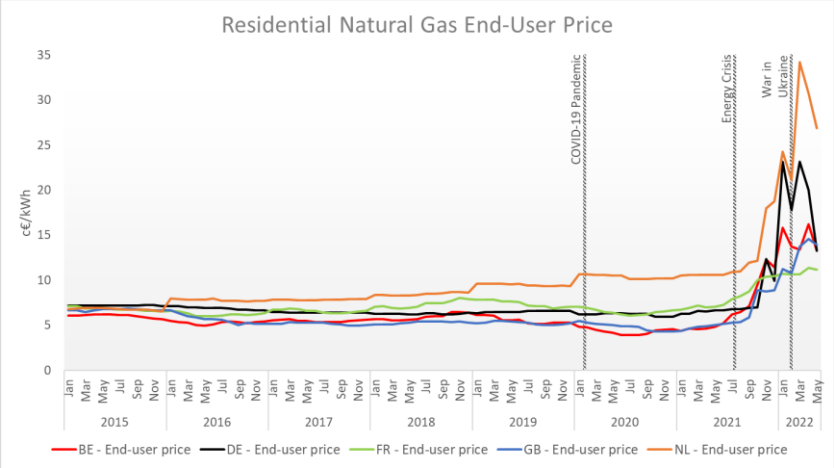


Figure 4: Comparison of end-user natural gas price trend among analysed countries

During the pandemic, while prices in Belgium (Brussels), Great Britain, and even France and Germany fell slightly, at least temporarily, prices in the Netherlands increased substantially, accentuating a trend that had already been ongoing for several years and making it by far the most expensive market.

So far (May 2022) during the energy crisis, extreme increases in the Netherlands have made it far and away the most expensive market for gas offers, followed by Germany, Belgium (Brussels) and Great Britain. Due to its more modest increases, France has now become the cheapest of the five markets.

So how do the gas markets rank in terms of price?

- If we look at long-term average all-in gas prices between January 2015 and May 2022, Great Britain has had the cheapest prices, followed closely by Belgium (Brussels) and then France followed by Germany, with the Netherlands which has been on average 35% more expensive than Germany and 68% more expensive than Great Britain.
- If we exclude the COVID-19 and current energy crisis period (2020 onwards), the ranking changes with Great Britain and Belgium (Brussels) the cheapest, followed by Germany and France and then the Netherlands.
- If we only look at the COVID-19 and energy crisis period (2020-present), Great Britain has been the cheapest, followed by Belgium (Brussels), France and Germany, with the Netherlands 57% more expensive than Germany and 110% more expensive than Great Britain.

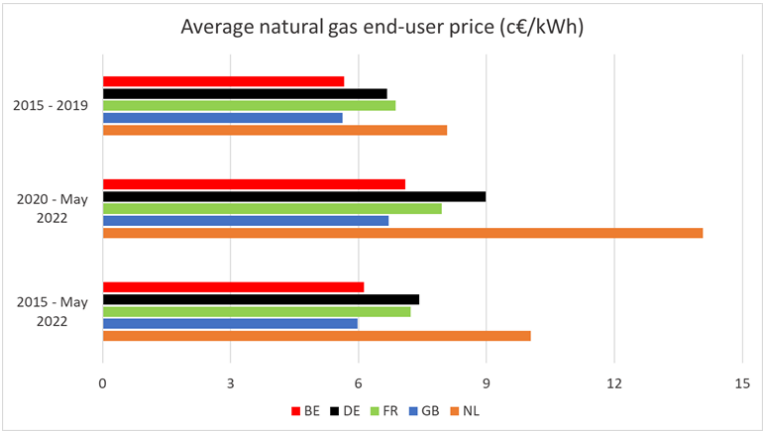


Figure 5: Comparison of average natural gas end- user price in three time periods among analysed countries

Regarding Belgium, it is important to note that the prices described in the above analysis and for most of the report refer to Brussels. The following figures, based on data from CREG, provide a picture of relative end user (all-in) prices in each of the three Belgium regions for electricity and gas. As can be seen, Brussels has electricity prices that are significantly lower than the other regions, but patterns are very similar for all three. For gas prices Brussels is between the other two regions and the

patterns are extremely similar for all three regions. The prices for Brussels (data by CREG) were analysed and found to be very similar to the VaasaETT data[2]

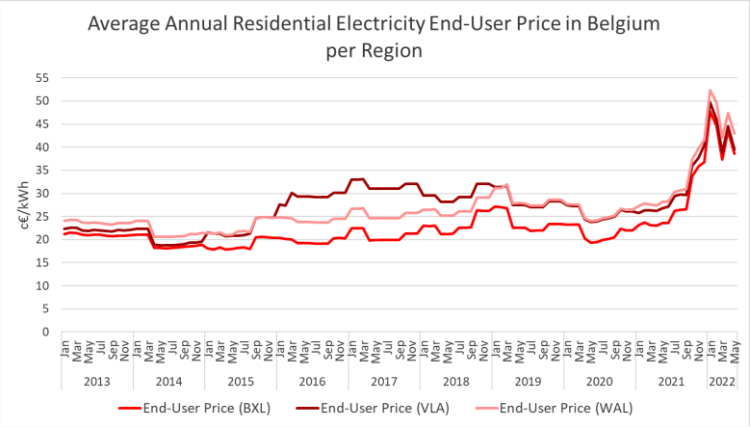


Figure 6: Comparison of average annual residential electricity end-user price among three different regions of Belgium (BXL: Brussels, VLA: Flanders, WAL: Wallonia)

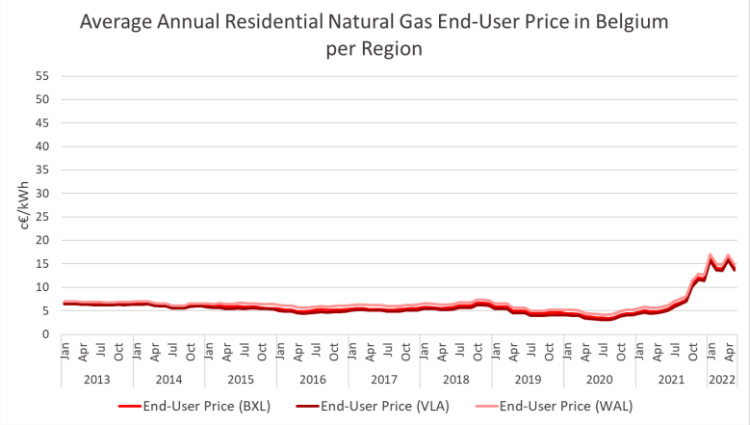


Figure 7: Comparison of average annual residential natural gas end-user price among three different regions of Belgium (BXL: Brussels, VLA: Flanders, WAL: Wallonia)

In general, in all five focus markets, electricity and gas prices are extremely similar across cities, towns and rural areas. The separation into cities, towns and rural areas in Figure 8 is based on the typology developed by DG Regional and Urban Policy, Agriculture and Rural Development[3]. Germany is the only market with noticeable differences, but even those differences are very small considering the large size and diversity of the German market.

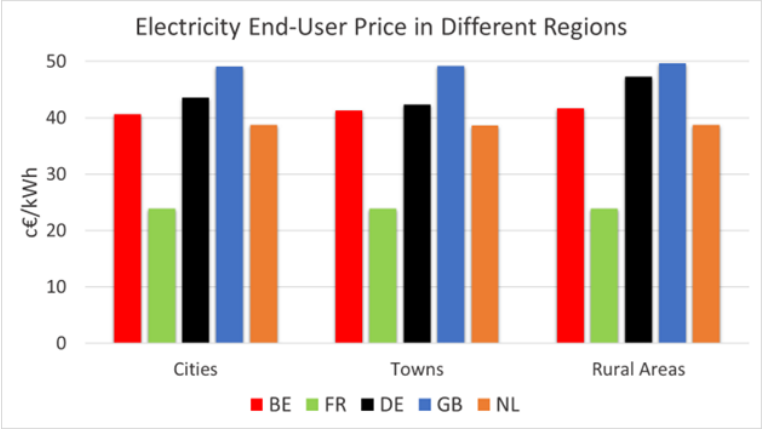


Figure 8: Electricity end-user price of a typical household customer among different regions, May 2022

[2] See Appendix 1.
[3] Available at https://ec.europa.eu/eurostat/web/degree-of-urbanisation/methodology.

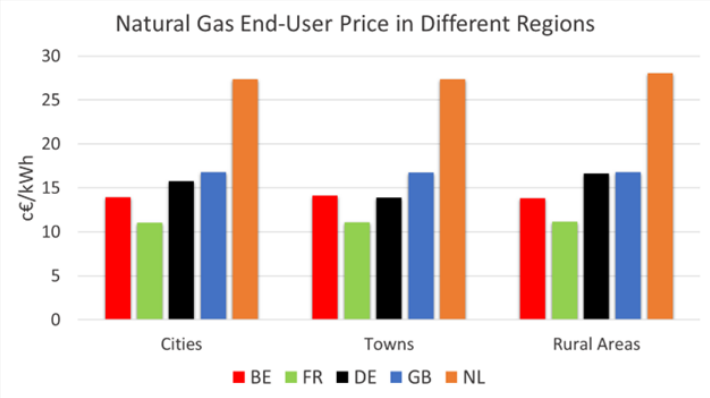


Figure 9: Natural gas end-user price of a typical household customer among different regions, May 2022

As shown by the following figure, relative all-in electricity prices for SMEs are rather similar to residential and in the same order, to those for residential customers. As of May 2022, Great Britain was the most expensive market by a significant margin, followed by Belgium (Brussels), Germany and the Netherlands all at a similar level, with France significantly cheaper than all the other markets. The reason for Great Britain being more expensive is largely due to suppliers passing on more costs onto SME customers who are not protected by the price cap and are generally considered more risky and less desirable customers.

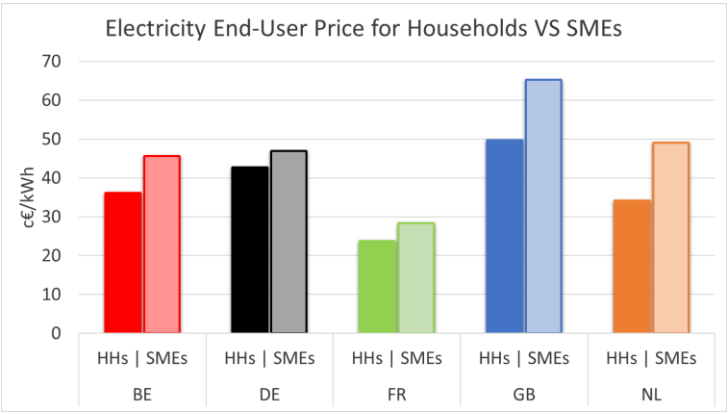


Figure 10: Electricity end-user price of a typical household (HHs) versus a typical, low-voltage SME customer, May 2022

3.2. Energy Component Price Trends

Looking at the long-term trend of the energy component in isolation across the five markets, it can be seen that Great Britain has consistently had the highest electricity component prices until the current energy crisis, ahead of Germany which has generally been slightly ahead of the Netherlands and France. Belgium (Brussels) has, in general, though not at all times, been the cheapest until the current energy crisis. During the energy crisis, the Netherlands has become the most expensive and France the cheapest by some margin. Belgium (Brussels), Great Britain and Germany have been following a similar path.

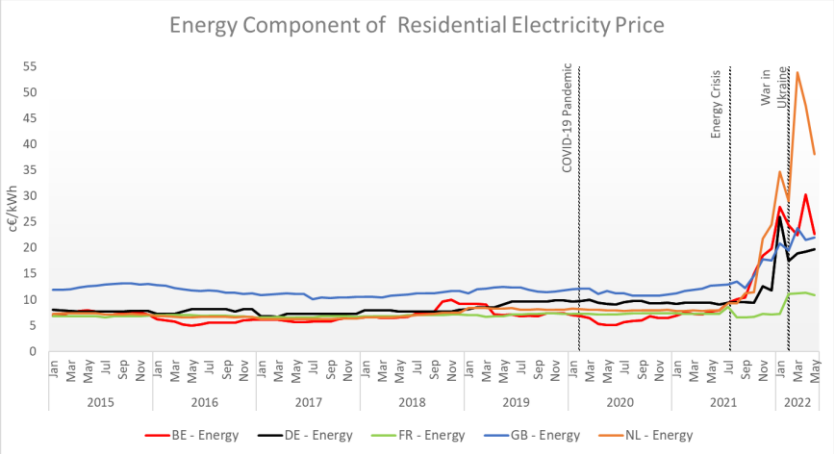


Figure 11: Comparison of energy component of electricity price trend among analysed countries

Great Britain and Germany have historically had the highest gas component prices ahead of the Netherlands which in turn has been more expensive than France and Belgium (Brussels). During the COVID-19 period Belgium (Brussels) became clearly the cheapest while the other markets converged with each other. During the current energy crisis, the markets have all diverged with (as of May 2022) the Netherlands on top, followed by Belgium (Brussels), Germany, Great Britain and France respectively, although prices have recently been so volatile that any ranking is only momentary.

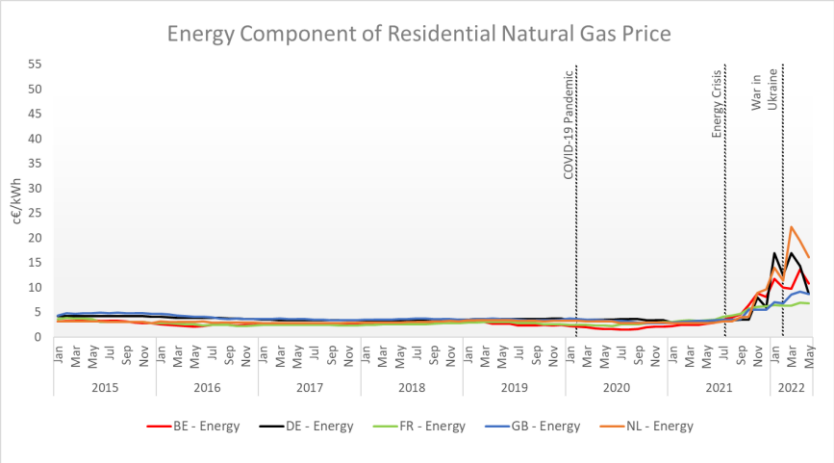


Figure 12: Comparison of energy component of natural gas price trend among analysed countries

Two other observations from the above energy component analysis are firstly that in general the markets all broadly follow the same trends and secondly, that the current energy crisis has resulted in prices that are unprecedented in level and behaviour.

Regarding Belgium, it is again important to note that while the prices described in the above analysis refer to Brussels, the following figures, based on data from CREG, provide a picture of relative end user (all-in) prices in each of the three Belgium regions for electricity and gas. As can be seen, Brussels energy component prices are almost identical across the three regions, for both electricity and gas. Furthermore, the prices for Brussels (data by CREG) were analysed and found to be very similar to the VaasaETT data[4]

[4] See Appendix 1.

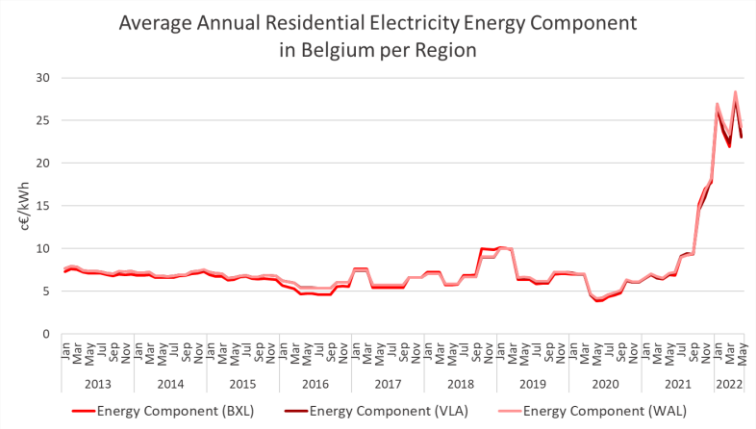


Figure 13: Comparison of average annual residential electricity energy component among three different regions of Belgium (BXL: Brussels, VLA: Flanders, WAL: Wallonia)

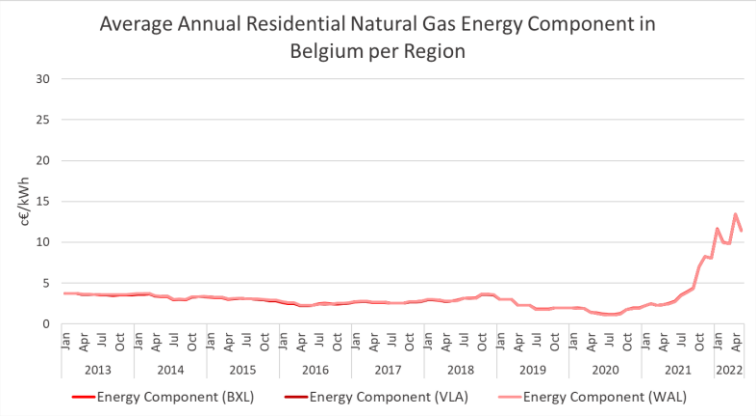


Figure 14: Comparison of average annual residential natural gas energy component among three different regions of Belgium (BXL: Brussels, VLA: Flanders, WAL: Wallonia)

3.3. Retail product type prices compared

Different retail products have differing prices. To truly understand differences between markets we need to understand the products and their relative prices, in particular fixed vs variable tariffs; dual fuel vs separate tariffs and default versus competitive tariffs.

3.3.1. Fixed vs Variable

Fixed tariffs are any tariffs where the price is set for a period of time, typically one (most common), two or three years. Contract terms and regulations relating to fixed term tariffs can vary quite considerably, as discussed further in the report, but in general prices cannot change during the term of the contract. In Germany, Great Britain and the Netherlands, fixed contract prices for residential electricity and gas have historically mostly been cheaper than variable , especially standard variable prices, except at times of high wholesale price volatility or uncertainty. This is because fixed prices have enabled suppliers in these markets to lock-in customers and benefit from a longer customer lifetime value and greater hedging certainty. At times of higher wholesale volatility and uncertainty, an additional risk premium needs to be added to longer fixed term offers. In Belgium (Brussels) and France however, the opposite has been the case since it has not been possible to lock-in customers. During the current energy crisis, however, in all markets except Germany (although this is also changing) few if any fixed prices have been on offer and where they have, they have been more expensive than variable prices (except Germany). The resilience of fixed price contracts in Germany appears to be because of the relatively good procurement/hedging position of incumbent German suppliers, and the historical importance of such tariffs in the German market.

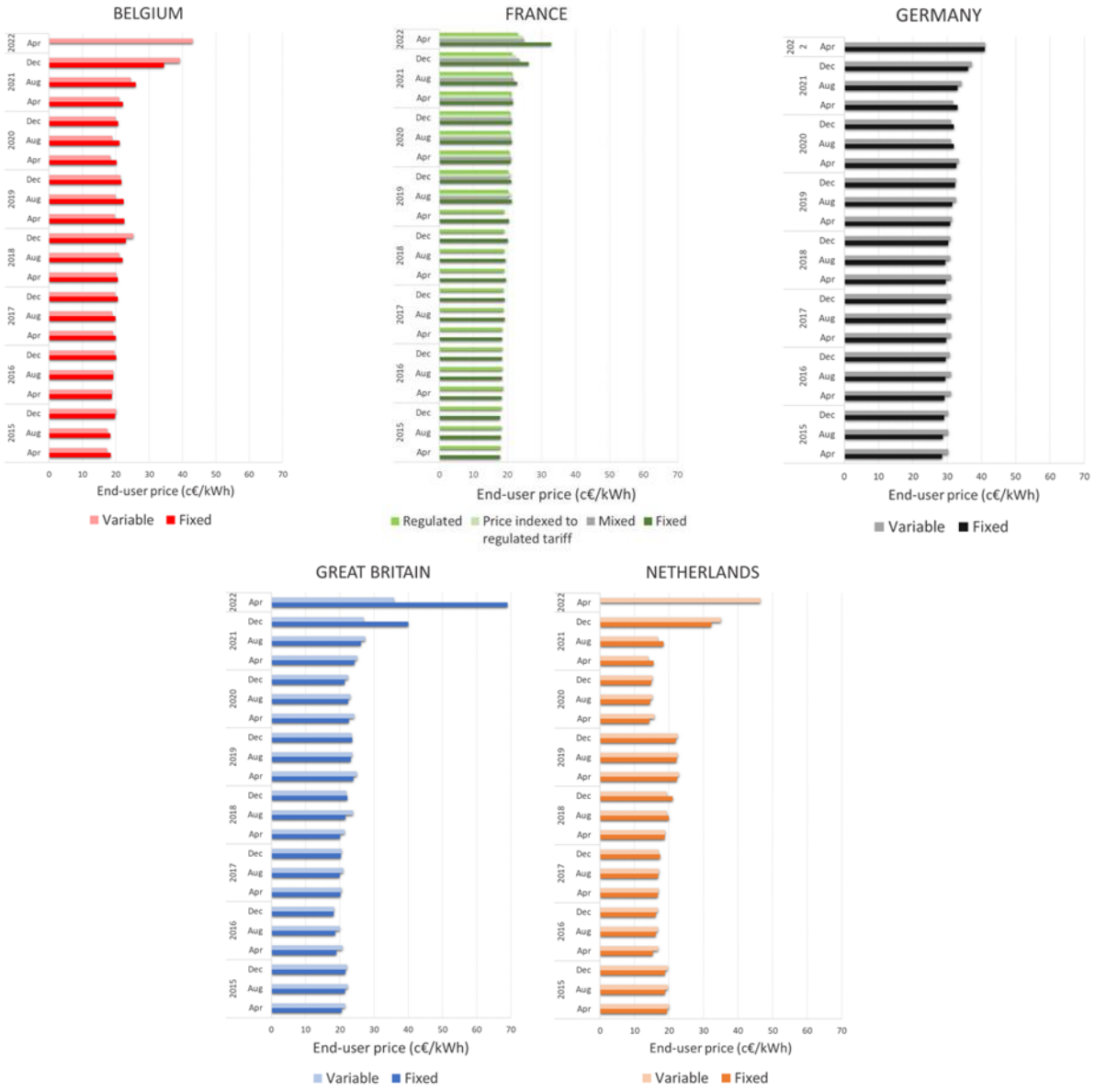
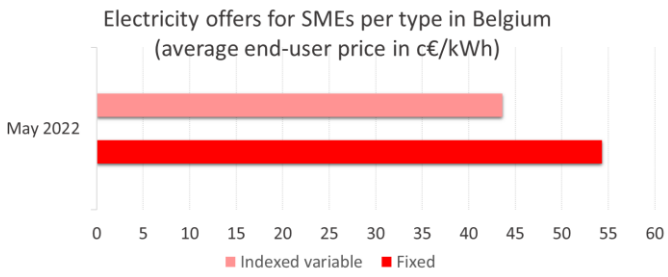


Figure 15: Average end-user price per electricity tariff types[5] in each country, residential customers

The situation is also similar for SME customers during the energy crisis (as of May 2022).



[5] Tariff type definitions:
-"Fixed": Tariffs with a pre-defined duration, during which the price has to remain stable.
-"Variable": Tariffs with non-fixed price including standard variable, spot-based and other indexed variable tariffs (e.g. in Belgium, the term "indexed variable" is used for variable contracts that their pricing gets updated in specified time intervals and follows the market).
-"Mixed": Tariffs that combine the principle of "Fixed" and "Variable" e.g. fixed duration contracts with a limitation on the number of times the price can change per year or with commitment to keep stable only a subset of the price components throughout the contract duration. This category is only applicable in France.

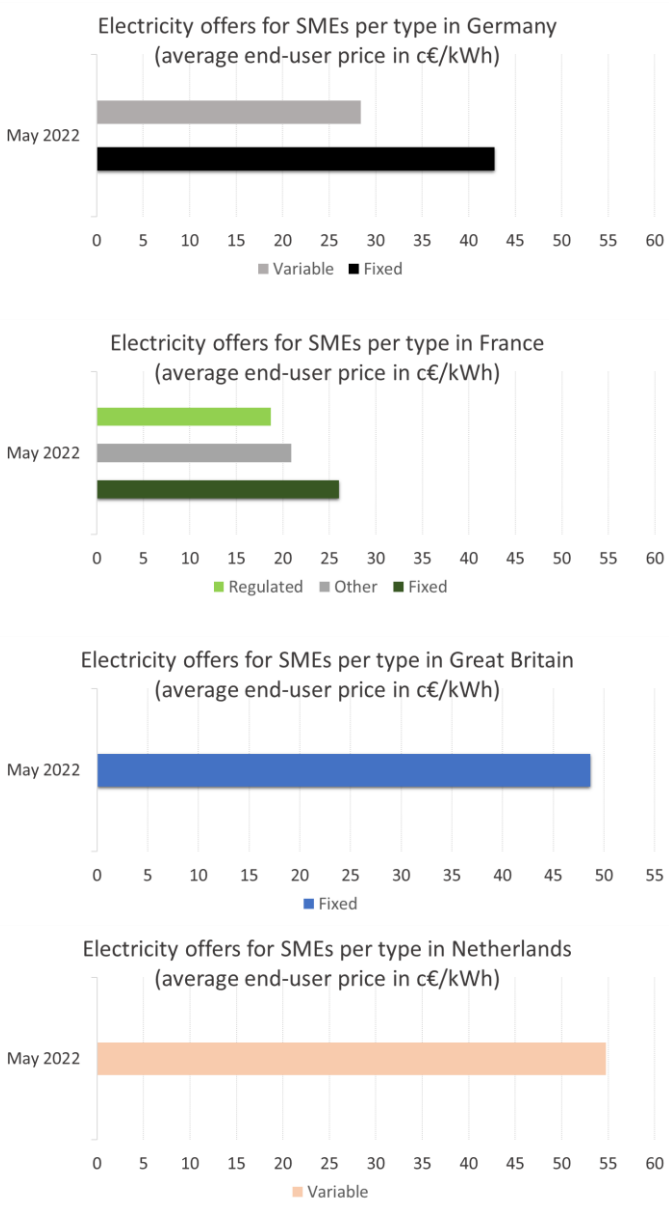


Figure 16: Average end-user price per electricity tariff types in each country, SME customers, May 2022

3.3.2. Dual fuel vs Elec & Gas separate

Given the possible synergies that exist between electricity and gas retail, it is interesting to see if the presence of dual fuel is a likely precursor to lower energy bills. In the following figure, the annual bill estimation for customers on the cheapest market tariffs has been compared for customers having separate electricity and gas products versus those with one dual fuel contract. The 5 cheapest tariffs[6] in the market have been taken under consideration for the analysis. The information was collected using accredited price comparison websites for all countries except Germany, in which we used selected suppliers' websites; dual fuel is less popular in Germany and thus only some suppliers offer dual fuel tariffs.

While the current energy crisis is not fully representative of prices at other times, in Belgium (Brussels), France and Great Britain there is no significant difference between a dual fuel price and the price a customer could obtain by shopping around for the cheapest electricity and gas separately. In the Netherlands there is a significant, but quite small difference, amounting to a saving of approximately 10%. In Germany however, the difference is more substantial, amounting to approximately 28%, but this is primarily the result of bonuses being added or the sale of dual fuel and is not considered a sustainable or comparable saving.

[6] The 5 cheapest electricity contracts were added to the 5 cheapest natural gas contracts and their combination was then compared to the 5 cheapest dual fuel contracts.

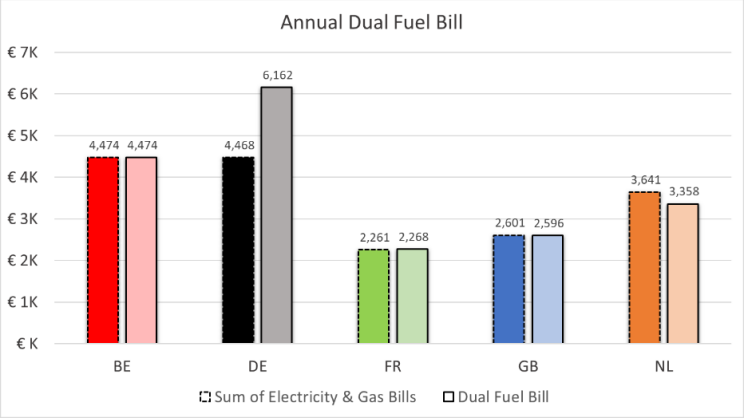


Figure 17: Comparison of estimated dual fuel bill to the sum of electricity and gas bills, based on a typical household consumption profile. Data correspond to May 2022.

3.3.3. By Default incumbent tariff vs competitive

It is often assumed that incumbent default prices are higher than competitive prices and that the prices of incumbent suppliers are higher than the prices of their competitors. The quantitative analysis shown in the figures below was performed in residential electricity data as a representative fuel, but market insight from the interviews confirmed that gas prices also behave in similar manner. The figures reveal that default incumbent prices are indeed historically higher than non-default and competitive prices in Great Britain and Germany, and occasionally in Belgium (Brussels) and the Netherlands. However, in France they have often been the lowest as they sometimes have also been in Belgium (Brussels) and the Netherlands. Furthermore, incumbent default prices are less volatile than incumbent market-based prices which in turn tend to be less volatile than competitor market-based contracts. Especially during the current energy crisis, incumbent default prices have generally been both lower and less volatile than other prices in all five markets.

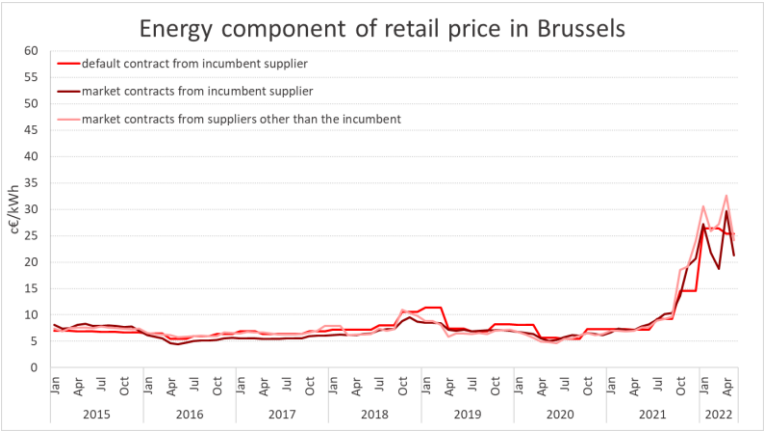


Figure 18: Energy component of electricity price per contract type (incumbent supplier's by-default contract, incumbent supplier's market contracts, main competitors' market contracts), in Belgium (Brussels) from January 2015 – May 2022.

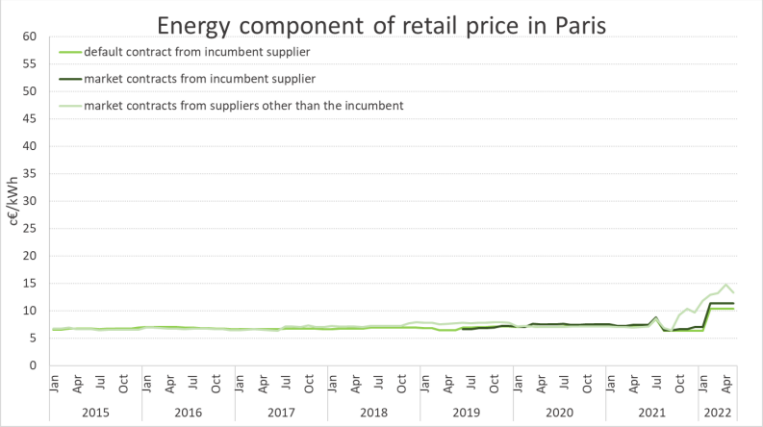


Figure 19: Energy component of electricity price per contract type (incumbent supplier's by-default contract, incumbent supplier's market contracts, main competitors' market contracts), in France (Paris) from January 2015 – May 2022.

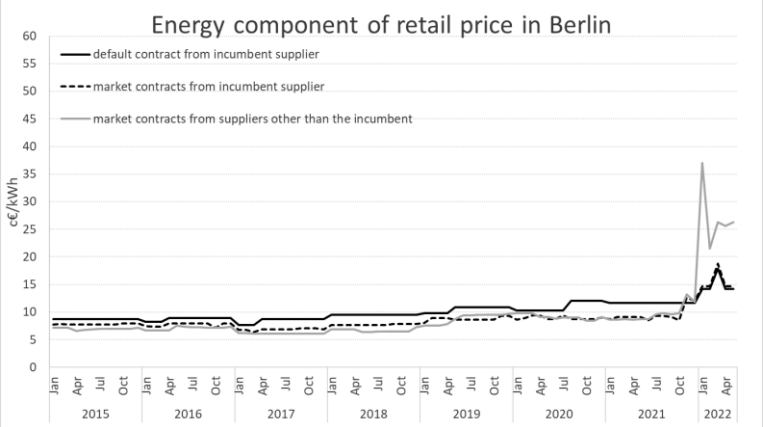


Figure 20: Energy component of electricity price per contract type (incumbent supplier's by-default contract, incumbent supplier's market contracts, main competitors' market contracts), in Germany (Berlin) from January 2015 – May 2022.

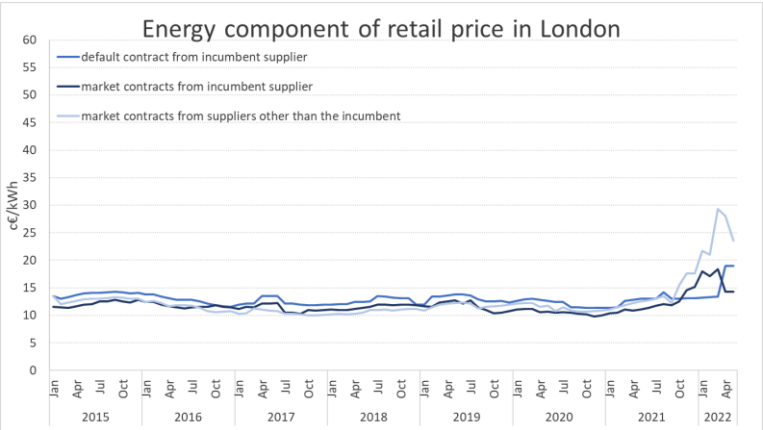


Figure 21: Energy component of electricity price per contract type (incumbent supplier's by-default contract, incumbent supplier's market contracts, main competitors' market contracts), in Great Britain (London) from January 2015 – May 2022.

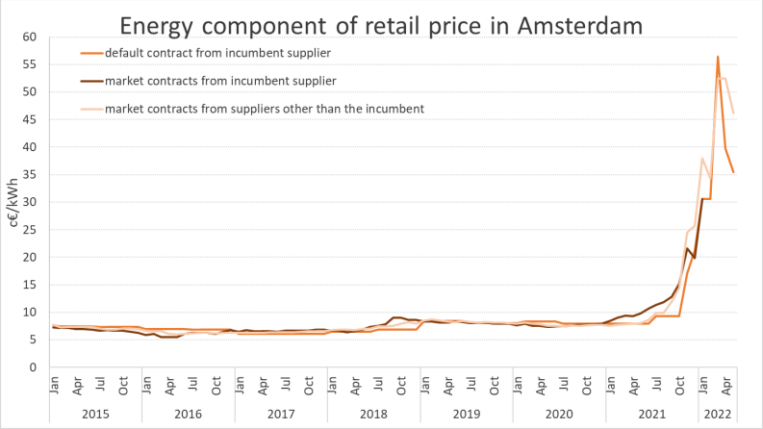


Figure 22: Energy component of electricity price per contract type (incumbent supplier's by-default contract, incumbent supplier's market contracts, main competitors' market contracts), in the Netherlands (Amsterdam) for the period January 2015 – May 2022.

3.4. Relationship between wholesale and retail prices

In an efficient retail energy market, retail energy prices should predominantly be determined by energy costs. Supplier procurement strategies differ, but in general it is assumed that most suppliers obtain a large proportion of their energy from wholesale markets (spot and futures). Analysing the relationship between wholesale prices and the energy component of retail prices can provide an indication of the extent to which suppliers are procuring from wholesale markets.

3.4.1. Spot vs Energy Component

The energy component of retail electricity prices in Belgium (Brussels), Great Britain and the Netherlands have correlated extremely closely with spot prices during the 2020-2022 period. Belgium (Brussels) prices have correlated the most. The correlation for France and Germany is also very high but less than the other markets. During the period 2016-2019 the correlation was less but still close in Belgium (Brussels), Germany and the Netherlands. Great Britain and France were lower but still show a significant level of correlation.

What is also interesting is the time lags between spot and retail price changes. The shorter lags are in Belgium (Brussels), in which the identified lag for the 2020-2022 period is as short as one month. This indicates a very efficient pass through of spot prices changes to retail price changes. Even during the 2016-2019 period, the lag was only approximately two months. In Great Britain the lag was approximately seven months in the 2016-2019 period but three months in the 2020-2022 period, indicating a substantial tightening up of responsiveness in recent years. The Netherlands has been similar to Great Britain in the 2020-2022 period, but was approximately 10 months prior to that, a very long lag. Germany and France display a relatively similar behaviour, with a lag of approximately four and five months respectively during the 2020-2022 period but a very long lag of nearly one year during the 2016-2019 period.

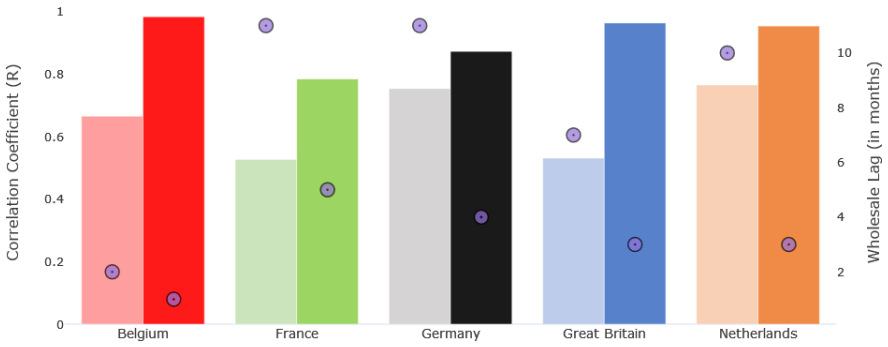


Figure 23: Relationship between retail electricity component and wholesale price (correlation and lag)
Time ranges: 2016/01 – 2019/12 (pale shade, left bars) VS 2020/01 – 2022/03 (intense shade, right bars)

The energy component of retail gas prices in all markets have correlated extremely closely with spot prices during the 2020-2022 period. As with electricity, Belgium (Brussels) prices have correlated the most. During the period 2016-2019 the correlations were less but still very close for all markets except Great Britain.

Regarding the lag times for gas, they are broadly similar if generally a little shorter, although during the 2020-2022 period, France has had an extremely short lag time similar to that of Belgium (Brussels).

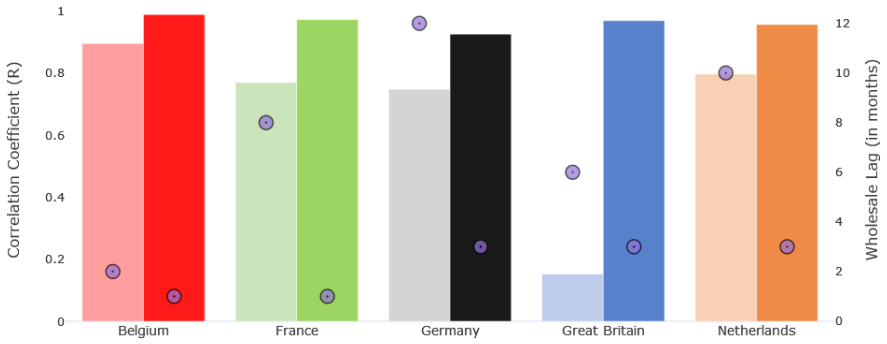


Figure 24: Relationship between retail gas component and wholesale price (correlation and lag)
Time ranges: January 2016 - December 2019 (pale shade, left bars)
versus January 2020 – March 2022 (intense shade, right bars)

Residential electricity tariffs were selected as representative examples of the behaviour of the energy markets (electricity and gas for all segments) in the analysed countries and have been further analysed, to provide more insight on the price evolution of the different tariff types[7] over time. For each market the upper graphs show price trend of wholesale vs energy component of different contract types, for 2016-2019 (left) and 2020-2022 (right). The lower graphs show the correlation of the contract types with wholesale for different price lags. The selected wholesale lag in each case is the lag that maximises the correlation value. The separation of the price data in separate graphs (for 2016-2019 and 2020-2022) allows the best observability of the price fluctuations, since the scale and standard deviation of the prices are significantly different between these two periods, in all analysed markets. Two cases are presented below - Belgium (Brussels) and France - and the rest in Appendix 1.

In Belgium (Brussels), energy price component closely follows wholesale price, for all contract types. The correlation is higher for Competitor's market contracts and lower for Incumbent's contracts. In France, the energy price component follows the wholesale price but in a less volatile manner. Competitor contract behaviour clearly differentiates from incumbent contract behaviour - incumbent prices are less responsive to wholesale price changes. There is a significant increase of the correlation and decrease of the time-lag for all types of contracts between the periods 2016-2019 and 2020-2022.

[7] Analysed contract types: Incumbent's by-default contract (variable), incumbent's market contracts (variable/fixed), competitors' contracts (variable/fixed).

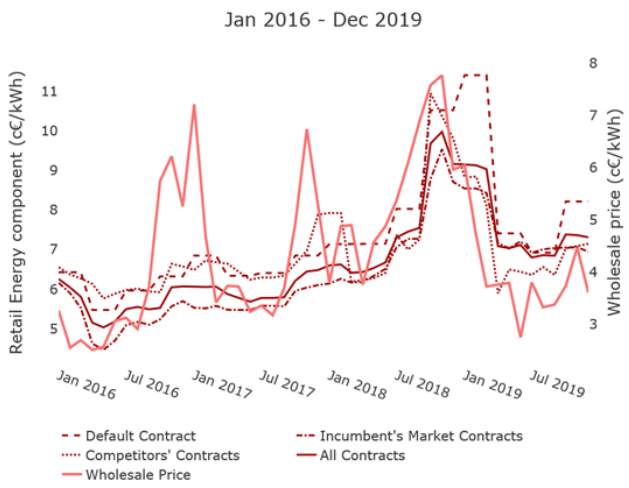


Figure 25: Electricity retail energy component per contract type versus wholesale price evolution, for 2016-2019 for Belgium (Brussels) (zoomed scale)

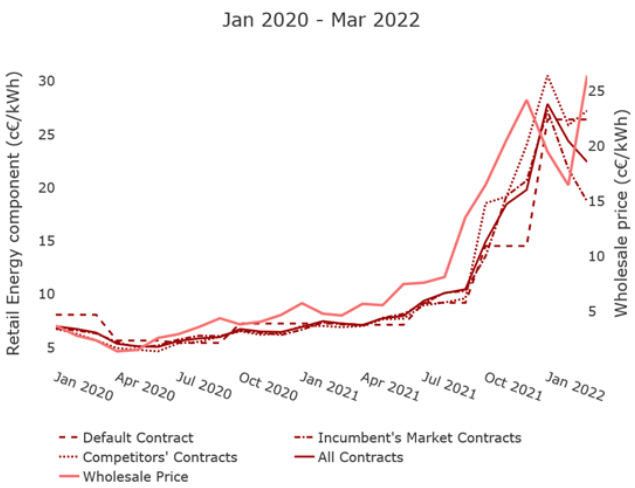


Figure 26: Electricity retail energy component per contract type versus wholesale price evolution, for 2020-2022 for Belgium (Brussels)

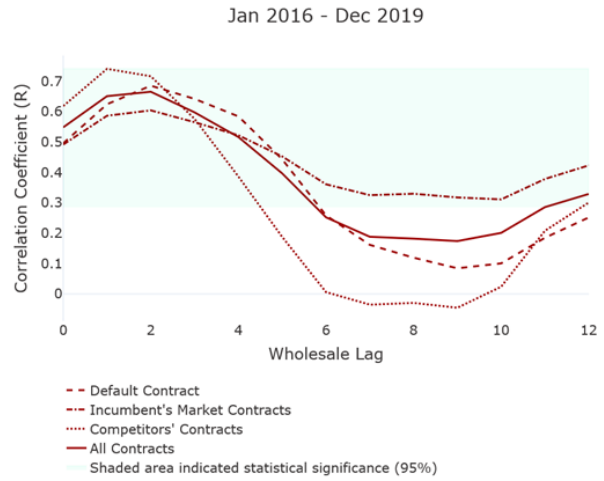


Figure 27: Electricity retail energy component correlations for different wholesale lags (in months) for 2016-2019 for Belgium (Brussels)

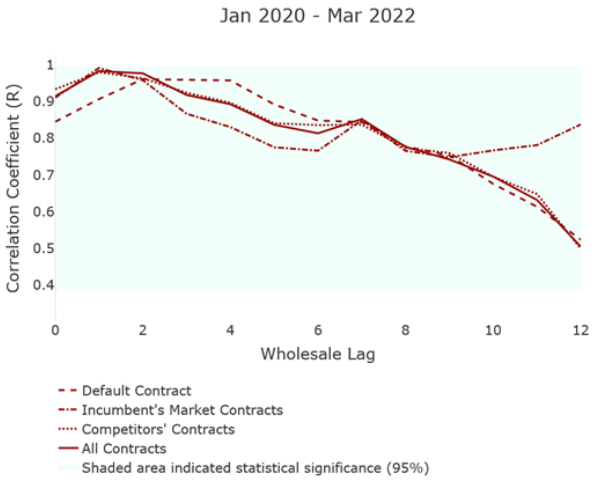


Figure 28: Electricity retail energy component correlations for different wholesale lags (in months) for 2020-2022 for Belgium (Brussels)

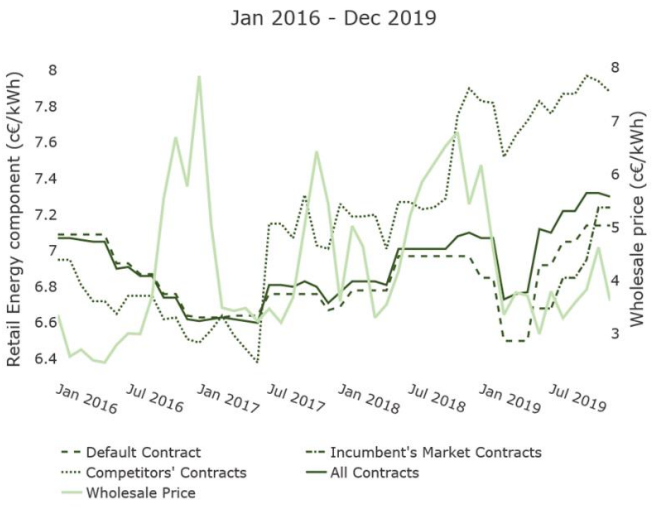


Figure 29: Electricity retail energy component per contract type versus wholesale price evolution, for 2016-2019 for France (zoomed scale)

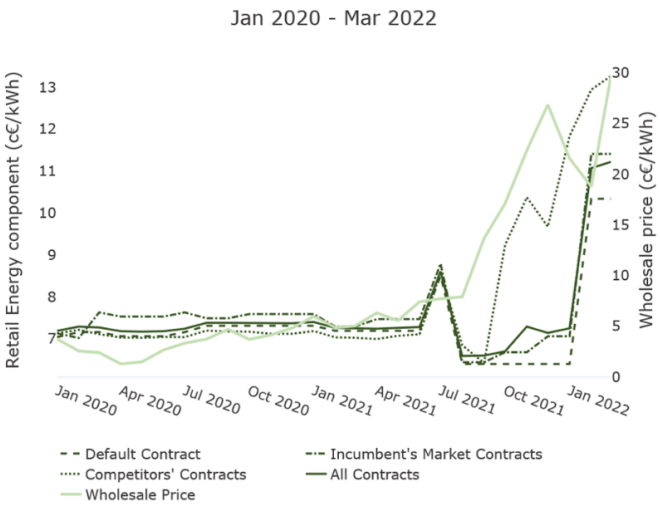


Figure 30: Electricity retail energy component per contract type versus wholesale price evolution, for 2020-2022 for France

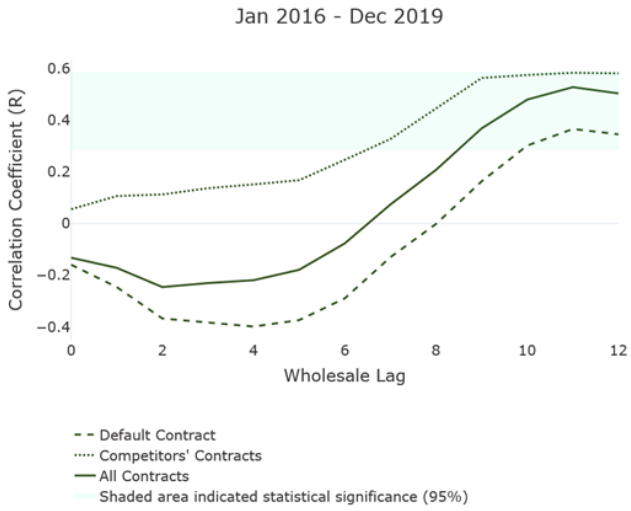


Figure 31: Electricity retail energy component correlations for different wholesale lags (in months) for 2016-2019 for France

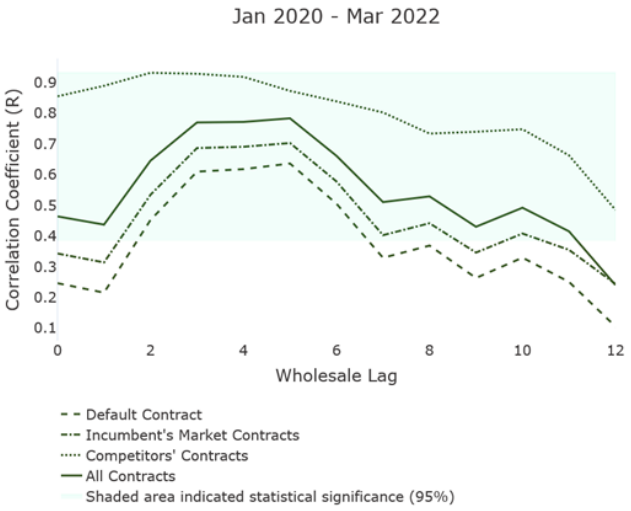


Figure 32: Electricity retail energy component correlations for different wholesale lags (in months) for 2020-2022 for France

3.4.2. Futures vs Energy Component

The following figures show the relationship between the energy component of the electricity price and futures prices for each market. It is clear that there is a very close correlation between the two in all markets except France.

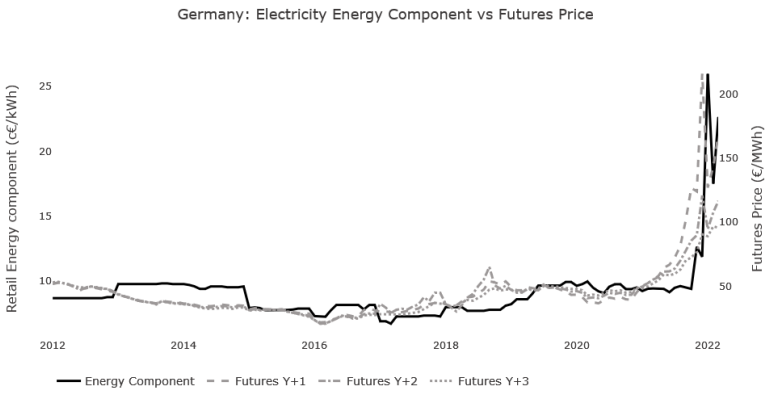


Figure 33: Electricity Energy Component trend versus Futures (Y+1, Y+2, Y+3), in Germany (Berlin)

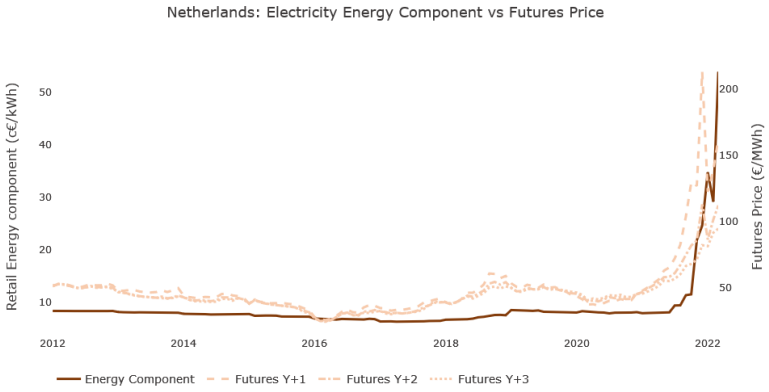


Figure 34: Electricity Energy Component trend versus Futures (Y+1, Y+2, Y+3), in Netherlands (Amsterdam)

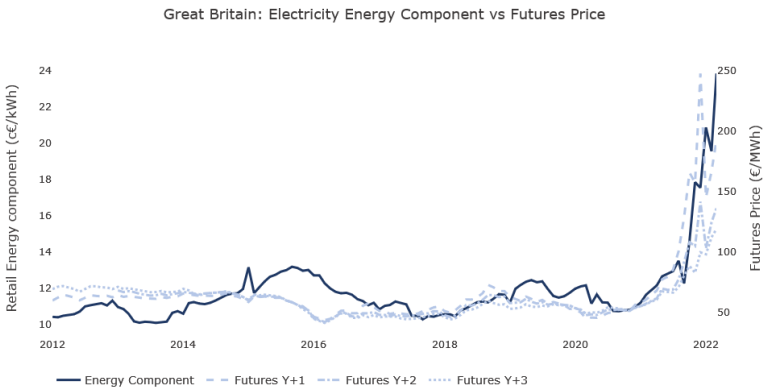


Figure 35: Electricity Energy Component trend versus Futures (Y+1, Y+2, Y+3), in Great Britain (London)

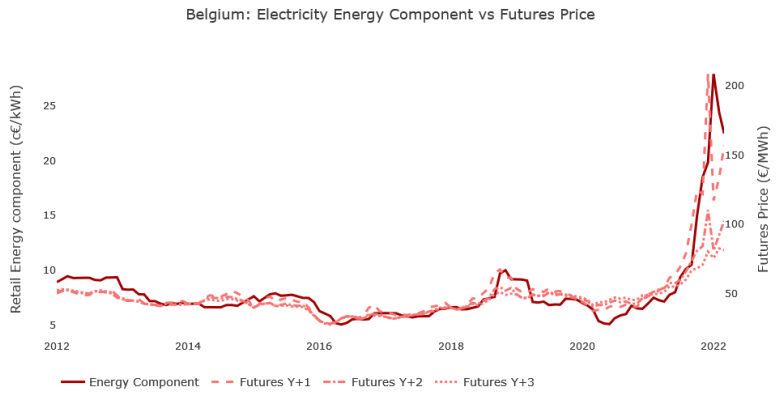


Figure 36: Electricity Energy Component trend versus Futures (Y+1, Y+2, Y+3), in Belgium (Brussels)

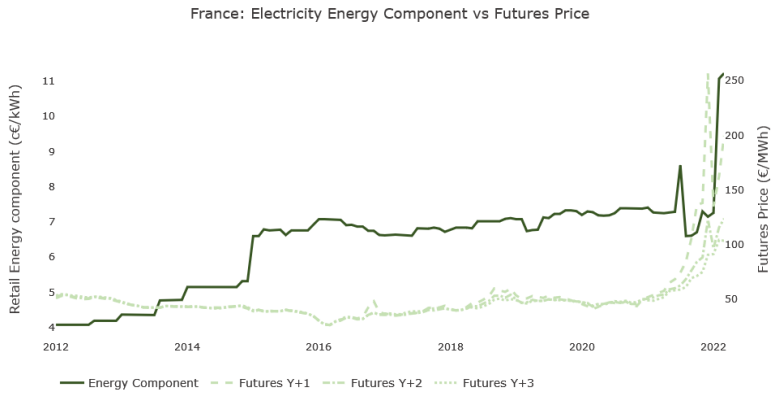


Figure 37: Electricity Energy Component trend versus Futures (Y+1, Y+2, Y+3), in France (Paris)

On closer inspection, it is apparent that Belgium (Brussels) displays the highest correlation between these components, followed by the Netherlands, Great Britain and Germany respectively. France has by far the lowest correlation. What is also apparent is that whereas all the other markets' energy components correlate most closely with Y+1 and least closely with Y+3, Germany correlates extremely evenly with Y+1, Y+2 and Y+3 and in fact most closely with Y+3.

The picture is very different concerning gas. The energy component correlates reasonably well with Y+1 in all markets, especially Belgium (Brussels) and France, followed by the Netherlands, Great Britain and Germany. Y+2 and Y+3 is not available for Belgium (Brussels) and while Germany, France and the Netherlands' correlations drop off in Y+2, the correlation for Great Britain increases. In Y+3 all markets' correlation drops to their lowest, especially Germany and the Netherlands.

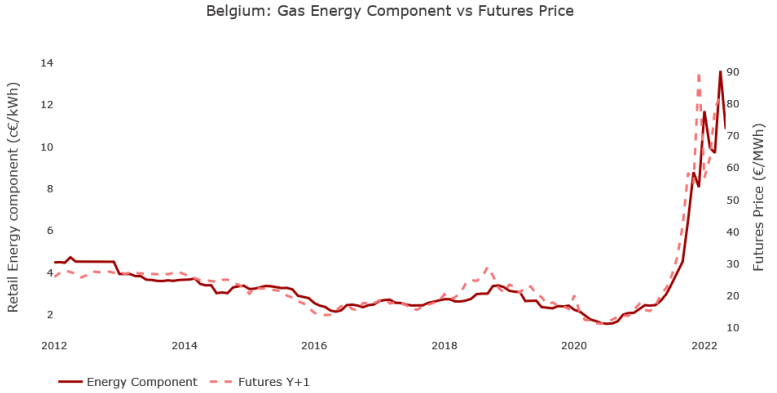


Figure 38: Natural gas price Energy Component trend versus Futures (Y+1), in Belgium (Brussels)

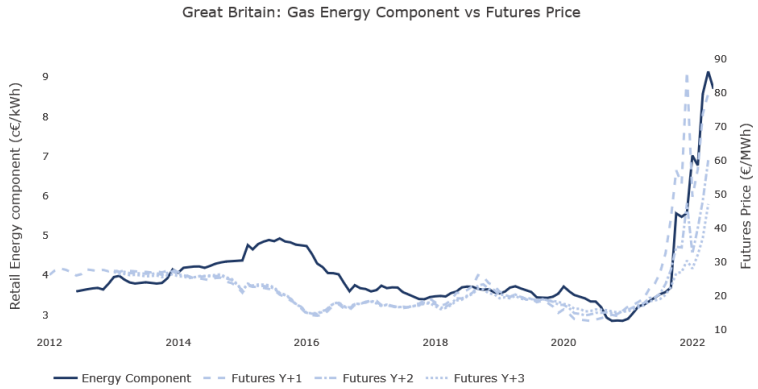


Figure 39: Natural gas price Energy Component trend versus Futures (Y+1, Y+2, Y+3), in Great Britain

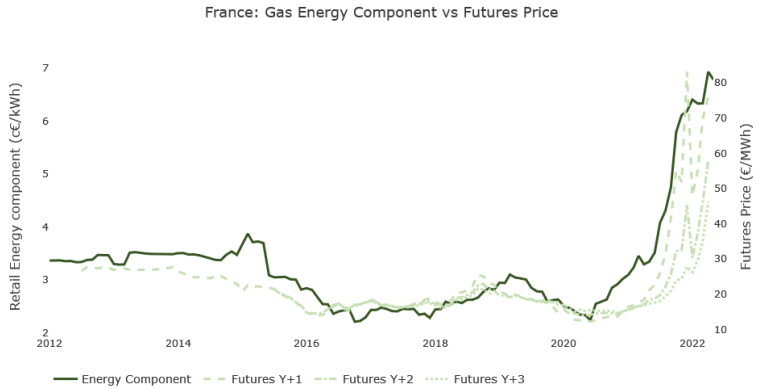


Figure 40: Natural gas price Energy Component trend versus Futures (Y+1, Y+2, Y+3), in France

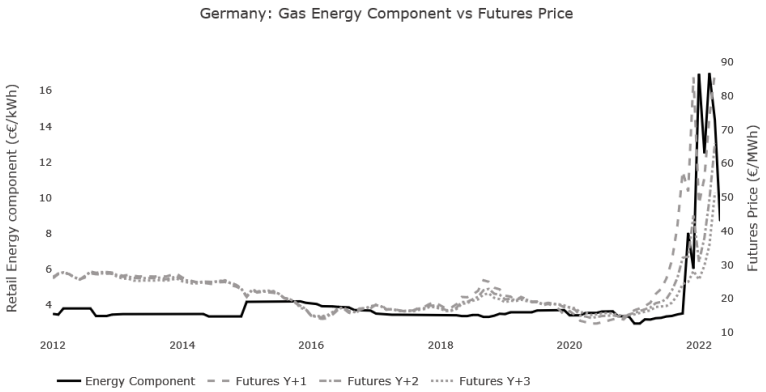


Figure 41: Natural gas price Energy Component trend versus Futures (Y+1, Y+2, Y+3), in Germany

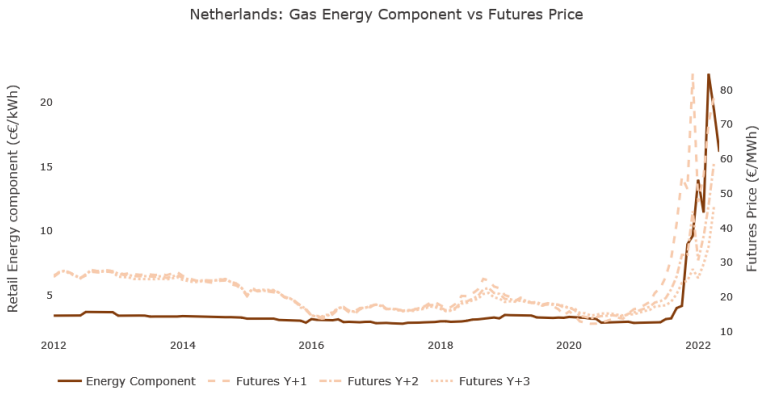


Figure 42: Natural gas price Energy Component trend versus Futures (Y+1, Y+2, Y+3), in Netherlands

3.5. Indicative Gross Margin Progression

'Indicative gross margins' is a metric measuring the difference between the spot market price and the energy component price. It is intended purely as a proxy for the relativity of the gap between energy costs for suppliers and the price suppliers sell the energy for. It ignores the actual procurement strategy of suppliers and is not an indication of actual gross margins. However, it helps compare and understand, over time and between markets, the relative differences in suppliers' commercial situation. A larger Indicative gross margin may, for instance, reflect higher operational costs, larger profits or higher risk. A negative indicative gross margin may reflect a high level of procurement from forwards markets or other sources (such as Power Purchase Agreements (PPAs)) or commercial losses for suppliers.

The following figure shows that indicative gross margins of offer prices for residential electricity have historically been highest in Great Britain, followed by Germany, Netherlands, France and Belgium (Brussels). During the energy crisis however, the situation has changed dramatically and as of May 2022 the Netherlands has the largest margins, far ahead of Belgium (Brussels) and Germany, with France and Great Britain in negative territory.

On closer inspection, looking at the following figures, which take account of the spot price lag analysis, it can be seen - perhaps unsurprisingly - that incumbent default prices historically deliver the highest (or equal to) indicative gross margins. During the energy crisis so far however, competitors' margins have fared best except in France.

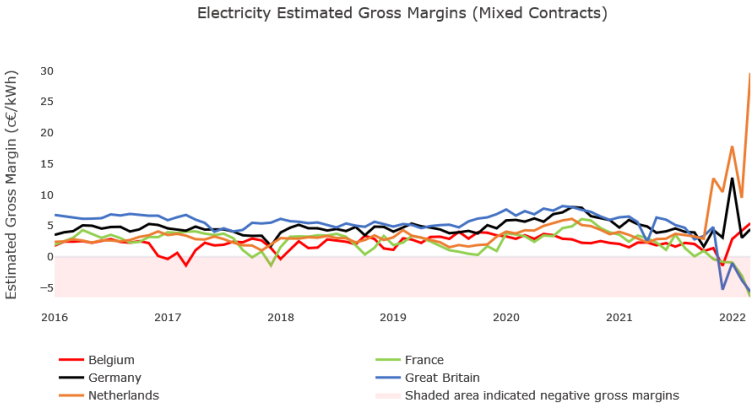


Figure 43: Comparison of indicative gross margins in the analysed electricity markets, for the period 2016-2022

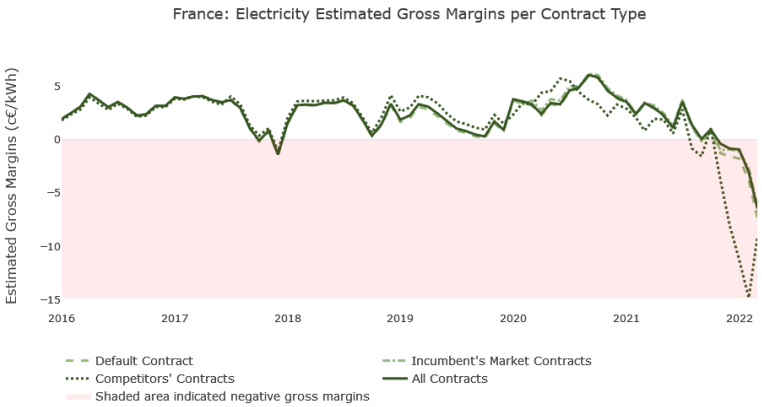


Figure 44: Comparison of indicative gross margins per contract type in French electricity market, 2016-2022

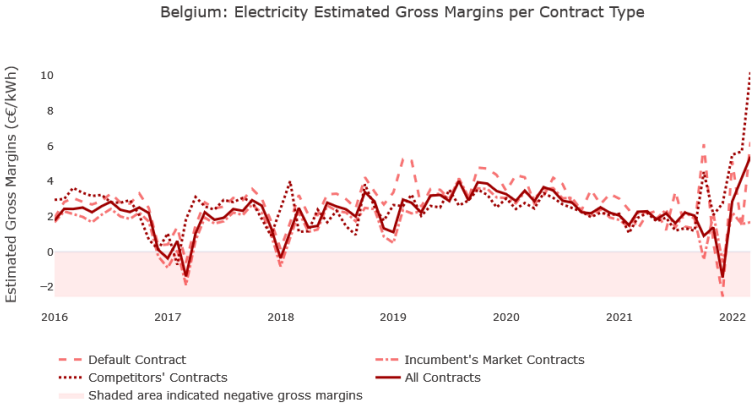


Figure 45: Comparison of indicative gross margins per contract type in Brussels electricity market, 2016-2022

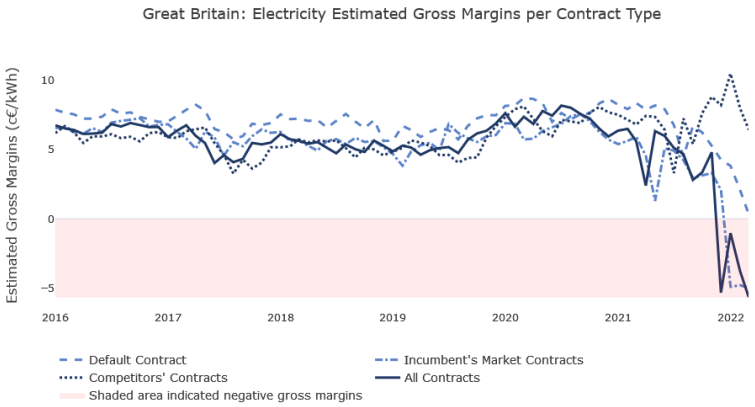


Figure 46: Comparison of indicative gross margins per contract type in British electricity market, 2016-2022

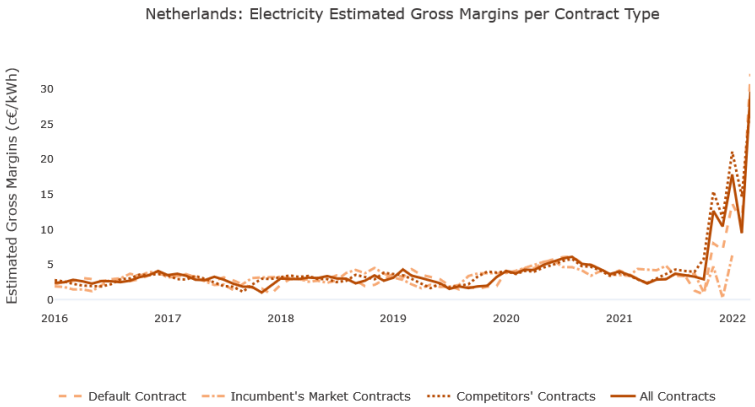


Figure 47: Comparison of indicative gross margins per contract type in Dutch electricity market, 2016-2022

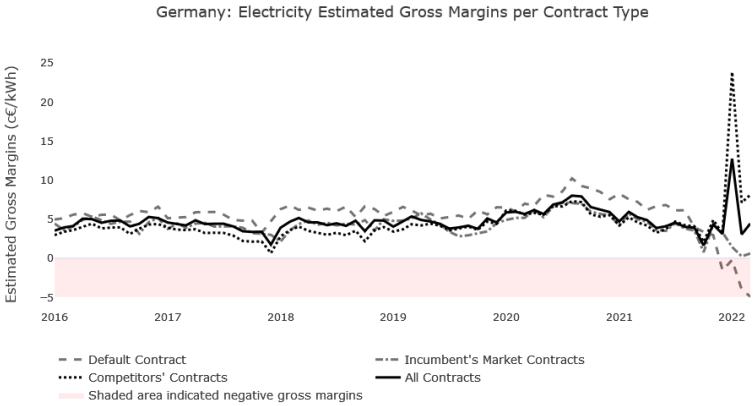


Figure 48: Comparison of indicative gross margins per contract type in German electricity market, 2016-2022

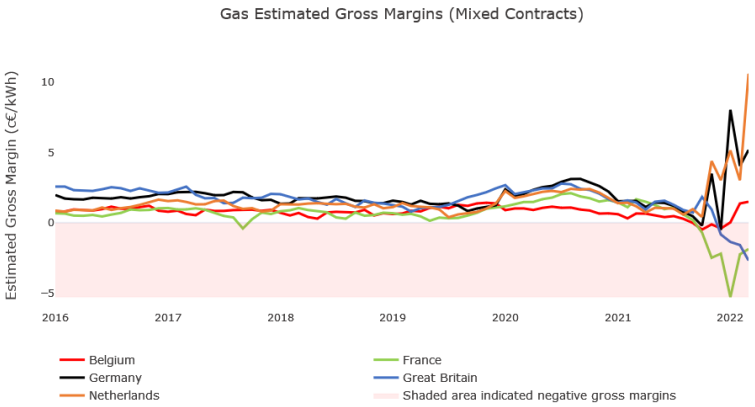


Figure 49: Comparison of indicative gross margins in the analysed natural gas markets, for the period 2016-2022

4. Explanations for Price Levels and Wholesale Relationships

4.1. Wholesale (Spot) Volatility

In general, across Europe wholesale volatility for Electricity and Gas has been increasing substantially for over a decade and expectations are that the trend will continue to increase dramatically in the decade ahead. This is particularly true of all the target markets for Gas and for Belgium, Germany and the Netherlands for electricity. In Great Britain and especially France, the increase for electricity has been more recent. Regarding electricity, Germany has experienced the largest increase and France the least. For Gas the rates of change have been very similar across the target markets.

However, in terms of sheer level of wholesale electricity volatility, France, Belgium and Germany respectively are significantly higher than the Netherlands and Great Britain. For gas, the levels are similar for all markets.

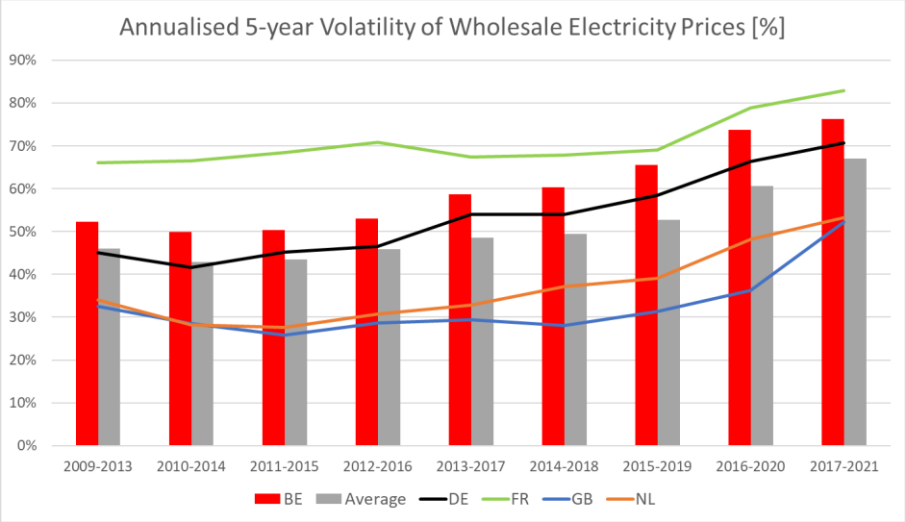


Figure 50: Annualised 5-year volatility (%) of wholesale electricity prices in each country

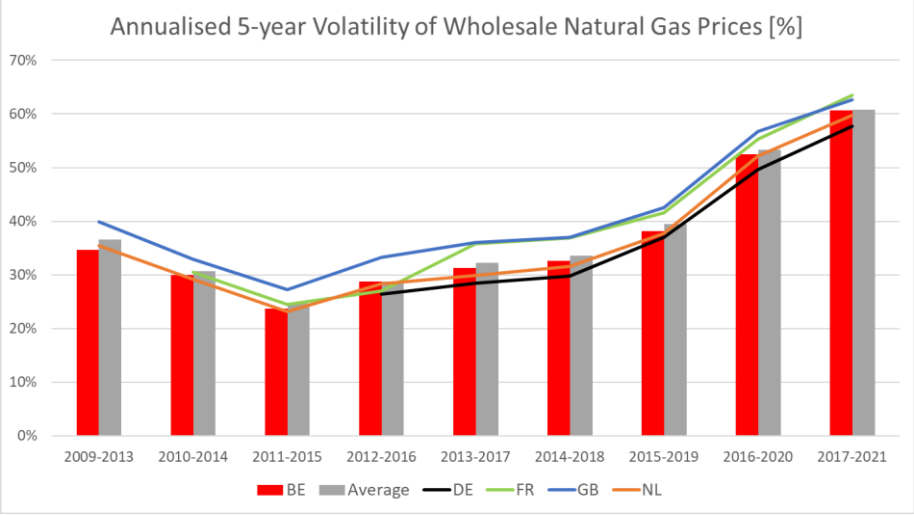


Figure 51: Annualised 5-year volatility (%) of wholesale natural gas prices in each country

A common claim in the interviews, and one which fits our broader research experience, is that wholesale volatility is built into responsible retail pricing in the form of a risk margin. Increasing volatility means increasing risk and therefore an increased risk margin. This being the case, it might be expected that French, German and Belgian retail prices would incorporate the biggest risk allowance within bills, while all target markets would have experienced increases in allowance, most of all Germany. The degree to which wholesale (spot) volatility impacts retail prices is impacted by the degree to which wholesale spot prices are used within retail procurement and price setting.

4.2. Retail Volatility

The level pattern of volatility is rather different for retail prices. Belgian (Brussels) electricity retail price volatility has been generally high and has followed a rather similar pattern to that of wholesale; German volatility has been quite high and increased significantly with a dip for 2016-2020; Great Britain and the Netherlands volatility has generally been relatively low until the recent period but has increased steadily and significantly, especially in the case of the Netherlands which most recently has the highest level of retail volatility; France had a relatively high level over a decade ago, but then became far less volatile over the years until increasing again in the recent period. In the case of gas, the relative levels and patterns of volatility of the markets are somewhat similar to that of electricity, but Germany has changed significantly over time and increased dramatically in the recent period along with the Netherlands.

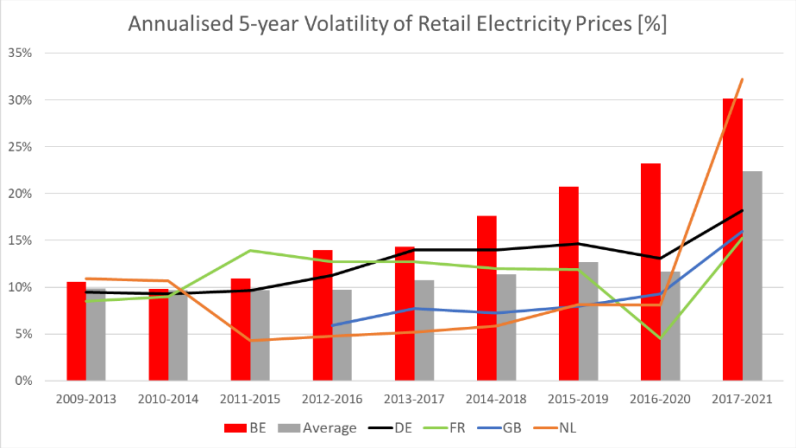


Figure 52: Annualised 5-year volatility (%) of retail electricity prices in each country

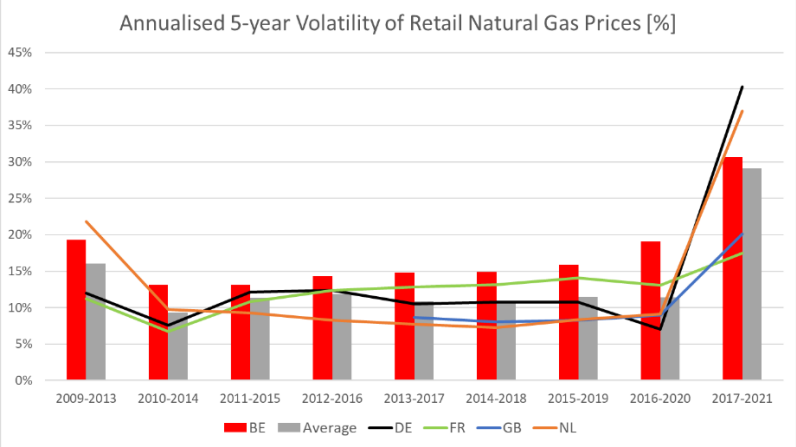


Figure 53: Annualised 5-year volatility (%) of retail natural gas prices in each country

So, what would this all indicate? While only a small proportion of wholesale (spot) volatility is passed onto retail prices in any of the markets, Belgium (Brussels) electricity retail prices have historically passed through more wholesale volatility to retail prices and done so most efficiently whereas France has passed through the least and done so least efficiently. Belgium (Brussels) is also the leader regarding gas with France second.

4.3. Wholesale liquidity

Suppliers' ability to procure and hedge easily and efficiently is critical to their competitiveness and risk management. Suppliers consider wholesale liquidity to be low if access to wholesale is limited (for instance if guarantees for trading are considered excessive), if hedging is excessively expensive (for instance if the cost of futures is so high that it effectively makes hedging financially unviable, or if it is simply not possible to obtain the kind of hedge that they would need (e.g., if there are no hedge prices available for a given year). From a market perspective, it can to some extent be seen in the volume of trade through spot or futures relative to the volume of energy procured.

Limited access to wholesale is becoming more of a problem for smaller and larger suppliers, but the main issue for the more impactful players appears to be the cost of hedging - which generally increases with volatility and uncertainty, and in some

cases the absence of prices (albeit perhaps temporary) into the future. In this respect, wholesale liquidity was considered a substantial issue under normal circumstances by suppliers interviewed in all markets except Germany and France, and during the current energy crisis was also considered an issue, albeit less so, in France and Germany. Specifically in Great Britain it was argued that Electricity wholesale liquidity was far worse than Gas wholesale liquidity and it was stated that it is currently considered impossible to hedge at peak at present (due to the excessive cost). It was also claimed that some generators are abusing their power and consequently generation is not getting into the wholesale market when it is needed, creating a need for suppliers to buy proxies. It was also pointed out in Belgium interviews that making fixed-term contracts was now difficult or impossible due to the lack of liquidity[8].

4.4. Share of renewables

One of the reasons behind the increasing volatility in electricity wholesale has been the increasing share of renewables across Europe. Concerning domestic electricity generation mix, as shown by the following figure, as of 2020 Germany and Great Britain had the most renewable share at approximately 40%, followed by Belgium and France with approximately 25% and the Netherlands at 18%. Between 2015 and 2020 Belgium increased its share of renewables by 32%, Germany by 44%, France by 35%, Great Britain by 71% and the Netherlands by 111%.

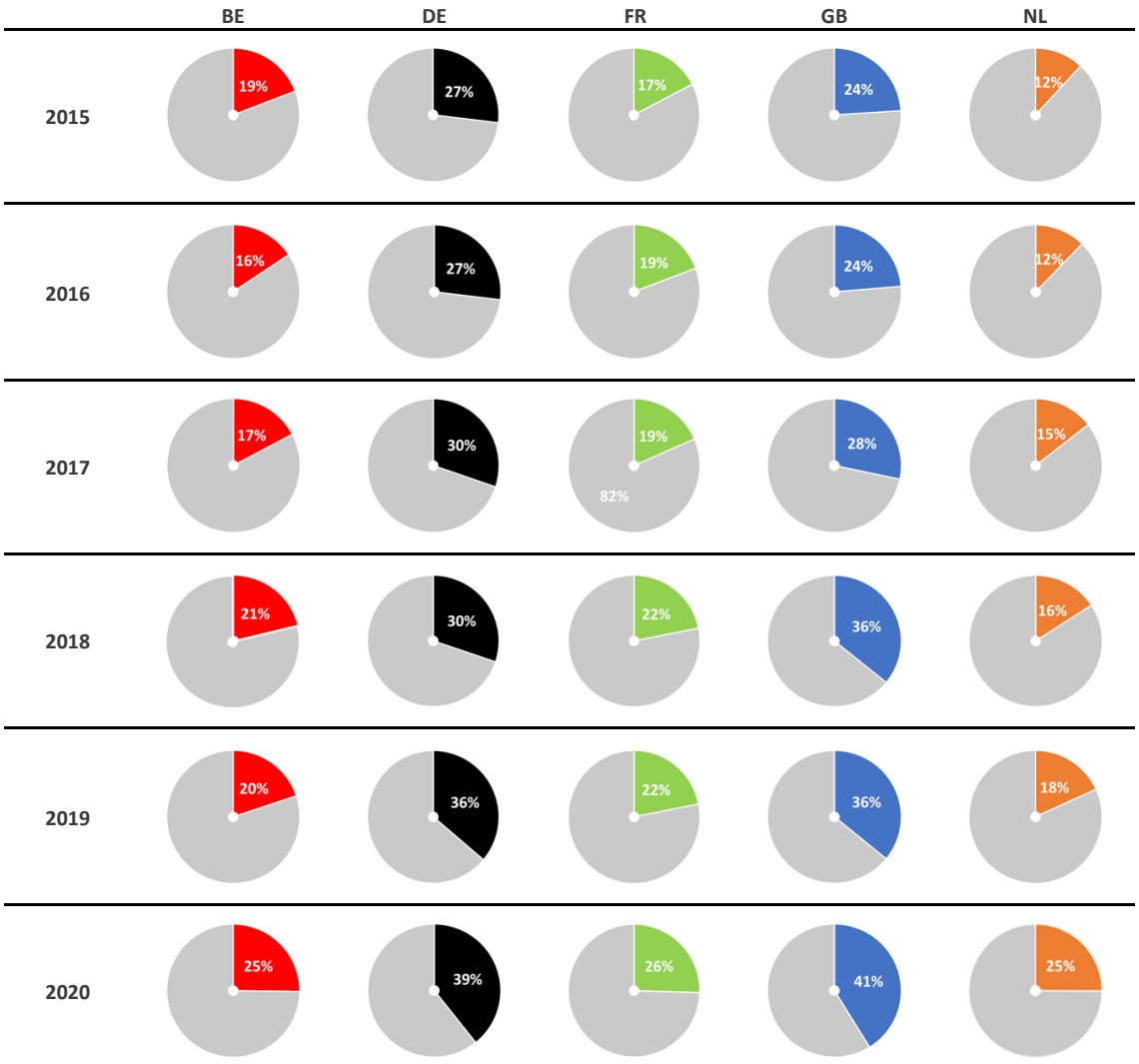


Figure 54: Share of renewables in power generation in each country per year

[8] Wholesale market price is passed through so much that it pushes everyone to offer / request fixed prices (even during normal times), but during the energy crisis, with the volatility in the market, it is considered impossible to offer fixed prices. The main problem is the volatility in the wholesale price. Most important thing for small consumer is to have more security of prices, but security has a price in a volatile market, also for B to B customers. Volatility related risks are currently considered higher than the margins the suppliers have. Fixed prices now need to include a lot of risk.

For a full picture of energy mix it would be necessary to look at both domestic generation mix and imports for each wholesale region, as well as the proportion of renewables that are agreed outside the wholesale market (e.g., PPAs). However, renewables play an important and increasing role in all the markets. It is also important to point out that in France, the large majority of wholesale market mix, which excludes the ARENH), is now renewable.

Most suppliers interviewed, regardless of market, stated that in their view wholesale volatility, in part driven by increasing share of renewables, is creating substantial risk that needs to be, and is as far as possible, incorporated into tariffs.

4.5. Energy procurement and hedging - opportunities and strategies

4.5.1. Hedging horizon at a glance

As indicated by the analysis in Section 3 and supported by the supplier interviews, suppliers in each market tend to follow a different approach to hedging. Regarding electricity, Belgian suppliers and to a slightly lesser extent also suppliers in the Netherlands, seem to be well hedged, even over a three-year horizon (spreading their hedges quite evenly over three years but lessening in Y+2 and Y+3). In Germany, suppliers are also well hedged, although apparently less through futures than in Belgium. However, German suppliers, at least the larger ones, tend to take a very even hedge across Y+1, Y+2 and Y+3. Suppliers in Great Britain (larger, more established suppliers at least), while still well hedged, appear to put less emphasis on Y+3. Suppliers in France hedge far less through futures but follow a similar pattern to Belgium and the Netherlands.

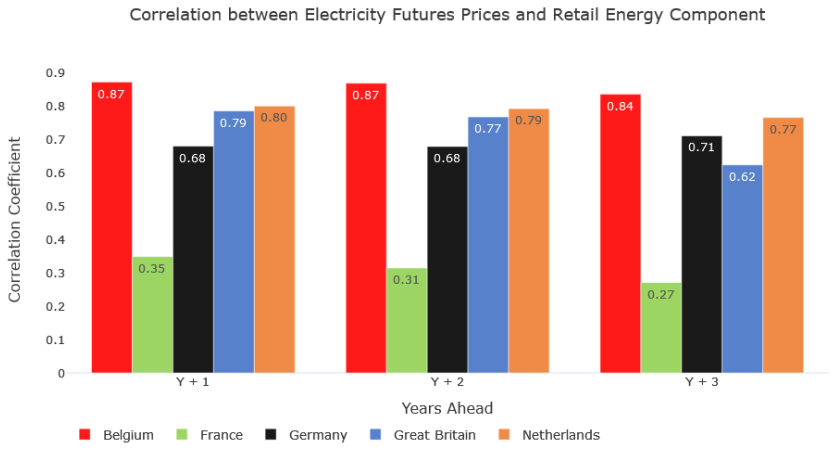


Figure 55: Correlation between electricity futures prices and retail energy component (Y+1, Y+2, Y+3); Belgium retail price corresponds to Brussels.

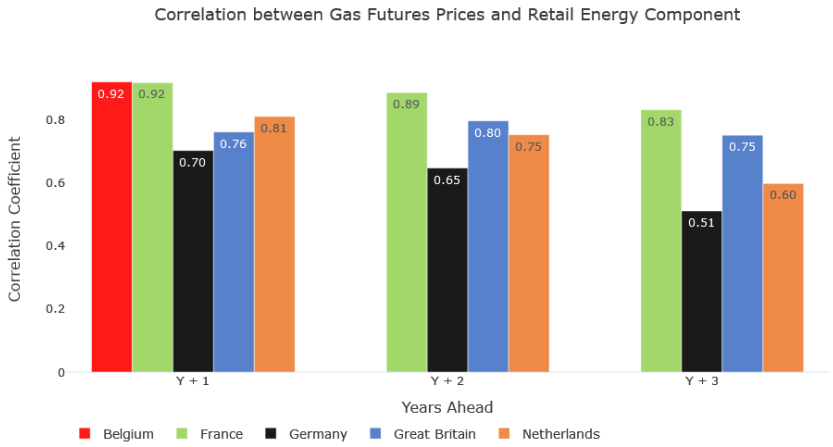


Figure 56: Correlation between natural gas futures prices and retail energy component (Y+1, Y+2, Y+3) ; Belgium retail price corresponds to Brussels.

Regarding Gas, suppliers in France seem to be the most hedged overall, being hedged highly across Y+1, Y+2 and Y+3. Suppliers in Belgium are also hedged highly for Y+1 but not in Y+2 and Y+3. Suppliers in the Netherlands are less but still reasonably well hedged, although far less so in Y+3. Suppliers in Great Britain are hedged well across Y+1, Y+2 and Y+3.

These findings follow patterns that were explained in the interviews. Belgium and Netherlands suppliers appear to follow a relatively safe procurement strategy with long-term (three year except for gas in Belgium) hedging, slightly weighted towards the near term (one year) to allow for competition risk. In Belgium at least, this is perhaps in part a result of supplier licensing requirements[9]. German suppliers, especially larger ones, tend to be more diverse in their procurement (often including own generation), assuming a large proportion of inactive customers on standard tariffs and a highly stable average retail price and therefore hedging extremely evenly for electricity at least. For gas (in particular), Stadtwerke and other larger players may additionally have long-term agreements, placing less emphasis on hedging. In Great Britain, with traditionally the highest levels of competition and now a variable price cap that changes every six months (soon to be every three months), while it is important to hedge well, there is a relatively high need for price flexibility, and therefore, at least for electricity, a slightly shorter-term perspective to electricity hedging. By no means, however, could it be said that the market is poorly hedged. In France, the ARENH is the underlying source of baseload procurement and hedging, whereas procurement on the spot market and hedging on the futures market is more for profiling and therefore only part of the procurement and hedging picture. While these conclusions are necessarily general and simplistic and primarily representing the larger and / or incumbent suppliers, they nevertheless provide a contributing explanation for, and reflection of, retail price component behaviour.

4.5.2. The ARENH

EDF currently sells up to 100/120TWh per annum of electricity to competitor suppliers at a low, regulated and predictable price, normally set two years in advance[10]. This pool mechanism, known as ARENH (Accès Régulé à l'Electricité Nucléaire Historique) or 'Regulated Access to the Historic Nuclear Power' was originally designed to provide a more level energy procurement playing field to retail competitors of EDF at a time when new entrants otherwise struggled to procure sufficient volumes of affordable energy. This was considered preferable to selling off and / or splitting up EDF's nuclear fleet. Under the present climate, it ensures more affordable energy and simpler hedging for the now quite large number of suppliers in the market. The ARENH price is currently far below the wholesale market price (which is also presently highly volatile). It has only increased by approximately 2% during the energy crisis.

ARENH is primarily intended to provide baseload availability to suppliers, enabling suppliers to obtain a substantial amount of their procurement at a low, predictable, regulated price. However, the quantity is capped across all suppliers and if the sum of all-supplier demand for this electricity increases, the cap may be reached, resulting in suppliers receiving less than they requested. Suppliers have to request the amount needed by November the previous year (full profile, year ahead). They have the possibility to adjust their request to adapt to a changed demand or profile, but deviation from the original request results in a need to pay compensation (to encourage accurate predictions from suppliers).

Suppliers on average procure around half from ARENH and half from the wholesale market (or direct renewable procurement agreements), typically half of that which they procure from the wholesale market will furthermore also likely be hedged. Suppliers generally therefore buy non-baseload from the wholesale market.

80 suppliers requested ARENH energy for 2022. However, for many or most suppliers, it is likely they have not been able to buy as much as they would have wished from the ARENH during the energy crisis. The high and volatile wholesale price in France, exacerbated by the recent unavailability in the nuclear fleet, has resulted in higher than normal demand for ARENH, beyond the volume cap. Even though the availability was increased in 2022 through an agreement between the government and EDF, suppliers have been highly exposed to wholesale. Those who requested too little from ARENH will have suffered even more during the crisis.

Nevertheless, not-withstanding the higher wholesale level and volatility in France, interviews indicated that ARENH provides a level of security for suppliers not available in other markets, hence a relatively low level of supplier failures in France during the crisis. In fact, only two residential suppliers and three B to B suppliers have failed so far, to our knowledge, far less than in many other markets, and it has been argued that these suppliers may have relied too heavily on short-term wholesale procurement.

[9] In order to get a supplier's license some criteria with regard to financial and technical capacity should be met:

Financial capacity:

- a business and financial plan, containing at least the following information: A description of the purchasing strategy. if there is cooperation with an intermediary (trader/supplier) for the purchase of electricity or natural gas: a description of the cooperation with this intermediary and a copy of the relevant contract; The structure of the purchase price, including the various components. If the sales price is linked to the purchase price, reference can be made to information about the calculation of the total price and the positioning of this price in relation to the main competitors.

Technical capacity

- an overview of the relevant experience in the energy sector
- a note with information about the capacity to meet customer needs for electricity
- a note with information about the capacity to meet customers' needs for natural gas
- a signed declaration of cooperation if other companies provide technical assistance

[10] 100TWh at 42€/MWh for the year 2022 + 20TWh extra at 46,2 €/MWh for delivery between April 1 and December 31 2022.

Additionally, recently, some suppliers have struggled with liquidity in the wholesale market, for instance relating to increased margin calls, but in more normal years hedging liquidity is not considered particularly difficult and the difference between ARENH and the wholesale price is typically far smaller, indeed the wholesale price has even been cheaper than ARENH at certain times. Furthermore, given the two-year predictability and flat long-term nature of ARENH (until now at least) and the reality that supplier tariffs are typically referenced against the regulated retail price of the incumbent supplier EDF, the market is not considered a particularly risky market.

4.5.3. Price Cap - Hedging Mismatch (Great Britain)

While the price cap references wholesale over 12 months, the price cap is adjusted every 6 months. It has been argued that this forces suppliers to hedge to match the price cap methodology, the short-term nature of the price cap methodology shortening the time of hedging, thereby increasing hedging risk.

4.6. Bill-Component Mix - Current and Historical Price Breakdown

Looking at the components of the prices, we gain some insight into what is and has been driving end-user price (all-in price) patterns. In Belgium (Brussels) we see that distribution prices and taxes are relatively stable over the long-term and have changed inversely during the energy crisis, approximately neutralising each other and ultimately resulting in no substantial combined impact on recent all-in price increases. VAT has though, after an initial increase at the start of the crisis, reduced significantly more recently, counteracting very slightly the very large increase in the energy components. In general, however, historically the all-in price pattern is strongly determined by the energy component price. The same is also broadly true for gas.

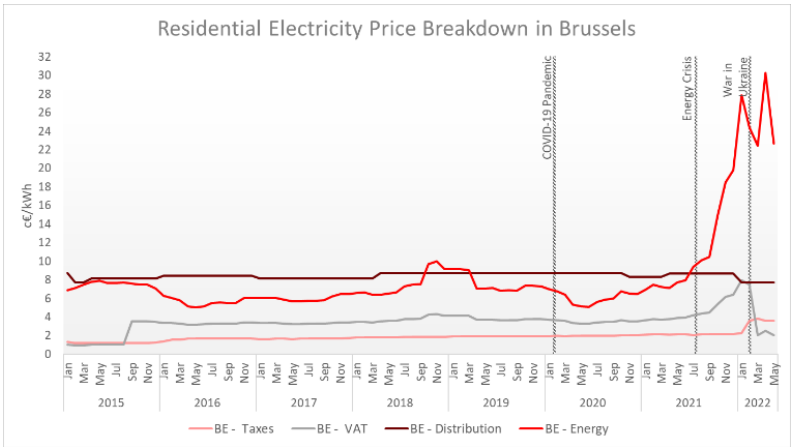


Figure 57: Historical trend of electricity price breakdown components in Belgium (Brussels)

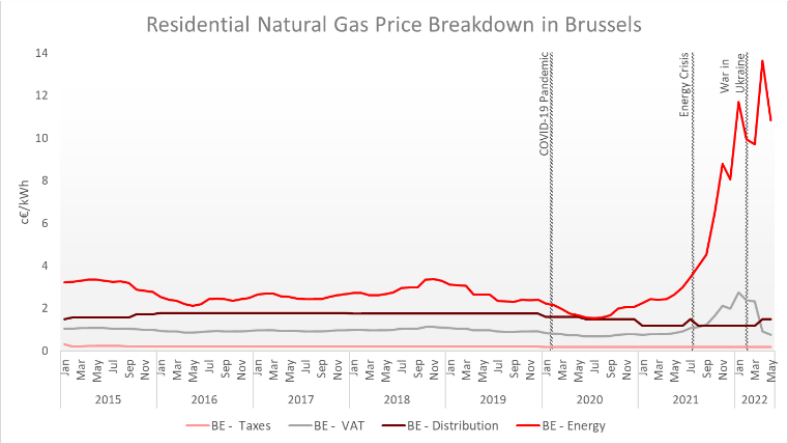


Figure 58: Historical trend of natural gas price breakdown components in Belgium (Brussels)

A very different picture can be seen for electricity in France, where all components except VAT have been equally changeable, and while the energy component has been the main driver of all-in price change during the energy crisis, the cost of distribution has, in the longer-term, led to approximately as much volatility and net increase in all-in prices as the energy

component. Distribution prices have at times however, apparently adjusted in a way that counterbalances the energy component and Taxes have historically, and especially during the energy crisis, changed in a way that softens (through inverse behaviour) the combined impact of distribution and energy price changes. The net result of these apparently inter-connected component behaviours is the relatively flat all-in price trend that we saw in the earlier section. For gas, whereas the energy and distribution components appear to somewhat counterbalance each other, VAT and taxes are less impactful.

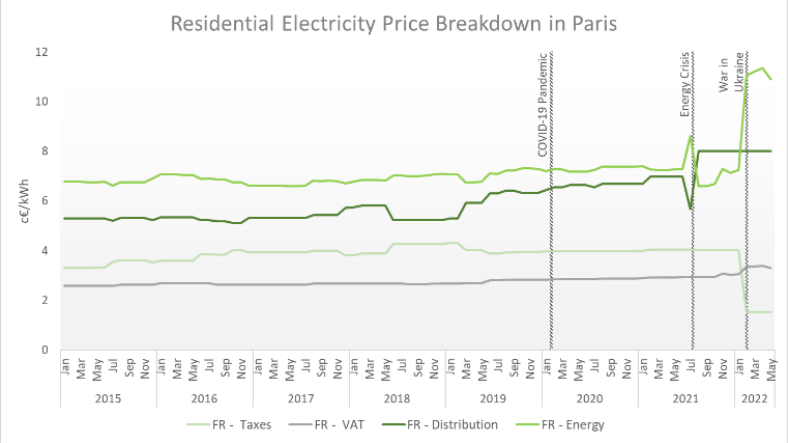


Figure 59: Historical trend of electricity price breakdown components in France (Paris)

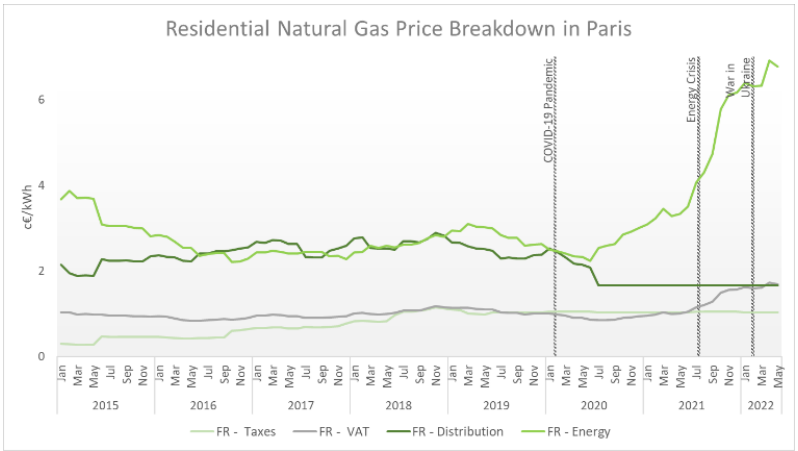


Figure 60: Historical trend of natural gas price breakdown components in France (Paris)

In Germany, while there is some evidence of electricity distribution prices and even (to a lesser degree) taxes and VAT counterbalancing the energy component at times, the energy component is by far the driving force behind the all-in price pattern for both electricity and gas.

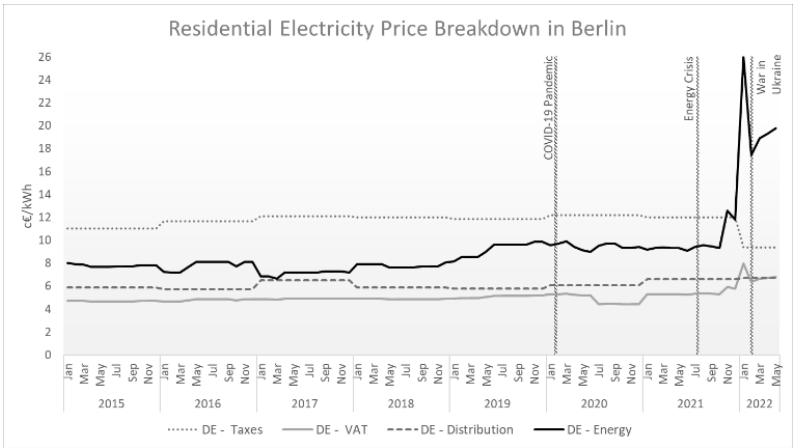


Figure 61: Historical trend of electricity price breakdown components in Germany (Berlin)

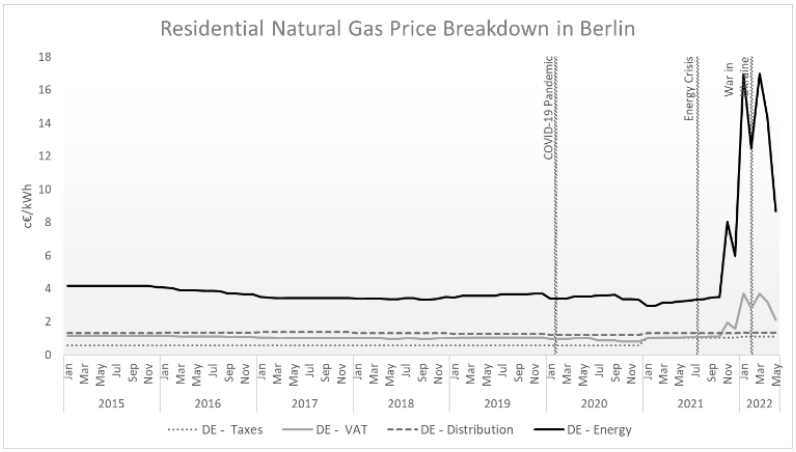


Figure 62: Historical trend of natural gas price breakdown components in Germany (Berlin)

In Great Britain, while all components follow a very similar pattern, the energy component is nevertheless the most significant driver of the all-in price trend. The same is true also for gas.

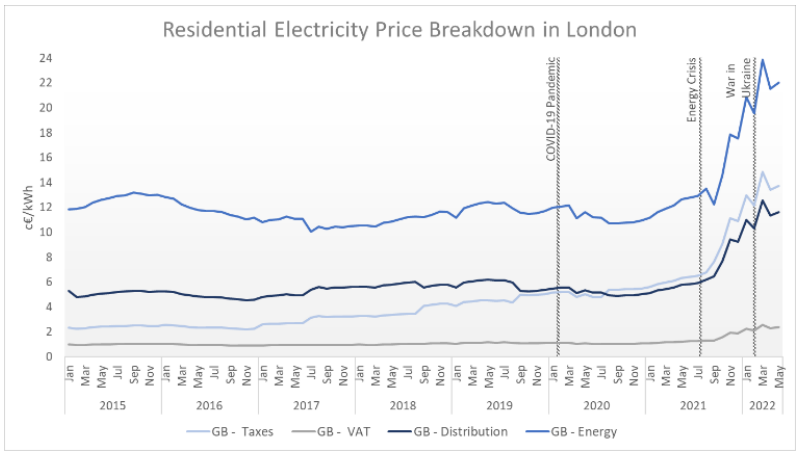


Figure 63: Historical trend of electricity price breakdown components in Great Britain (London)

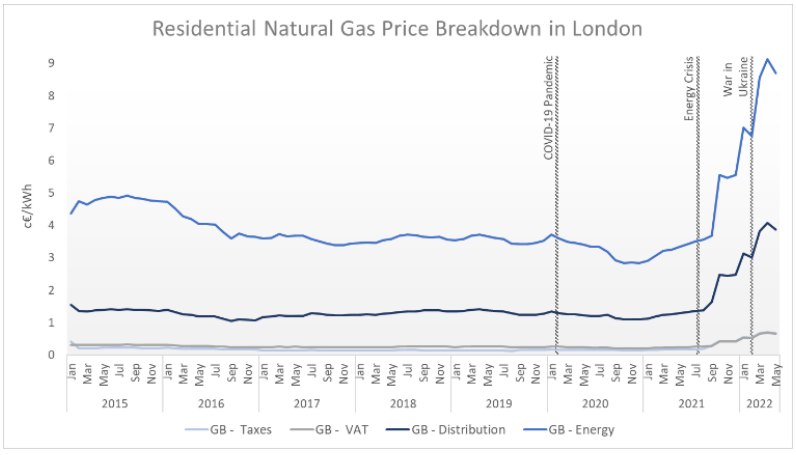


Figure 64: Historical trend of natural gas price breakdown components in Great Britain (London)

In the Netherlands, while energy is also the most influential trend setter for electricity and gas, taxes have also been heavily influential in the electricity all in price trend since 2020. For electricity however, taxes have had a counter-balancing effect on the energy component.

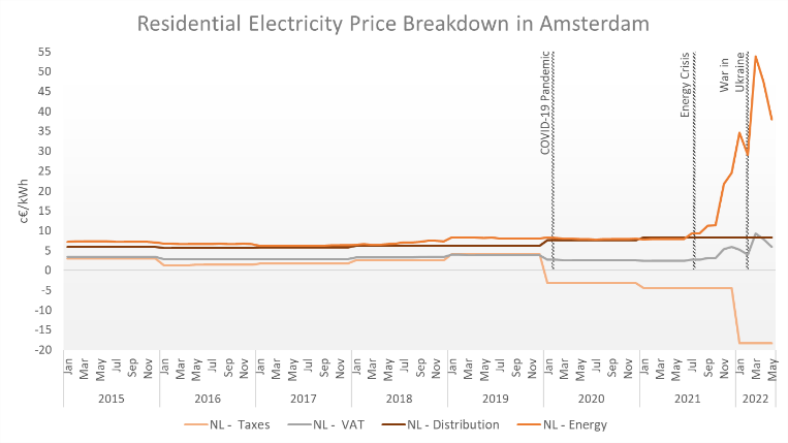


Figure 65: Historical trend of electricity price breakdown components in the Netherlands (Amsterdam)

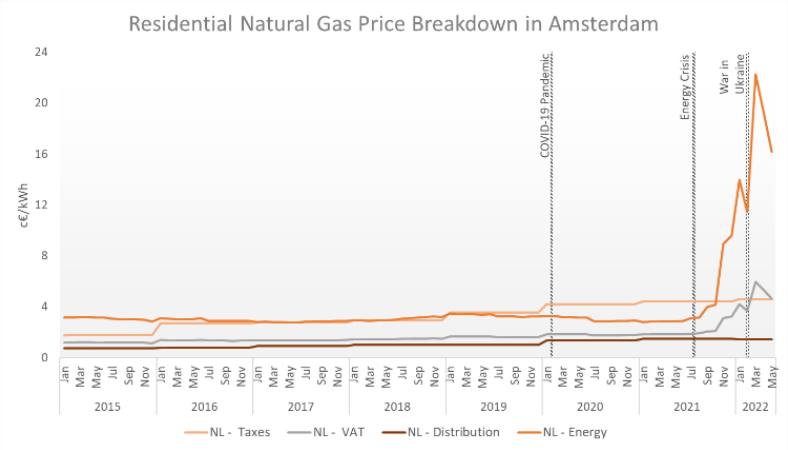


Figure 66: Historical trend of natural gas price breakdown components in the Netherlands (Amsterdam)

The significance of the price trends of each component can be further understood by looking at the average share of each component in the overall price. Regarding residential electricity prices, the significance of the electricity component has changed during the past two years. Between 2015 and 2019 the average energy component share across all markets was 37% (using one average value for the Belgium markets) while between 2020-2022 it was 49%, a share that continues to rise as the energy crisis continues. In fact, the average share for Belgium (Brussels), Germany and the Netherlands has increased from 30% to 43%, a proportionate increase of 43%. However, in France the share has remained almost constant and in Great Britain the share of energy has only increased by less than 12%. Nevertheless, Great Britain has historically had the highest share (the only market above 50% since 2015), while Great Britain and the Netherlands have had the highest share between 2020 and May 2022.

Regarding the other components within residential electricity prices, the largest network component shares have historically been in Belgium (Brussels), Netherlands and France and the smallest in Great Britain. The largest tax component share has historically been in Germany and the smallest in Great Britain (which also has the least VAT). In general, taxes have lost the most share across all the markets, falling from 23%-17%, while network share has fallen from 27%-23%.

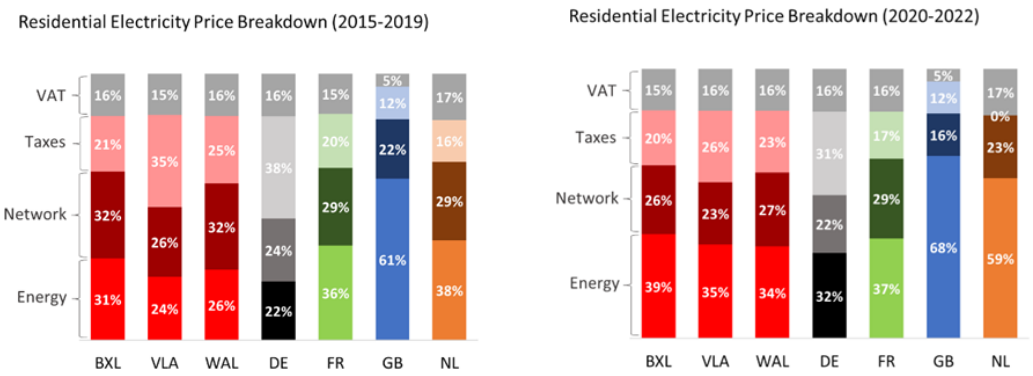


Figure 67: National average residential electricity price breakdown per market for two time periods, 2015-2019 (left) and 2020-2022 (right)[11]. Data source: CREG

In the professional (commercial) gas segment, the picture is broadly similar except that Great Britain's energy share reduced far less (since taxes/VAT have increased less) and the Netherland's energy share has increased less (since taxes/VAT were reduced far less).

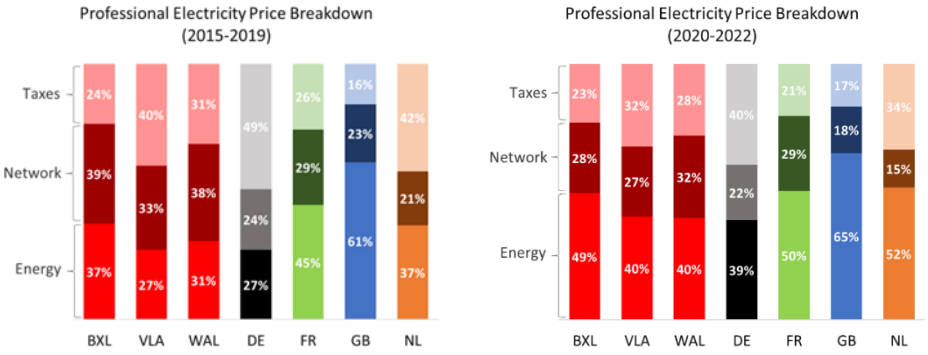


Figure 68: National average professional electricity price breakdown per country for two time periods, 2015-2019 (left) and 2020-2022 (right). Data source: CREG

Regarding residential gas, the energy component has long been a larger share of the bill than for electricity, in all markets except the Netherlands. Furthermore, between at least 2015 until 2019, Great Britain had a far higher energy component share of the bill than the other markets, on average over two thirds of the bill. However, it was also a substantial share of the bill, half of the bill in fact, in Belgium (Brussels) and around 40% in France and Germany. Between 2020-2022, the share has increased substantially in Belgium, Germany and the Netherlands, bringing all markets to between 50%-65%. France has however remained approximately the same, while Great Britain has fallen to 44% because of increased taxes and VAT and reduced network costs, contrary to the Netherlands where the network share has increased heavily, and taxes and VAT have fallen from a combined share of 53% to just 6%.

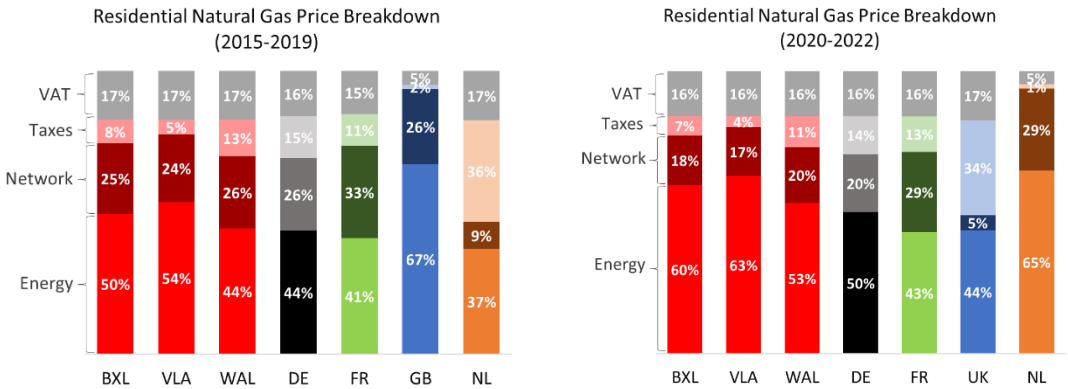


Figure 69: National average residential natural gas price breakdown per country for two time periods, 2015-2019 (left) and 2020-2022 (right). Data source: CREG

[11] Please note that for NL, the typical household considered receives a tax refund on their energy tax, starting from January 2020. When considering this, the end-consumer's bill breakdown for the period 2020-2022 is as follows: Energy component 66%, network 46%, taxes -29%, and VAT 17%.

In the professional (commercial) gas segment, the picture is broadly similar except that Great Britain's energy share is reduced far less (since taxes/VAT have increased less) and the Netherland's energy share has increased less (since taxes/VAT were reduced far less).

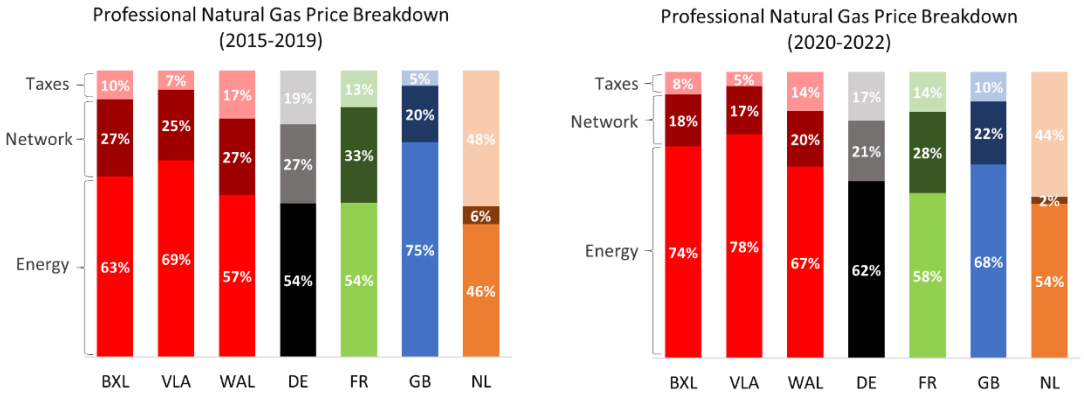


Figure 70: National average professional natural gas price breakdown per country for two time periods, 2015-2019 (left) and 2020-2022 (right). Data source: CREG

It is therefore clear that the impact of any change in component prices is highly dependent on the market concerned. For instance, a large reduction in the tax rates in Germany (electricity) and the Netherlands (gas) will have a large impact on bills, but similar changes in Belgium (gas) and Great Britain (electricity) would have a far more limited impact.

Germany - EEG

It is important to mention the impact of the EEG tax in Germany. EEG is a tax which represents a substantial proportion of the electricity bill in Germany. But not only does it significantly impact prices through its magnitude, but the level of EEG surcharge is negatively correlated to wholesale prices and total consumption volume. So, for instance, when wholesale prices and consumption fell during COVID-19 period, the tax increased, but during the energy crisis, it naturally falls. As such it has a tendency to flatten the all-in price level compared to markets that have taxes which are either % or flat fixed amount add-ons.

4.7. Price regulation

4.7.1. Primary and long-term regulation

Four of the five markets have some form of permanent or long-term price regulation: France has a regulated default price calculated by CRE (Commission de Régulation de l'Energie) based on a public methodology (in particular regarding linkage with forward market prices)[12]; Great Britain has a price cap that applies to a standard variable tariff (SVT) which all suppliers must offer; the Netherlands has standard variable 'model' tariffs - hitherto rarely chosen but heavily so during the energy crisis - which per se are not price-regulated but which can be adjusted at most twice yearly (more in 'exceptional' market conditions). Germany does not have regulated prices per se, but many Stadtwerke have default prices which are influenced by local political decisions and changes to default prices are bound by regulations. Belgium does not have regulated prices, but does have social tariffs, explained further below. Without doubt, the above-mentioned regulations in Great Britain and France have kept prices lower than they would otherwise have been. In the Netherlands, the impact has been muted by customers moving onto model tariffs. In Germany the impact is regional and is probably not reflected in the prices shown in this report. In Belgium, typical prices have not been impacted.

Great Britain - Price Cap

Ofgem, with the support (or rather instigation) of the government, has introduced the cap to protect domestic (residential) consumers, supposedly temporarily but so far for four years already and no sign of an end in the foreseeable future - hence we do not consider it here as a temporarily measure. It applies to the standard energy tariff of each energy supplier, whether by direct debit, standard credit or a prepayment meter. It does not apply to fixed-term energy tariffs or standard variable green energy tariffs. Different caps apply depending on whether customers use a prepayment meter or are on a 'default' tariff. Currently we estimate (based on feedback from interviews) that around 70-80% of domestic customers are covered by the Default Tariff Price Cap and the rest by the Prepayment Meter Price Cap.

[12] The regulated Gas tariff is going to end 2023, the intention is not to protect customers after that, although it is questionable if it will happen during the current gas crisis.

The price cap limits the rates a supplier can charge for their default tariffs. These include the standing charge and price for each kWh of electricity and gas. Twice a year, in April (the 'summer' cap period) and October (the 'winter' cap period), Ofgem adjusts the cap levels to reflect the estimated costs to supply energy over the next six-month price cap period. There is a suggestion by Ofgem to change the price cap level/price every three months, to be decided by July 2022 (we expect this to happen).

The cap aims to ensure suppliers set their prices to reflect the underlying costs to supply energy, and no more. Capped prices only increase when the underlying cost of energy increases. Equally, if costs fall consumers should see a cut in their bills as suppliers are prevented from keeping prices higher for longer than necessary. The interviews suggest however that there are three main issues with the price cap. Firstly it does not allow customers to be profitable. OFGEMs own analysis has calculated that the average supplier net margin in Great Britain have been negative for the past few years, even before the recent and current crises. Secondly, the fact that the price cap is adjusted every six months is problematic. While it aims to be forward looking, it is not possible to make accurate predictions about the prices over the following six months, and if the price cap is set too low as a result, suppliers must bear the weight of those prices for the associated period. What's more, the mismatch between year ahead intervals in the futures market and six-monthly adjustments make hedging problematic. Thirdly, there is the question concerning to what degree the price cap is set according to economic vs political reasoning. In any case, the fact that over 40 suppliers have failed since the onset of the price cap (far more than during the two decades before it) would indicate that it is a problematic mechanism for suppliers.

4.7.2. Social tariffs, short-term tariff-support and other support measures

Prices are not always what they seem and not all prices are seen. Governments can temporarily affect prices through impacting fiscal components, supporting social tariffs, providing credits to customers' bills or simply payments to customers to help them pay those prices. In markets where mainstream prices are directly impacted, they will appear cheaper than in markets where they are not. In markets where there are social tariffs, the social tariffs are typically lower than other tariffs and hidden from national and international price averages and comparisons, making the prices paid in those markets appear higher than in the markets with direct measures on mainstream prices, although the situation is relatively transparent. In markets where prices are not directly affected at all but rather personal credits or payments are provided, prices will appear higher than in the other markets but the situation is arguably less transparent than in the other markets.

If significant numbers of customers are affected by such measures, we need to consider their impact in order to gain a more complete picture of prices, although quantifying the impact in a way that would enable adjusted comparability is unfortunately not possible. We will look at the different measures taken, their significance, and analyse – where possible - how prices would look if direct measures were excluded. However, because there are such different and incomparable methods of supporting energy tariffs for vulnerable customers across the five markets, it is considered unrealistic to attempt to eliminate the impact of all measures within a comparison of prices in the five markets.

Measures are being added, removed and adjusted on an almost daily basis. The following measures were valid at the time of writing the report but provide only a snapshot of measures which were known by the researchers at the time of the report. Nevertheless, they provide a good feel for the sizable impact that such measures have had across the five markets.

Belgium

At present approximately 20% of customers in Belgium are on social tariffs - lower price tariffs supported by government. Additionally for all residential customers, VAT has been reduced on electricity from 21% to 6% from March 2022 until December 2022, and on Gas from 21% to 6% from April 2022 until end of December 2022. The approximate impact of these reductions on the end-user price is shown in the following figure.

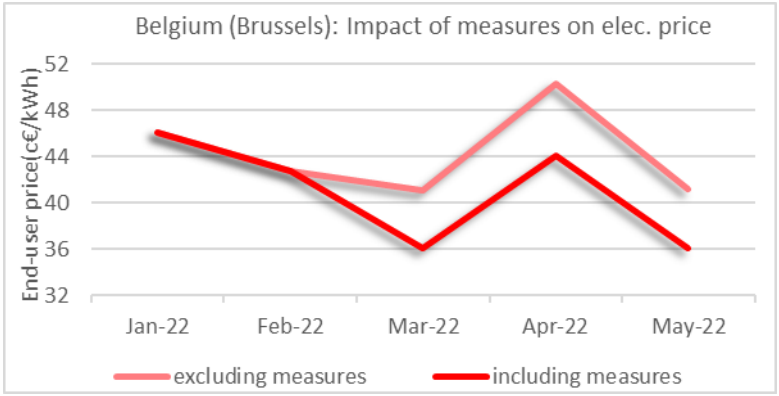


Figure 71: Electricity end-user price evolution with and without the effect of support measures during the energy crisis, in Belgium (Brussels)

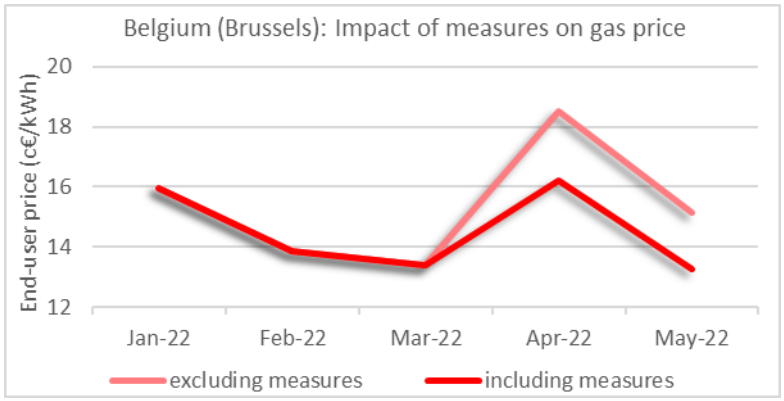


Figure 72: Natural gas end-user price evolution with and without the effect of support measures during the energy crisis, in Belgium (Brussels)

There have also been other recent and current mitigation measures over the past couple of years to support customers in Belgium which have not directly impacted prices or which are difficult to measure: in October 2021 the most vulnerable citizens benefited from an €80 energy cheque to be deduced from their bill; on 12 October 2021 a €16 million fund for Gas and Electricity was established to support households in need that are not eligible to receive the social tariff, in 2022 all residential electricity consumers receive a cheque of €100 to compensate for rising costs of heating. The government has also forbidden unilateral changes in energy contracts, by which energy suppliers could independently increase the down payment invoice of consumers also in fix-price agreements. Additionally, certain taxes such as the federal contribution for gas and electricity and offshore green power certificates are being replaced by excise duties which can easily be adjusted by the government to compensate for energy price variations. The point is to keep revenues at a constant level, rather than increasing along with energy prices.

France

In France there are no social tariffs as such, but there is an annual energy payment – related to household income – that helps vulnerable customers pay their bills. In 2021 for instance 5.8 million French households received an energy cheque. Additionally, for all residential customers, there was a reduction in CSPE, TICFE energy taxes since February 2022 until January 2023[13] [14]. The approximate impact of these reductions on the end-user price is shown in the following figure.

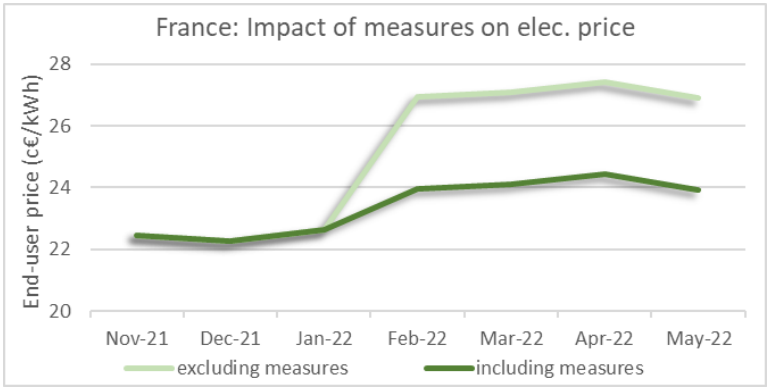


Figure 73: End-user price evolution with and without the effect of support measures during the energy crisis, in France

Netherlands

In the Netherlands there has since January 2022 been a reduction of 265€ in energy tax (from 559€ to 825€) for a typical household regardless of consumption (amounting to €3.2bn in total). The approximate impact of this reduction on the end-user price is shown in the following figure. Additionally, it has been announced that as of 1 July 2022, the government will

[13] Le mediateur national de l'energie: AUGMENTATION DE 4% TTC DES TARIFS RÉGLEMENTÉS D'ÉLECTRICITÉ LE 1ER FÉVRIER 2022

[14] Early January 2022, the French government limited the increase of the regulated tariff (TRV) applicable to households and very small enterprises to 4%, by deciding on two measures: 1. Reducing the TICFE[2] in 2022 from 22.50 €/MWh to 1 €/MWh for individual consumers and to 0.50 €/MWh for businesses, which are the minimum levels allowed by the European Regulation. The measure, which will be in force from February 1, 2022 to January 31, 2023, represents a cost of 8 billion euros for the State. 2. Increasing the ceiling of the electricity volume sold by EDF under the ARENH[3] mechanism from 100 TWh to 120 TWh for 2022. The price of these additional volumes of ARENH have been fixed to 46.20 €/MWh (whereas the first 100 TWh have been sold to the historical price of 42€/MWh). According to EDF, this measure represents a cost for EDF between 7.7 billion and 8.4 billion euros (depending on market prices).

temporarily lower the VAT on energy from 21% to 9%, until December 2022[15,16].

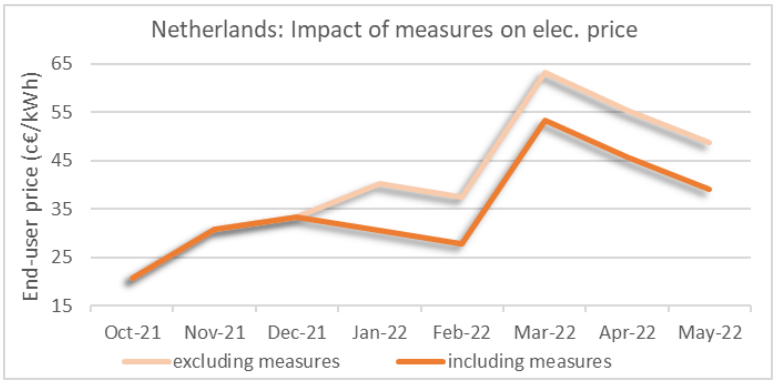


Figure 74: End-user price evolution with and without the effect of support measures during the energy crisis, in Netherlands

There have also been direct payments of 800 euro to the lowest income groups (800,000 consumers).

Germany

Many measures have also been taken in Germany by the federal government, including: a temporary VAT reduction from 19% to 16% (on all goods incl. electricity and gas) between 01 July-31 December 2020; a reduction in the EEG surcharge (electricity), capped at 6.5 ct./kWh (ca. 9.6 ct./kWh otherwise) between 01 January and 31 December 2021[17]; and the abolishment of the EEG surcharge (electricity) from customer bills as of 01 July 2022 (payments to RES generators will basically come from state budget instead) [18].

Great Britain

In addition to the price cap, there are various other grants and benefits for vulnerable customers in Great Britain now including a rebate[19], Warm Discount Scheme, Winter Fuel Payment[20], Cold Weather Payments[21], Grants from energy suppliers to help customers pay off their energy debts, and Local Energy Grants.

4.7.3. Tariff change regulations

In addition to the above regulations, there are regulations related to tariff and contract changing which effectively directly impact price levels and patterns.

Variable tariffs and non-fixed contracts

The regulations surrounding price changes naturally impact the pattern, level and volatility of prices. In Belgium, for open ended contracts suppliers are required to inform customers of price and other contractual changes two months prior to the change. In France and Great Britain the notice period is 30 days. In the Netherlands, a variable tariff may be adjusted twice per year on January 1 and July 1, but for a contract with variable rates, prices can change as stated in the general terms and conditions of the contract, but customers must always be able to cancel before new rates take effect. In Germany suppliers must inform household customers at least one month before the price change is to apply (other end consumers must be given two weeks notice). However, this deadline did not apply to price changes before July 27, 2021. Before that time, they only had to be done "in good time" before the end of the regular billing period. The information must be simple and understandable, informing the customer of the reason, the requirements and the scope of the price change (also new since July 27, 2021) and must also inform the customer of their special right of termination.

[15] Business.gov.nl: Energy tax
[16] Business.gov.nl: VAT on energy to go down
[17] Context: Level of EEG surcharge is negatively correlated to wholesale prices and total consumption volume. Measure intended to protect customers from otherwise drastic EEG surcharge increases due to (mostly COVID-related) decline in wholesale prices and consumption levels. € 4.7 billion for the measure provided by the federal climate fund (EKF), which uses revenues generated through the newly implemented CO2 tax.
[18] Context: Planned phase-out of the surcharge expedited due to current high energy prices.
[19] If the customer pays the council tax and their home is in council tax bands A to D, they get £150 back from the council to help pay the energy bills. They also get the £150 if they get a Council Tax Reduction (including if they get a full reduction) and if they get the Disabled Band Reduction discount and their home is in band E. If they cannot get the rebate, the council might still offer them help e.g. in the form of certain benefits
[20] An annual one-off payment for heating during the winter (usually for the ones born before 26/09/55).
[21] One-off payments to help you pay for extra heating costs when it's very cold. Citizens get a payment each time the temperature drops below a specific temperature for a set period of time. To be eligible for a Cold Weather Payment a customer should already get Pension Credit, Income Support, income-based Jobseeker's Allowance, income-related Employment and Support Allowance, or Universal Credit

This suggests that for variable tariffs, Belgium is the least flexible and the Netherlands the most flexible of the markets.

Fixed-price, fixed-term contracts

If in a given market fixed price tariffs are common and if fixed prices cannot be changed during the term of a contract, then the prices paid by customers in that market are going to be more static than in a market where fixed price tariffs are less common, or the prices can be changed during the term of a contract.

Apart from Germany, it is generally necessary in all other markets for suppliers to honour fixed-price contracts for the duration of the term of the contract.

Specifically in Belgium the fixed price (in the case of a fixed-price product) or the price indexation formula (in the case of a variable-price contract) cannot be changed within the duration of the contract. More precisely, no modifications of the contractual conditions are possible if they are to the detriment of the consumer but are possible if they are in the favour of the consumer. Furthermore, while tacit renewal is possible without unilateral modification by the supplier (in accordance with the general conditions of sale of the supplier), renewal at the end of a contract otherwise requires a new contractual proposal sent to the customer at least two months before the end of the term of the contract. If a current energy contract no longer exists, the supplier is obliged to inform the customer and to offer an alternative, cheaper price plan, with a 2 month notice period as a reminder letter offering updated rates. If a customer does not respond, the supplier must also allocate its lowest priced equivalent product. It should also be noted that in Brussels suppliers are obliged to offer three-year contracts, although there is no fixed contract obligation.

In France, the price of Gas and/or Electricity can only be revised at each expiry of a contract. The customer must be informed at the latest 30 days before this deadline, of the new price which will be applied from the date of renewal of his contract. In the event of refusal of this new price by the customer, the customer has a period of 3 months from receipt of the letter indicating the new price, to terminate the contract without penalty (although the price will change as of the advised time).

In Germany however, energy suppliers who have reserved the right in the contract to unilaterally change the terms of the contract, shall inform end consumers in good time, in any case before the end of a billing period, in a simple and understandable manner about the intended exercise of a right to change the prices or other terms of the contract, and about the rights of end consumers to terminate the contract. Notification of price changes must be given no later than two weeks, in the case of household customers no later than one month, before the intended change occurs. The information must be provided immediately and in a comprehensible and simple manner, with reference to the reason, prerequisites and scope of the price changes. If the energy supplier exercises a right to change prices or other contractual terms, the end consumer can terminate the contract without notice at the time the changes come into effect, without the energy supplier being entitled to demand a separate fee for this. A change in the contractual terms also applies to an adjustment of the contractual services. In the case of an unchanged transfer of additional or reduced sales tax charges resulting from a statutory change in the applicable sales tax rates, no notification is required. While these rules protect consumers to some extent, they are still lighter than the other markets, and formerly before recent rule changes, it was possible, even common for competitors to 'jack up'[22] prices (historically also happens in Great Britain) of customers once their initial fixed-term contract had come to an end.

4.8. Tariff mix

Looking at the share of different tariffs on offer to residential electricity customers (similar for electricity and gas) - not the share of customers per contract - in each of the markets, in Belgium (Brussels) and France, despite substantial waves of variation over time, there appears to have been a broad long-term trend away from fixed contracts being the most common towards variable, or in the case of France, tariffs indexed to regulated tariffs and other tariff types. In Germany, Great Britain and the Netherlands on the other hand, fixed tariffs have historically been the most common and were - except occasional anomaly months - becoming more so until the current energy crisis.

[22] Price jacking is not visible in price comparisons between markets and may mean that one market is more expensive than another if price jacking is very prevalent there, since the prices are essentiall post-offer.

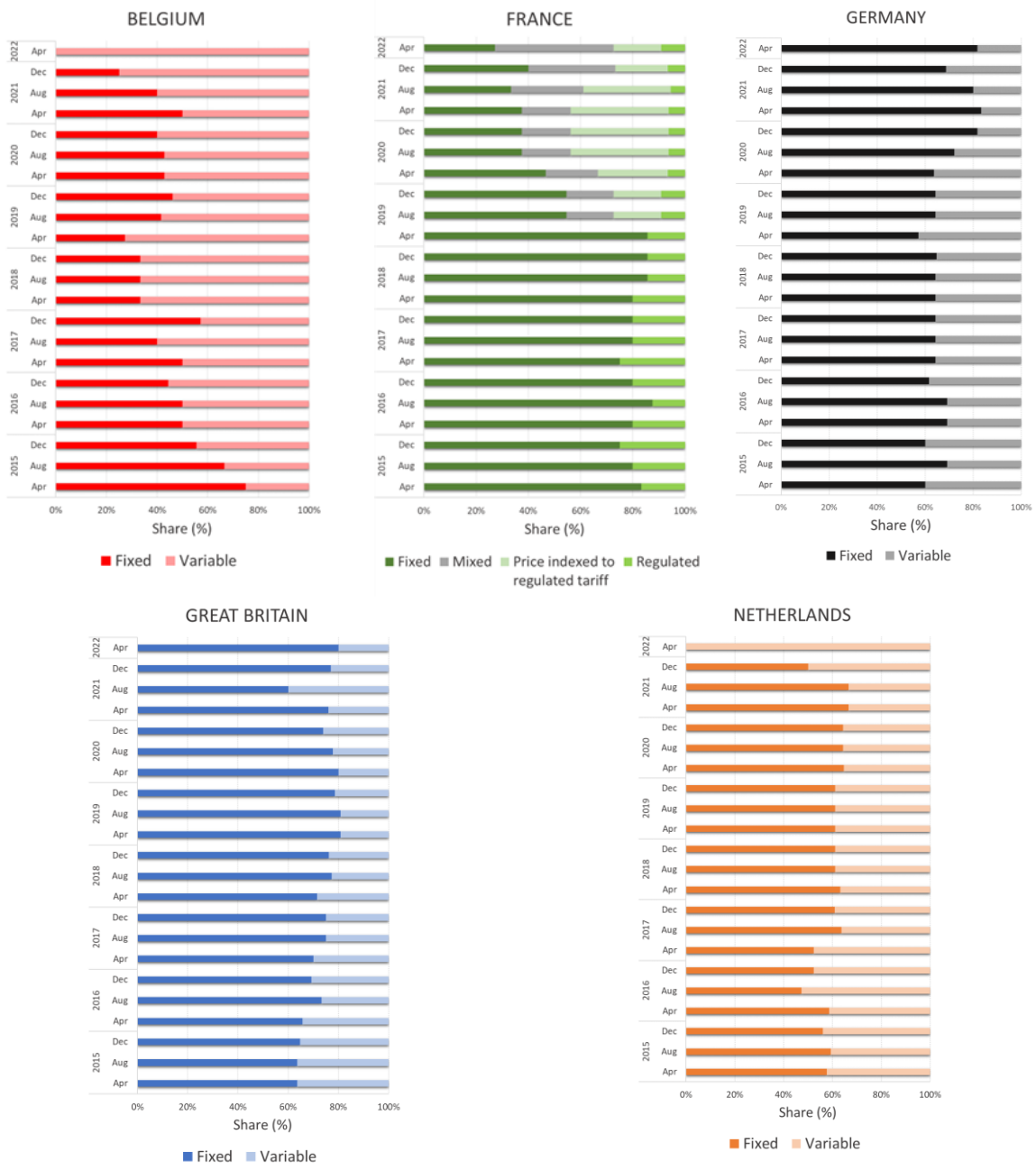


Figure 75: Shares of electricity tariff types[5] in each country, residential customers

To really understand the popularity of different tariff types however we need to consider the proportions of customers on each tariff type.

Belgium

Approximately 20% of customers are presently on the social tariff, but as of the time of this report estimates of the proportion of customers on fixed-term contracts range from 50%-60% (interviews). It was, however pointed out in interviews that these fixed-term contracts are no longer being offered (during the energy crisis) and will not be renewed during the current energy crisis and will therefore gradually become variable contracts. Historically, however, 80% of active customers (switchers) chose fixed price fixed term contracts.

France

Approximately 70% of households (2020) have a regulated electricity tariff, and therefore a variable tariff, (but only changes annually) while in the gas market only 36% of households have regulated tariffs. In addition to customers not on the regulated tariff, many other customers are on tariffs that are tied to or benchmarked against the regulated price. These numbers have been broadly the same for some years. The number of fixed price contracts has however been falling for both electricity and

gas even lower during the energy crisis as more customers move back to the regulated tariff and fewer fixed price offers are available in the market.

Germany

The large majority of customers (of incumbents and competitors) are on rolling fixed-price, fixed-term contracts, mostly 12 months but also 24). Germany is the only market where the proportion of fixed-term contracts does not appear to have diminished during the energy crisis, so far at least, although far fewer offers are being provided by competitors (as opposed to incumbents). According to the interviews, the most profitable segment are incumbent residential customers on one to two year fixed-price rolling contracts.

Great Britain

Prior the price cap and the energy crisis, most customers who had switched supplier (approximately 70% of the market), and a sizable proportion of the rest had fixed price contracts. At the time of writing this report, as of May 2022, we estimate that approximately 70-80% of all customers are on a standard variable tariff at or below the price cap.

Netherlands

Prior to the energy crisis, the majority of customers were on fixed price contracts, but a sizable minority were on variable price contracts. At present approximately half are on the model tariffs, in addition to those on other variable price contracts.

Looking at the situation for SME electricity customers in May 2022, we see a similar pattern.

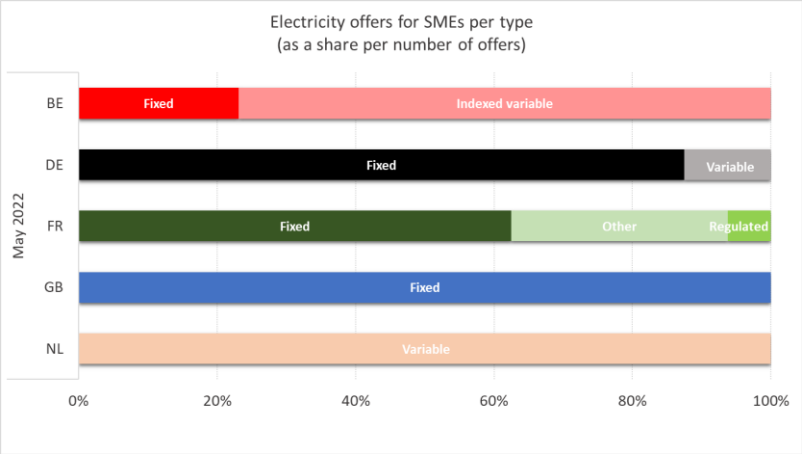


Figure 76: Shares of electricity tariff types (fixed, standard variable, indexed variable, regulated, other) in each country, SME customers

4.9. Net margins

Accurate net margins are difficult to come by, but over many years VaasaETT, through its dealings with suppliers internationally, including projects for suppliers and (confidential) due diligence for investors has collected samples of net (typically EBITDA) margins data in the five markets. While not being able to divulge specific data, some key aggregated conclusions can be drawn on a country-by-country basis:

Germany

Germany has had, in normal times, some of the largest margins. This situation stems from the fact that despite typically having relatively high costs (see later section on cost-to-serve), the generally high customer loyalty and relatively low customer activity in Germany has resulted in relatively low-price pressures on incumbent tariffs.

While incumbents, many of which are owned by municipalities, have often aimed to have fair prices, they have also often been seen as long-term revenue streams for those municipalities and operate sustainable business models. Their relatively substantial margins enable them to retain and win active customers in their incumbent and, (typically) surrounding and even further afield areas. But they tend not to engage in particularly aggressive in-area or near-area price competition for fear of lowering their incumbent margins or sparking severe reprisals from neighbours. Instead, they tend to focus more on incentives (bonuses etc.), extensive marketing and / or targeted sub-brands.

Concerning new entrant competitors, the situation is often rather different. While they are often prepared to price far more aggressively, the competitive environment in Germany is such that winning customers can be very expensive (as explained later in the report). Because of this and the heavily hedged nature of the larger incumbent players in Germany, new entrant

competitors often struggle to make margins except when wholesale prices are falling significantly (if they can significantly under-cut the incumbents) or if they have managed to obtain a good long-term hedge at a time when wholesale prices are rising. In any case despite the apparent aggressive competition, price pressure is less than in some other markets.

During the current energy crisis, the situation has become more extreme. The better hedged incumbents (though not all of them have been well hedged) have generally been able to retain profits (so far at least) - some have suffered, and others have made windfall profits - keeping customers even when retail prices have been rising, while many competitors have failed to survive.

Great Britain
It may seem, by looking at gross margins in Great Britain, that net margins are also large. That prices have been inflated by excessive profits. The opposite is in fact the case. High regulated costs and costs of competition for suppliers suck up much of the relatively large gross margins.

The Great Britain market has long been an extremely competitive market. With the lowest level of incumbency in Europe, most customers can be considered active. Price competition has been fierce and the only way to make profit has been through lowering cost-to-serve. New entrants were the first to realise this and achieved super-low-cost supplier platforms. As they won large numbers of customers through their cost advantage, former incumbent players began to dramatically lose margin, but in their desperation to retain customers, their profitability suffered further and indeed margins for all players became tighter. With the introduction of the price cap in 2019 and a raft of regulated obligations (described later), net margins began to become negative even before the arrival of the energy crisis. The energy crisis then resulted in a perfect storm for less well hedged, financed or cost-effective players as well as those who had priced too aggressively. The result has been the failure of over 40 suppliers since 2016.

Netherlands and Belgium
The Netherlands and Belgium have both been active markets and as such price pressures have been relatively intense. The net margins that we have seen have been relatively small (as low as 0.5%-1% EBIT) even in normal time and even negative as a result of the energy crisis.

France
Identifying the true incumbent net margins in the French market is unrealistic according to many experts we have interviewed in the French market. However, while the regulated price in France is intended to be a sustainable price, it is a relatively low price and there is no secret of the financial difficulties faced by EDF.

For competitors, net margins vary widely in normal times but have apparently, in recent years generally been reasonable. The combination of the predictable safety net availability of the ARENH as baseload, the stable benchmark of the regulated price, the liquidity of the wholesale market and increasing availability of bilateral renewable generation procurement as well as the growth of gen-retailer models (suppliers with own generation or similar), has resulted in a relatively safe market for many competitors, especially those with large quantities of their own competitive (e.g., renewable) generation. While the current energy crisis has resulted in a highly volatile wholesale market, the relatively positive situation in France is arguably reflected in the low level of supplier failures.

4.10. Cross Subsidization

The purpose of this report is not to analyse cross subsidization in detail, but through the research, including the interviews, several issues have been identified. In general, it appears that cross subsidization may impact price differences to some extent.

4.10.1. Unbundling

In Great Britain, the Netherlands and Belgium, network-retail unbundling is not an issue. Suppliers are ownership unbundled from distribution companies and there is no indication from the pricing patterns of any interconnection between distribution prices and energy component prices. In France and Germany however, network and retail companies are generally only legally unbundled.

In France, due to the price regulation process, we feel it is unlikely that collusion is a factor in price determination, but it is clear from the price data that retail and network prices are inversely related. This relationship is perhaps more likely to be politically determined, possibly designed to ensure cost reflectivity in retail while keeping the all-in price as flat as possible. Either way, since regulated prices are apparently designed in this way, and since other tariffs in the market tend to be benchmarked – to a greater or lesser extent - to the regulated price, distribution and retail prices in France are not fully divorced from each other.

In Germany, while the national price data does not show any relationship between distribution and energy component prices, we have seen (not able to be shown in this report) individual incumbent supplier price data that clearly shows such relationships in some regions. Furthermore, some interviews and other non-public evidence has suggested that there is indeed cross-subsidization of retail prices by distribution prices and vice versa, although it only relates to some regions. The main intention of the cross-subsidization appears to be either to keep default all-in prices flatter, or to enable more competitive retail prices at times of higher price competition. We do not have any evidence concerning cross subsidization of competitive prices for the purpose of customer acquisition. In any case, since most customers in Germany are on default incumbent tariffs, and since those tariffs act as a benchmark for the competitors, any such cross subsidisation is likely to influence not only incumbent tariffs, but also those of competitors.

4.10.2. Incumbent advantage

Incumbent advantage can extend far beyond vertical integration. Other advantages include customer inertia and loyalty (explained further in the section on switching and competition), brand awareness and marketing synergies, financial liquidity and cross subsidization of price sensitive customer segments with margins less price sensitive incumbent segments. Such advantages are arguably generic to incumbent suppliers regardless of the market that they are in, but the degree of the advantage depends primarily on two factors: the market share of inactive incumbent customers and the level of margins that are typically made on such customers.

On both counts, German incumbents are in a strong position. Approximately 70% of German customers are inactive and on incumbent tariffs, and the margins made on those customers are generally relatively high. Consequently, German incumbents can engage strongly in hedging, marketing and customer retention measures (including defensive or offensive pricing). The result is less price pressure on default prices, flatter prices (in normal times), and occasional price adjustments in moments of competitive pressure.

In the Netherlands, another incumbent advantage has been the ability to buy up the emerging competition. While the Netherlands is not unique in such behaviour, it is more extreme. Indeed, the majority of customers with non-incumbent suppliers belong to suppliers owned by incumbents. It is perhaps therefore unsurprising that prices of incumbents and competitors are so similar in the Netherlands, where price tends to play a relatively limited role in the positioning of many competitors.

In Great Britain, the advantage of the incumbents has changed substantially over the years, from times when they enjoyed the benefits that incumbents typically do, to times when the growth of new entrants was such that the incumbents no longer had a dominant position. However, due to the massive rate of supplier failures during recent years and the adoption of the customers of failed suppliers mostly by incumbents, the current threat from competitors has lightened considerably. Even the largest competitors, which are now as large as incumbents – one of which acquired the supply business of one of the largest incumbents, are now akin to incumbents in terms of size and arguably also behaviour. As a result, competitive price pressures in Great Britain - price cap aside – are arguably less than they have been since the onset of competition.

4.10.3. Dual Fuel

As supported by the earlier analysis in this report, there appears to be little impact of dual fuel on prices. The salience of dual fuel tariffs is unlikely to make a substantial difference to the relative prices of the five markets, given that in all five markets there are similar proportions of gas and electricity customers. Without doubt, as explained later in the section on costs, there are cost advantages for suppliers from selling electricity and gas to the same customers, but within markets where gas and electricity are both common, there is no evidence that dual fuel lowers or increases prices. Indeed, customers can save by shopping around for gas and electricity separately.

4.10.4. Own-generation

In a market where wholesale prices are increasing sharply, such as during the present energy crisis, suppliers with their own generation (or long-term PPAs), especially renewable generation, can gain a competitive price advantage. This advantage may be used to reduce prices to win customers or to enhance margins. It is not clear if or to what extent this benefit impacts prices of those suppliers or the market in general, but in all five markets there are anecdotal cases to support the view that such advantages enable more competitive prices than would otherwise be the case, and in some cases enable suppliers to survive volatile wholesale price periods.

One challenge that we have noticed in France, is that ethically focussed suppliers who position themselves as 100% renewable, may consider themselves unable (since it would damage their integrity) to procure Nuclear (unless they claim nuclear is renewable) and thereby unable to procure from the ARENH. In normal times, this would not be a serious issue, but during the energy crisis it requires them to procure all the renewable energy that they cannot produce or procure directly (e.g. PPAs) from the expensive wholesale market - instead of the ARENH - and then obtain green certificates to that amount. This results in a higher and more volatile cost of procurement for the supplier, thus increasing the prices they need to sell at.

4.11. Competition

4.11.1. Incumbent market share

Great Britain and the Netherlands have by far the highest proportion of electricity customers who are no longer with their incumbent, approximately 62% for electricity as of 2020. Until 2019 Great Britain was in fact far ahead of the Netherlands in this respect, but due to supplier failures they re-adopted (were awarded) many lost customers. The situation is the same for Gas in the Netherlands, but over 70% of gas customers in Great Britain are no longer with their incumbent (British Gas is the only former incumbent for gas in Great Britain). In Germany and Belgium, the rate is between 30-40% for electricity and gas (interview responses for Germany indicate it could be as low as 25-30%), but in France, while over a third of gas customers are no longer with their incumbent, it is less than 30% for electricity customers.

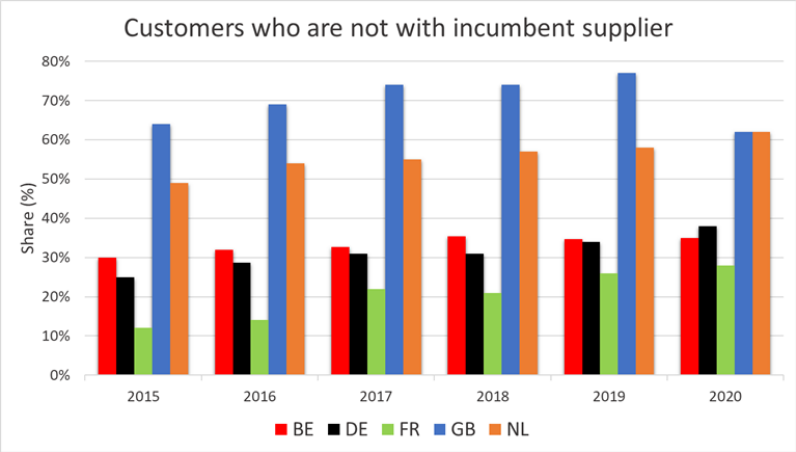


Figure 77: Market share of residential electricity customers who are not with incumbent supplier (as per number of customers)

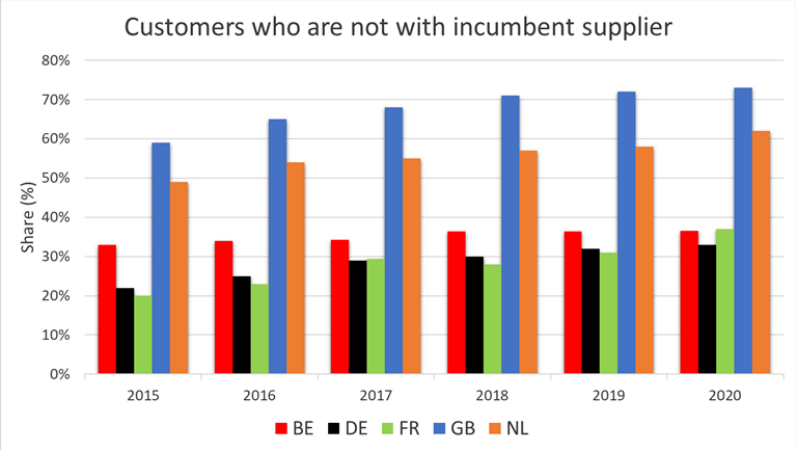


Figure 78: Market share of residential natural gas customers not with incumbent supplier (as per number of customers) in each country

The implications of this for prices are that in Great Britain and the Netherlands, far more customers have historically been on competitive tariffs, either from the competitors those customers switched to, or the incumbents who responded by offering competitive contracts to retain those customers. Since in both markets most competitive offerings have generally been fixed contracts and since switching customers have overwhelmingly chosen fixed contracts, this has meant that not only have most customers been on fixed contracts, but those contracts have generally been the most competitive. In France and Germany, although fixed prices have commonly been offered (less so in recent years in France) by competitors, a far smaller share of customers have switched to them since most customers have remained with their incumbent, and there has consequently been less pressure for incumbents to respond in kind. In Belgium, the combination of a high level of retained share of customers with the incumbent and a high share of indexed variable offers, most offered tariffs are currently variable and thus linked closely to the wholesale market.

4.11.2. Switching rate

As shown by the following figures, despite dropping off since 2020 due to supplier failures, the annual switching rate[23] in Great Britain has historically been far higher than the other four markets, not that the other markets have low levels of switching. However, the other markets were all on an upward trajectory until 2016 and although Belgium (Brussels) and the Netherlands have since experienced a tailing off of switching rates, Germany and France were in 2021 approaching the level of Great Britain for electricity switching and exceeding Great Britain for gas, the first time since those markets were liberalised. Despite some high moments of switching historically, Belgium (Brussels) had the Netherlands are now trailing the other markets in terms of switching rates.

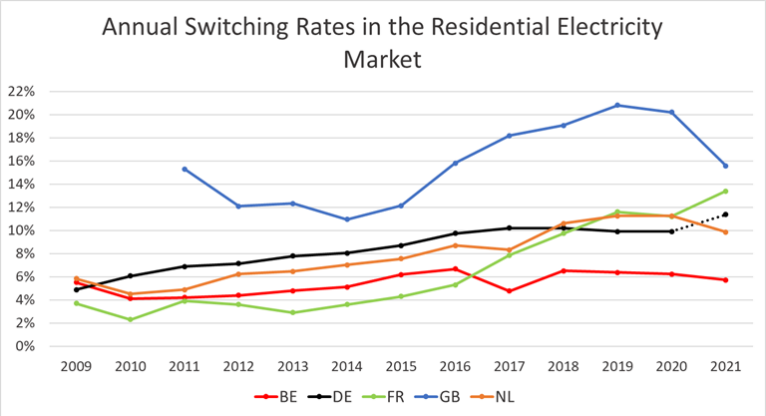


Figure 79: Annual switching rates in the residential electricity market as per number of customers in each country

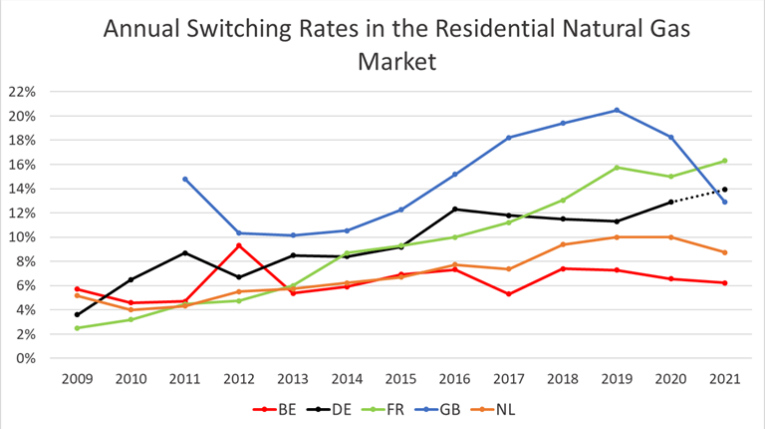


Figure 80: Annual switching rates in the residential natural gas market as per number of customers in each country

Relationship between End-user Prices and Switching

As shown by the following figures, correlations between end-user prices and switching rates vary substantially between country and over time, ranging from very low to very high. Regarding electricity, the level of correlation appears to have fallen heavily over time in Germany and (to a lesser extent) the Netherlands, while increasing in Great Britain and France. In recent years the correlation has been highest in Great Britain and France and lowest in Germany, the Netherlands and Belgium (Brussels). In any case, switching clearly has an influence on prices and/or vice versa. Regarding gas, the variability is equally large, but correlations exist, and in recent years the correlations have been strongest in the Netherlands, Great Britain and Germany.

[23] By switching rate we refer to supplier switches. Combined switched and customer switches have been excluded from this analysis.

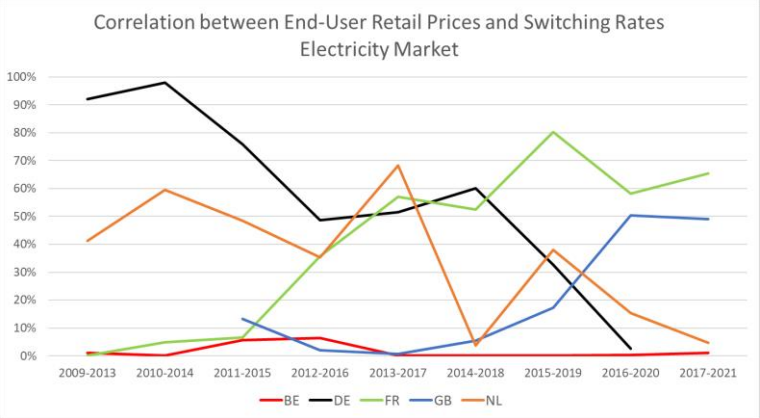


Figure 81: Correlation between electricity end-user retail prices and switching rates in each country

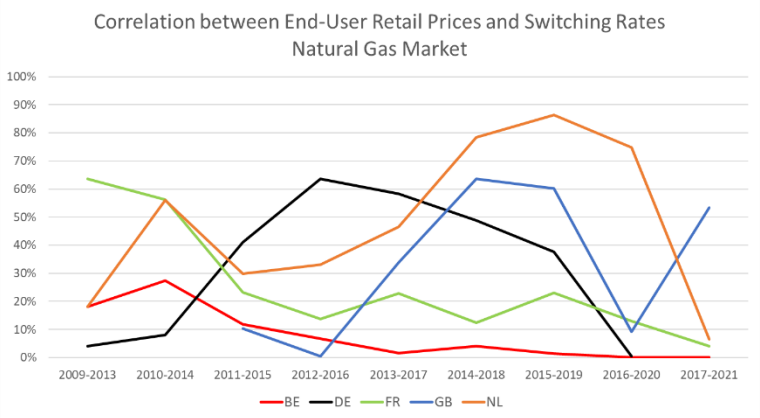


Figure 82: Correlation between natural gas end-user retail prices and switching rates in each country

Relationship between Margins and Switching

Switching and margins have a two-way relationship. Higher margins may lead to higher switching if the higher margins result in higher prices and higher savings potentials from switching. The higher switching may in turn lead to lower margins if suppliers lower their prices to stem the customer losses. Likewise, lower margins may reduce the benefit from switching and result in suppliers raising prices to take advantage of the apparent lack of price elasticity. It might therefore be expected that there is a close relationship between margins and switching. In fact, as shown by the following figures, Gross margins in Great Britain (electricity) and Germany (gas) do moderately correlate with switching rates, but the other markets show only a very low level of correlation. It could therefore be argued that this would support the argument that higher gross margins in Great Britain (electricity) and Germany (gas) are leading to higher levels of switching.

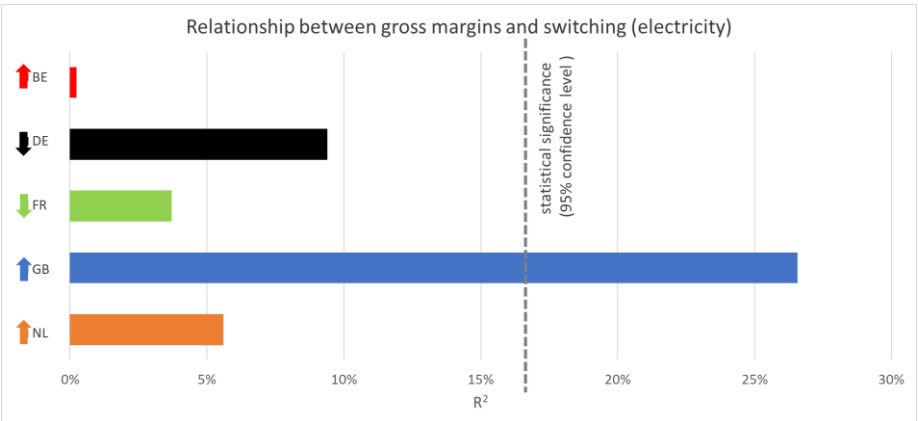


Figure 83: Correlation square between electricity gross margins and switching rates for the period 2016-2021

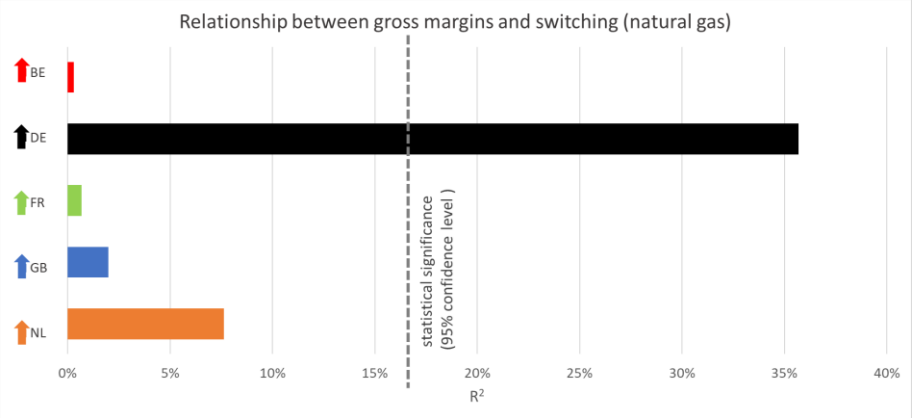


Figure 84: Correlation square between natural gas gross margins and switching rates for the period 2016-2021

Relationship between savings and switching

Switching and electricity savings are very closely related in Great Britain and quite closely related in the Netherlands and France. They are less related in Belgium (Brussels) and Germany. Switching and gas savings are quite well related in all markets except Great Britain. These findings can be interpreted as indicating that the switching rates for electricity in Great Britain, and to a lesser extent the Netherlands and France, are not only supported by savings opportunities, but also that the switching rate imposes moderation on savings. For gas the same can be claimed to some extent for Belgium (Brussels), the Netherlands, Germany and France.

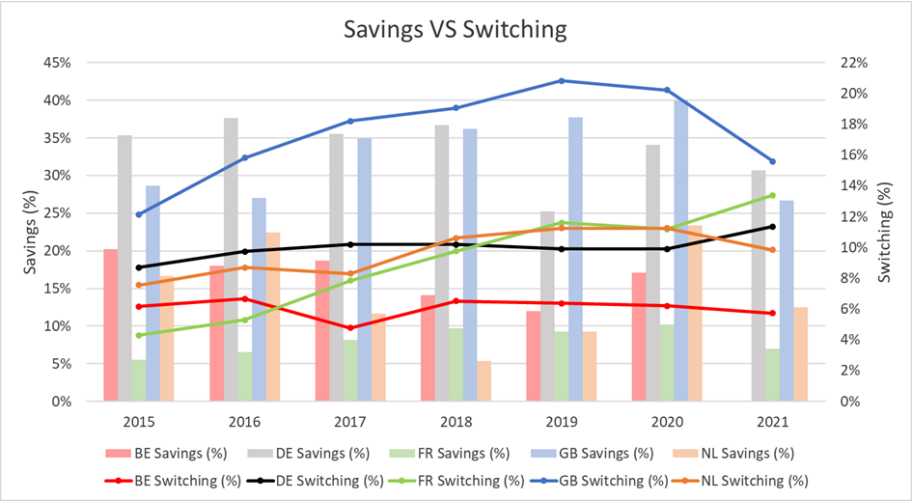


Figure 85: Potential average savings as a % of the current energy bill which could be saved VS switching rates per number of customers (Residential Electricity Market)

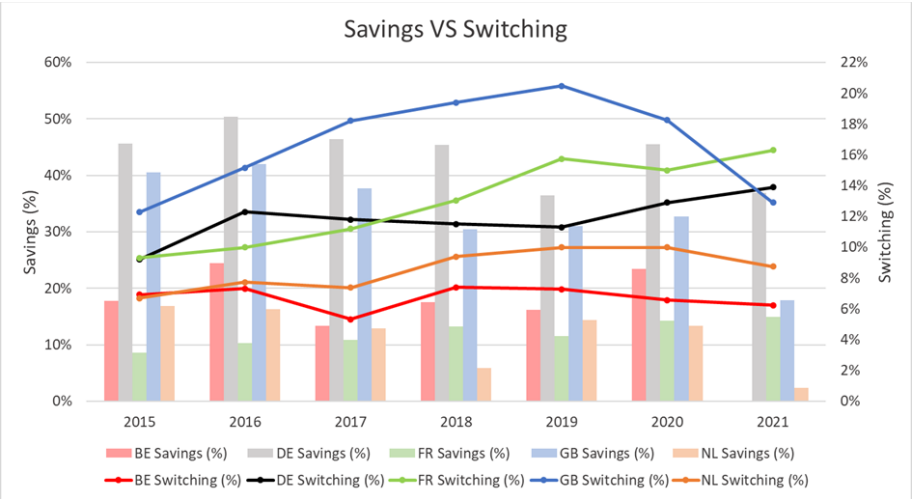


Figure 86: Potential average savings as a % of the current energy bill which could be saved VS

switching rates per number of customers (Residential Natural Gas Market)

4.11.3. Buying Groups

Another competitive force exerting pressures on price is buying groups. Buying groups are aggregations of consumers, typically residential consumers, for the purpose of obtaining a lower price from suppliers. This may take the form of a direct price negotiation with suppliers by a co-operative (with or without the help of an agent) or an auction whereby suppliers bid for a group of customers, typically organised by a company specialised in such auctions.

Buying groups were pointed out in the interviews for their impact on prices in Belgium and the Netherlands. Indeed, buying groups are substantially more prevalent in these countries than in Great Britain, France or Germany. As such, we can conclude that buying groups are a more significant influence on prices in Belgium and the Netherlands.

4.12. Cost to Serve

The largest cost element of any supplier, other than the procurement and hedging of energy, is the cost of serving the customer. This cost includes many components, the most significant of which are discussed below.

4.12.1. Supplier Systems and Efficiency

Each supplier has a unique cost of systems and processes relating to serving the customer. Key systems and processes within this customer relationship management (CRM) include pricing/tariffs, billing and collection, sales/acquisitions, customer retention, switching/onboarding, additional service management (such as self consumption, flexibility or home EV charging services), compliance and a whole host of other customer facing and customer related activities. These elements, combined with other utility operational processes such as balancing, interact with external systems (e.g. for metering, billing and switching) etc. The system(s) that support all of this are often referred to as the supplier or utility platform, and the cost of this and all associated operational processes represent the cost to serve.

Regardless of the market, the efficiency of such platforms and processes varies massively between suppliers, based on our research for this project (including interviews) and other prior research (VaasaETT has extensive experience of working with suppliers and vendors on this issue). While it is not possible to provide, with any level of certainty, numbers relating to costs of specific suppliers or averages for each market, it is clear that suppliers with the greatest efficiencies with a given market have costs that are less than half that of typical supplier in the same market. Furthermore, some markets are less efficient than others regardless of the nature of the market.

These efficiency differences can make a massive difference to the price that a supplier is able to profitably sell at. They also affect the ability of suppliers to price in other ways. For instance, an efficient system will enable a supplier to change a price quickly at little cost (excluding the cost associated with regulated requirements such as having to send letters to customers to announce a price change). For a supplier with an inefficient system, every change in prices, tariff structure or bill format can be extremely expensive. For this reason, an inefficient system may result in high costs resulting from regulatory changes such as a lowering of VAT. In general, suppliers with inefficient systems not only have higher costs (resulting in higher prices or lower margins), but also have far more difficulty in adjusting prices and therefore prefer to do so less frequently.

The efficiency is not only associated with the platform,but is also associated with the broader efficiency of the operational processes of the suppliers concerned. Here too, we find major differences between suppliers and markets.

Looking at each market, the following observations can be concluded:

Germany
In general (not in all cases), the incumbent suppliers in Germany, which represent around 70% of the market, are not considered very efficient. They tend to have antiquated and / or otherwise inefficient systems as well costly organisational structures and corporate cultures. Cost-to-serve can therefore be relatively high and changing tariff structures and prices can be expensive. Some competitors are far more efficient but incur other high costs as discussed later in the report.

Great Britain
Incumbent suppliers have generally not had very efficient systems, processes or indeed organisations. Some of the leading competitors, on the other hand, such as Octopus Energy, have had extremely efficient systems and processes, and given their large share of the market in recent years, this has improved dramatically the average costs and pricing flexibility of the industry as a whole. Furthermore, the incumbent suppliers have recently started to adopt the platforms and even processes of the most efficient competitors. For instance, all E.ON and NPower (the supply business of NPower was integrated into E.ON) customers have been integrating into E.ON Next, a new ground-up supply business set up by E.ON using a new low-

cost organisation and the low-cost Kraken utility platform from Octopus. In total, this change dramatically lowered the cost to serve for approximately 7 million customers in Great Britain. Other suppliers have now followed suit, including EDF (also using Kraken) and British gas (using a different platform), and with the acquisition of the SSE supply business, OVO has been in the process of also transforming the cost to serve for those customers. In all, with these and other similar transformations (not all of which have been completed), we estimate that between two thirds and three quarters of customers in Great Britain are now on low-cost platforms and the majority are also served by relatively efficient processes and organisations. As the transformation progresses, more and more customers will be impacted by these changes, but because these incumbent transformations have been very recent, they are only relevant to a significant degree to prices since 2021 and especially 2022 onwards.

Belgium, France and Netherlands

Belgium France and the Netherlands are all very mixed markets. France includes a heavy incumbent bias in both Gas (Engie) and Electricity (EDF), yet it also has a mix of competitors large and small. The incumbents are very difficult to judge in terms of their systems and efficiency, while some of the competitors have low-cost platforms / and or models. In a market with heavily regulated incumbent prices, it has been necessary for incumbents and competitors alike to be relatively efficient. Belgium and the Netherlands have a broad mix of incumbents and competitors, including several well established and scaled competitors (although Brussels only has two large suppliers at present). Some of the suppliers use legacy systems, some are relatively modern, and some could be considered low-cost. Overall, in Belgium, France and the Netherlands the average typical cost-efficiency could be considered between the levels of Great Britain and Germany.

4.12.2. Social tariffs

Of the five markets, only Belgium has social tariffs per se. According to the interviews, there are two main issues with the social tariffs in Belgium. Firstly, while the suppliers are compensated for the reduced tariffs, it is claimed that the compensation does not cover the full cost of the reduction[24] and the margins are extremely low on these customers. Secondly, the number of customers on social tariffs has increased heavily over the past couple of years and now amounts to approximately 20% of all customers. This means that a large proportion of customers have essentially been taken out of the market, representing a significant opportunity cost (assuming more profit could be made on those customers if they were not on social tariffs) and reduced economies of scale. It is not possible to quantify the financial impact of this based on the data we have, but it is realistic to believe that some degree of lost margin or even loss, is passed on (socialised) in the form of higher prices to other customers (those not on the social tariff).

4.12.3. Cost of winning customers

The cost of winning customers depends on many variables, the most significant of which are discussed here.

Channel costs

Overall, channel fees are relatively similarly priced across the markets, but due to higher costs in general, tend to be slightly higher in Germany. But real channel costs depend on more than fees. Channels which cost-effectively win more of the right type of customers are - other costs held constant – cheaper. In general, online (especially price comparison sites) and tele-sales tend to win the most customers, but whereas customers won through price comparison sites tend to be pro-active, price sensitive and easily lost (though are still less disloyal than those won through social media), customers won through telesales tend to be less pro-active, less price sensitive and at least a little more loyal. Since both channels incur substantial commissions, tele-sales tend to be more cost effective since the lifetime value of the customers will tend to be higher, resulting in a lower cost of acquisition per € of lifetime value won.

Of course, there are many other channels, and the effectiveness of any channel will depend heavily on the quality of the sales and marketing, the attractiveness of the proposition and the propensity of customers to switch. Considering the above logic, however, and as supported by multiple interviews and other research, the real channel costs are higher in Germany than the other markets. This is because tele-sales (and other similar channels such as door to door) is more limited in Germany due to privacy restrictions, there is a high proportion of inactive customers (more customers need to be reached in order to find an active one), the fees for channels are high and the fragmentation of the market into effectively a thousand regions (many of them very small), leads to additional logistical complexity. Digital channels tend to be very effective on the other hand (supported by a highly digital society but tend to result in relatively low retention levels.

One issue that was additionally raised in interviews and has been seen in other evidence available to the researchers, was the argument that competitors' marketing costs are raised substantially by the need to sufficiently match the marketing might of the incumbents. This is seen as an issue in all liberalised markets that we have researched, not just the five here, but it was raised most prominently in the interviews pertaining to Germany.

[24] Additionally, suppliers havePre-financing the social tariff (18 months) and it has been argued in interviews that green certificate obligation estimates used to calculate the cost of the social tariff, use prices for Brussels which are cheaper than the other regions.

Incentives
Another significant cost for some suppliers in Germany which are trying to win customers, is the presence of non-price, financial and non-financial incentives offered to customers who switch, either in the form of up-front gifts or bonuses at the end of the first year. Only some competitors offer such incentives - fewer than in the past when they were quite common - but where they exist, they represent an additional cost of winning customers, as well as a short-term benefit for customers that is not shown in the price. Such incentives are not apparent in the other markets.

4.12.4. Economies of scale

Belgium
An issue which was raised in multiple interviews was the size of the Belgian market. The market itself is not large but when broken into three regions, it results in three markets that are considered very small, with too many differences (regulations, prices - especially between Brussels and the other regions), competitors, language and processes - even smart metering implementation) to be considered as one market. The implication is that suppliers feel that while there are some synergies between the markets such as marketing, sales, processes (e.g., same clearing house and interface with DSOs) and federal level regulations, there are many costs that are additional to a single market the size of Belgium. For suppliers that choose not to be in all three markets, in some cases choosing to be in only one of the markets (most commonly Flanders), the economies of scale are relatively small. Lower economies of scale and added cost, it has been argued, have been passed on to consumers in the form of higher prices, but also result in lower net margins for suppliers.

Netherlands
Not only is the Netherlands a larger market than Belgium, but because it is not divided into sub-markets, the economies of scale are significantly higher.

Germany
Germany is the largest of the markets in terms of customer numbers, although Great Britain is in fact larger in terms of residential market value (number of customers multiplied by the average revenue per residential customers for electricity and gas). However, Germany is nevertheless to some extent a market of markets. With approximately 1000 incumbent areas, processes that require suppliers to interact with DSOs in any area they win customers from, and differences in network and retail component prices in each region, there is a substantial amount of logistical challenge for any supplier that wishes to compete nationwide. As a result, many competitors only compete in some regions and economies of scale are compromised.

France and Great Britain
France and Great Britain are both large markets with substantial economies of scale, but the market value of Great Britain in 2021 was approximately two thirds larger than France, and due to the higher proportion of customers who could be considered active, Great Britain's economies of scale are therefore arguably greater, putting aside process related differences (discussed later).

However, there is a need to also consider the relative size of suppliers. In Belgium, while the markets may be small, the key players have high market shares, resulting in improved economies of scale. In the Netherlands, market shares of the leading players are slightly lower and as such each player is smaller than they would be if they had larger market shares. In Germany, the market is fragmented and while the largest players are among the largest in Europe, hundreds of suppliers are in fact very small. In France and Great Britain, the leading players are all very large, large enough in fact that it is unlikely that any additional size would provide benefits to economies of scale.

Consequently, it can be argued that the best economies of scale are in Great Britain, followed by France, Germany, the Netherlands and finally Belgium.

4.12.5. Cost of Defaulting Customers

Defaulting customers - customers who do not pay their bills - are an important cost for any supplier. Ultimately there are several factors determining costs relating to defaulting customers: the rate of default; the cost (including effectiveness) of collection; the amount of the bill that the supplier is responsible for; and the time taken to cut-off customers who default.

Regarding the rate of default, our information suggests that typical default rates are a few percent of customers, for instance 3-5 percent, some of which is eventually collected and some of which is not. In any case it appears that default rates are relatively similar across the five markets and becoming worse during the energy crisis. Costs of collection are also considered relatively similar across the markets.

The interviews strongly suggested that a major factor relating to collection is the need for suppliers to pay the full bill stack for customers who default on payments, for whatever reason. If a customer defaults, the supplier must pay not only the cost of procuring the energy for that customer, but also the distribution fees, taxes and VAT. Since margins are so small for

suppliers - at best just a few percent per bill, any defaulting customer will wipe off the profits made from many (e.g., 20-50) paying customers in a given payment period. This is in addition to the cost of collection. However, this challenge for suppliers is the case in all five markets and so it is not considered a reason for differences in prices between the markets.

What is a significant difference between the markets, however, is the difficulty in stopping supply to customers who default. In Germany it is relatively easy, and a supplier can stop serving a customer within approximately one month of default[25]. In Belgium, according to feedback from the interviews, it can take over a year to get a defaulting customer cut-off or removed due to legal procedures[26]. It is also a very long, complicated and difficult process in France[27] and Great Britain[28]. The process in the Netherlands is considered quicker than France and Belgium.

The longer it takes before a service can be ended, the more expensive the default is for the supplier. Given the substantial cost of default for a supplier and the rates of default, it is reasonable to believe that even in normal (non-crisis) times, a suppliers' costs could increase substantially as a result of the long period before termination of supply. As the energy crisis continues and the default rate probably increases, this is likely to become an increasing cost for suppliers.

The costs associated with defaulting customers are lowest in Germany and the Netherlands and higher in the other markets. It would also appear that the costs are higher in Brussels than the other Belgium markets. However, the benefit received by German suppliers from being able to stem supply to customers who do not pay is balanced to some extent by the extra costs, included in German energy bills, that German suppliers must cover in the event of a customer default[29].

4.12.6. Processes

Interviews strongly supported a long-held observation. That the five markets differ significantly in terms of access to data; switching, billing, metering and other processes; and bill complexities. All of which result in cost differences which may impact prices.

In general processes in Belgium (especially Flanders[30]) and Great Britain (benefitted by its customer centric nature) are considered relatively efficient, as they are in France (benefitted by the existence of a data hub and smart meters).

Regarding Germany, Interviews and other evidence have indicated that processes surrounding data access and information, switching, billing and metering are all complex and therefore expensive, especially for competitors in the market. Germany has no data hub and approximately 1000 incumbent regions which competitors must interact with if they wish to operate nationally (additional costs through fragmented communication and separate pricing / communication etc. in each market, although some regions are large and there are synergies between markets). Interview respondents also claimed that there is very low data quality, no way of testing market interactions before going live and so errors and correction costs, there is a need for monthly data for bills but suppliers only receive data yearly; processes tend to be more decentralised and more labour intensive; there are high switching costs due to highly complex switching processes - complexity which allows incumbents to benefit from imperfections (e.g. data) by delaying the switch and giving the bent the chance to renew

[25] However, before executing individual power or gas cuts, suppliers are obliged to offer solutions to defaulting customers to prevent these cuts. These include, for instance, paying debts by instalment in the case of "default supply" contracts. Customers outside "default supply" must be advised e.g. to consult publicly funded debt counselling services. As executing power cuts is relatively costly to suppliers, under normal circumstances – i.e. before the explosion of gas and power wholesale prices – these alternative solutions were considered preferable from a supplier perspective.

[26] According to interviews: average of 420 days to remove a customers + 3 months. Regional default procedure differences; In Wallonia = budget meters + social tariff. In Flanders customers are supplied by DGO.

[27] When a consumer of electricity, gas, heat or water has not paid their bill within 14 days after its date of issue or on the payment deadline, its supplier informs it by a first letter that in the absence of payment within an additional period of 15 days its supply may be reduced or interrupted for electricity, or interrupted for gas, heat or water, subject to the provisions of the third paragraph of article L. 115-3 of the code of social action and families. In the absence of agreement between the consumer and the supplier on the terms of payment within the additional period of 15 days mentioned in the preceding paragraph, the latter may proceed with the reduction or interruption of supply, subject to the provisions of third paragraph of Article L. 115-3 of the Code of Social Action and Families, and notifies the consumer at least 20 days in advance by a second letter in which he informs this consumer that the latter can seize social services if he considers that his situation falls under the provisions of the first paragraph of article L. 115-3 of the social action and family code. The letters also invite the consumer to advise the supplier, where applicable, the rights associated with the benefit of the energy voucher mentioned in Article R. 124-16 of the Energy Code, by paying invoice with the energy check or by sending its supplier one of the certificates provided for in article R. 124-2 of the same code.

[28] If a bill is unpaid for 28 days, the supplier contacts customer for the possibility of disconnecting, usually offers to install a prepayment meter instead. A customers cannot be disconnected between 1 October and 31 March if they have reached state Pension age and they either live alone or live with people on state pension age or children under 18. If no agreement is made for debt payment, the supplier can apply to a court for a warrant to disconnect. They sent a notice telling the customer they are applying to the court. If the court grants a warrant the supplier gives the customer a 7 days notice in writing before they disconnect.

[29] As discussed in the VaasaETT et al. "European barriers in retail energy markets – Germany" report for the European Commission, besides grid tariffs, German suppliers are responsible for collecting several additional special taxes and levies on behalf of others. In the case of power suppliers, this includes Electricity tax, EEG surcharge, Concession fee, CHP surcharge, § 19 (2) StromNEV surcharge, Offshore surcharge (§ 17f EnWG), and Interruptible loads surcharge (§ 18 AbLaV). Compared to a regulatory system where the supplier is only responsible for the collection of the core business components (energy components + VAT), in a system like this the supplier has to bear a substantially higher risk, as in case of a non-payment the supplier is still accountable for all outstanding charges. On top of that, the complexity in order to keep track of any changes and for collection is substantially higher.

[30] Flanders in considered to have simpler regulation than Wallonia and Brussels and less costs.

contracts (system requires precise info so any missing info delays process and adds costs); and the complexity of pricing can be expensive for suppliers with weaker pricing systems.

Processes in the Netherlands are broadly considered the most efficient of the markets, especially from the perspective of competitors, due in large part to the existence of a data hub, smart meters and otherwise efficient, centralised processes. Interviews suggested that the Netherlands' fundamental market design was efficient, especially that its centralised processes and information access with higher quality of data leads to less errors[31] and correction costs and is less labour intensive.

4.12.7. Contract termination

It was argued in numerous interviews (and considered a major issue in Belgium), that it is very costly for suppliers if it is not possible to apply contract termination fees (sometimes referred to as exit fees) on customers who switch supplier during the term of a fixed-term contract. For a hedged supplier, a lost customer may result in substantial procurement inefficiencies and contract termination fees can cover some or all of that cost. Additionally, in the absence of termination fees, more customers are likely to switch supplier during the term of a contract. On the other hand, a large number of customers are on variable tariffs without fixed contracts (customer can leave any time) and many suppliers prefer to avoid exit fees, even when allowed, because they feel customers are less likely to switch to them if they feel they may be trapped by the contracts. Therefore, even if regulations around contract termination fees differ between countries, the impact will be limited to only a proportion suppliers and customers.

Contract termination fees on customers who break fixed contracts are allowed in Germany[32]. They are also allowed in the Netherlands but are limited[33]. They are also allowed in Great Britain but are only sometimes applied[34]. They are not allowed in France[35] and Belgium[36]. This would indicate lowest costs (for suppliers) relating to exits in Germany, medium costs in the Netherlands and Great Britain, and higher in Belgium and France.

4.12.8. Imbalance costs

It was claimed in some interviews, especially in the Netherlands and Belgium, that imbalance costs were increasing and becoming a significant cost for suppliers. One supplier in Belgium stated that it was 300% what it was and far higher than some other markets. It was also stated that this was creating additional uncertainty. Looking at average balance expenses in each of the markets, the costs are indeed clearly highest in the Netherlands, although it is difficult to see a clear increasing pattern, and in any case as a proportion of all costs for suppliers these costs appear limited in significance. However, this is not to say that such costs are not increasing, nor that they may not be substantial in the near future.

4.12.9. Other Costs

Supplier Obligations (Great Britain)
Depending on the market concerned, suppliers have additional costs - beyond taxes and VAT - associated with a variety of obligations, primarily social, environmental or energy efficiency related. In the interviews, the many obligations present in Great Britain were highlighted as a substantial cost, adding significantly to the cost-to-serve customers.

The most substantial obligations in Great Britain are the social environmental obligation costs to cover schemes to support energy efficiency improvements in homes and businesses, help vulnerable people and encourage take-up and generation of renewable technology. During the past years around a quarter of an average electricity bill (only around 2% of an average gas bill) was made up of environmental and social levies compared. These levies pay for various policies that either support clean energy (Renewables Obligation, Feed-in-Tariffs, Contracts for Difference) or help with social issues such as fuel poverty (Warm Homes Discount and Energy Company Obligation, which offer direct payments to help with bills or support to cut

[31] It was pointed out that the Netherlands market is built around continuous data and billing whereby it is possible to test compatibility with market interaction.
[32] Standard provisions, existing contracts (entered into before 01.03.2022): Generally contractual freedom, common termination periods are 1-3 months (3 months is the maximum). Additionally, contracts often include minimum contract periods (e.g. in combination with signing bonuses). Minimum contract periods may not exceed 2 years. Late termination leads to automatic renewal of the contract. The renewed contract's minimum duration must not exceed the prior minimum contract duration or 1 year. "Default supply" contracts: can always be terminated by customers at 2 weeks' notice, "Ersatzversorgung" contracts even immediately at any time.
[33] To switch suppliers, a customer may pay a fine up to €125,00 for terminating prematurely if there's more than two months left on the contract and often there is a 30-day notice period. The amount of the termination fee is capped by law and depends on the duration of your contract. The electricity supplier must inform the customer about the termination fee when they sign the contract. The old energy supplier must send the final bill to the customer within 6 weeks of switching to another electricity supplier.
[34] For fixed tariff customers an "exit fee" might exist for a switch of supplier or tariff before the end of the contract. Many suppliers however, give customers flexibility to leave without an exit fee.
[35] The French Law prohibits energy providers from imposing a mandatory commitment period on their clients. This applies to all customers (residential or business) with a power capacity between 3 and 36 kVA. According to law, no cancellation penalty or activation fees can be charged. Customers can return to regulated tariffs at any time with no penalty.
[36] Customers are not committed for the duration of the contract with an energy supplier. A customer can terminate the contract or change a supplier without paying a fee, after one month's notice.

energy waste, respectively). A very small amount goes to support high network costs in remote regions such as the Scottish Highlands. The level of obligation is, however, significantly higher for larger suppliers (those with over 150.000 customers).

Market Stabilisation Charge - MSC (Great Britain)
Suppliers in Great Britain are also saddled with an additional temporary charge called the Market Stabilization Charge. This charge that is unique to Great Britain, temporarily requires all domestic suppliers acquiring a domestic customer to pay a charge to the losing supplier, triggered when wholesale costs fall more than 10% below the wholesale cost element of the price cap. The MSC also includes a derating factor, currently set at 85%, which determines the proportion of nominal hedging losses beyond the trigger point that will be covered by the MSC. It is a temporary measure due to expire on 30 September 2022, introduced as a short-term intervention to address risks to consumers from ongoing wholesale market volatility. It is a volumetric charge published weekly, split into two sub-charges; one for gas and one for electricity. As of 23 May 2022 it had not yet been triggered, but in the event it is triggered it can be regarded as a cost for winning customers but also as compensation for losing customers. It would also temporarily reduce pressures on suppliers to lower their prices in the event that the whole prices were to fall. However, given the timing of this measure and the fact what wholesale has not significantly fallen yet, it will not have had any impact on prices to date.

Supplier of Last Resort Costs - SLR (Germany)
Suppliers of last resort incur costs when they are forced to supply customers of suppliers who have failed. However, in Germany there has, during the energy crisis, been another cost. A significant number of suppliers have decided to stop serving customers so that they do not fail, or in order to retain more profit (it is not clear which), effectively passing those customers onto the SLR. It has now been clarified that this behaviour is not permitted, but it has happened reasonably extensively. Since it is not possible for the SLR to give a special high price tariff to those customers[37], each customer being offloaded on the SLR in this way adds to the costs of the SLR which has not hedged for those additional customers. It is not clear if this has so far led to any increases in prices for the other customers of those SLR suppliers, some have argued that it may have been the case.

Short-term regulatory changes (Great Britain and Germany)
The interviews suggested that short-term regulatory changes can cause significant costs for suppliers, especially those with weaker systems. For instance, changing VAT requires billing changes that can be expensive and if there are many such changes in a short space of time, costs for suppliers can be high. Arguably, Great Britain and Germany have historically, and especially during the energy crisis, experienced the most complex raft of regulatory changes and as such are thought to have incurred the greatest cost.

Level of compliance (Germany and Great Britain)
All energy markets must comply with many regulations. Compliance adds cost and the more compliance, the greater the costs. In general, from a supplier's point of view according to the interviews and other research, it is considered that Germany is relatively light on regulation and Great Britain is very heavy. Of the five markets, German suppliers would seem to have the lowest level of compliance associated cost and Great Britain would seem to have the highest.

4.13. Pricing Strategies

While a variety of different pricing philosophies, approaches and models by suppliers have been identified through the interviews and research conducted for this report, a remarkable degree of similarity has also been observed.

4.13.1 Differing Contexts and Horizons

Regardless of the market, it is important to point out that all suppliers interviewed for this report hedged extensively, with a view ranging from one to three years. As stated earlier in the report, German suppliers tended to have the longest view but the other markets by no means took a short view and there were no suppliers who took a view of less than one year (although it is understood that some suppliers may take such a view). As such, price setting is driven by this same view. However, there are peculiarities to the markets that drive differences.

In Germany it has long been a norm for larger players to hedge three years out, albeit weighted towards the first year more than the second and the second more than the third. That is not to say, however, that some players in the other markets do not take a similar approach. They do, but in Germany retail prices have historically been relatively flat and competition modest and relatively predictable, with a large proportion of inactive incumbent customers on fixed rolling contracts, it has been relatively easy to take a longer-term perspective. Such an approach has also been popular with municipal owners of stadtwerke who often depend on predictable future revenues and prefer stable prices for their residents. Such an approach has been further facilitated by own-generation and perhaps also by a degree of cross subsidization and substantial incumbent customer margins.

[37] State-level anti-trust agencies compare prices among each other. Price of two “default supply” tariffs can be different starting from July 2022.

In France, despite a relatively volatile wholesale market, the nature of the ARENH and the regulated price, as discussed earlier, is such that suppliers are essentially hedged (for baseload) and benchmarked for around two years ahead, backed by a history of regulation that generally avoids drastic price changes, albeit with some step changes occasionally. A longer-term approach is therefore also possible in France, though slightly less than in Germany.

In Great Britain, however, the situation is rather different. Political influence on regulation, and therefore regulation itself has been anything but stable, anything but predictable, and the current price cap, adjusted every six months (soon to be three), and a regularly changing regulated cost (obligations) environment, has contributed to an already strong sense of uncertainty. Combined with a history of aggressive suppliers buying short to undercut the better hedged suppliers, a highly active and price-sensitive market, and tight margins, it has led to a somewhat shorter-term perspective on hedging and pricing.

Belgium, and especially Netherlands, on the other hand, appear to have been in more of a middle ground, with suppliers hedging reasonably long, but ensuring ability to respond to competition (generally higher in the Netherlands), impacted relatively little by politics and driven apparently more by market fundamentals.

4.13.2. Pricing Models

There are a mix of supplier models that impacts supplier pricing across the five markets. Models include pre-purchase (where customers pre-buy packages of energy) - not the same as pre-payment; price setting for the year ahead set at the futures price at the time of contracting; flat pricing (all you can eat); subscription models (e.g., where customers pay the wholesale price average plus a monthly fee); real-time pricing, time of use; and other models. While each of these models result in very different approaches to pricing by suppliers, they all represent a tiny part of the market - and will remain so well into the medium-term and thereby have and will continue to have little or no impact on the typical prices paid by consumers in any of the five markets in the foreseeable future. The large majority of customers have the fixed or variable contracts described earlier in the report, and as such suppliers have one of two pricing models. That said, some interviews indicated that suppliers are considering the adoption of some hybrid tariff/pricing models in the near term. The understanding is that there may be a new mix of fixed, variable and some of the other models mentioned above. As yet, there is no clarity, however, on what the hybrid models might look like.

4.13.3. Price Setting

In general, there are some pricing principles common to most if not all suppliers. Firstly, suppliers' number one aim is to price in a profitable way. This may sound obvious, but contrary to what is sometimes bounded around by the media, in general most suppliers aim to procure energy as cost effectively as possible and sell at a price that is profitable. Depending to a large extent on their hedged position, they will then price fixed contracts for one to two (or even three years in some markets) depending on the hedge and the spot price they will set variable prices. All customers need to be shaped using the spot (day ahead) market, however, and the cost of this shaping will depend on the level and volatility of the spot market and the ability to predict customer consumption. In this respect, the prices that the large majority of customers pay are based on both futures and spot market prices, and regardless of how well hedged a supplier is, they are still exposed to the cost of shaping which is becoming far more expensive during the energy crisis[38].

In order to win customers, suppliers may occasionally follow a slightly different strategy. For instance, if a supplier has a large and profitable customer base or a wealthy owner intent on growth, they may decide to use some of that wealth or some of the margin from the profitable customers to price at a lower, even unprofitable level, in order to gain more customers. Some less capitalised suppliers may also price ahead of a falling market in order to consistently undercut other less risky competitors, although such suppliers often fail as soon as wholesale prices turn and typically represent a small share of the market. In order to achieve these lower acquisition-focused prices, suppliers often create separate tariffs with different conditions, only offer outside their incumbent areas (if they are an incumbent) or offer more competitive tariffs through a separate (e.g., digital) brand.

In general, suppliers also typically try to avoid big price rises (or changes in general); often try to price sustainably (price at the best possible margin without stimulated excessive churn); may benchmark their prices - formally or not - to those of their leading competitors, the market average or the lowest price in the market, with a margin of difference above or below; may price to guarantee a flat or percentage gross margin over their energy procurement costs.

All the above strategic pricing elements can be seen as part of the diversity of suppliers, regardless of the market concerned, however. The mix of these strategies at any given time will influence the prices in each market but are not an inherent characteristic of that market.

[38] Accoding to interviews in Belgium, shaping cost used to be 1-2 € per MWh but is now 10-15X or more.

4.13.4. Fixed vs Variable

Essentially, all other pricing considerations referred to in this section are relevant to the pricing of both fixed and variable tariffs. It should be pointed out however, that in the past many suppliers have seen fixed contracts as a way of locking customers into a relationship that supports a hedged position and guarantees a minimum customer lifetime value, allowing lower prices in the process (this is only possible if customers can be locked into contracts, which is not the case in Belgium). When wholesale is rising and volatility and as is the case during the energy crisis, this can present a risk (see below) that suppliers feel is too high and instead preferring variable contracts and only offering fixed contracts with full risk factored in.

4.13.5. Factoring in risk

A major pricing element raised in the interviews was risk. Retail prices must factor in the risk of wholesale price volatility, regulatory uncertainty and other risk factors. Some of these risk factors are common to all markets and others are either market-specific of more prominent is some markets more than others. The more the risk, the higher the risk margin that needs to be put into the pricing of the energy component by suppliers.

During the energy crisis, there have been a number of risks facing suppliers in all markets, especially the uncertainty of where the markets are heading. It is unclear how long the crisis will last, how high prices will go, when they will fall and if so by how much. There are fears of the cost of a hedge, the amount of guarantees and working capital that will be required and the number of customers who might default on their bills if the crisis continues. There are also risks associated with the measures taken by governments and regulators to protect customers during the crisis.

In general, based on interviews, it seems that the above-mentioned risks are highest in Great Britain and Belgium.

In Belgium there is clear concern from suppliers about regulatory risk, including a substantial fear about the risk of a scenario whereby customers may suddenly leave well hedged tariffs in large numbers. With the cost of hedging so high, and the ease with which customers in Belgium can leave their tariff and supplier, some suppliers fear that when wholesale prices eventually fall (when they do) as the crisis subsides, customers could suddenly jump to other lower price suppliers before the hedge has run out. The affected supplier would be left with a stranded hedge and far fewer customers. This problem is not limited to Belgium, indeed in Germany and Great Britain there are some suppliers in a similar situation where they have voluntarily given customers the right to switch without restriction, but many or most suppliers do not give customers such rights. Also, in France, it is simple for customers to leave a tariff or contract, but the price differences are lower and therefore also the incentive to switch.

In Great Britain, a big risk is considered to be a cliff-edge resulting from the price cap.

- The price cap is a short-term variable contract without exit fees. This creates a switching and hedge risk related cost as an unexpectedly (or unpredictable) high number of customers move onto the price cap when it represents the cheapest tariff - a tariff that suppliers did not sufficiently hedge for since the did not expect so many customers), customers who are at high risk of switching off the price cap once the price cap no longer represents the lowest or safest tariff option for customers.
- Historically, almost all switchers in GB (around 70-80% of customers in the market) have switched to fixed-term dual fuel contracts (the cheapest option) with exit fees. Fixed price contracts are currently still available but very expensive and only worthwhile if a customer thinks the price cap is going up massively. Some customers are being won on other short-term contracts, but currently, an estimated 80% of residential customers (and most switchers) are on the price cap since it represents the floor price in the market. Before the crisis the proportion is estimated to have been approximately 50-60%. Most of those not on the price cap are on existing fixed-price contracts and as these expire, more customers continue to move onto the price cap.
- However, the price cap has been and will be increasing substantially over the coming months or more, reducing its positioning as a ‘safe-haven’ and making fixed price contracts once again more appealing, even if more expensive than the price cap. Some customers are apparently already switching to fixed contract for fear of an even higher price cap in future and more will move as the price cap increases. This will mean customers may be locked into high fixed prices and those that are not locked in will be at risk of leaving when the wholesale market eventually falls (resulting in a risk like the one faced by Belgium as explained above).
- The appeal of alternative contracts will then increase even further if the wholesale market (including futures) then starts to fall significantly in a sustained way, becoming cheaper than the slow-to-respond price cap. At this point large proportions of customers, driven by pent-up switching pressure and demand for fixed contracts, would be expected to switch away from the price cap towards new fixed tariffs and often new suppliers.
- This presents a major trading risk and switching cost for suppliers who have been hedging or will be hedging for large numbers of customers who are likely to switch (albeit often to a new contract with the same supplier).

Of course, the above are just scenarios, but they are risks nevertheless and as such need to be considered by suppliers within their pricing of non-capped tariffs, and this is in addition to high levels of perceived regulatory risk in the market.

The Netherlands is generally considered to have less uncertainties, although there are some fears about what might happen to all the customers on free-to-exit model tariffs if/when they are increased. It also has another, albeit arguably much smaller risk, namely prosumer risk. The Netherlands has a relatively high proportion of self-consumption (mainly solar) customers. Prosumers' residual consumption tends to be relatively low and unpredictable and imbalance costs (for PV) tend to be high. Volume risk is therefore very high and need to be added into pricing for those customers or spread among all customers.

France on the other hand has the predictability of the ARENH, the regulated tariff - which most other tariffs are benchmarked against, and relative regulatory consistency. Likewise, Germany according to the interviews, has a relatively predictable cost stack since in general regulated elements change rarely and are typically easy to estimate, network charges are complex but constant and there are few other uncertainties in cost stack other than wholesale.

4.13.6. Other Peculiarities

Some additional national peculiarities include:

In Germany, incumbent suppliers make the majority of their profit from incumbent customers. These customers tend to be loyal and are willing to pay higher prices, apparently valuing and trusting their municipality's supplier above others. Despite their apparently low-price elasticity however, these customers are most vulnerable to switching when prices rise. Incumbent suppliers have learned that it is best to change prices as infrequently as possible and be careful not to raise prices by more than customers will tolerate. This approach sits well with their long-term hedging strategy and results in retail prices that are historically relatively flat, until the energy crisis at least.

In France, the regulated price has historically represented a two-year benchmark price against which most other suppliers' price. This welcome degree of certainty creates prices that deviate little from the regulated path.

In the Netherlands, suppliers have historically changed prices twice per year (see section on price changing). This has resulted in price levels being less dynamic than they would otherwise have been. With the energy crisis however, prices are starting to change more often.

Appendix 1: Analysis of similarity between CREG and VaasaETT price data

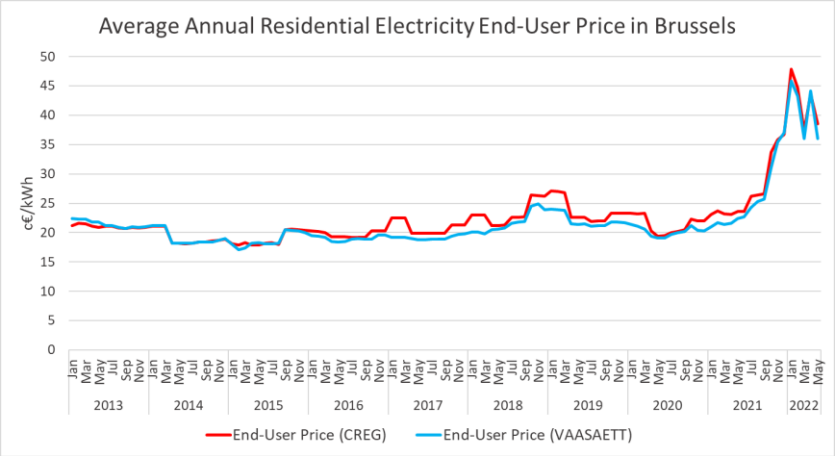


Figure 87: Comparison of average annual residential electricity end-user price in Brussels based on two data sources, CREG and VaasaETT

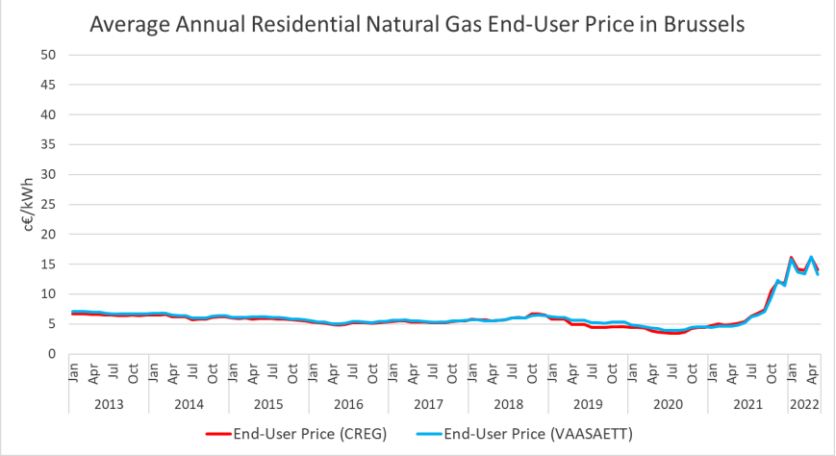


Figure 88: Comparison of average annual residential natural gas end-user price in Brussels based on two data sources, CREG and VaasaETT

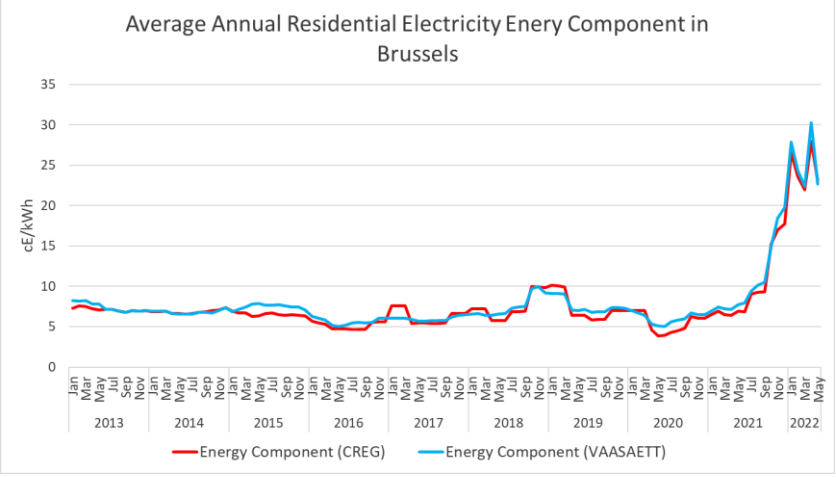


Figure 89: Comparison of average annual residential electricity energy component in Brussels based on two data sources, CREG and VaasaETT

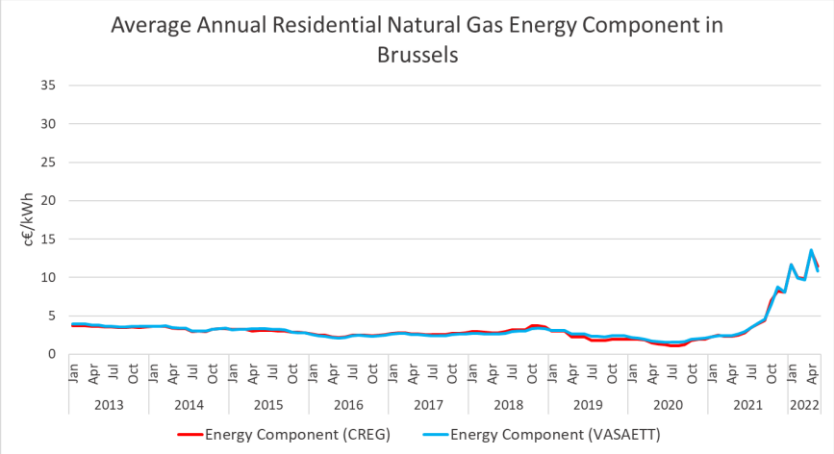


Figure 90: Comparison of average annual residential natural gas energy component in Brussels based on two data sources, CREG and VaasaETT

Appendix 2: Analysis of relationship between wholesale and retail prices

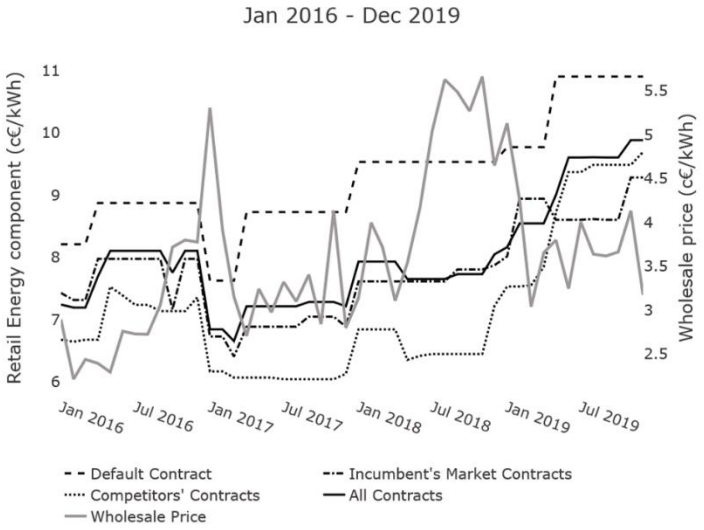


Figure 91: Electricity retail energy component per contract type versus wholesale price evolution, for the period 2016-2019 for Germany (zoomed scale)

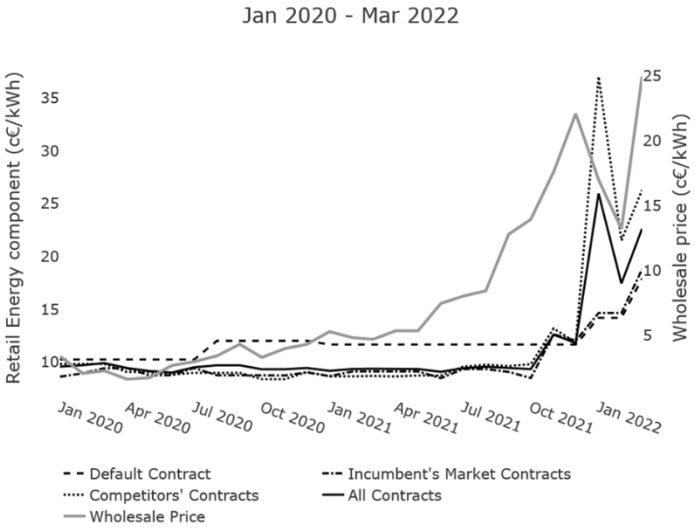


Figure 92: Electricity retail energy component per contract type versus wholesale price evolution, for the period 2020-2022 for Germany

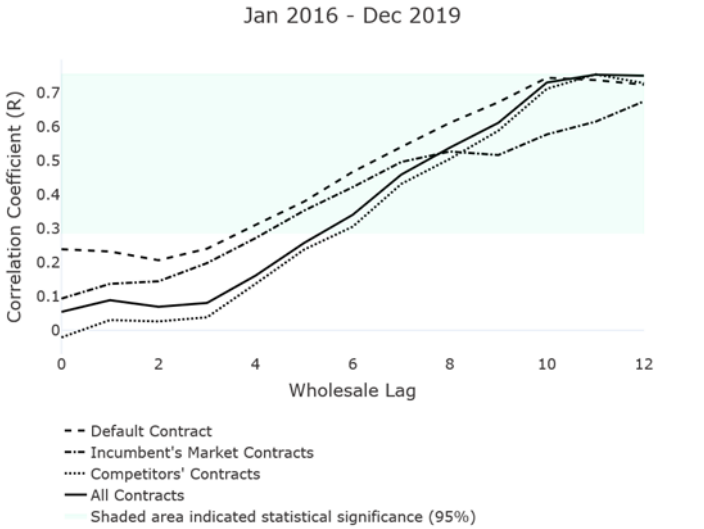


Figure 93: Electricity retail energy component correlations for different wholesale lags (in months) for the period 2016-2019 for Germany

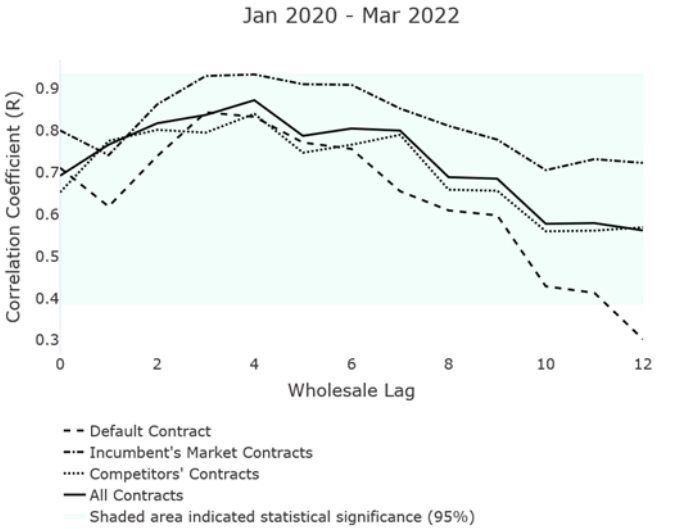


Figure 94: Electricity retail energy correlations for different wholesale lags (in months) for the period 2020-2022 for Germany

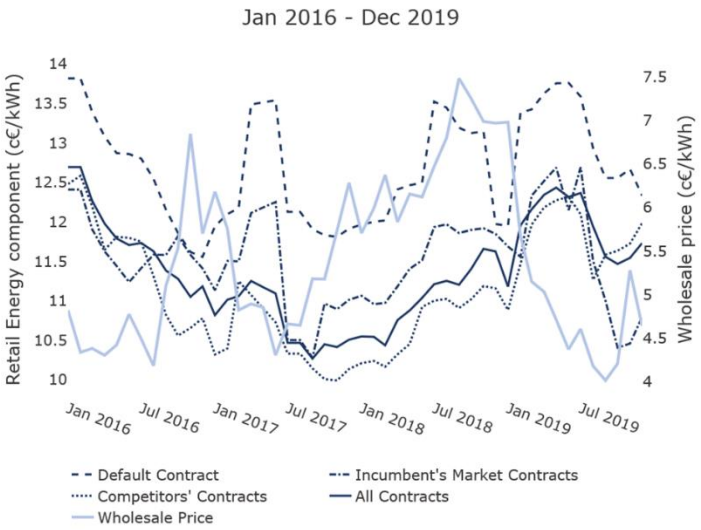


Figure 95: Electricity retail energy component per contract type versus wholesale price evolution, for the period 2016-2019 for Great Britain (zoomed scale)

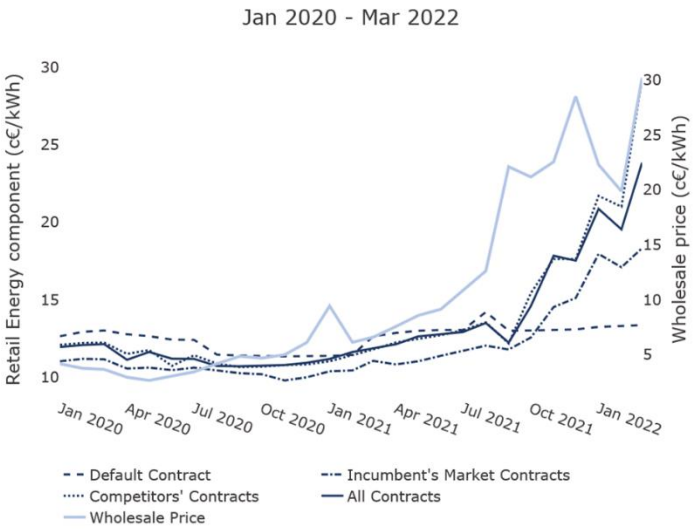


Figure 96: Electricity retail energy component per contract type versus wholesale price evolution, for the period 2020-2022 for Great Britain

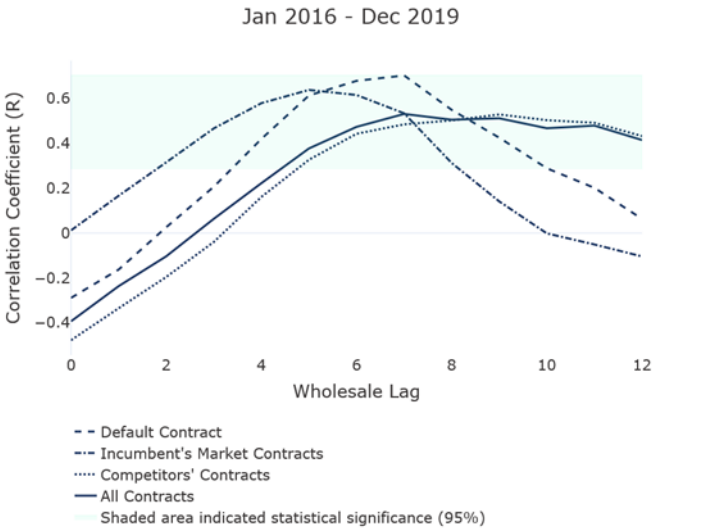


Figure 97: Electricity retail energy component correlations for different wholesale lags for the period 2016-2019 for Great Britain

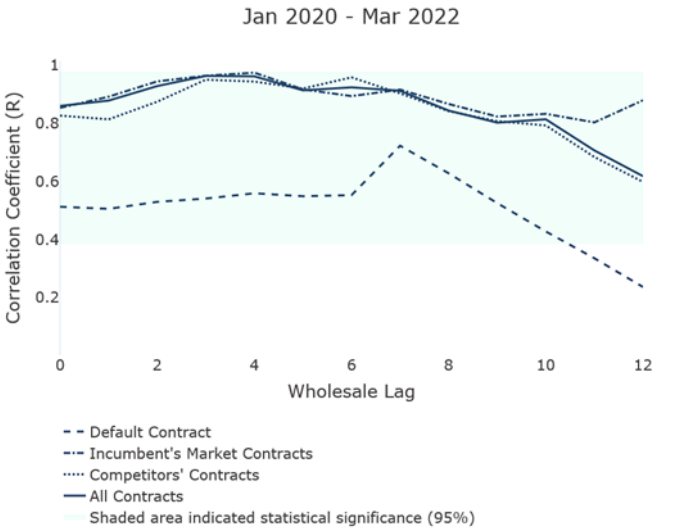


Figure 98: Electricity retail energy component correlations for different wholesale lags for the period 2020-2022 for Great Britain

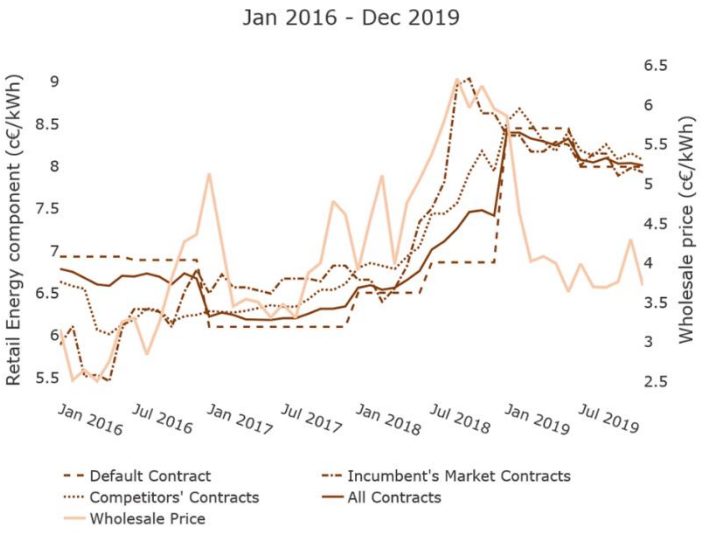


Figure 99: Electricity retail energy component per contract type versus wholesale price evolution for the period 2016-2019 for the Netherlands (zoomed scale)

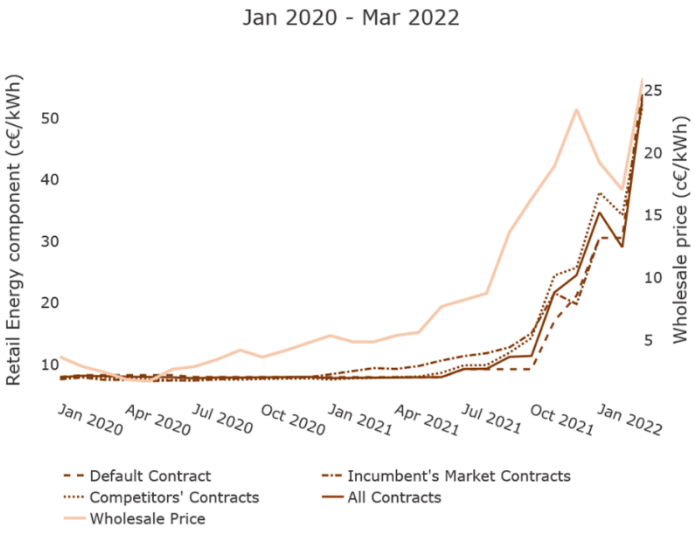


Figure 100: Electricity retail energy component per contract type versus wholesale price evolution for the period 2020-2022 for the Netherlands

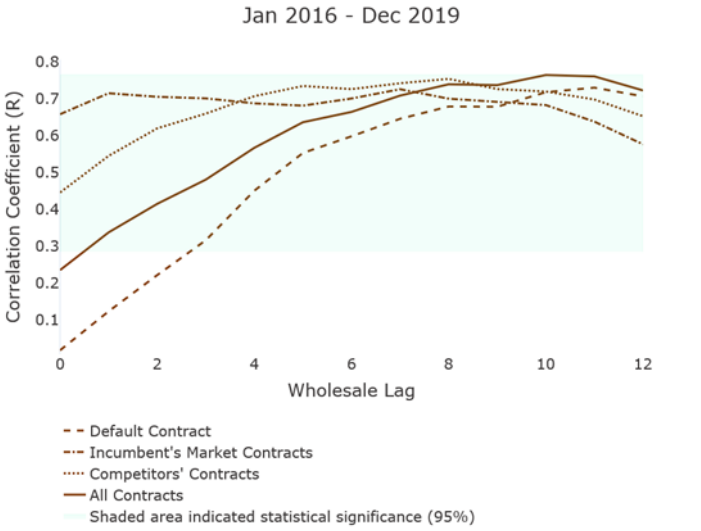


Figure 101: Electricity retail energy component correlations for different wholesale lags (in months) for the period 2016-2019 for the Netherlands

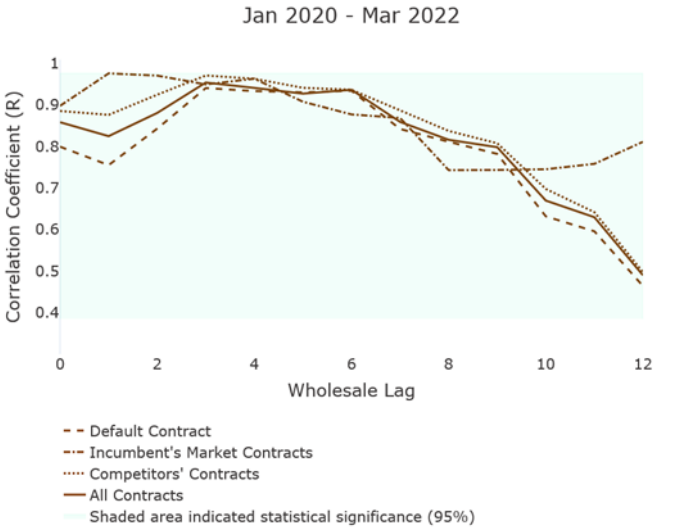


Figure 102: Electricity retail energy component correlations for different wholesale lags (in months) for the period 2020-2022 for the Netherlands

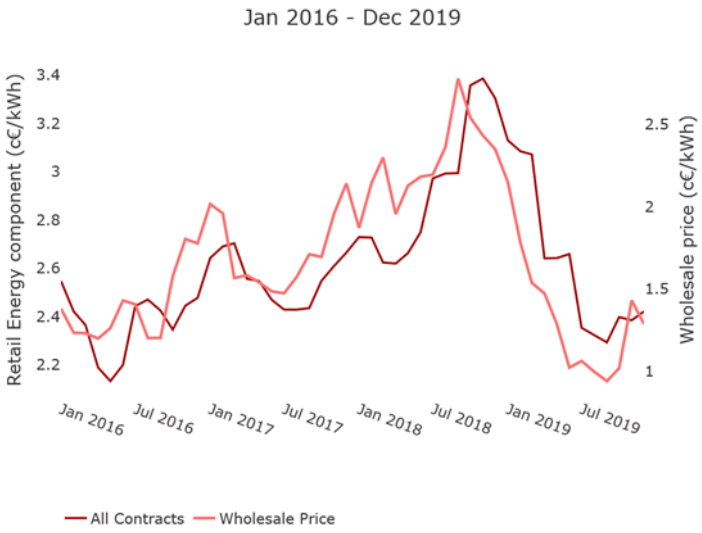


Figure 103: Gas retail energy component versus wholesale price evolution, for the period 2016-2019 for Belgium (Brussels) (zoomed scale)

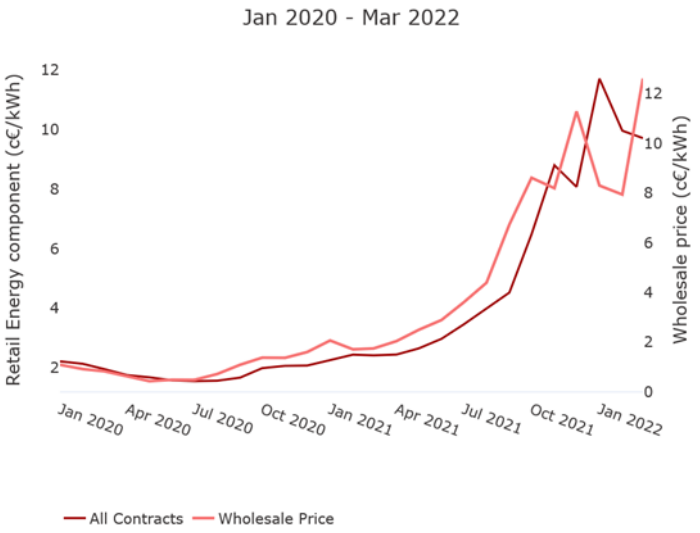


Figure 104: Gas retail energy component versus wholesale price evolution, for the period 2020-2022 for Belgium (Brussels)

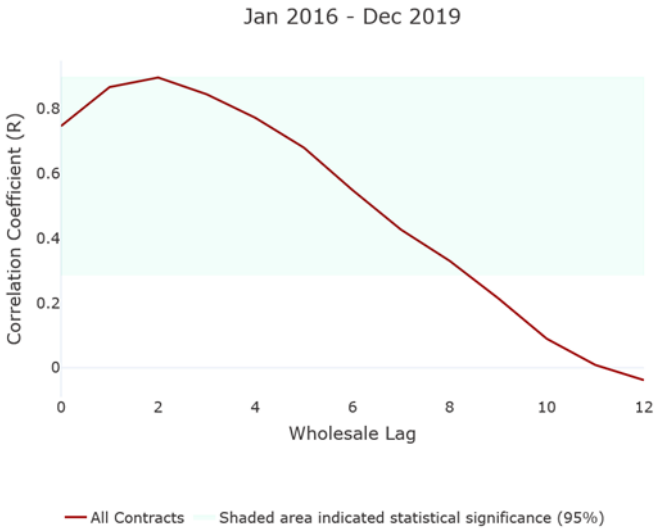


Figure 105: Gas retail energy component correlations for different wholesale lags (in months) for the period 2016-2019 for Belgium (Brussels)

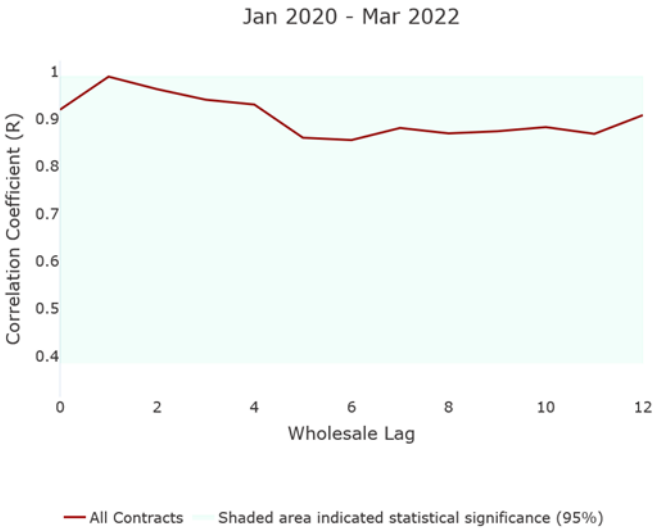


Figure 106: Gas retail energy component correlations for different wholesale lags (in months) for the period 2020-2022 for Belgium (Brussels)

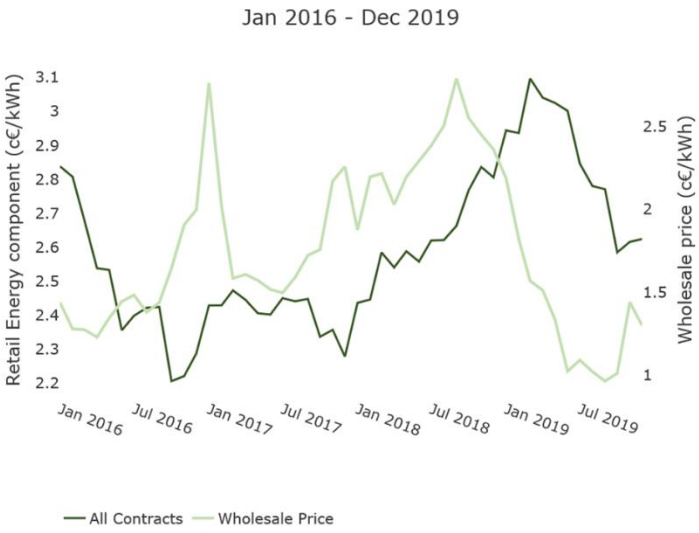


Figure 107: Gas retail energy component versus wholesale price evolution, for the period 2016-2019 for France (zoomed scale)

Figure 108: Gas retail energy component versus wholesale price evolution, for the period 2020-2022 for France

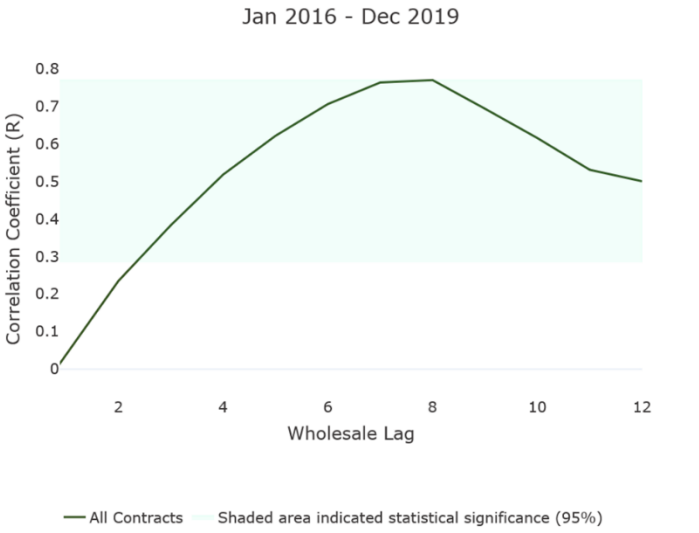


Figure 109: Gas retail energy component correlations for different wholesale lags (in months) for the period 2016-2019 for France

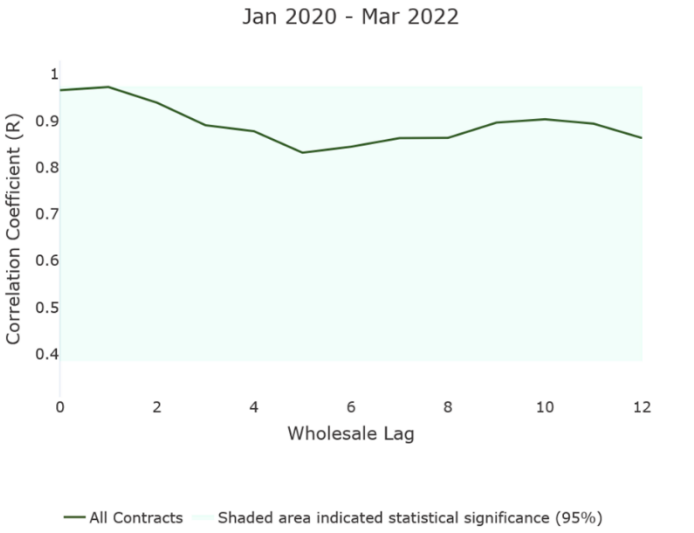


Figure 110: Gas retail energy component correlations for different wholesale lags (in months) for the period 2020-2022 for France

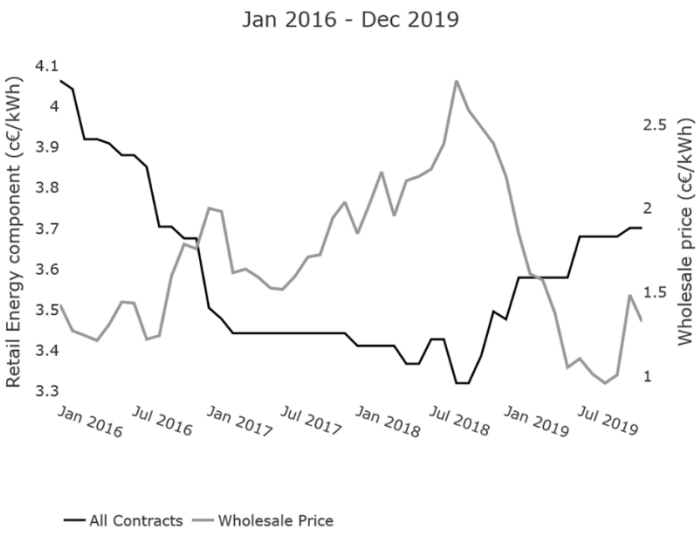


Figure 111: Gas retail energy component versus wholesale price evolution, for the period 2016-2019 for Germany (zoomed scale)

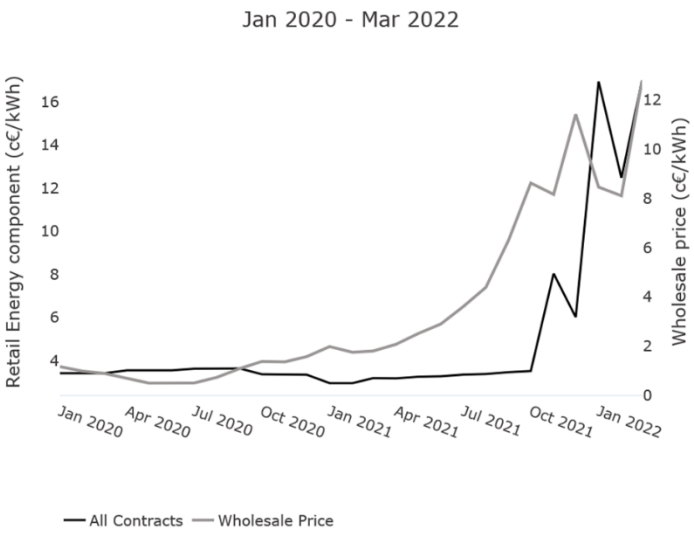


Figure 112: Gas retail energy component versus wholesale price evolution, for the period 2016-2019 for Germany

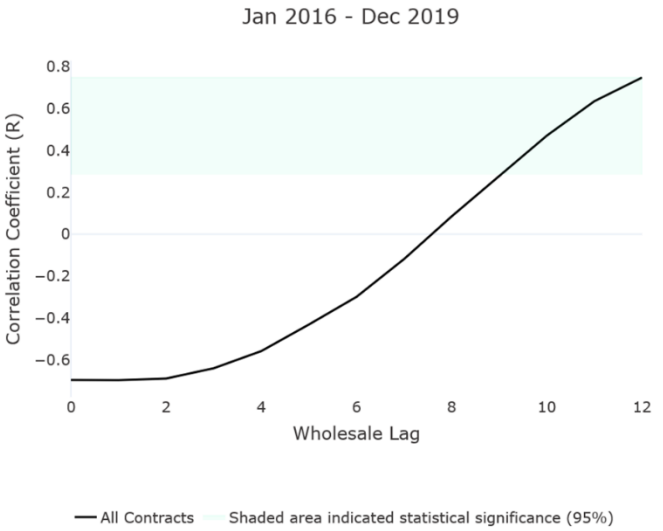


Figure 113: Gas retail energy component versus wholesale price evolution, for the period 2016-2019 for Germany

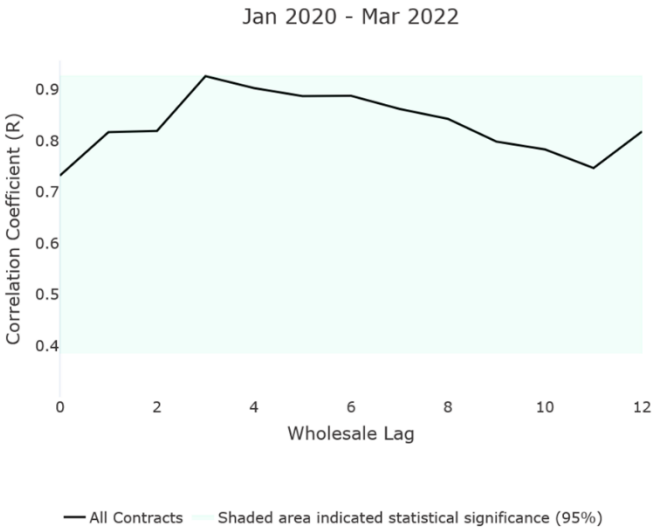


Figure 114: Gas retail energy component versus wholesale price evolution, for the period 2016-2019 for Germany

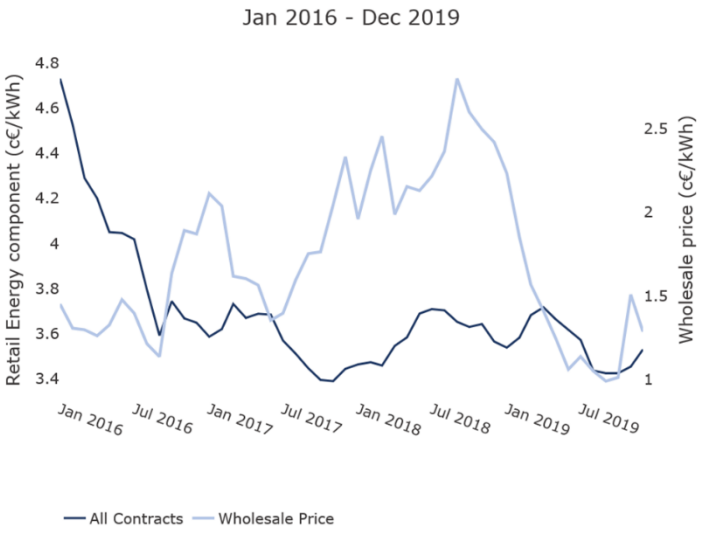


Figure 115: Gas retail energy component versus wholesale price evolution, for the period 2016-2019 for Great Britain (zoomed scale)

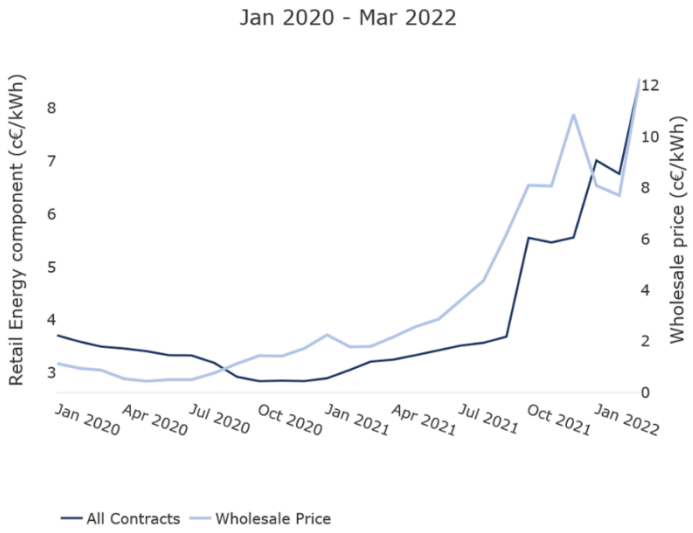


Figure 116: Gas retail energy component versus wholesale price evolution, for the period 2020-2022 for Great Britain

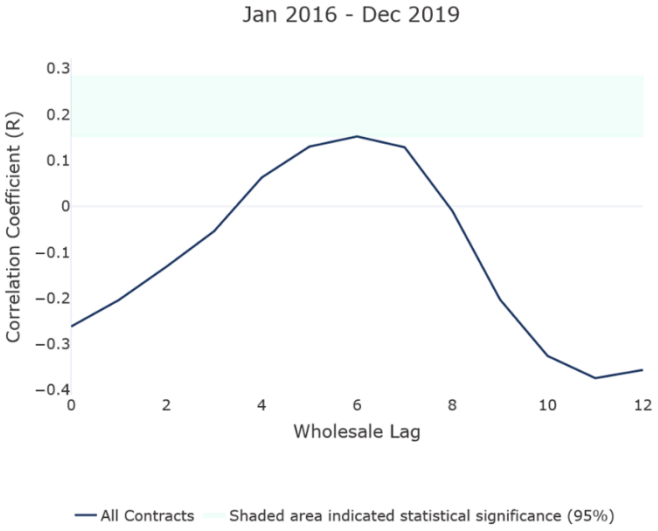


Figure 117: Gas retail energy component correlations for different wholesale lags (in months) for the period 2016-2019 for Great Britain

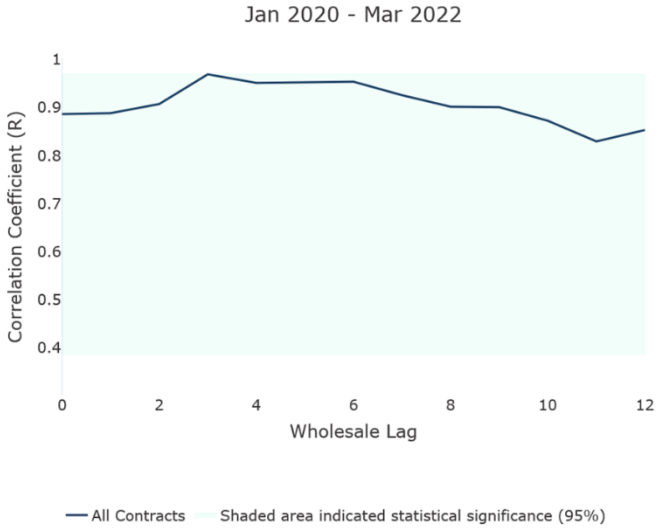


Figure 118: Gas retail energy component correlations for different wholesale lags (in months) for the period 2016-2019 for Great Britain

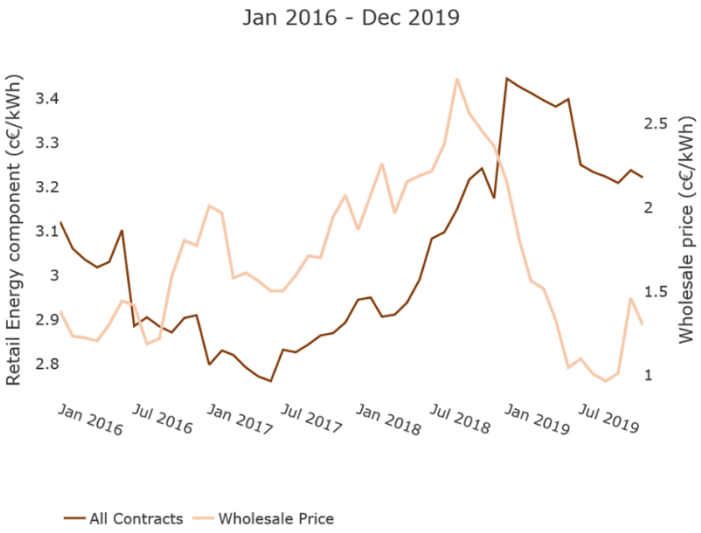


Figure 119: Gas retail energy component versus wholesale price evolution, for the period 2016-2019 for the Netherlands (zoomed scale)

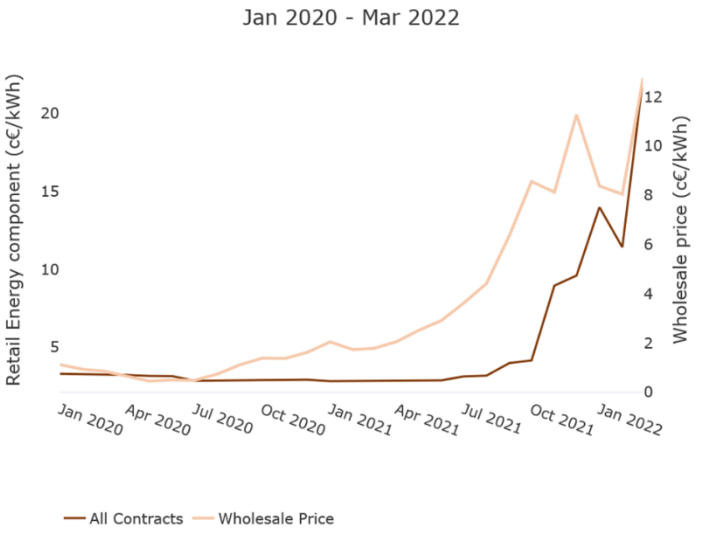


Figure 120: Gas retail energy component versus wholesale price evolution, for the period 2020-2022 for the Netherlands

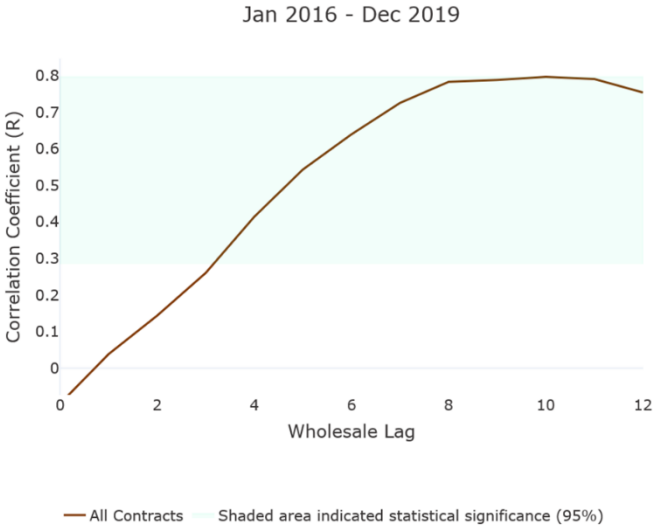


Figure 121: Gas retail energy component correlations for different wholesale lags (in months) for the period 2016-2019 for the Netherlands

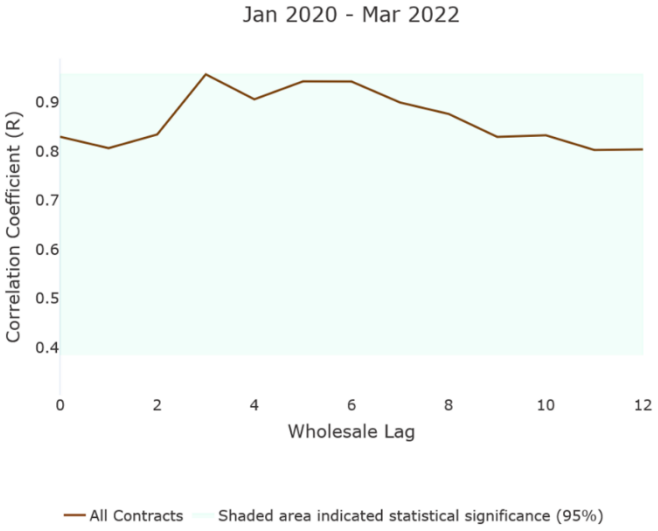


Figure 122: Gas retail energy component correlations for different wholesale lags (in months) for the period 2020-2022 for the Netherlands