ACER
European Union Agency for the Cooperation of Energy Regulators

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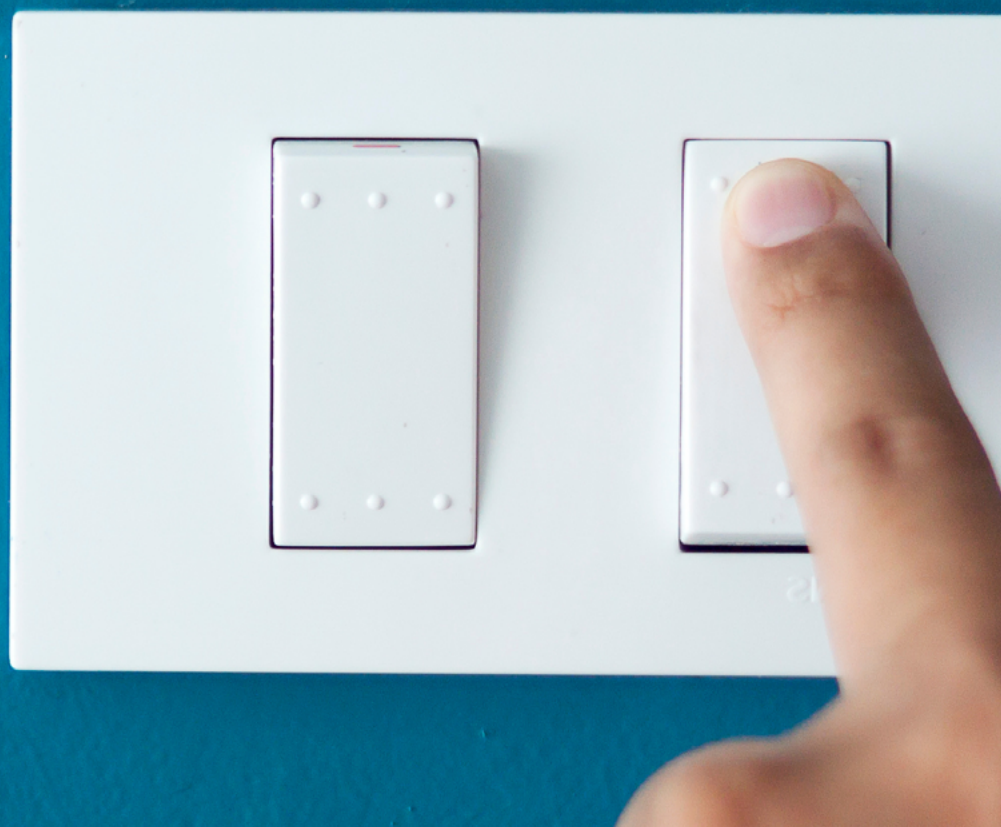
Energy retail - Active consumer participation is key to driving the energy transition: how can it happen?

2024 Market Monitoring Report

30 September 2024



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(4 October 2024 - Corrigendum of report incorporating updated data from the Italian Regulatory Authority in Figure 1)

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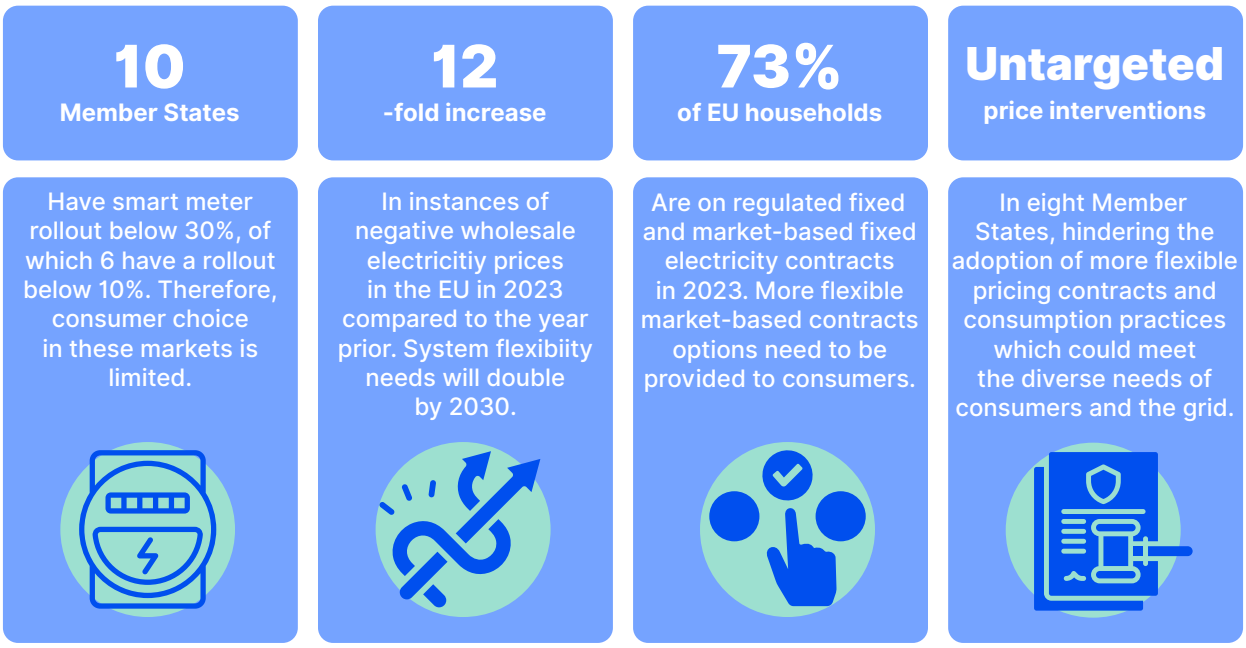
Contents

Executive summary



1 **The European energy sector's drive towards carbon neutrality by 2050 requires swift regulatory changes. To stabilise the system and fully tap into retail market potential, regulatory authorities and Member States must prioritise demand-side response frameworks, incentivise efficient grid use, and accelerate the rollout of smart meters. Dynamic[1] and flexible contracts are key to empowering consumers, who should be made aware of and incentivised by the benefits of flexible energy use. This unified effort is essential for a resilient and sustainable energy future.**

In tighter energy systems, retail markets can play a pivotal role as providers of flexibility.

2 The EU energy system is shifting towards electrification, while the gas sector must transform to support decarbonisation with renewable and low-carbon gas options. According to the recent European Environment Agency and ACER report on flexibility solutions[2], EU power system flexibility needs will double by 2030, requiring more storage, distributed generation, cross-border support, general flexibility and demand-side response. Increasing renewable power production is reshaping electricity systems operation: 2023 saw a 12-fold increase (6 470 instances) in negative wholesale electricity prices in the EU[3], while the cost of managing the increasingly congested EU power grid amounted to EUR 4 billion[4]. These indicators underscore how market integration and access to flexibility, such as from demand-side response and cross-zonal capacity, will become essential going forward.

1 Dynamic contracts refers to the definition as outlined in Directive (EU) 2019/944.

2 European Environment Agency and ACER, Flexibility solutions to support a decarbonised and secure EU electricity system, 2023.

3 ACER, Key Developments in EU Electricity Wholesale Markets – 2024 market monitoring report, 2024.

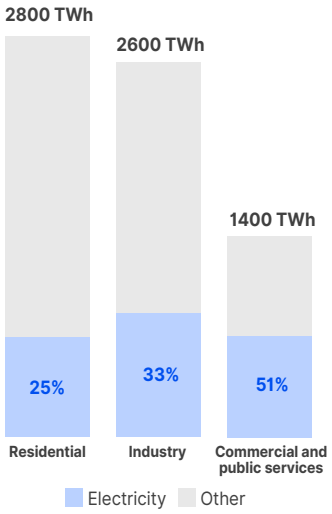
4 Grid congestion limits Member States' progress in maximising capacities for cross-border trade, thus impeding this flexibility source (see ACER, Capacities for Cross-zonal Electricity Trade and Congestion Management – 2024 market monitoring report, 2024).

3 The increasing electrification enhances its potential as a key source of flexibility for the system. Given their larger consumption profiles and higher electrification rates, industrial consumers should be a primary focus for targeted flexibility efforts. Unlocking this flexibility potential is crucial for the energy transition's success. Moreover, it creates opportunities for consumers to benefit from lower energy prices. To achieve this, consumers must be provided with the necessary tools to participate, critically smart meters and dynamic-price contracts. Simultaneously, regulators must promote competitive retail markets and innovation among electricity suppliers and network operators, to encourage flexible and cost-effective energy use. To foster a market environment that further promotes flexibility, several coordinated actions, including improved regulatory monitoring of contracts, will be required.

Unlocking more flexible retail consumption is crucial for the energy transition's success. Moreover, it creates opportunities for consumers to benefit from lower energy prices.

More electrified than the household sector, the industrial sector offers larger flexibility potential

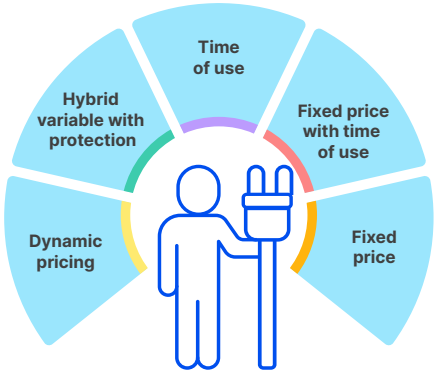
Share of electricity in final energy demand in the household, industrial and commercial sectors in the EU-27, 2022 (terawatt hours)



Fixed-price contracts are predominant in EU retail markets and hinder system flexibility.

4 Fixed-price contracts dominate in the EU today, shielding consumers against market volatility but locking consumers into higher prices. Despite the potential cost savings that they could achieve with dynamic pricing, many consumers opt for fixed-price contracts. However, in many cases consumers are not offered any real alternative, this may be a carry-over following the energy crisis. This preference, particularly when fixed contracts are offered as the default regulated price option, hinders the adoption of more flexible energy practices/contracts and their overall contribution to the energy transition. At the same time, it limits the price benefits of more responsive consumption patterns.

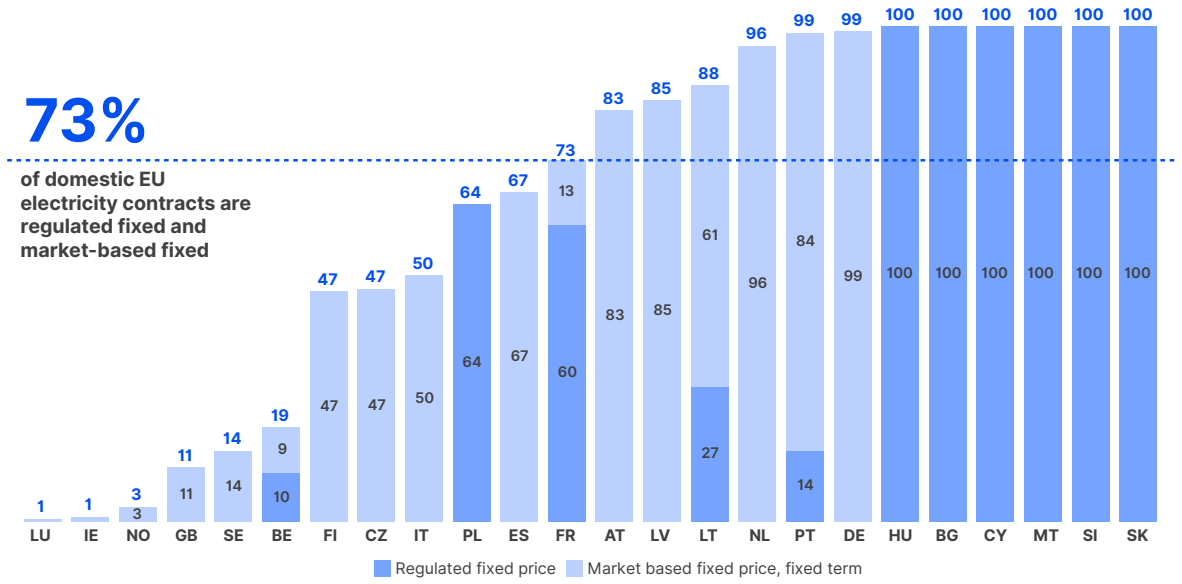
5 Consumers need the right knowledge, choice and tools to actively contribute to decarbonisation efforts. This requires a roll-out of smart meters and access to dynamic-price contracts for all consumers. This emphasises the need for regulators to also foster competitive retail markets and innovation among electricity suppliers and network operators to encourage flexible and cost-effective energy use.



Despite the potential cost savings with dynamic pricing, many consumers have limited choices.

Most EU households sign fixed and regulated electricity contracts[5]

Fixed-price contracts as a share of household contracts in a selection of EU Member States, EEA member Norway, and Great Britain, 2023 (%)



The key to unlocking retail flexibility is a supportive regulatory framework, appropriate infrastructure, an adapted offer, and informed consumers.

- **A supportive regulatory framework creates opportunities for** innovative services or encourages distribution system operators to support retail flexibility.

Current regulations and market structures often do not support flexible and dynamic contracts. Barriers hinder innovative pricing solutions that could improve grid stability and consumer engagement.

6 Current regulations and market structures often do not support flexible and dynamic contracts offering and uptake. Barriers to the development of demand-side response were detailed by ACER in a dedicated report published in December 2023[6]. These barriers hinder innovative solutions to improve grid stability, security of supply and consumer engagement and addressing them is crucial for advancing towards a more flexible and resilient energy system.

7 In addition, the current regulatory environment may not sufficiently encourage distribution system operators. Implementing more dynamic network charges and measures that could further promote more cost-efficient system use are of utmost importance, as network charges are anticipated to form a large share of consumers' electricity bills.

8 Regulatory authorities should implement regulatory frameworks which support flexible and dynamic contracts and remove and/or advocate for the removal of untargeted regulated interventions. Moreover, they should explore measures that incentivise and unlock the potential for more flexible consumption. Such frameworks should prompt distribution system operators to improve system operation, shifting and reducing peak demand and improving grid reliability without expensive infrastructure expansion[7].

5 See Section 2.2.2 for details on contract uptake.

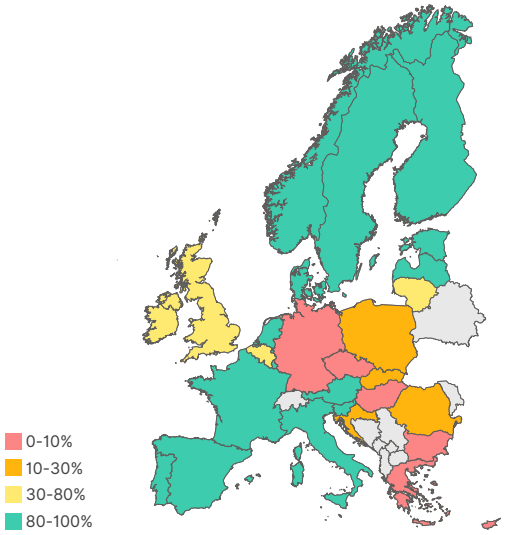
6 ACER, Demand Response and Other Distributed Energy Resources: What barriers are holding them back? 2023 market monitoring report, 2023.

7 ACER has been actively promoting discussion in this domain. See in particular ACER, Report on electricity transmission and distribution tariff methodologies in Europe, 2023.

- **An appropriate infrastructure exploiting smart tools** while enabling the uptake of flexibility.

Few households benefit from smart meters in Central and Eastern Europe

Smart meter roll-out in the EU Member States, EEA member Norway, and Great Britain, 2023 (% of households)



9 Despite smart meters' critical role in enabling dynamic contracts and unlocking consumer flexibility, deployment remains limited in 10 Member States. This hinders consumers from benefiting from variable pricing and hampers efforts to optimise energy use and cut carbon emissions. Member States, advocated by regulatory authorities, should accelerate smart meter roll-out along with promoting dynamic and hybrid[8] contracts.

Despite smart meters' critical role in dynamic pricing and consumer participation, deployment remains limited in 10 Member States.

- **Adapted offers** able to follow various consumption profiles and assisting users to discover effectively and easily the most suitable flexibility options.

10 The lack of dynamic and hybrid contracts limits consumers' ability to adjust their energy usage to periods of higher renewable generation, and correspondingly lower prices, restricting their participation in the energy transition. In several countries where smart meters have been rolled out, dynamic-price contracts for household consumers are still not available. Regulators must ensure that consumers with smart meters have access to dynamic-price contracts, as required by the 2019 Electricity directive. While not all consumers may wish to partake in flexibility, those who do will bring benefits for those who do not, and, therefore, it may be appropriate for regulators to consider providing incentives for the provision of flexibility accordingly.

11 ACER and CEER recommend promoting a variety of contract types, to ensure that consumers can choose between stable and variable price options based on their preferences and needs. This must include dynamic contracts in addition to promoting market-based variable price options as well as an overall more innovative commercial environment. Overall, balancing price protection with active participation, while avoiding untargeted protection will be key.

12 Specifically, ACER and CEER reiterate their recommendation from the 2023 Retail MMR that Member States adopt balanced and targeted protection measures for vulnerable consumers. There will be a subset of consumers that require shielding from prices. The main feature in this context would be to protect vulnerable consumers from extreme high prices while allowing for controlled exposure to some price variability which can lead to price savings. Hybrid contracts could offer price stability during the winter and market exposure during periods when heating is not required, and energy is cheaper.

13 Targeted support measures could be only designed if one gains sufficient knowledge on vulnerable consumers. In this context, regulatory authorities should either establish or be provided with a register of vulnerable consumers to ensure the accurate targeting of assistance where it is most needed. In conjunction with regulatory authorities, Member States should (via social protection mechanisms) design targeted support mechanisms in line with the Electricity Directive, tailored to those most in need.

8 Hybrid contracts are agreements that combine fully dynamic pricing during certain periods with fixed rates during other times of the year, such as offering dynamic pricing outside of the heating season while providing fixed rates during the winter months.

- **Informed and incentivised consumers need a** nudge to move to efficient energy use.

14 Consumers need better information on and incentives for adjusting their energy use during high renewable energy periods and seizing opportunities to cut carbon emissions and save on energy costs. Regulatory authorities and Member States should provide frameworks to ensure that incentives can be offered, combined with accessible and clear information for consumers, especially industries, about the benefits of flexible contracts and optimising energy use. As a no-regret measure, they should consider programmes to encourage energy use during non-peak periods. At the same time, particularly households with high energy consumption should be encouraged to act in a more flexible manner, an approach that shall be gradually extended to a broader user base. Vulnerable consumers could be assisted with targeted social schemes and frameworks during the energy transition also aiming at reducing the vulnerability of these consumers. Potentially, focus could be placed on reducing energy consumption and in turn expenditure by improving building efficiency ratings[9].

Regulatory changes

- Regulatory frameworks should evolve to **promote demand-side response**, in advance of 2030, while for households, consumer protection needs have to be also balanced.
- Regulators must ensure that distribution system operators are incentivised to deliver **more cost-efficient grid use and investment.**

Access to flexibility

- Regulatory authorities, distribution system operators and Member States must ensure a swift roll-out of smart meters, whilst regulators and suppliers must **ensure the provision of a broad range of flexible contract offers, in particular dynamic price contracts.**

Informed and incentivised consumers

- Member States, regulators and suppliers must ensure that **consumers are aware of the benefits and drawbacks of flexible energy consumption** and approximately incentivised, in recognition of the benefits that flexibility will bring.

9 See Section 1.2.2 for more information on household energy consumption.

1. Evolution of the transitioning energy markets: a change is needed

15 To achieve the decarbonisation goals of the Green Deal and the REPowerEU plan the EU must radically transform not only how it produces energy, but also how consumers engage with and use energy in their daily lives. Decarbonisation will be driven by a substantial rise in electricity produced by renewable resources[10] and by the expanding electrification of the heat and transport sectors. This profound transformation will double the need for flexibility resources in the EU electricity systems by 2030.

16 The rapid increase in hours with negative and low prices in 2023 indicates that the anticipated challenges have arrived. For example, curtailment of renewable electricity has increased in 2023 in the EU as recently highlighted by ACER[11]. Therefore, the various tools to address these challenges should be made available. Among them, enhancing the flexibility of the system is key. Three elements are deemed crucial for enhancing the system flexibility:

- **Demand response**, which involves consumers adjusting their energy usage during peak times in response to price signals, thereby helping to balance supply and demand on the grid,
- **Energy storage**, whether home-based or market-based, which allows the storage of electricity for peak periods,
- **Distributed energy resources**, such as solar panels or small wind turbines, which provide localised energy generation, further supporting grid stability and energy independence.

17 The importance of demand response has been made clear in the national energy and climate plans (NECPs) with explicit targets to increase flexibility from demand response solutions[12]. Without such flexibility, the price paid by all consumers will ultimately increase as network reinforcement will be required to transport and deliver more energy to final consumers, and persistent concentration of electricity consumption during morning and evenings will ultimately drive-up energy prices. Irrespective of the type of contract the consumer is on, without significant behavioural changes to demand patterns, the price will likely increase during peak consumption periods.

1.1. New generation driving a need for change

18 A comprehensive set of technical, business solutions and behaviours are necessary to drive the decarbonisation change in the retail sector. This includes among others reinforced uptake of renewable energy backed by developing storage solutions, novel pricing and contractual options and encouraging the formation of energy communities. This Section introduces the trends and challenges in each of these areas.

Renewable generation rise and novel electricity uses

19 The deployment of rooftop photovoltaics accelerated during the energy crisis in 2022 and skyrocketed during 2023, reaching a capacity of 174 GW. According to the 2023–2027 EU market outlook by SolarPowerEurope, two thirds of the new photovoltaic installed capacity in 2023 was attributed to either residential, commercial or industrial rooftop systems, growing at a pace of 54 % year on year[13]. This was

10 Building on previous climate packages, the EU set an ambitious target to increase its renewable capacity to at least 42.5 % by 2030. This means that more than 65 % of the electricity produced in 2030 will come from renewable energy sources, with most of the energy produced by intermittent wind and solar units (see Figure 3).

11 Transmission capacities for cross-zonal trade of electricity and congestion management in the EU - 2024 Market Monitoring Report.

12 According to the European Commission's assessment of the draft updated national energy and climate plans, '... most of the draft updated plans emphasise essential measures to increase flexibility through the uptake of demand response, smart grids and aggregators ... Several Member States mention digitalisation in their draft plans as an enabler for the further integration of renewable energy and grid expansion' and, on distributed renewable energy sources, '... many Member States consider the importance of solar energy and have plans to promote its uptake mostly in the residential sector through incentives and simplified permitting procedures'.

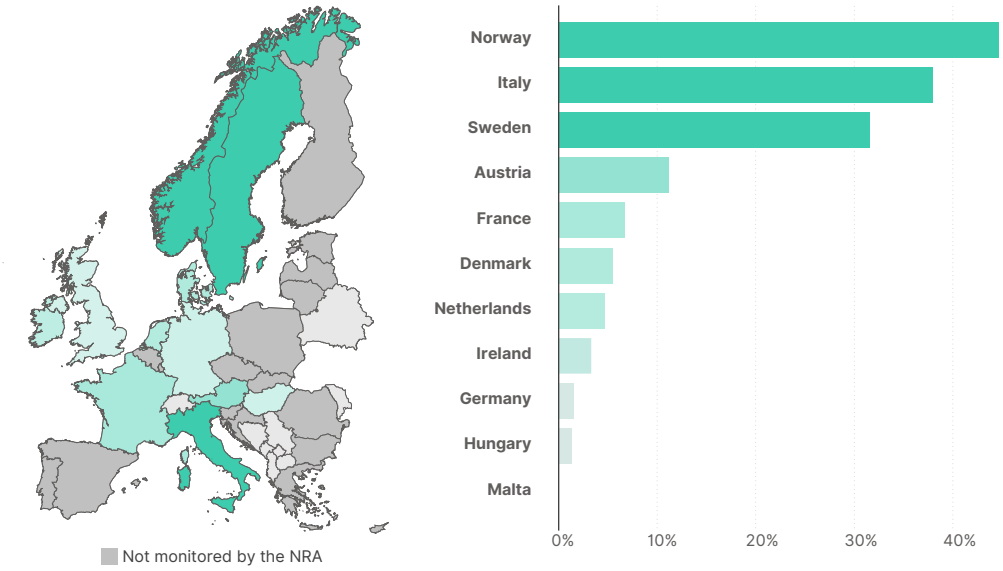
13 According to SolarPowerEurope, the total installed capacity of photovoltaics in the EU-27 in 2023 grew by 27 % on a year-on-year basis, reaching 263 GW, and increased by more than 160 % compared with 2018 (pre-COVID-19 times). Of this capacity, 174 GW can be accounted for by rooftop installations. By 2027, the total installed capacity of rooftop photovoltaics is expected to reach 355 GW.

the result of favourable policies to address high energy prices during the energy crisis[14], lower costs due to stockpiling of photovoltaic modules and the anticipation of an end to favourable policies such as net metering[15]. The sector's short-term prospects also seem favourable, with another doubling of the capacity expected by 2027[16]. However, these developments face challenges. As reported recently by Bruegel, over 95 % of solar panels used in Europe are imported from China. This dependence has raised concerns regarding the growth of sector, particularly considering the recent global disruption[17].

20 According to the most recent market analysis of the European Association for Storage of Energy, the total European storage capacity[18] in 2023 was nearly double that of 2022, exceeding 20 GW. Nearly 7 GW out of the 10 GW of newly installed capacity in 2023 refers to residential systems, while new behind-the-meter commercial and industrial installations account for more than 550 MW in the same year. Around 300 MW of these new systems are coupled with some type of renewable system, mainly photovoltaics – a trend that is expected to increase in the future. The midterm prospects for behind-the-meter systems are promising, according to the same analysis, with projected annual additions in the three sectors in the range of 5–7 GW until 2030.

21 Electrification of energy demand for heating and transport is also progressing, with EMBER suggesting a 1.3 % increase in demand from electrification in novel uses in the EU from 2021 to 2023[19]. The most recent market report by the European Heat Pump Association shows that in 2023 there were nearly 22 million heat pumps installed in Europe, covering approximately 16 % of the building stock[20]. However, a decrease of 5 % was registered in 2023 relative to 2022 heat pump sales, linked to the high price of electricity observed during the energy crisis. Such high purchase prices, together with supply chain disruptions and certain regulatory complexity have been highlighted as hampering the technology growth momentum.

Figure 1: Share of households with heat pumps installed – 2023 (%)



NB: The share of households with heat pumps installed is estimated as the number of heat pumps installed divided by the number of household metering points in the country.

Source: ACER based on data provided by National Regulatory Authorities.

14 See ACER's inventory and assessment of emergency measures during the crisis.

15 According to Article 15(4) of Directive (EU) 2019/944 on common rules for the internal market for electricity, schemes that do not account separately for the electricity fed into the grid and the electricity consumed from the grid should cease as of 31 December 2023.

16 In the longer term, EMBER's analysis on the draft national energy and climate plans indicates an even larger ambition for the solar sector as a whole, setting the target as high as 672 GW by 2030, much of which will be rooftop installations The repowerEU target for solar is set even higher at 740 GW by 2030.

17 See Bruegel's smarter European Union industrial policy for solar panels policy paper.

18 European Market Monitor on Energy Storage (EMMES) report 2024.

19 EMBER's analysis includes as those novel uses heat pumps, electric vehicles and electrolysers.

20 See European Heat Pump Association, European Heat Pump Market and Statistics Report 2023. Installed heat pumps amounted to 174 GW of thermal capacity and produced some 325 TWh of useful heat. Assuming an average coefficient of performance of 4, these figures amount to an estimated electrical capacity of 44 GW and an electricity consumption of 81 TWh.

22 As for the electrification of the transport sector, data from the Alternative Fuels Observatory suggest that the number of battery electric cars and vans in Europe reached 4.7 million units in 2023, a more than sixfold increase since the beginning of the decade. The EVs market is anticipated to grow significantly, to reach a market share of 65% by 2030 versus 16% in 2023 in accordance with different projections[21].

Consumer engagement and innovative business models contributions

23 There is huge potential for consumers to engage actively in and become part of the decarbonisation process. Firstly, promoting energy efficiency is paramount, as it will be discussed across the chapter. Complementarily, shifting consumers' electricity demand will clearly assist in mitigating the need for additional capacity to ensure security of supply but also to limit the curtailment of electricity produced from renewable sources[22]. Public campaigns during the energy crisis targeted European consumers' awareness of the costs and risks of energy consumption patterns and opportunities to increase energy efficiency and benefit from more active participation in the energy market. Following the crisis, new initiatives to reap the benefits of consumer engagement have started to appear that offer consumers more control over their consumption. [See Section 3.2.2 on contract uptake]

24 In particular, the role of energy communities, which enable collective and citizen-driven energy actions, will be a key contributor to the transition. Yet, barriers to such communities continue to exist. A recent report from the Energy Communities Repository[23], managed by the European Commission Directorate-General for Energy, examines the ability of energy communities to engage in activities outlined in the clean energy package, including renewable energy production, energy sharing, retail supply and participation in providing flexibility. These communities, which include citizens, small and medium-sized enterprises and local authorities, aim to generate environmental and socioeconomic benefits rather than profits, promoting democratic participation in and ownership of renewable energy assets and hence promoting renewables' use and penetration.

25 Key barriers and action drivers are identified, highlighting challenges such as legal uncertainties, lack of technical expertise and difficulties in accessing finance and market mechanisms. The referred report emphasises the need for tailored national assessments and policies to address these barriers, accounting for the unique characteristics of energy communities, but recognises the importance of technical expertise being available[24].

26 Furthermore, new and innovative retail business models will be a core requirement to drive consumers' more active participation. These novel models are starting to expand across Europe, although at different speed and extent per national jurisdiction, offering novel pricing options or advanced holistic services to consumers. For example, hybrid contracts that provide market exposure, but also certain price predictability are being made available. A supportive policy and regulatory framework, along with the uptake of key technologies such as smart meters and bidirectional electric vehicle charging stations - where the electric vehicle can send electricity to the grid[25] -, will be key to enabling the upcoming change in the retail business. In that respect, ACER's recent report on monitoring barriers to demand response and other distributed energy resources highlights that there is still work to be done to ensure the consumer sector is in a position to participate. In addition, income disparity, household ownership and building efficiency ratings will all have an impact on the level of consumer participation and the level of vulnerable consumers that can be reasonably expected to participate and who will require different customer-focused services to be crafted (Figure 2).

21 See for example IEA's Global EV Outlook 2023, Prospects for electric vehicle deployment.

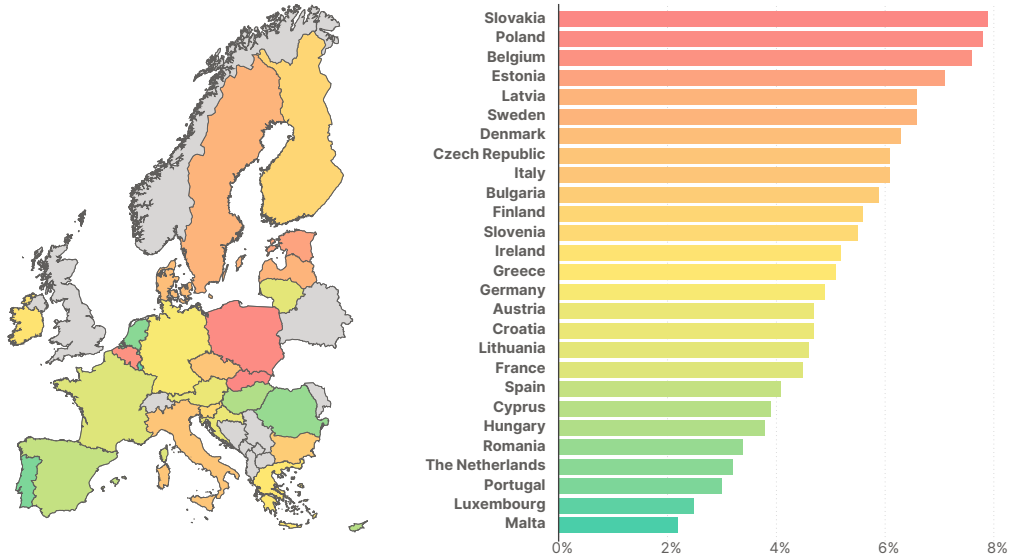
22 For more details on the curtailment of electricity produced from renewable sources, see Chapter 2.

23 See European Commission, Barriers and action drivers for the development of energy communities and their activities, 2024.

24 Cross-cutting issues such as the absence of clear legal definitions, the necessity of awareness and trust building, and the importance of inclusive participation are also discussed. Recommendations include establishing one-stop shops for technical advice, financial support mechanisms and regulations to facilitate easier market entry for energy communities.

25 For developments in the uptake of smart meters, see Chapter 3.

Figure 2: EU-27 share of average household expenditure on energy as a percentage of total spending – 2022 (%)



Source: ACER, based on data from Eurostat: 'Final consumption expenditure of households by consumption purpose' (nama_10_co3_p3).

27 While the potential benefits of further consumer engagement are high, not all consumers are able or willing to participate at the same level. Awareness levels differ across regions and consumer categories, and there is often a lack of some enabling features, such as digital literacy and an understanding of how energy is produced, distributed and used. The needs and priorities that shape consumers' reactions and preferences also vary. Behavioural changes can be difficult to deliver. Switching rate numbers in most Member States suggest that consumers are either unaware of or do not attach value to the benefits of better offers[26], where those offers exist. However, some consumers may not choose the cheapest offer available, as they may prefer stability over low price. It is therefore vital that consumers are provided with a broad range of options to meet their needs and are updated about the broader value of their actions.

28 Finally, the cost of investments enabling consumers to benefit from the opportunities of the transition is substantial and may not be affordable for many households or businesses, even with the existing support schemes. To reach EU and national decarbonisation targets, Member States need to enhance their efforts to bridge these gaps and increase the number of consumers actively participating in the energy transition. Admittedly, however, part of the consumer base will always be less keen or able to adapt and, therefore, specific attention to guaranteeing access to affordable energy services for all is also important. However, while retail markets should cater for all types of consumers, the provision of financial benefits and incentives should be provided to those who are more active, acknowledging the benefit that they bring to the wider energy system, while governmental social supports should be created for vulnerable users.

1.2. Increasing need for flexibility across the EU

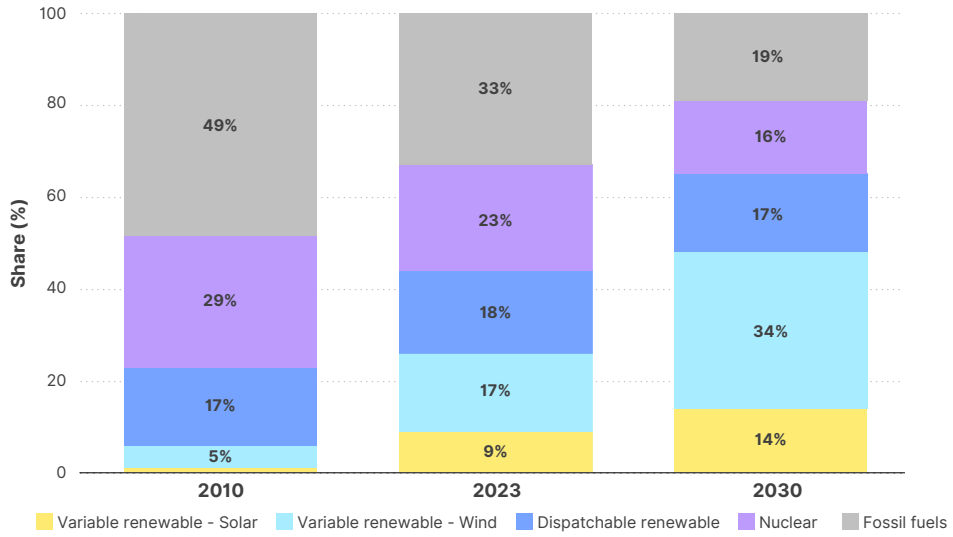
29 EU electricity systems are undergoing a transformational change. While most consumers may not notice, the way energy is generated and delivered to their homes has changed significantly in the last 10 years. Such changes will continue across the EU but will ultimately necessitate a collective change in behaviour among all parties engaging with energy systems.

30 Figure 3 shows the evolution of electricity generation by source since 2010 and up to 2030. It reveals the significant increase in variable renewable energy production such as solar and wind, alongside a decrease in nuclear and fossil fuels. While each Member State differs with respect to level of actual renewable penetration today, the shift to more intermittent renewable generation (this is, from 6 % in 2010 to 48 % by 2030) will require a shift in flexibility provision from generation to demand, requiring in turn significant societal and behavioural changes toward climate-friendly and more dynamic electricity consumption. This defy will require new infrastructure to transport greater amounts of electricity as well as significant policy support and more enabling regulatory frameworks.

26 For more details on switching rates, see Chapter 4.

31 While not all consumers may wish to adapt their consumption behaviour, all consumers need to be provided access to the tools to enable their participation. Regulatory oversight shall drive, and not hinder, the delivery of such flexibility resources.

Figure 3: EU-27 electricity generation by source – historical and 2030 ambition (%)



Source: ACER based on historical data from EMBER and 2030 projections from the 2023 European Environment Agency and ACER report Flexibility solutions to support a decarbonised and secure EU electricity system.

32 The shift towards increased renewable energy requires careful planning and a variety of supportive measures to ensure it is done cost efficiently. Key priorities include ensuring grid stability, addressing affordability concerns and fostering consumer contributions to flexibility. All these aspects face a range of challenges and considerations with impacts on consumers.

- **Policy and regulatory frameworks** that empower consumers' more dynamic behaviour will be key to enhancing system flexibility. Promoting supply competition and business innovation shall favour greater consumer choice and empowerment.
- **The expansion of renewable energy** opens consumer opportunities to access cleaner options that better align with their values and preferences. A more diversified energy mix will thereby offer consumers more options to select energy plans tailored to their needs, whether prioritising affordability, sustainability or reliability.
- **Impact on energy costs.** While the rise in renewable energy is anticipated to lower energy component costs over time, fossil fuel prices may become more volatile. Understanding these cost dynamics can help consumers make more informed choices.
- **Grid stability and reliability.** The transition to a higher share of variable renewable energy sources can pose challenges to grid stability and reliability. However, advancements in technology and grid infrastructure, coupled with the integration of energy storage solutions, can mitigate these challenges and ensure a reliable energy supply for consumers.

1.2.1. Barriers to demand response today

33 Barriers to demand-side response persist in EU retail markets today. ACER's 2023 market monitoring report, Demand Response and Other Distributed Energy Resources: What barriers are holding them back?, identified these barriers as well as highlighted the key areas that hinder the ability of consumers to further participate in energy markets. This section summarizes the report's findings on existing barriers and the measures needed to overcome them.

- **Potential as providers of flexibility**. The report highlights consumers' potential role as providers of flexibility in the EU power system. It models how consumers can contribute to demand response, energy storage and distributed generation, thus enhancing the system's flexibility.

- **Barriers to consumer participation.** The report identifies barriers preventing consumer participation in wholesale electricity markets and system operation services, such as demand response programmes. These barriers include lack of proper legal frameworks, limited incentives, restrictive requirements for participation and interventions in retail electricity prices.

- **Need for smart meters, dynamic-price contracts and information.** The report underscored that consumers require smart meters and access to dynamic retail electricity contracts to actively participate in demand response programmes. In addition, it analyses how consumers need information on the benefits of joining such programmes.

- **Impact of policy choices on consumers.** The report discusses how policy choices, such as interventions in retail electricity prices or subsidies for certain technologies, can affect consumers' ability to engage in demand response activities. It emphasises the importance of considering the impact of such interventions on consumers' ability to respond to price signals effectively.

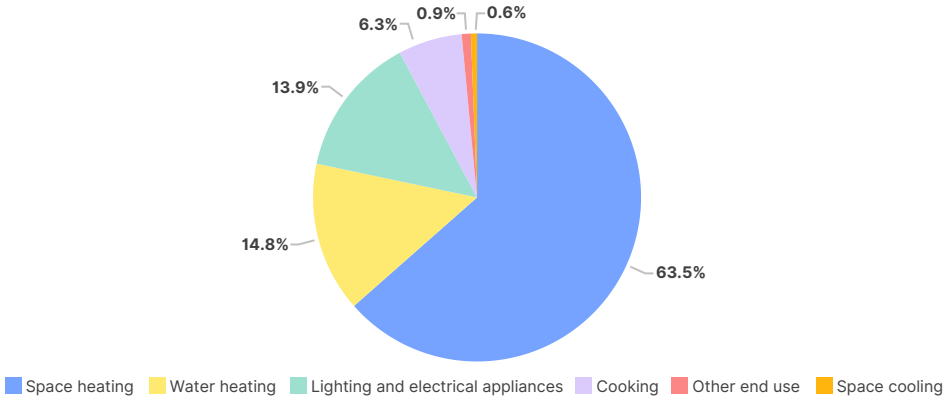
- **Recommendations for consumer engagement.** The report offers recommendations aimed at empowering consumers to reduce their bills and support EU climate goals through demand response. These recommendations include providing suitable market rules, accelerating the roll-out of smart meters, raising consumer awareness and ensuring open access to retail markets.

34 Overall, the report underscores the importance of enabling consumer participation in demand response and other flexibility mechanisms to achieve a more resilient and sustainable energy system. While not all consumers may wish to become active consumers, they should not be hampered by a lack of choice in their market, which prevents both the individual household consumer and non-household consumer organisations acting on behalf of a collective group of consumers from engaging actively in energy markets.

1.2.2. Household energy consumption and building efficiency

35 As shown in Figure 4, EU household energy consumption is predominantly devoted to space heating (63.5%) and water heating (14.8%). This underscores the significant potential that energy efficiency solutions in buildings offer for reducing EU total energy consumption. The electrification of households' heating systems presents large opportunities to enhance the overall system efficiency, but also importantly, it can foster consumers' ability to distribute its consumption in a more flexible manner. Although current demand flexibility in lighting and cooking is limited, opportunities for flexible heating and appliance use are expected to significantly grow as the EU energy system becomes increasingly electrified.

Figure 4: EU-27 final household energy consumption – 2022 (%)



Source: ACER based on data from Eurostat: 'Disaggregated final energy consumption in households' (nrg_d_hhq).

36 Significant variations in the fuels used for space heating can be observed today across the EU.

- **Solid fossil fuels and peat products** still show a relatively high presence for space heating in Bulgaria, Czechia, Poland and Romania.
- **Natural gas** is the prominent energy source for space heating across many Member States, notably in Belgium, Germany, Italy, Hungary, the Netherlands and Slovakia, with the share ranging from 15.5 % to 84.7 %. While natural gas is relatively cleaner than solid fossil fuels, its continued usage poses challenges in terms of greenhouse gas emissions.
- **Oil and petroleum products** remain a significant source of energy in countries such as Belgium, Germany, Ireland and Latvia, though their share varies widely. The relatively high reliance on oil in some countries could expose consumers to price volatility.
- **Renewables and biofuels**, including biomass and solar heating, are utilised in countries such as Bulgaria, Estonia, Ireland, France, Latvia and Portugal.
- **Electricity** is a notable contributor to space heating in countries such as Finland, Norway and Sweden, where it accounts for a substantial portion of final energy consumption.
- **Heat** as a direct source of energy is prominent in Denmark, Estonia and Finland, reflecting the use of district heating systems and geothermal energy, particularly in Nordic countries.

37 The persisting reliance on fossil fuels underscores the importance of further transitioning towards cleaner and more sustainable energy sources for space heating. Overall, increasing emphasis will be put on electricity as a cleaner and efficient alternative, even if low carbon gas options will still play its part, as Chapter 5 discusses. To achieve that shift, there is a pressing need to adapt policies, innovate on technologies and encourage consumer behaviours. Electrified solutions, if combined with good insulation and smart technologies such as programmable thermostats, can better assist consumers to adjust consumption patterns based on grid demands and real-time pricing (RTP), hence reducing energy bills.

38 Above and beyond, improving building energy efficiency is the most impactful measure to achieve the EU decarbonisation goals. Buildings are responsible for circa 40% of EU energy consumption and 36% of greenhouse gas emissions, across the construction, usage, renovation and demolition phases[27]. Thereby, retrofitting all buildings (including rental properties) with energy-efficient measures will significantly reduce energy consumption and emissions. That's why the EC and Member States have agreed in the revised Directive on the energy performance of buildings on the ambitious goal of reaching a zero-emission EU building stock by 2050 - including the adoption of rules for new buildings to be zero-emission from 2030. The reality is however that 85 % of EU buildings were built before 2000, with 75 % performing poorly, what underscores the extent of the defy.

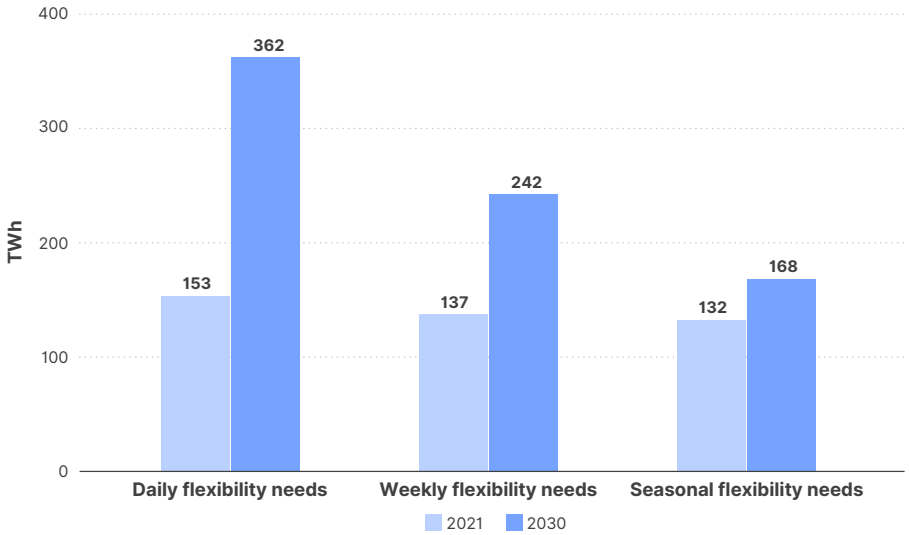
1.2.3. Increasing flexibility needs for EU power system

39 The increasing need for flexibility in the EU power system will be one of the major challenges posed by the shift to renewable generation technologies and the rising electricity demand.

40 The European Environment Agency and ACER report Flexibility solutions to support a decarbonised and secure EU electricity system, outlined how by 2030 the electricity system in Europe will need more than twice the current amount of flexibility resources to keep up with changing needs. The demand for flexibility will increase sharply on a daily (2.4-fold), weekly (1.8-fold) and annual (1.3-fold) basis, compared with 2021 (Figure 5).

27 See EC's Energy efficiency in buildings in focus assessment.

Figure 5: Daily, weekly and seasonal flexibility needs in 2021 and 2030 in Europe (TWh)

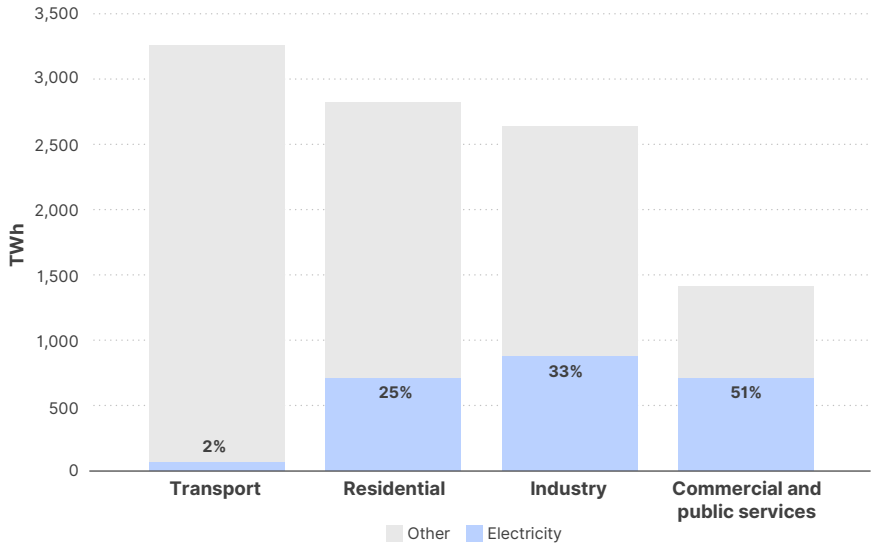


NB: The 2030 results correspond to the average simulation results under the scenarios considering existing and planned interconnectors and no demand-saving and demand-shifting measures. More variable renewable energy deficit hours than excess hours are expected by 2030; therefore, the subtraction of must run generation would probably reduce the flexibility needs estimated in this paper. The analysis was performed for interconnected member countries of the European Network of Transmission System Operators for Electricity.

Source: European Environment Agency and ACER, Flexibility solutions to support a decarbonised and secure EU electricity system, 2023.

41 As stated, demand-response, storage, cross-border and not distribution solutions shall all contribute to meet the rising flexibility needs. One aspect that is noted here is that, while households' electricity consumption is expected to rise with the increase in electric vehicles and electrified heating solutions, the correlation between flexible power consumption and price incentives is anticipated to be even greater in large industry and commercial services. This calls for further targeting of industries and, gradually, large buildings with flexibility incentives (Figure 6).

Figure 6: Electrification of EU energy use – 2022 (TWh)



Source: ACER, based on data from Eurostat (nrg_bal_s).

1.2.4. The need for flexible pricing options to enhance consumer choice

42 Finally, flexible and dynamic pricing models will be essential to meet the diverse needs of consumers and the grid of the evolving EU retail electricity markets. However, not all consumers can adapt to frequent changes in pricing or consumption patterns. Traditionally, residential rate design included a fixed charge and a time-invariant volumetric rate, varying by usage volume but not by time. This traditional design no longer aligns with modern grid needs, prompting the development of alternative rate designs to address these deficiencies.

43 It is important to recognise that consumers need broad choice; it should not simply be a choice between a fixed-price contract and a full dynamic-price contract. While electricity consumers will have the right to both a fixed-price, fixed-term contract and a full dynamic-price contract, these rules will enable electricity suppliers to offer a broader suite of products to consumers.

44 This gives rise to the following types of contract models that should be available to ensure electricity consumers have appropriate choices as part of the transition.

- **Fixed-price contracts.** These offer consumers a stable and predictable rate for electricity over a specified period, appealing to those who prioritise budget certainty and are less interested in market dynamics. While they provide security against market volatility, they result in higher costs during periods of low wholesale prices and consumers paying higher costs over a longer period for their electricity when compared to more variable contracts.

- **Dynamic pricing and real time pricing.** Models, critical peak pricing and real time pricing adjust rates based on the time of day, overall demand and grid conditions. They reflect the actual cost of electricity production and delivery more accurately, incentivising consumers to reduce or shift their usage during peak times, thus aiding grid management and renewables integration. They can lead to savings during low demand and high renewable generation but can expose consumers to price spikes if they do not adjust their consumption patterns. They suit consumers who can shift their usage patterns in response to price signals and take advantage of low-cost electricity.

- **Time-of-use (TOU) contracts.** The day is divided into peak and off-peak time periods. Prices are higher during the peak period hours to reflect the higher cost of supplying energy during that period.

- **Hybrid contract models.** These combine fixed and variable pricing elements to balance stability and flexibility. Some contracts offer a fixed rate for part of the consumption and a variable rate for the rest, or incentives for reducing peak-period consumption. These models provide some protection against price volatility while encouraging efficient energy use.

- **Subscription and incentive-based models.** These innovative models, such as fixed bills with incentives, allow consumers to pay a stable monthly fee while earning rewards for reducing peak usage. They simplify billing and promote energy efficiency and load shifting.

45 Despite the benefits of flexible pricing models, many consumers prefer the simplicity and predictability of traditional fixed-rate plans. The complexity of dynamic contracts, lack of enabling technologies (e.g. smart meters) and concerns about bill volatility can deter adoption. Therefore, it is crucial to provide education, technological support and safeguards to ensure all consumers can benefit from the evolving energy market.

46 Retail electricity pricing must balance flexibility and simplicity to cater to the diverse needs of consumers. While flexible models offer significant benefits for grid management and renewable integration, a one-size-fits-all approach is not feasible. Policymakers[28] and energy providers must consider these different consumer preferences and barriers to design effective and inclusive pricing strategies. A continuation of the outcomes observed today may not be compatible with the achievement of wider decarbonisation goals.

47 Policymakers should recognise and understand the historical behaviour of consumers and apply policies to provide incentives which nudge consumers to adopt more flexible consumption patterns. This must not hinder consumer choice but could, if deemed appropriate in driving the transition, involve defaulting consumers onto fixed-price TOU contracts, which offer a level of flexibility such as time of use contracts.

28 Where appropriate, input and support could be sought from relevant consumer organisations.

1.3. Conclusions

48 To meet the EU's decarbonisation goals, a radical transformation of energy production and consumer engagement is essential. The shift to renewable energy and the electrification of heat and transport will significantly increase the need for flexibility in the electricity system by 2030. This requires solutions like demand response, energy storage, and distributed energy resources.

49 Consumers play a crucial role in this transition, but barriers such as legal uncertainties, financial limitations, and lack of access to enabling technologies like smart meters hinder broader participation. Tailored policies must address these challenges, ensuring inclusive access to tools and dynamic pricing models that encourage efficient energy use and grid stability.

50 The EU electricity market is shifting towards renewable energy, projected to account for 48% of generation by 2030. To support this transformation, enhanced grid infrastructure, flexible pricing, and consumer participation are vital. While flexible pricing models promote energy efficiency and system stability, many consumers still prefer the predictability of fixed-rate contracts. Policymakers must design inclusive strategies that balance flexibility and simplicity to drive the energy transition without limiting consumer choice.

51 Ultimately, meeting the rising flexibility needs is essential for managing increasing renewable generation and electricity demand, ensuring a decarbonised and secure EU energy system.

2. Enablers of consumer participation in decarbonising energy markets

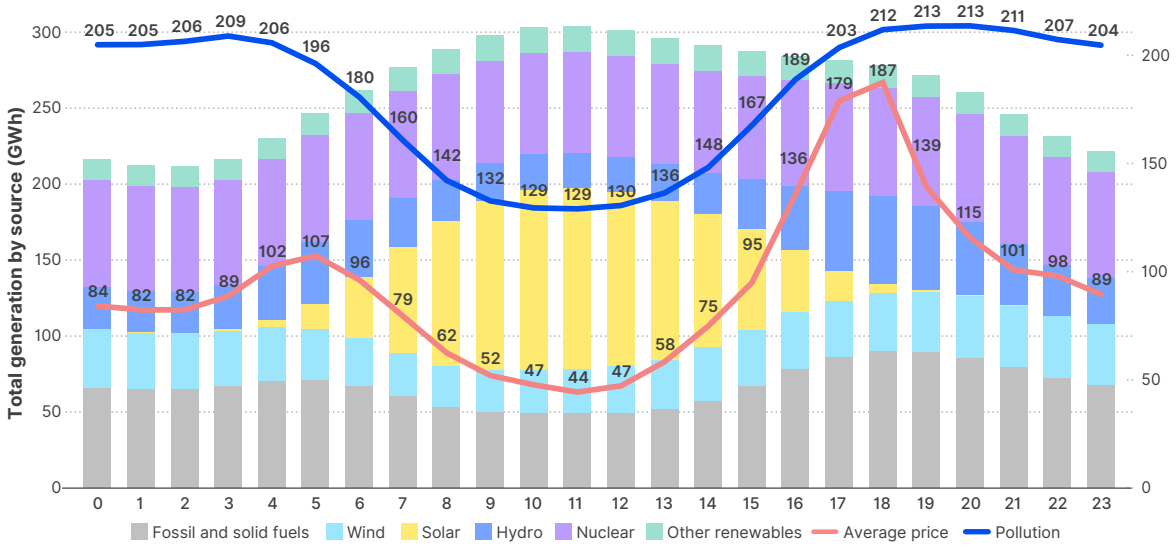
52 This chapter provides an overview of the access to key tools that are needed to ensure that retail energy consumers can actively participate in the delivery of decarbonisation and the provision of flexibility[29].

53 As outlined in Chapter 1, a more flexible demand base will be required to address the rising flexibility needs of the EU electricity system, which will increasingly rely on intermittent renewable generation.

54 From 2019 to 2023, the installed capacity of solar and wind power generation across the EU increased by 80 %, from 261 GW to 475 GW[30]. In the Energy Community Contracting Parties, the installed solar and wind capacity increased by 75% between 2022 and 2023, to reach around 1 GW[31]. The larger availability of cheaper renewable electricity has displaced parts of the polluting fossil fuel-based generation in the wholesale market. However, weather-dependent, non-dispatchable renewable generation can be in occasion at odds with the consumption habits of retail consumers.

55 Because of the high prevalence of fixed-rate contracts (see Figure 12 below for more information), most consumers have no real incentive to shift their demand to periods of low prices commonly associated with higher renewable power generation. Under such contracts, household electricity demand peaks are observed in the morning and in the evening, periods characterised by scarce solar generation. In the absence of sufficient renewable generation during these peak periods, the energy demand tends to be met by dispatchable fossil fuel power plants (as illustrated in Figure 7).

Figure 7: Average hourly generation by source (GWh), day-ahead price (EUR/MWh) and CO2 pollution (kg/MWh) in the EU-27 in August 2024



Source: ACER calculations based on generation and pricing data from the Transparency Platform of the European Network of Transmission System Operators for Electricity and Scope 3 emissions data from the Intergovernmental Panel on Climate Change.

56 Enabling retail consumers to participate in decarbonising energy markets requires adjusting their demand incentive-structure to account for the availability of renewable generation. However, to ensure that consumers are collectively enabled to participate in the transition, they must, at a minimum, have access to renewable electricity and receive price signals that steer a behavioural shift in consumption. Aligning consumption with periods of abundant non-dispatchable generation will lead to higher utilisation of renewable resources, less need for fossil fuel-based peak supply plants and increased flexibility in the energy system. This will ultimately benefit all consumers via lower peak prices and a reduced need for network reinforcements.

29 While Great Britain is included in this section, it is not required to apply the rules outlined in Directive (EU) 2019/944 following its exit from the European Union.

30 See Ember's electricity data explorer for more information on capacity and generation by type in the EU-27.

31 Compiled by the Energy Community Secretariat based on information provided by the Contracting Parties.

57 Three elements are required as a minimum to enable and incentivise consumers to act more flexibly and shift their consumption towards periods with high renewable availability.

- **Smart meters**, offering near real-time recording of consumption (and injection) volumes, are essential for empowering consumers. Member States must ensure these meters meet relevant standards, follow best practices, are interoperable and can interface with consumer energy management systems, smart grids and other eligible parties.
- **Dynamic and hybrid pricing contracts**, which align the cost of electricity consumption with prevailing wholesale market conditions, provide consumers with a direct monetary incentive to flexibly shift their consumption in response to a higher availability of abundant renewable generation.
- **Information** about pricing changes and levels of consumption must be communicated in a simple manner, easily accessible to consumers and available to eligible parties.

58 These three prerequisites for consumer participation in decarbonising energy markets are mandated by Directive (EU) 2019/944 and must be available in all Member States and EnC Contracting Parties. The following sections review the status of consumer access to these, but also other, enablers outlined in the directive across the EU and the EnC[32]. The key findings of such review for the year 2023 are:

- 10 Member States[33] have a limited smart meter roll-out, that is, below 30 %, while 14 Member States[34] and European Economic Area (EEA) member Norway have achieved a roll-out above 80 %;
- despite the widespread availability of smart meters, household consumers in Ireland, France[35], Luxembourg, Malta and Portugal did not have access to dynamic-price contracts in 2023 despite the mandate under Directive (EU) 2019/944;
- 73 % of households in the EU are under a regulated fixed-price or market-based fixed-price electricity contracts;
- the monitoring and collection of metrics with high relevance to the energy transition, such as non-household contract uptake and prosumer energy injections, is still limited, with many national regulatory authorities not collecting such data at all.

2.1. Smart meters

59 Smart meters are a key tool in enabling energy consumers to engage in flexible energy consumption. They also enhance the provision of information to consumers, suppliers and system operators, and negate the need for suppliers to physically read consumers' meters. Both limited roll-out of smart meters and inability to use them properly[36] will prevent consumers from engaging in flexibility and energy demand shifting. However, smart meters alone are not enough to enable consumer participation in the energy transition and must be paired with dynamic contracts to achieve this.

60 Figure 8 shows the status of smart electricity meter deployment among households at the end of 2023. Fifteen countries have a smart meter roll-out rate above 80 % (Denmark, Estonia, Spain, France, Italy, Latvia, Luxembourg, Malta, the Netherlands, Austria, Portugal, Slovenia, Finland and Sweden, and EEA member Norway). Belgium, Ireland, Lithuania and Great Britain have a roll-out rate of between 30 % and 80 %.

61 Most significantly, 10 countries have a very limited rate of roll-out of smart meters to household consumers (below 30 %), specifically, Bulgaria, Czechia, Germany, Greece, Croatia, Cyprus, Hungary, Poland, Romania and Slovakia[37]. Of these, only Croatia, Poland and Romania have a roll-out rate above 20 %.

32 Deadline for implementation of the directive expired in December 2023 and so far, none of the EnC Contracting Parties fully transposed its provisions into the national legislation. Therefore, the following chapter includes only limited information for the EnC.

33 Bulgaria, Czechia, Germany, Greece, Cyprus, Hungary and Slovakia.

34 Denmark, Estonia, Spain, France, Italy, Latvia, Luxembourg, Malta, the Netherlands, Austria, Portugal, Slovenia, Finland and Sweden.

35 In France, a dynamic price contract was offered in 2021. However, due to the energy crisis, the supplier exited the French market.

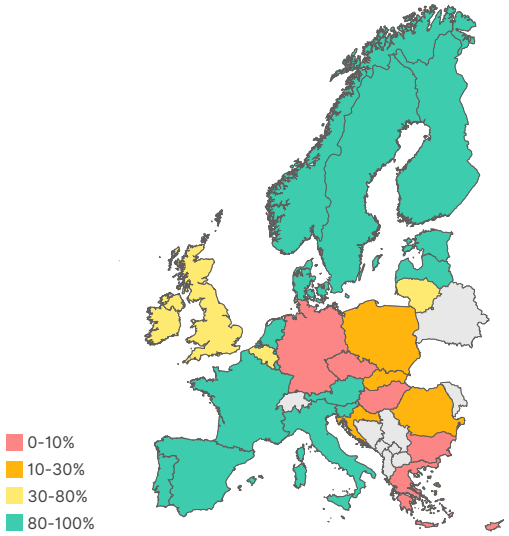
36 See Section 2.4 for more information.

37 A smart meter roll-out is to be carried out in Slovakia (15 %) for consumers connected to the distribution system at a low voltage level with an annual electricity consumption of at least 4 MWh, and for prosumers.

62 The roll-out rates of smart meters substantially vary in the EnC Contracting Parties too, ranging between 76% in Montenegro to 4% in Serbia. However, these smart meters still do not meet the functionalities criteria required by Directive 2019/944.

63 In the absence of access to smart meters, consumers in these markets are significantly limited in the offers that they are provided by energy suppliers and have limited opportunities to engage in flexibility. Moreover, limited smart meter roll-out also hinders third parties and suppliers from offering flexibility services.

Figure 8: Roll-out of smart meters among households across Member States, EEA member Norway and Great Britain – 2023 (%)



NB: Table Annex 1 presents the numerical values for smart meter roll-out, consumers' access to near real-time data, and the smallest data recording interval per country.

Source: ACER based on data provided by National Regulatory Authorities.

64 Per Article 19(2) of Directive (EU) 2019/944, Member States must ensure the deployment of smart meters in their territories; however, such deployment may be subject to a cost–benefit analysis. Bulgaria and Czechia failed to report if such studies were conducted[38]. In the capital region of Belgium (Brussels) and in Hungary and Slovakia, the smart meter cost–benefit assessments were negative.

65 Smart meters are also a necessary element to allow prosumers to inject electricity into the grid. Figure 9 shows the share of household prosumers across the EU, EEA member Norway and Great Britain. The median share of household prosumers within these countries is 3.3 %, with the Netherlands and Belgium having the largest shares, at 29 % and 24 %, respectively. Shares of household prosumers in the EnC Contracting Parties are still below 1%.

66 Germany, the Netherlands and Poland exhibit the largest volumes of energy injected[39] into the grid by household prosumers. In the case of Germany, 11.9% of electricity fed into the system in 2023 came from photovoltaic systems[40]. However, many NRAs have not provided data on energy injections[41], which hinders comprehensive analysis and policymaking. This lack of transparency is concerning, as it limits the ability to assess and support the increasing solar photovoltaics production and a better understanding of network suitability aspects. While NRAs need to increase and improve data collection efforts, policymakers must prioritise data provision from NRAs to better understand and manage the integration of renewable energy sources.

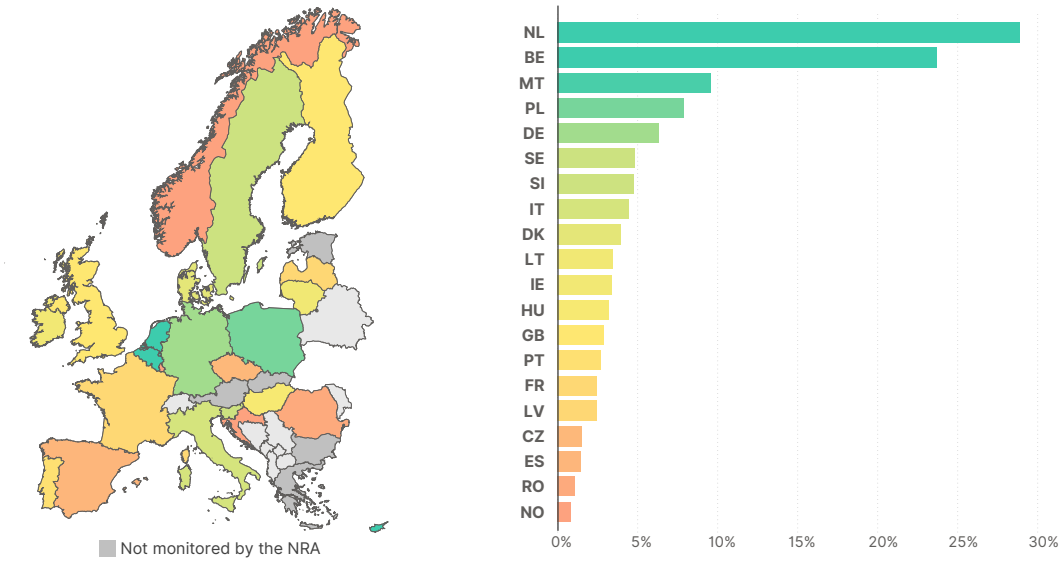
38 Bulgaria, Czechia and Greece have a household smart meter roll-out rate below 10 %. Cyprus reported that the outcome of its cost–benefit assessment was positive; however, the country has a roll-out rate of 0 %. While the NRA did not provide a response, in Greece, the roll-out has been positively assessed in Greece since 2012.

39 Energy produced by a prosumer is considered the sum of energy self-consumed (in case of self-consumption) and energy injected to the grid. In this way, without an intermediary metering device collecting data for production and self-consumption, data collected by the meter are likely to relate to energy injected into the grid.

40 https://www.cleanenergywire.org/news/germany-sees-30-increase-pv-units-achieves-record-solar-share-total-electricity-feed

41 The volume of electricity injected into the grid by household prosumers was reported by 14 countries, with only 11 reporting on non-household volumes. The reported data can be found in Table Annex 2.

Figure 9: Share of household prosumers across Member States, EEA member Norway and Great Britain - 2023 (%)



NB: The share of household prosumers is calculated as the number of households with installed solar PV divided by the total number of household metering points. Table Annex 2 presents the numerical values for the ACER-calculated share of household prosumers, the NRA reported share of total consumers who generate their own electricity, and household and non-household energy injected in the grid.

Source: ACER based on data provided by National Regulatory Authorities.

2.2. Contract offers and contract uptake

67 This section provides an overview of the contracts available to retail consumers in the EU, EEA member Norway and Great Britain, and the contract uptake for both household and non-household consumers.

68 As stated, a more flexible consumer base will be essential for the EU's transition to increased renewable energy. To achieve this, suppliers must offer a range of contract options, with regulatory frameworks driving such offering. Specifically, Directive (EU) 2019/944 mandates that electricity suppliers with over 200 000 customers offer dynamic-price contracts. Additionally, under the recent electricity market reform, they must also offer fixed-price, fixed-term contracts, where the price does not change throughout the duration of the contract but may take account of peak pricing. These two contract options represent the opposite ends of the pricing model spectrum, with the first exposing customers to real time pricing variations and the latter offering complete price stability.

2.2.1. Electricity retail offers in the EU

69 This section explores the competitive landscape of electricity retail markets across various countries, focusing on assessing the number of active suppliers, the variety of offers available to consumers and the accessibility of dynamic-price contracts. Understanding these factors is crucial for assessing potential market flexibility and consumer choice, which are essential for fostering a robust and competitive energy market.

70 Member States' household retail markets can be categorised into three groups based on the presence of regulated and market-based offers, which is an important feature influencing market competition:

1. **fully regulated offers:** Bulgaria, Cyprus, Hungary and Malta;
2. **market-based offers only:** Austria, Belgium, Czechia, Denmark, Finland, Germany, Greece, Ireland, Latvia, Luxembourg, the Netherlands, Norway, Romania and Sweden;
3. **both regulated and market-based offers:** Estonia, France, Croatia, Italy, Lithuania, Poland, Portugal, Slovenia, Slovakia, Spain and Great Britain.

71 The availability of dynamic contracts is a key metric indicative of the ability of suppliers to market flexible pricing models. In 2023, household consumers in Bulgaria, Ireland, Greece, France[42], Cyprus, Luxembourg, Hungary, Malta, Poland and Portugal did not have access to dynamic-price contracts, despite regulations requiring them (see below). Two main factors preventing the availability of such contracts across Member States can be identified: 1) the limited roll-out rate of smart meters and 2) continued untargeted price intervention in the retail sector [See Chapter Contract Uptake]. In the presence of either of these conditions, it is unlikely that suppliers can successfully market any flexible and innovative contracts.

Figure 10: Availability of different types of contracts to customers in the household electricity market in 2023

Country	Contract types for the household market					
	Fixed price, fixed term	Dynamic price	Average monthly spot price	Regulated fixed price	Regulated variable	Others
AT, BE, DE, DK, RO	✓	✓	✓	✗	✗	✗
CZ, FI, NO, SE	✓	✓	✓	✗	✗	✓
BG, CY, MT	✗	✗	✗	✓	✗	✗
GB, IT	✓	✓	✓	✗	✓	✓
EE	✓	✓	✓	✓	✗	✗
ES	✓	✓	✓	✗	✓	✗
FR	✓	✗	✗	✓	✓	✓
GR	✓	✗	✓	✗	✗	✗
HR	✓	✓	✗	✗	✓	✗
HU	✗	✗	✗	✓	✓	✗
IE	✓	✗	✓	✗	✗	✓
LT	✓	✓	✓	✓	✓	✗
LU[43]	✗	✗	✗	✗	✗	✓
LV	✓	✓	✗	✗	✗	✗
NL	✓	✓	✗	✗	✗	✗
PL	✓	✗	✗	✓	✗	✗
PT	✓	✗	✓	✓	✗	✗
SI	✓	✓	✗	✓	✗	✗
SK	✗	✓	✗	✓	✗	✓

Source: ACER based on data provided by National Regulatory Authorities.

72 Non-household consumers collectively have significantly higher electricity consumption than household consumers (on average 70 % of total electricity demand in Member States corresponds to industrial and commercial enterprises). Managing these needs efficiently is critical for their operational and cost management. Therefore, having access to a broad range of contracting options for such consumers is critical, as they influence their balancing cost, risk, reliability and sustainability considerations. Furthermore, given the larger volume of industrial and commercial electricity demand, non-household consumers represent a relevant source of flexibility. Enabling these consumers to participate directly in the market through demand response programmes is therefore fundamental to advancing the energy transition.

42 In France, dynamic price contracts were offered in 2021. However, following bankruptcy due to the energy crisis, the supplier exited the French market.

43 Luxembourg reports 99 % of consumers on variable-price contracts. The variable-price contract does not have a fixed term, the duration is undefined. The price per kWh can be changed by the supplier with a 30 days prior notice.

73 Despite higher levels of competition in the non-household retail electricity supply market [See Chapter ELE HHI], the range of contracts available to such consumers, although somewhat larger, does not significantly differ from those available to the household sector. Dynamic-price contracts[44] were not available either to industrial and commercial consumers in Bulgaria, Ireland, Greece, Cyprus, Hungary, Malta and Portugal (Figure 11). When comparing the availability of dynamic contracts for both the non-household and household sector across Member States, differences can be seen only in France and Poland. Overall, monthly spot-pricing contracts were available in 19 out of the 27 countries that monitor non-household contract uptake.

74 As previously referred, industrial consumers use a range of tailored contracting options to optimise their electricity procurement strategies. Such options include power purchase agreements and index-linked, hedging, baseload and hybrid contracts. Consumers may also choose to use different contracts for different shares of their demand.

75 Monitoring of the industrial contractual uptake and mix across Europe is currently limited. However, given the flexibility potential and relevance to the decarbonisation efforts of the sector, ACER and the Council of European Energy Regulators are committed to increasing transparency and providing further insight into these dynamics in the following additions of the market monitoring report.

76 In the EnC Contracting Parties, households are only in individual cases offered an alternative to regulated fixed price contracts. Namely, in Ukraine and Moldova, households may choose market-based fixed price, fixed term contracts and in Ukraine only, market-based variable contracts. However, in 2023 all household customers in these Contracting Parties were supplied at regulated prices. The NRAs in the EnC Contracting Parties largely do not monitor offers and uptakes of contracts in non-regulated market segment.

Figure 11: Availability of different types of contracts to customers in the non-household electricity market in 2023

Country	Contract types for the non-household market				
	Fixed price, fixed term	Dynamic price	Average monthly spot price	Regulated fixed price	Regulated variable
AT, BE, DK, EE, ES, GB, PL, RO, SE	✓	✓	✓	✗	✗
BG, CZ, GR, IE	✓	✗	✓	✗	✗
FR, LT, SI	✓	✓	✓	✓	✓
LV, NL	✓	✓	✗	✗	✗
CY	✗	✗	✓	✓	✓
FI	✗	✓	✗	✗	✗
HR	✓	✓	✗	✗	✓
HU	✓	✗	✗	✓	✗
IT	✓	✓	✓	✗	✓
MT	✗	✗	✗	✓	✗
PT	✓	✗	✓	✓	✗
SK	✗	✓	✗	✓	✗
DE, NO	No data	No data	No data	No data	No data

Source: ACER based on data provided by National Regulatory Authorities.

Note: Czechia[45], France, Italy, Lithuania, Slovenia and Sweden also reported the uptake of contracts that would be included in the category 'other'.

44 Article 11 of Directive (EU) 2019/944 mandates Member States to publish annual reports on the main developments of dynamic contracts, including market offers and the impact on consumers' bills, and specifically the level of price volatility. Despite having dynamic contracts in either the household or non-household sector, Czechia, Denmark, Estonia, France, Italy and Finland have failed to produce such reports. In Poland and Portugal, dynamic contracts were introduced in 2024; hence, the mandate will apply from 2025.

45 The NRA defines contracts in this category as market based variable price with an indefinite term.

Hybrid contracts offer a way forward

77 Flexible and dynamic pricing models are essential to meet the diverse needs of consumers and the grid. However, not all consumers can easily adjust or may want to adjust to frequent pricing changes. Moreover, the recent energy market volatility has highlighted the strengths and weaknesses of dynamic pricing models, including the need to provide hedges related to certain contract types. This has led to the emergence of hybrid charges as an alternative solution for those avoiding full dynamic pricing.

Hybrid models come in many forms and shapes

78 Hybrid contracts combine elements of fixed and variable contracts, offering greater flexibility and protection against market volatility. The following models are notable.

- **Fixed or variable + demand rewards.** These contracts offer fixed or variable pricing with incentives such as demand rewards. For example, some contracts provide a fixed rate for 1 year plus an annual free month of energy.
- **Fixed or variable + free or discounted hours.** These contracts include fixed or variable pricing with free or discounted energy during off-peak hours. Examples include weekend discounts and flexible hours where consumers can select specific times for lower rates.
- **Variable + protection.** This model caps prices at a certain threshold to protect consumers from high market rates. If prices exceed the threshold, they are capped at a fixed rate, providing price stability.
- **Fixed + dynamic (spot).** These contracts combine a fixed price for a set period with dynamic pricing based on spot market rates. For instance, some models fix prices for 6 months and then switch to variable rates based on market conditions.
- **Dynamic (spot) + flex.** These contracts offer dynamic pricing with flexible terms, incentivising reduced electricity use during peak periods.

79 Moreover, specialised hybrid contracts can be offered to target specific consumers, for example those with assets or specific consumption profiles:

- **Electric vehicle price contracts** are designed for electric vehicle users, optimise charging during green grid periods and offer low-cost options, such as flat rates for off-peak charging and incentives for smart charging.
- **Dynamic asset-focused tariffs** integrate renewables and storage solutions such as solar panels and batteries, aiming to reduce costs through optimised energy management and selling excess energy back to the grid.

80 Overall, hybrid contracts offer significant benefits and should be facilitated to ensure broad consumer choice. Innovative business models and their offering through comparison tools are crucial for their uptake. As the energy market evolves, hybrid contracts blend fixed and variable pricing, addressing market volatility and providing better options and protection for consumers.

2.2.2. Contract uptake

81 The uptake of contracts that allow dynamic and flexible electricity pricing is key to progress towards more flexible and sustainable energy systems in the EU. This section examines how widely these, and other-type contracts have been embraced by consumers across different Member States. By analysing uptake rates, the report aims to highlight the factors influencing the adoption of the different contract types, the successes and challenges of Member States, and insights into best practices and areas for improvement to enhance market flexibility and consumer benefits.

82 The actual uptake of dynamic and hybrid contracts is influenced by the availability of these type of offers as well as by the deployment of smart meters. Both aspects have been analysed in the preceding sections. Therefore, actual uptake figures of such contracts must be evaluated in this context.

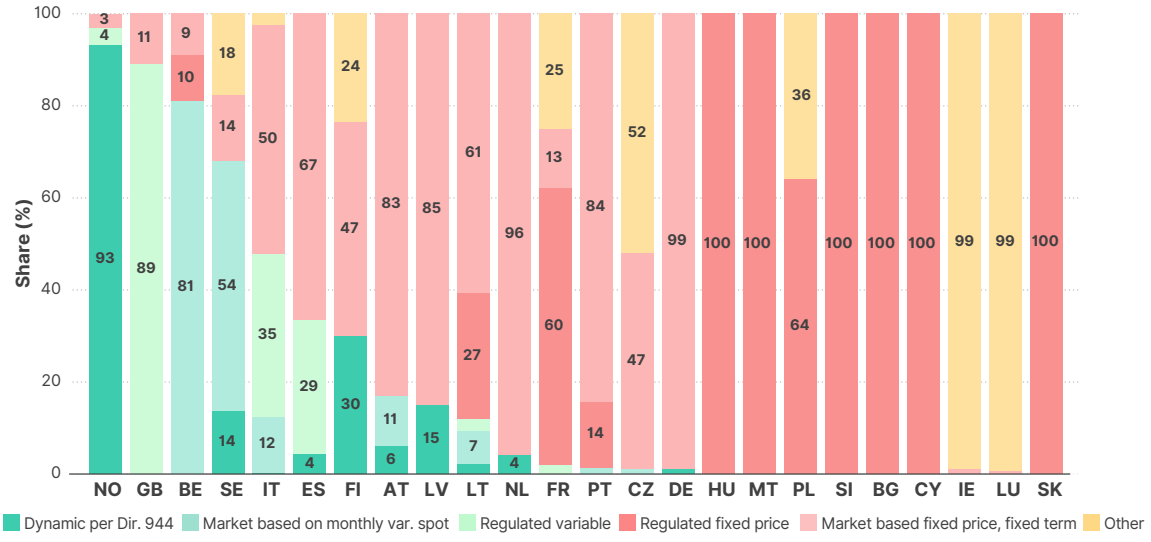
83 Article 11 of Directive (EU) 2019/944 requires that every final customer with a smart meter have the option to enter a dynamic-price contract with at least one electricity supplier, including any supplier serving over 200 000 final customers. Member States' regulatory frameworks should support the development of these contracts, as they are effective tools for large-scale flexibility. Such offers should be clearly communicated, and their benefits and risks highlighted, including potential cost savings and the individual contribution to supporting the electric system, to mitigate any undue concerns.

84 Based on NRA responses, household consumers in Austria, Belgium, Croatia, Czechia, Denmark, Estonia, Finland, Germany, Italy, Latvia, Lithuania, the Netherlands, Norway, Romania, Spain, Sweden, Slovakia, Slovenia and Great Britain have access to dynamic-price contracts[46]. It must be noted that while some NRAs report the availability of dynamic- price contracts, the roll-out of smart meters in Croatia, Czechia, Germany, Romania, and Slovakia have a smart meter roll-out rate below 30%. This indicates that the availability is not widespread. Despite an access to smart meters, consumers in Ireland, France, Malta and Portugal did not have access to dynamic-price contracts in 2023, as these were not offered to them.

85 Some Member States (Czechia[47], France, Cyprus, Lithuania, and Finland) have specified a significant uptake of contracts in the 'other' category. The definition of 'other' varies across Member States. The French NRA has stated that contracts under the 'other' label are in most cases explicitly indexed on results of the regulated access to incumbent nuclear electricity (ARENH) mechanism, which entitles suppliers to electricity generated by nuclear plants at a regulated wholesale price, infrastructure costs, or the market value of energy savings certificates, either cumulatively or not. They can be time of use or have a flexible component. In Ireland, 'other' refers to fixed-term contracts that are not fixed price for the term of the contract. In Finland, it refers to hybrid contracts. In Sweden, 18 percent of the uptake falls under the "other" category, out of which 7.5 percent is default contracts given to inactive customers. The rest consists of for example different types of hybrid contracts.

86 The analysis of household contractual uptake data shows that 73 % of households across the EU are subscribed to either a market-based fixed-price contract or a regulated fixed-price contract. This entails that, nearly three quarters of households in the EU have no incentive to participate in a flexible, consumer-responsive energy market.

Figure 12: Share of household contract uptake per Member State and in EEA member Norway and Great Britain (%)



NB: 'Dynamic per Dir. 2019/944' refers to dynamic pricing as per Directive (EU) 2019/944.

Source: ACER based on data provided by National Regulatory Authorities.

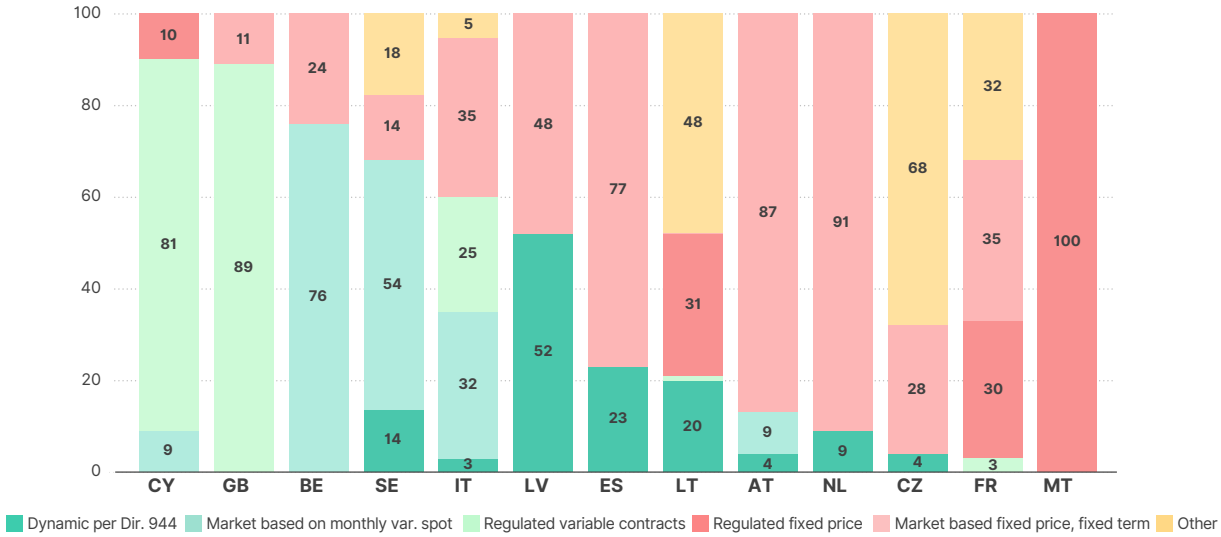
87 Figure 13 shows the uptake of non-household contracts across the EU and Great Britain. Concerningly, only 12 NRAs provided data regarding non-household contracts, showing that most NRAs may not be actively monitoring non-household markets. NRAs in Bulgaria, Croatia, Denmark, Estonia, Finland,

46 See Table Annex 3 for NRA responses on smart meter penetration and the availability of dynamic price contracts.

47 The Czech NRA has stated that 'other' in its case means market-based variable price of indefinite term.

Germany, Greece, Hungary, Ireland, Luxembourg, Poland, Portugal, Romania, Slovakia, Slovenia and Norway did not provide any data to ACER, indicating that they do not monitor the uptake of contracts in their respective markets. Given the need for more flexibility on the demand side, it is vital that NRAs possess an understanding of the contracts that consumers have entered. This will be necessary to drive any policy amendments aimed at changing consumption patterns and behaviour.

Figure 13: Share of non-household contract uptake per Member State and in EEA member Norway and Great Britain (%)



NB: 'Dynamic per Dir. 944' refers to dynamic pricing as per Directive (EU) 2019/944.

Source: ACER based on data provided by National Regulatory Authorities.

88 Dynamic contracts uptake may be correlated to the availability of renewable generation in the different national wholesale electricity markets. To assess that, Figure 14 shows the relationship between non-dispatchable renewable generation and household electricity consumption in the EU in 2023, with:

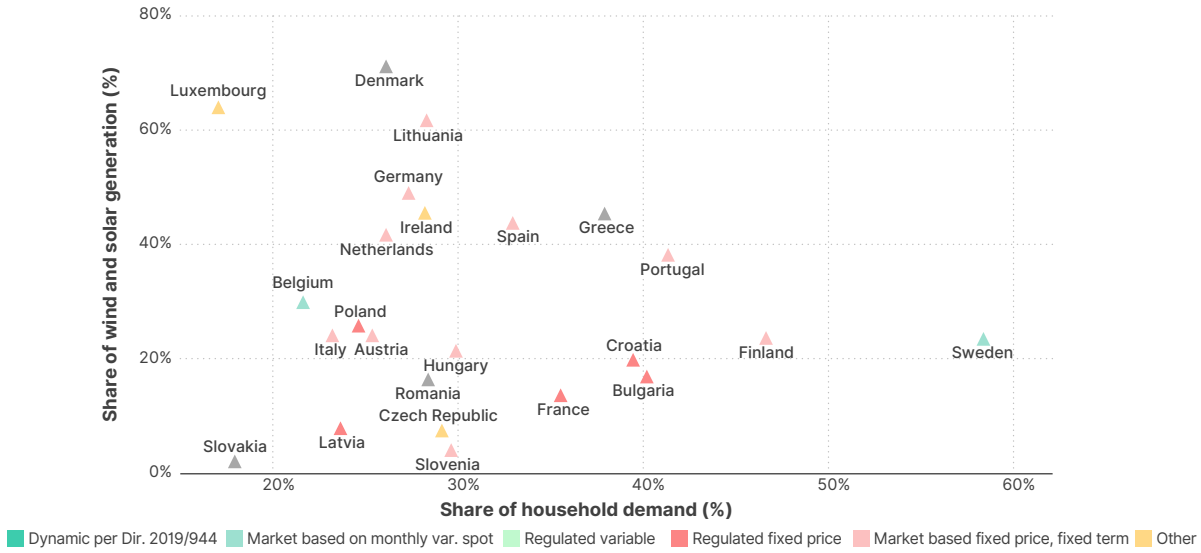
- high intermittent renewable generation being seen in Denmark (~ 70 %) and Lithuania (~ 60 %);
- medium intermittent renewable generation being seen Germany, Ireland, Greece, Spain and the Netherlands (above 40 %);
- low renewable generation being seen in Czechia, Latvia, Slovenia and Slovakia (< 10 %);
- high household consumption being seen in Sweden (~ 60 %), Finland (~ 45 %), Portugal (42 %), while the EU average is 30 %.

89 Figure 14 data points are colour-coded in accordance with the most common electricity pricing mechanisms used at household contracts in each national market. The predominant contract type is 'market-based fixed price, fixed term' (pink triangles), indicating a strong consumer preference for stable pricing.

90 High intermittent renewable energy generation in a Member State creates greater opportunities for consumers in that country to benefit from the uptake of dynamic contracts and demand response programmes. Although the share of intermittent generation is not the only driver of low and negative prices, it is a highly significant determinant of their occurrence. Therefore, consumers exhibiting flexibility in their demand practices in Member States with medium and high generation are likely to benefit greatly from switching to such contracts.

91 Countries with a high share of renewable energy may also face challenges in balancing supply and demand due to renewable energy variability. This indicates a need for more flexible pricing mechanisms and improved grid management to handle the fluctuations in renewable energy contributions and maintain a stable electricity supply.

Figure 14: Household demand as a share of total demand (%) (x-axis), share of wind and solar generation (%) (y-axis), and household contract type with the highest uptake per Member State – 2023



NB: 'Dynamic per Dir. 2019/944' refers to dynamic pricing as per Directive (EU) 2019/944.

Source: ACER, based on generation data from the Transparency Platform of the European Network of Transmission System Operators for Electricity and household demand and contract uptake data from National Regulatory Authorities.

2.2.3. Best practices for dynamic-price contracts

92 Dynamic-price contracts come with both potential risks and potential benefits to consumers, depending on their ability to adjust usage patterns. To maximise benefits and minimise risks, suppliers should establish effective communication systems, such as price alerts, to notify consumers when prices are high.

93 The following are proposals for best practice.

- **Signalling platforms and smart applications.** Suppliers should develop platforms and smartphone apps that alert consumers to high or low electricity prices. These tools are more effective when paired with smart appliances that automatically respond to price signals. National policies and subsidies could support the adoption of such appliances.
- **Reducing risk exposure.** In European Commission declared emergency crisis situations, contracts could be eligible for targeted governmental support. Suppliers could also offer insurance-like products with premiums to protect against extreme wholesale price spikes.
- **Time-differentiated network tariffs.** Network tariffs could include dynamic, time-differentiated elements. Charging more during peak times and less during off-peak times can enhance grid stability and defer the need for network reinforcements, ultimately reducing consumer costs. Spain and Finland are examples of countries experimenting with such tariffs.

94 **Moreover**, NRAs and distribution system operators (DSOs) should consider introducing dynamic network tariffs to benefit both the grid and consumers, which can then be also reflected in the dynamic price contracts.

95 Hybrid contracts combining real time pricing and time of use contracts offer a balanced alternative to fixed-price and purely dynamic-price contracts. They provide cost savings by allowing consumers to benefit from lower off-peak prices while maintaining predictability and stability with time of use rates. This approach encourages efficient energy use and mitigates the risk of price spikes, offering a flexible and financially stable option. For consumers, hybrid contracts represent an accessible introduction to dynamic pricing, combining the best aspects of both fixed and variable pricing models.

96 **Offer alternatives to dynamic-price contracts.** Suppliers in Estonia offer two dynamic-price contract types: 'combined' and 'exchange'. The 'exchange' type allows consumers to choose between real time pricing or time of use contracts, while the 'combined' type splits billing between real time pricing and time of use.

2.2.4. Contract case studies

97 This section contains three case studies that analyse the potential gains that can be achieved through dynamic price contracts for different types of consumers and pricing models and discusses relevant conditions and considerations for these contract uptakes.

Sweden – saving potential with dynamic contracts during the energy crisis

98 From 2021 to 2023, Swedish households with electric heating and dynamic hourly electricity price contracts saved significantly on annual costs. Compared with a weighted monthly average spot-price contract, they saved about 12 %. Compared with a 1-year fixed-price contract, savings were around 42 %. The savings were made because the consumers on a dynamic contract were flexible with their consumption.

99 In January 2021, nearly 60 % of Swedish households had contracts based on monthly average spot prices, 5–10 % had dynamic hourly contracts and 25 % had fixed-price contracts with terms of 1, 2 or 3 years. Retail prices, which had been low, began to rise in 2021 due to post-pandemic economic recovery, weather factors and reduced Russian natural gas supplies leading up to Russia's invasion of Ukraine. Prices peaked dramatically in 2022 and remained high until mid-2023.

100 Fixed-price contracts include a margin for future price expectations and risk. In 2021, households with 1-year fixed contracts in bidding zone SE4 paid less than those with dynamic contracts. However, in 2022 and 2023, dynamic hourly contracts were cheaper. Over the 3-year period, dynamic contracts proved to be the most cost-effective (see below).

101 These findings are based on an average household consumption profile with 23 000 kWh annual usage, assuming 30 % of consumption for electric heating could be shifted away from peak hours using automation.

Figure 15: Saving potential with a dynamic hourly contract compared with a fixed-price 1-year contract and monthly average spot-price contract for a household with an annual consumption of 23 000 kWh in bidding area SE4, 2021–2023

	2021	2022	2023	2021-2023
Annual cost of fixed-price 1-year contract signed 1 January (EUR)	1 610	4 943	9 181	15 734
Annual cost of monthly average spot-price contract (EUR)	2 913	4 858	2 582	10 353
Annual cost of hourly dynamic-price contract (EUR)	2 571	4 321	2 201	9 094
Saving with hourly dynamic-price contract compared with fixed-price 1-year contract (% of annual cost)	– 60 %	13 %	76 %	42 %
Saving with hourly dynamic-price contract compared with monthly average spot-price contract (% of annual cost)	12 %	11 %	15 %	12 %

102 During the energy crisis, many households faced significantly higher prices when their fixed-price contracts expired, prompting a shift to monthly average spot-based or dynamic hourly contracts for cost savings. By January 2024, only 5.2 % of households in SE4 had fixed-price contracts, while 64 % had monthly spot-based contracts and 13 % had dynamic hourly contracts.

103 Approximately 1.2 million single-family homes in Sweden use heat pumps and 175 000 have direct or water-borne electric heating. This widespread use of electric heating allows many households to reduce electricity costs by adapting to hourly retail prices.

104 Consumer flexibility not only lowers individual costs but also reduces overall electricity costs for society by mitigating price peaks and avoiding the need for costly grid capacity investments.

Demand-based and time-differentiated distribution network tariffs

105 Sweden is introducing demand-based and time-differentiated distribution network tariffs, which include a forward-looking component. These tariffs incentivise consumers to reduce electricity use during grid constraints, potentially delaying and reducing future grid reinforcement needs and lowering distribution costs.

106 However, this shift presents a challenge, as there are currently no readily available tools to help consumers adapt to these new tariffs and respond to retail electricity prices and other price signals.

Automation is key to optimising both heating and electric vehicle charging

107 Consumers can achieve significant savings by investing in smart thermostat technology that adjusts heating based on price signals. Many modern heat pumps have built-in smart functionalities, and devices are available to upgrade older models. However, most services focus only on dynamic hourly prices, not on distribution network tariffs.

108 The benefits of automation extend to electric vehicle owners, who can use smart chargers to charge during low-price periods. While the cost of these devices is not included in the analysis, they represent a valuable investment for optimising energy use.

109 Individual savings depend on consumption profiles, the ability to shift usage, bidding zones, price levels and price volatility.

Spain - Voluntary price for small consumers

110 This case study analyses the impact of consumer empowerment through modified consumption behaviours, focusing on aligning household electricity use with the cheapest hours under the voluntary price for small consumers (PVPC) dynamic pricing scheme. This approach benefits both the electrical system and consumers by maximising renewable energy use, reducing infrastructure needs, lowering CO2 emissions and cutting consumer bills.

111 The study compares the typical household bill under the PVPC contract, Spain's most common dynamic-price contract, with a bill adjusted to shift consumption to cheaper hours, while also estimating the reduction in CO2 emissions. Households with less than 10 kW of contracted power are eligible for PVPC, with over 98 % having hourly meters since the smart meter roll-out in 2018. Under PVPC, customers pay hourly prices from the day-ahead spot market and ancillary services, with additional energy costs. From 1 January 2024, these hourly prices included a basket of future products to reduce volatility. The PVPC also incorporates time of use contracts with three periods for energy and two for contracted power[48].

Approach and hypothesis

112 The analysis covers the entire year of 2023 for a typical household with a contracted power of 3.5 kW during both peak and off-peak hours. Two scenarios are considered:

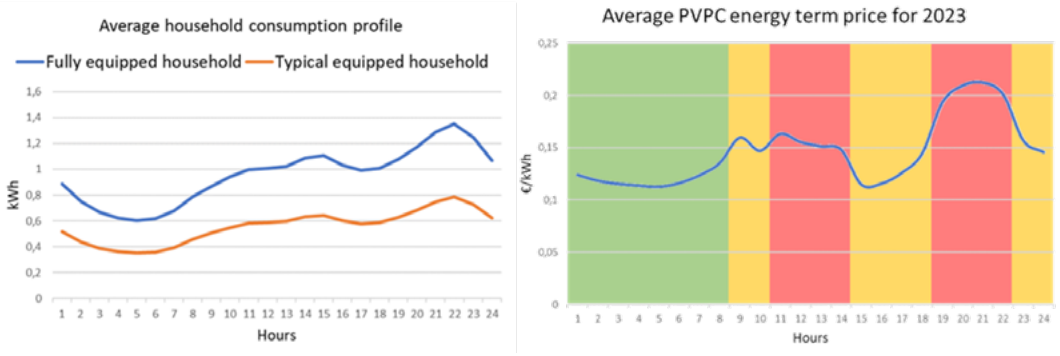
1. a fully equipped household, including all appliances and electricity services;
2. a typically equipped household, excluding fewer common services (independent freezers and space heating).

113 The resulting hourly consumption figures and PVPC hourly energy prices are shown in Figure 16[49].

48 Off-peak hours comprise early mornings on weekdays and whole weekends and national holidays.

49 The data on household electricity consumption were sourced from the Spanish government's Institute for the Diversification and Saving of Energy. Data from the SPAHOUSEC I study include the disaggregation of energy consumption by use and energy source, as well as the equipment characteristics by type of housing, at the national level and by climatic zone (https://www.idae.es/sites/default/files/estudios_informes_y_estadisticas/Informe_SPAHOUSEC_Basico_logo_Eurostat_negro_FINAL.pdf). Consumption by use was modelled based on the SECH-SPAHOUSEC I study and the Eurostat Manual for Statistics on Energy Consumption in Households (https://informesweb.idae.es/consumo-usos-residencial/informe.php). In addition, consumption was adjusted according to the system operator's load profiles. The system operator, Red Eléctrica de España, calculates the load profiles corresponding to the different network tariffs and publishes them online (https://www.ree.es/es/clientes/generador/gestion-medidas-electricas/consulta-perfiles-de-consumo). Households have the 2.0 TD network tariff, which applies to supplies with a power demand of up to 15 kW and low voltage supply.

Figure 16: Annual average Spanish household consumption profile and average PVPC energy term price for 2023



114 In addition, the analysis considers Spanish off-peak hours – cheaper prices during early mornings on weekdays, and all day on weekends and holidays. We identified which electricity loads in both scenarios could be easily shifted and to which hours. Consumption for each hour was adjusted proportionally based on the total shiftable load, as outlined in the table below.

Electricity use/ appliances	Hours to be shifted	Remarks
Washing machine	Weekends and holidays from 11:00 to 17:00	There is an assumption that this task can be shifted to weekends, when prices are the lowest.
Dishwasher	Every day from 14:00 to 17:00	As an everyday task, it is transferred to central hours.
Dryer	Weekends and holidays from 11:00 to 17:00	It must be aligned with the washing machine.
Water heating	Every day from 00:00 to 08:00 and from 14:00 to 17:00	The water heater is programmed to only heat in the early morning and 3 hours in the middle of the day, so hot water is available all day.
Space heating	It is used from January to March and from November to December Working days from 00:00 to 08:00 and from 14:00 to 18:00 Weekends and holidays from 00:00 to 08:00 and from 11:00 to 17:00	We assume that the space heating system can accumulate heat. We harness the better prices early in the morning on working days and the lower demand and prices during more hours in the middle of the day on weekends and holidays.

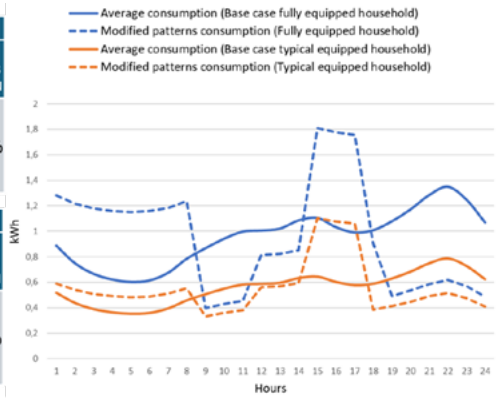
115 Finally, the impact on CO2 emissions was assessed by comparing emissions before and after the shifting of the loads, considering the hourly generation by technology and CO2 emission factors applied by the system operator, Red Eléctrica de España[50].

Results

116 The results presented below show that consumers with a PVPC contract could save 8 % to 11 % on their annual bills by changing their consumption patterns, depending on whether they have a fully equipped or typically equipped household. In addition, CO2 emissions would be reduced by 3 % for fully equipped households and by 6 % for typically equipped households.

FULLY EQUIPPED HOUSEHOLD					
BILL ITEM	BASE CASE COST (€)	MODIFIED PATTERNS COST (€)	ANNUAL SAVINGS AMOUNT (€)	ANNUAL SAVINGS %	CO_2 EMISSIONS REDUCTION
Energy term	1,270	1,109	161	13%	6%
Fixed term (power contracted)	94	94	0	0%	
Others	112	103	9	8%	
TOTAL	1,475	1,306	**169**	**11%**	

TYPICAL EQUIPPED HOUSEHOLD					
BILL ITEM	BASE CASE COST (€)	MODIFIED PATTERNS COST (€)	ANNUAL SAVINGS AMOUNT (€)	ANNUAL SAVINGS %	CO_2 EMISSIONS REDUCTION
Energy term	739	669	70	9%	3%
Fixed term (power contracted)	94	94	0	0%	
Others	82	78	4	5%	
TOTAL	915	841	**74**	**8%**	



NB: 'Others' includes supplier margin, social bond financing, metering equipment rental, electrical tax and VAT.

50 https://api.esios.ree.es/documents/580/download?locale=es.

117 A review of the modified consumption profiles, as shown above, indicates the elimination of the evening peak for household consumers and a potential alignment of increased consumption during central hours with the rise in solar energy generation. In fully equipped households, a new peak has emerged in the early morning off-peak hours, compensating for the global downwards demand trend.

118 In conclusion, empowered consumers can play a significant role in the energy transition by adjusting their consumption behaviours. By shifting loads to cheaper hours with dynamic electricity contracts, consumers support renewable energy integration, decarbonisation and reduced need for network infrastructure, while also lowering their electricity bills.

France – Tempo: stable variable pricing

119 EDF in France offers regulated-priced electricity supply contracts called regulated contracts for the sale of electricity (TRVE). These contracts have fixed-price grids that change in January and August. There are three versions:

- **a base version**, which offers a single price per megawatt hour, regardless of time or season;
- **a HPHC version**, which offers two prices per megawatt hour, one for peak hours and one for off-peak hours, without seasonal variation;
- **a 'Tempo' version**, with six prices per megawatt hour, differing by peak and off-peak hours across three defined seasons.

120 Tempo contract details are effective from 1 February 2024. The Tempo contract components are:

- **blue days**, with peak hours at EUR 160.9/MWh and off-peak at EUR 129.6/MWh;
- **white days**, with peak hours at EUR 189.4/MWh and off-peak at EUR 148.6/MWh;
- **red days**, with peak hours at EUR 756.2/MWh and off-peak at EUR 156.8/MWh.

121 Tempo peak hours are from 06:00 to 22:00. Annually, there are 300 blue days, 43 white days and 22 red days (from 1 November to 31 March, excluding weekends and holidays). The French transmission system operator, RTE, announces the colour to the consumer 1 day in advance. Customers receive notifications via text message, email and smart meters.

Pricing and regulation

122 Prices are set by the NRA (CRE) and reflect market supply costs averaged over the last 2 years. A 2020 decree set a minimum ratio of seven between the highest and lowest prices to encourage load shifting.

Consumer benefits and adoption

123 The Tempo contract incentivises load shifting with clear price signals, allowing short-term planning and long-term energy-efficiency investments. Its simple structure, with defined prices and colour-coded days, is more user-friendly than spot-based offers.

124 EDF reports a 23 % reduction in consumption on red days, with subscribers growing from 200 000 in 2022 to 500 000 in 2023.

125 However, voluntary uptake is low, at approximately 1.5 %. Therefore, while consumer reaction is positive, consumer participation is quite low.

Conclusion

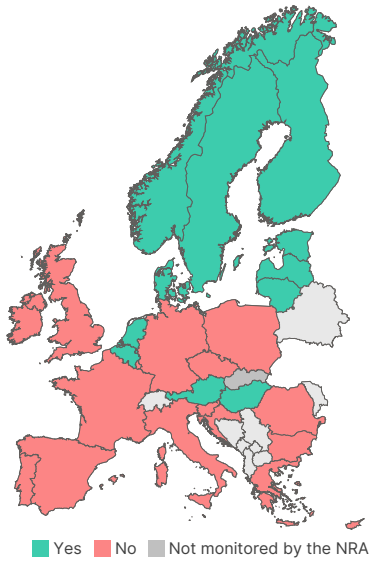
126 The Tempo version of TRVE suits consumers seeking limited exposure to price volatility. Its structured approach aims to balance load-shifting efficiency with consumer acceptability, supporting broader energy market goals. However, as the uptake is low, there may be merit in examining solutions to improve engagement from the consumer base.

2.3. Comparison tools

127 Comparison tools, mandated by Directive (EU) 2019/944, are essential for enabling consumers to easily compare retail electricity and gas prices and make informed decisions about energy offers and suppliers. However, only a few Member States – Belgium, Estonia, Lithuania, the Netherlands, Austria, Finland and Sweden – provide comparison tools that meet all legal requirements, such as independence from market participants, clear ownership indication, accurate and up-to-date information, market coverage and dynamic contract comparison.

128 In eight Member States, although smart meters are installed and dynamic contracts are offered, these contracts cannot yet be compared using any comparison tool, violating Article 14 of Directive (EU) 2019/944 (Figure 17). In the absence of comparison tools, consumers' ability to make informed decisions is significantly limited. Furthermore, as electric vehicles become more common, the need for flexible contracts and comprehensive comparison tools will become even more important.

Figure 17: Availability of price comparison tools able to compare dynamic contracts



Source: ACER based on data provided by National Regulatory Authorities.

129 The pricing variability present in dynamic contracts creates a challenge in comparing them against fixed-price contracts. In Member States these contracts are handled differently. Austria compares only the supplier's add-on. Estonia's tool uses average spot prices from the previous 2 months. Sweden's tool shows a price range from the cheapest to the most expensive hour of the previous month. In Spain, comparisons use real prices for billing periods or estimates for annual comparisons.

130 In 17 Member States, comparison tools are publicly operated. Estonia, Ireland and Croatia have trust-marked tools, but only Estonia's tool compares dynamic contracts and meets all requirements of Article 14 of Directive (EU) 2019/944.

131 Most Member States have separate tools for electricity and gas markets. Only Ireland, Spain, Italy, Austria and Portugal offer tools for dual offers[51].

132 In 2023, there were no gas market requirements equivalent to Article 14 of the Electricity directive. However, the Hydrogen and decarbonised gas market package introduces similar requirements for gas comparison tools, mirroring Article 14, except for the comparison of dynamic contracts. Altogether, 12 NRAs have reported that their gas market comparison tools already meet these requirements.

133 Electricity price comparison tools were available only in three EnC Contracting Parties in 2023- Albania, Bosnia and Herzegovina and North Macedonia.

51 A dual offer refers to a consumer entering a contract for the supply of both gas and electricity with a single supplier.

2.4. Data management: the use of a common reference model

134 Achieving the energy transition requires transforming Europe's energy system into one that is much smarter and more interactive than it is today. This transformation demands significant efforts in digitalisation to enhance energy and resource efficiency, drive decarbonisation, support electrification, integrate energy sectors and decentralise the energy system.

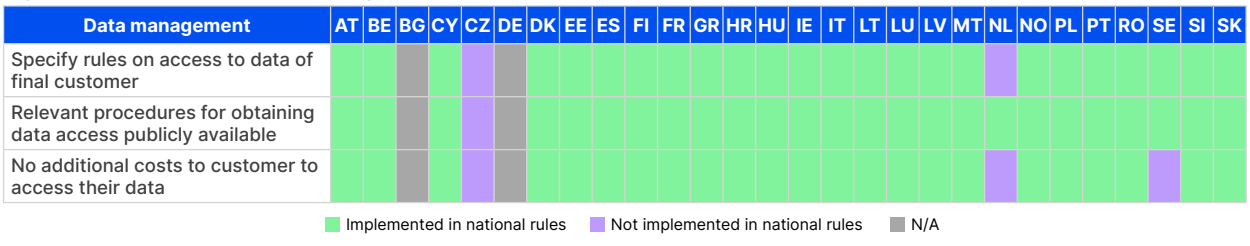
135 Data interoperability, cybersecurity, privacy and consumer empowerment have been underlined as cornerstones of EU digital and energy policies and papers[52]. Sharing data across the energy value chain and linking them with weather models, mobility patterns, financial services and geographical location systems through ever-more-powerful computing capacity will enable the development of innovative services at new levels of precision and adequacy.

136 Consumers are at the forefront of this change. Digitalisation will enable them, via innovative data-driven services, to actively manage their energy consumption and generation and benefit from direct participation in the market and energy communities. Digital inclusion should ensure that the most vulnerable citizens, those with low incomes and living in remote regions, have affordable access to new digital technologies and tools and are enabled to benefit from the digitalisation of the energy system.

137 To enable this change, the Electricity Directive requires that consumers and relevant parties have easy, unrestricted access to metering and consumption data, as well as the information needed for customer switching, demand response, and related services. Regardless of the data management model used, Member States must ensure efficient and secure access and exchange of data, protect data privacy and security, and provide final customers' data to any eligible party. Additionally, Member States must ensure that the procedures for accessing data are publicly available and that no extra fees are charged to customers for accessing or sharing their data.

138 Under this technological framework, suppliers and energy service companies will be able to develop open, efficient and cost-effective roll-out of demand response programmes supporting both price- and incentive-based demand response. For example, Drimpac[53] was a 3-year innovation action, funded by the EU, that aimed to create interoperability standards and communication protocols between the DSO and the end prosumer, enabling seamless demand response services in the residential and tertiary building domains. The ICT framework applied across four national markets in the EU – Germany, Spain, France and Cyprus, while acting as the aggregator, reports that collective demand response through a unified interoperability framework could lower individual energy bills by 20 %, driven by, among other things, a 15 % reduction in energy consumption[54].

Figure 18: Restrictions to accessing final customer data per Member State – 2022[55]



NB: (1) No information available for Bulgaria and Germany. (2) Cyprus has defined the requirements in its national rules; however, the regulatory decision has not been implemented yet. The NRA is going to publish a tender for the provision of consultancy services for the determination of the rules, including the definition of the eligible parties.

Source: ACER's barriers to demand response market monitoring report, based on data provided by National Regulatory Authorities.

139 The results of the Drimpac study underline that smart and digital energy infrastructure can bring immense benefits for consumers and market participants. In this context, ACER's barriers to demand response market monitoring report, as shown in Figure 18, reports that in 2022, most Member States had ensured that these requirements are part of national rules except for Czechia, Italy, the Netherlands and Sweden. Despite delays, in Sweden rules for data access have been available since 1 June 2023 with no additional costs to final customers, and the new Energy Act in the Netherlands is expected to further define the rules on access to final customer data.

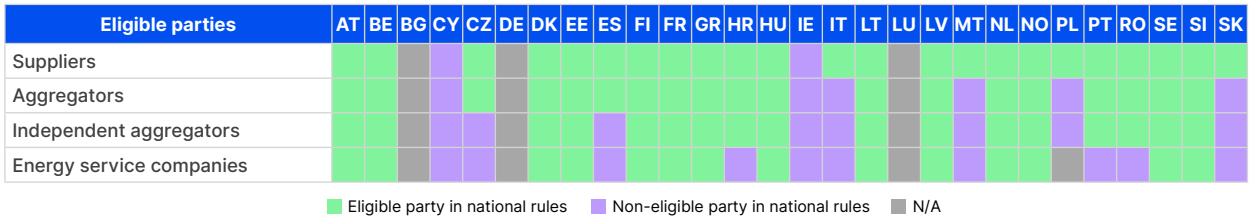
52 The EU action plan on digitalising the energy system; the 2030 digital decade policy programme; and Energy Transition Expertise Centre, Digitalisation of Energy Flexibility, 2022.

53 European Commission, 'Unified DR interoperability framework enabling market participation of active energy consumers', 2018.

54 Digitalising the energy system – EU action plan.

55 Since publication, relevant procedures for obtaining data acces are now publically available in Italy.

Figure 19: Parties eligible to access data of final customers per Member State – 2022



NB: (1) No information available for Bulgaria, Germany and Luxembourg. (2) The Cypriot NRA is going to publish a tender for the provision of consultancy services for the determination of the rules, including the definition of the eligible parties. (3) The Irish NRA is currently developing the Smart Meter Data Access Code, which will specify the rights of access to data of final customers. (4) By law, in Malta there is only one electricity supplier, which is also the DSO; thus, it has direct access to all final customers' data.

Source: ACER's barriers to demand response market monitoring report, based on data provided by National Regulatory Authorities.

140 As shown in Figure 19, in 2022 some Member States did not recognise aggregators, independent aggregators or energy service companies as eligible to access final customers' data based on their consent. Having access to final customer data subject to their consent is crucial for enabling new actors such as aggregators, independent aggregators and energy service companies to offer their services to final customers and promote explicit demand response or energy-efficient measures. To that end, in June 2023 the European Commission adopted a new implementing act to improve access to metering and consumption data[56]. The requirements and procedures implemented under this secondary legislation will ensure that data on metering and consumption in all Member States use one common reference model that should be in force from 5 January 2025.

2.5. Conclusions

141 Dynamic-price contracts can be beneficial if managed correctly, offering flexibility and potential savings for consumers. However, they require support systems providing information to consumers and consumer education to mitigate risks. Governments and regulators should ensure these contracts are fair, offer value for the price, and are beneficial, particularly during extraordinary circumstances, such as low energy prices, high energy prices and during security of supply events.

142 Suppliers should provide dynamic-price contract offers, which in turn should enable the offering of hybrid contracts to cater to different consumer behaviours and usage patterns. This approach is beneficial for consumers, as it allows them to take advantage of lower energy prices during off-peak times, ultimately reducing their overall energy costs. By aligning consumption with periods of lower demand and pricing, consumers can manage their energy expenses more effectively. Moreover, hybrid contracts can provide greater flexibility and customisation, ensuring that consumers have access to pricing structures that best suit their unique needs and usage patterns. This enhanced adaptability not only promotes cost savings but also supports more efficient energy consumption and a more responsive and resilient energy market.

143 Hybrid contracts offer significant benefits, but energy regulators need to carefully measure their impacts without limiting or favouring specific models. Enabling innovative business models will be crucial to their success. In addition, new approaches to price comparison and switching tools are necessary to effectively communicate the value of these contracts to consumers, since the value often lies more in consumers' ability to move load between hours.

144 The current energy market dynamics necessitate more flexible and innovative pricing models. Hybrid contracts provide a promising solution by blending fixed and variable pricing with additional benefits and protections, thus addressing the challenges posed by market volatility and offering consumers better options and protection.

145 However, the low uptake in many markets gives rise to concerns about the current outcomes observed in retail markets and the need for greater flexibility in the future. Consumer choice is not facilitated by contract offers, education and efficient tools (comparisons, platforms, etc). It is crucial that national energy regulators ensure that energy providers and system operators expand the range of available options and actively offer contracts and tools. Implementing educational campaigns to inform consumers about the advantages of (and how to unlock them) dynamic and hybrid pricing models and ensuring that regulatory policies support a diverse and competitive market seems also relevant. Conversely, the drawbacks of not adjusting demand should also be clearly outlined to the consumer. By doing so, consumer engagement can be better aligned with renewable energy availability.

56 Commission Implementing Regulation (EU) 2023/1162 on interoperability requirements and non-discriminatory and transparent procedures for access to metering and consumption data.

3. Retail electricity markets

146 This chapter provides insights into retail electricity markets, starting with electricity consumption trends across the EU, Norway, and Great Britain, helping readers understand shifts in energy demand following the energy crisis. It also examines recent changes in industrial and household electricity prices, highlighting the financial impacts on consumers within the broader context of the energy transition. Importantly, the chapter not only shows the prices paid by consumers but also breaks down the components of these prices, offering a clear understanding of what drives costs. Understandably, recent price increases have been driven by the energy component.

147 The analysis of nationwide suppliers emphasises their role in fostering market competition, which is crucial for driving innovation, improving pricing, and enhancing service offerings which ultimately bring benefits to consumers. Lastly, monitoring switching rates reveals the health of the market, with high rates indicating strong competition and low rates suggesting potential issues like market concentration or consumer disengagement. Readers should appreciate how these factors combine to create a flexible, competitive energy market that supports decarbonisation and consumer welfare.

148 As the EU transitions to more renewable energy sources, the need for flexibility in electricity markets is becoming increasingly important. Adapting to variable generational fuel mixes necessitates dynamic consumer engagement and responsive market mechanisms. This flexibility is essential for ensuring a stable energy supply, fair pricing and the ability to meet the diverse needs of all consumers, including the most vulnerable.

3.1. Consumption trends

149 Following the energy crisis, the importance of reducing energy demand has become a key consideration for Member States and for electricity and gas consumers. This section provides an overview of energy demand trends. Figure 20 provides an overview of electricity consumption trends in the EU, EEA member Norway and Great Britain in 2023 and a comparison with 2022 and 2021. Overall, in 20 countries there was a recorded decrease in electricity demand in 2023 compared with both 2022 and 2021. Four countries recorded an increase in demand in both periods.

1. Slovakia recorded a 53 % increase in demand between 2021 and 2023 and a 14 % increase between 2022 and 2023. Non-household demand was the main driver behind this change, increasing by 76 % and 19 %, respectively.

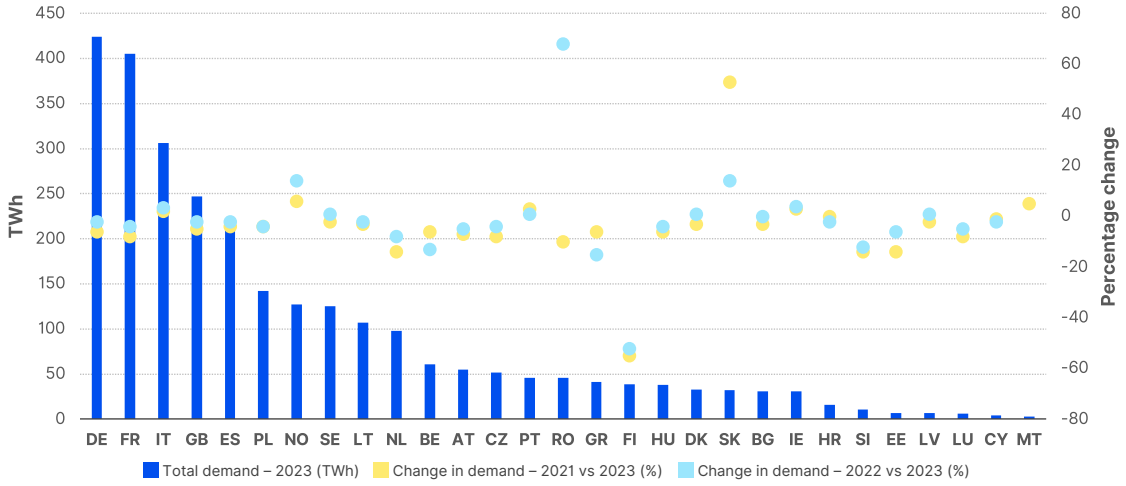
2. Norway exhibited a 6 % increase in demand between 2021 and 2023 and a 14 % increase between 2022 and 2023. Household demand increased 19 % year-on-year in 2023, returning to 2021 levels, highlighting the responsiveness and adaptability of consumers under real time pricing contracts.

3. Ireland demonstrated increases of 3 % between 2021 and 2023 and a further 4 % increase between 2022 and 2023. The increase in demand can be attributed to the expansion of data centres.

4. Portugal also showed an increase in demand, with a 3.0 % increase between 2021 and 2023 and a 1.0 % increase between 2022 and 2023, driven by a rise in household consumption.

150 Member States with regulated fixed prices contracts recorded on average a decrease of – 1.3 % in household demand between 2023 and 2022 and a – 4.8 % decrease between 2023 and 2021. In comparison, in Member States with no regulated fixed-price contracts, the reduction recorded was double this, at – 2.6 % between 2023 and 2022 and – 8.5 % between 2023 and 2021, indicating that consumers on market-based prices may be more reactive.

Figure 20: Total consumption of electricity consumers in Member States, Norway and Great Britain and demand change from 2023 and 2022 and 2023 and 2021.



Source: ACER calculations based on annual household and non-household demand data provided by National Regulatory Authorities. Where NRAs did not provide data, total demand data from Eurostat was used.

151 In the Energy Community Contracting Parties, electricity consumption also decreased in 2023 compared to the previous years. Table Annex 4 provides an overview of demand trends across them. While most of the EnC Contracting Parties recorded demand drops, two of them- Georgia and Kosovo*[57] registered slight increases between 2021 and 2023. Albania saw an increase in the period 2022 - 2023. The highest demand decrease was, as expected, in Ukraine- 33% between 2021 and 2023. In most cases, the decrease in industrial demand was much higher than that for households, clearly reflecting the greater elasticity of demand and less price intervention in this market segment.

3.2. Electricity prices

152 This section examines the recent industrial and household electricity price changes across European countries, highlighting the significant variations observed between 2023 and 2022. These price shifts are crucial to understanding the broader context of the energy transition and enablers of decarbonisation.

153 Figure 21 shows that final electricity prices[58] for EU households saw a notable increase in 2022, with average prices surging by a significant 17 % to 27 cents/kWh compared with 2021. This upwards trend continued in 2023, as household electricity prices rose by an additional 7.5 % to reach 29 cents/kWh. The consecutive yearly increases reflect the persistent challenges faced by household consumers in the EU, highlighting ongoing concerns about affordability and accessibility. To address this, Member States should ensure that support is targeted at consumers in need of assistance and rely less upon the use of untargeted regulated price intervention, as this hinders competition and can act as a barrier to flexibility.

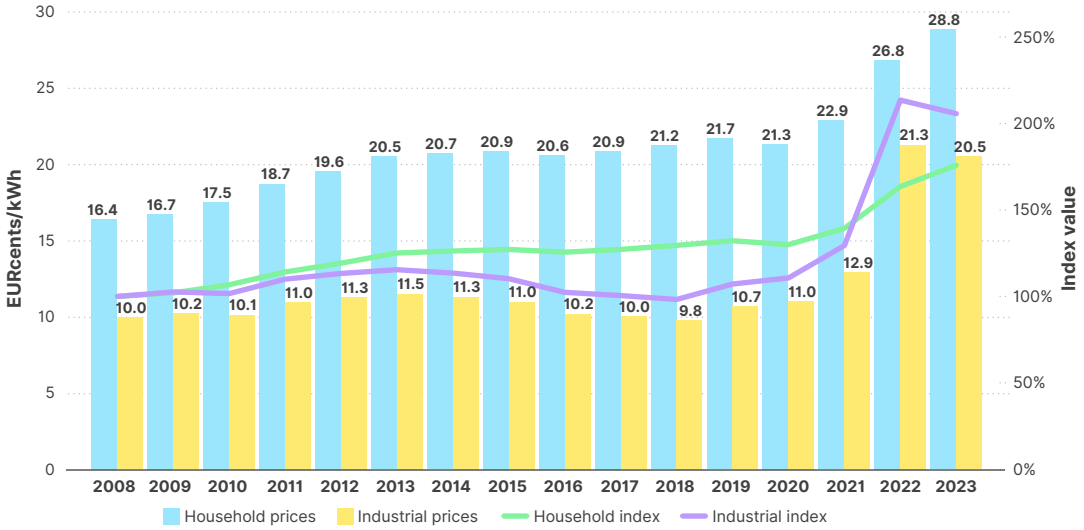
154 Meanwhile, industrial consumers experienced a slight decrease in electricity prices from 2022 to 2023, with prices dropping by approximately 3.7 % to 20.5 cents/kWh. This slight decrease follows the significant surge observed in 2022, indicating some stabilisation of industrial electricity prices.

155 A key observation is that, at the EU level, household energy prices were more closely aligned with non-household electricity prices in 2022 and 2023 compared to previous years. However, while non-household electricity prices decreased in response to wholesale price reductions, household electricity prices continued to rise.

57 Throughout this document, the symbol * refers to the following statement: This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Advisory Opinion on the Kosovo declaration of independence.

58 Final energy prices reflect the real costs incurred by consumers for energy consumption, including all taxes, levies, subsidies and allowances imposed on and received by the consumers.

Figure 21: Trends in final electricity prices for household and industrial consumers in the EU, 2008–2023 (cents/kWh and index change; 2008 = 100)



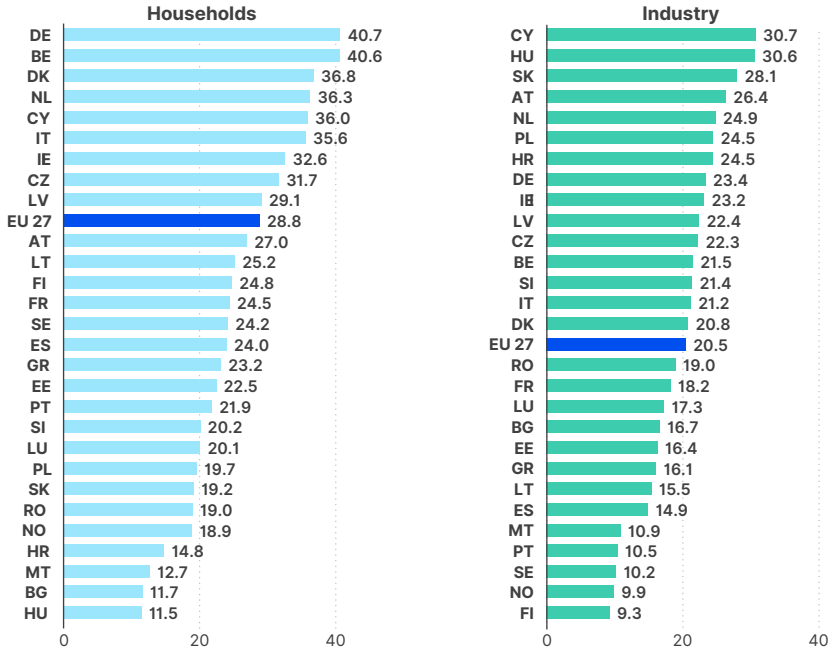
NB: The index change tracks the percentage change in nominal prices since 2008, where the base year equals 100 %.

Source: ACER calculations based on Eurostat data: Band DC, 2 500–5 000 kWh (household electricity consumption, nrg_pc_204), and Band IE, 20 000–70 000 MWh (industrial electricity consumption, nrg_pc_205); updated in July 2024.

156 Figure 22 compares electricity prices for households and industry in Member States and Norway in 2023. Belgium and Germany have the highest household electricity prices, exceeding 40 cents/kWh. For industrial electricity prices, Cyprus and Hungary lead, at over 30 cents/kWh. The EU average prices are 28.8 cents/kWh for households and 20.5 cents/kWh for industry, highlighting a significant difference in pricing between these two sectors across the region. The variation in electricity prices for households and industry across different European countries can be attributed to several factors, as follows.

- **Contract offers and contract uptake.** Countries with a higher proportion of consumers on fixed or regulated prices show less instances of price decreases in response to wholesale price decreases.
- **Energy mix.** Countries with a higher share of renewable energy or nuclear power may have different cost structures than those reliant on fossil fuels, affecting the overall electricity price.
- **Taxes and levies.** The level of taxes and levies imposed on electricity can vary significantly between countries. Some countries heavily tax electricity to support renewable energy initiatives or other policy goals, leading to higher end-user prices.
- **Market regulation and competition.** The degree of market liberalisation and competition among suppliers can influence prices. Countries with more competitive markets may have lower prices due to competitive pressure on suppliers to reduce costs.
- **Infrastructure costs.** Investments in grid infrastructure and maintenance can vary, affecting the cost recovery that utilities need to impose on consumers. Countries with ageing infrastructure or significant recent investments may pass these costs onto consumers.
- **Subsidies and support schemes.** Government subsidies for certain energy sources or support schemes for vulnerable consumers can impact the overall price structure. Countries with extensive subsidy programmes may have higher electricity prices or higher taxes to fund these initiatives.

Figure 22: Final electricity prices for households and industrial consumers in Member States and EEA member Norway in 2023 (cents/kWh)



Source: Eurostat, Band DC, 2 500–5 000 kWh (household electricity consumption, nrg_pc_204), and Band IE, 20 000–70 000 MWh (industrial electricity consumption nrg_pc_205); updated in July 2024.

157 Figure 23 indicates that household final electricity prices have generally risen across Europe, with some countries experiencing dramatic increases, particularly Czechia and the Netherlands. Short-term fluctuations are also evident, with Ireland showing a notable increase in the second half of 2023. These changes underscore the volatility and upwards trend in electricity pricing, driven by various factors, including market dynamics, regulatory changes and the removal of broader government interventions as a response to the energy crisis.

Figure 23: Change in final electricity prices for household consumers in Member States and EEA member Norway between 2019 and 2023 (%)

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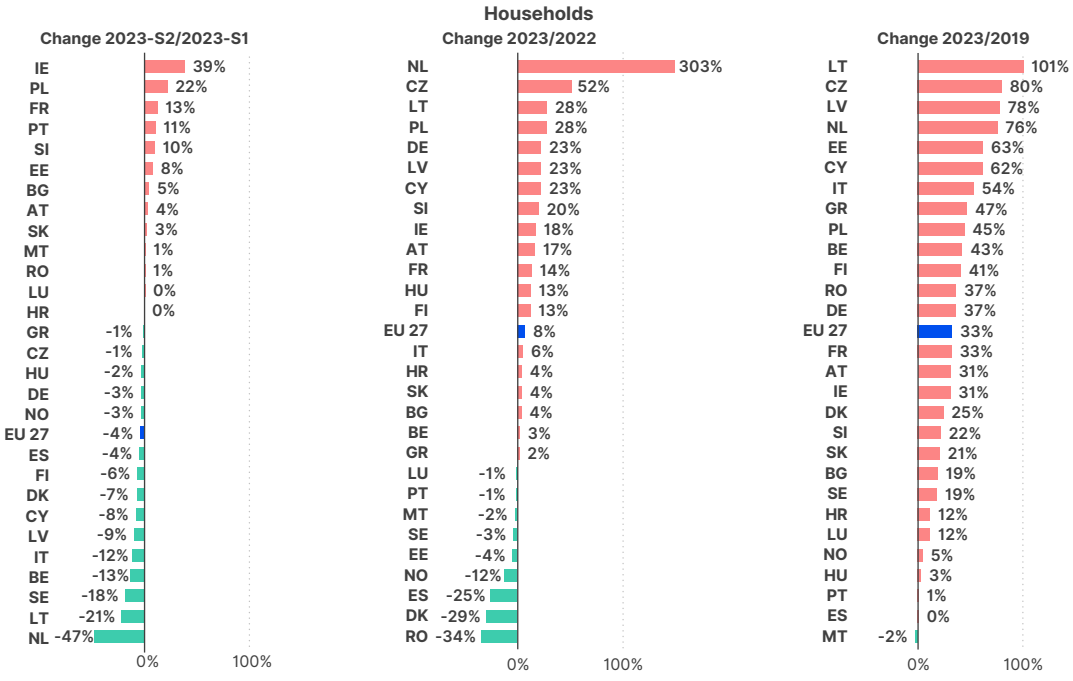
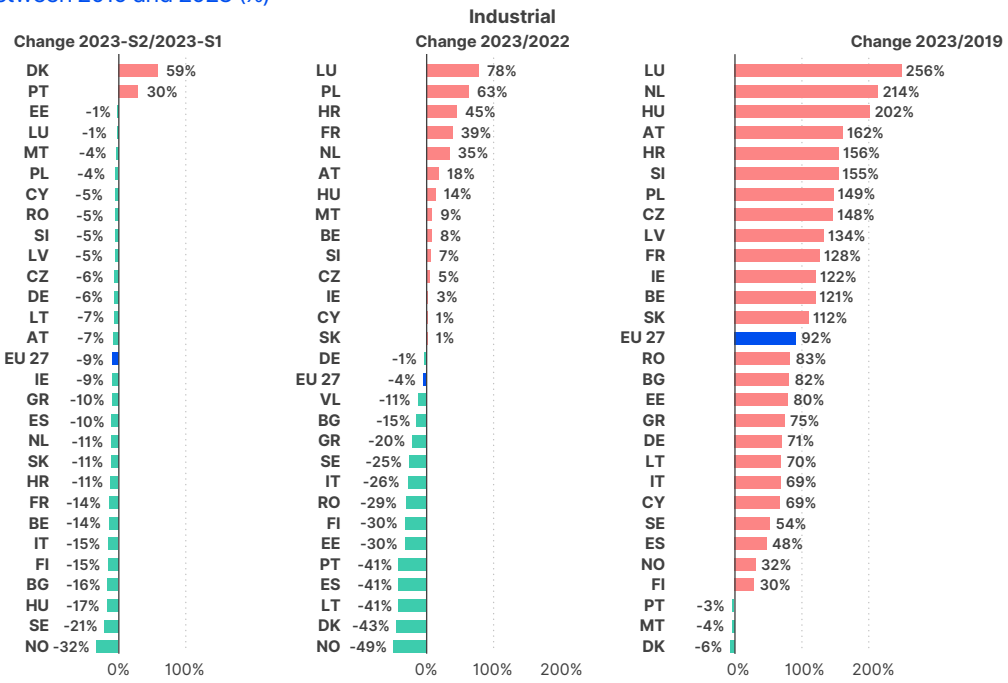


Source: ACER calculations based on Eurostat data: Band DC, 2 500–5 000 kWh (household electricity consumption, nrg_pc_204); updated in July 2024.

159 As seen in Figure 24, comparing 2022 to 2023 shows substantial variability in industrial electricity prices across Europe, with Luxembourg and Poland experiencing dramatic increases. This rise in prices can be attributed to several factors, including higher energy costs and/or increased demand. Conversely, some countries, such as Denmark and Norway, saw reductions, potentially due to falling wholesale prices. These variations highlight the dynamic nature of the industrial electricity market and the impact of different national policies and economic conditions.

Figure 24: Changes to final electricity prices for industrial consumers in Member States and EEA member Norway between 2019 and 2023 (%)



Source: ACER calculations based on Eurostat data: Band IE, 20 000–70 000 MWh (industrial electricity consumption, nrg_pc_205); updated in July 2024.

160 The significant fluctuations in electricity prices underscore the need for vigilant monitoring and adaptive policymaking. Encouragingly, some countries have seen falling prices, indicating progress and resilience in the energy markets. The recent energy crisis has provided valuable lessons on the vulnerabilities and strengths of these markets. It is essential to ensure continued monitoring of electricity prices to respond proactively to future challenges and opportunities. By learning from past experiences, policymakers and stakeholders can better support the energy transition, fostering a stable and equitable path towards decarbonisation while mitigating economic impacts on both industries and households.

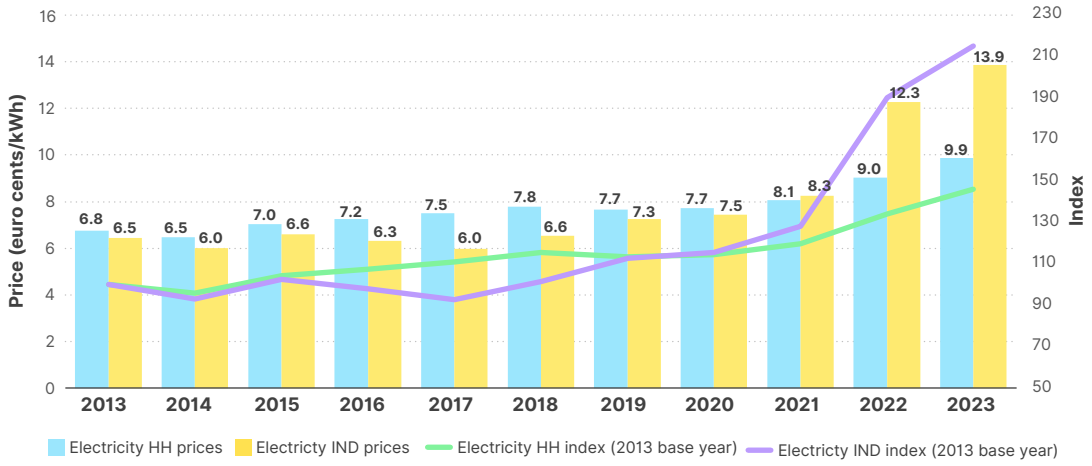
161 In the EnC Contracting Parties (excluding Ukraine[59]), final electricity prices for households rose by 9% from 9.02 to 9.86 cents/kWh between 2022 and 2023. Industrial prices increased by 13%, marking the third consecutive year that industry paid more on average than households. This difference in price trends is largely due to end-user price regulation for households in most EnC Contracting Parties.

162 Differences to EU average prices remain substantial: the average industry price in the EnC represented two thirds of the average EU price, while the average EU household price was almost three times higher than the average household price in the EnC.

163 Figure 25 compares electricity prices for households and industry in the EnC Contracting Parties in 2023. The highest household electricity price was registered in Moldova -16.33 cents/kWh, although it slightly decreased in comparison to 2022. The highest year-to-year increase in household prices was recorded in Serbia- almost 20%, leading to 10 cents/kWh. Kosovo* continues to have the lowest household electricity prices- 7.10 cents/kWh. In the industrial segment, the highest average price increased by 52% to reach almost 16 cents/kWh in Serbia. On the other side, the lowest industry price of 6.41 cents/kWh was registered in Montenegro.

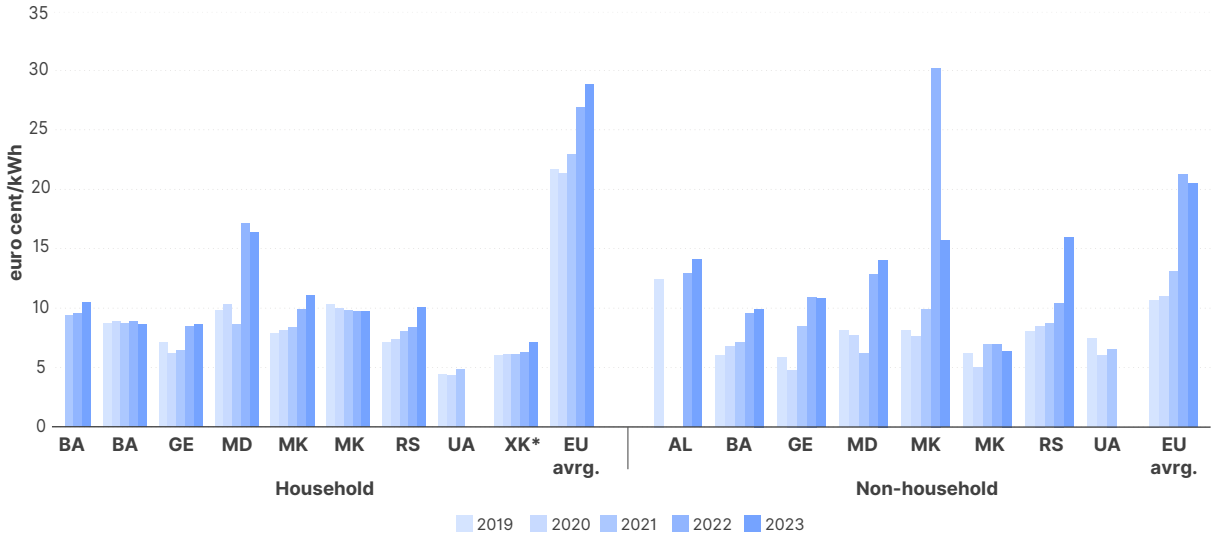
59 Due to martial law application, Ukrainian authorities do not provide data to EUROSTAT since 2022. Informal information indicates that there were some end-user price increases in 2023 for both market segments.

Figure 25: Trends in final electricity prices for household and industrial consumers in the EnC Contracting Parties, without Ukraine, 2013-2023 (cents/kWh and index change 2013=100)



Source: EnC Secretariat calculations based on EUROSTAT, Band DC:2500-5000 kWh (household electricity consumption) and Band IE: 20000-70000 MWh (industrial electricity consumption), August 2024.

Figure 26: Final electricity prices for households and industrial consumers in the EnC Contracting Parties - 2019 - 2023 (euro cents/kWh)



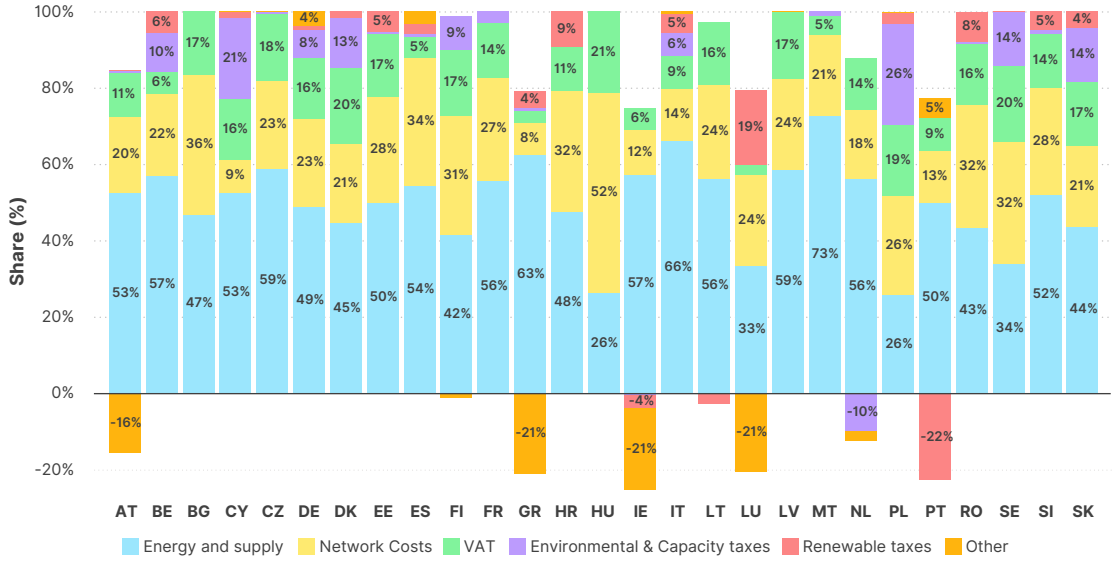
Source: EnC Secretariat calculations based on EUROSTAT.

3.2.1. Bill breakdown

164 Electricity and gas prices depend on their constituent components, which include energy costs, network charges, charges for renewable energy (known as RES charges), other taxes and charges, and value added tax (VAT). Information in this section has been obtained from Eurostat. As outlined by Eurostat, Member States must report national prices that are representative for the whole country.

165 Figure 27 shows that the composition of the final electricity bill for household consumers varies greatly across each Member State. As shown below, based on data provided by Member States to Eurostat, consumers in Ireland, Greece, Lithuania, Luxembourg, the Netherlands, Austria and Portugal had their bills subsidised significantly in response to the energy crisis.

Figure 27: Breakdown of the final electricity price for households in 2023 (%)

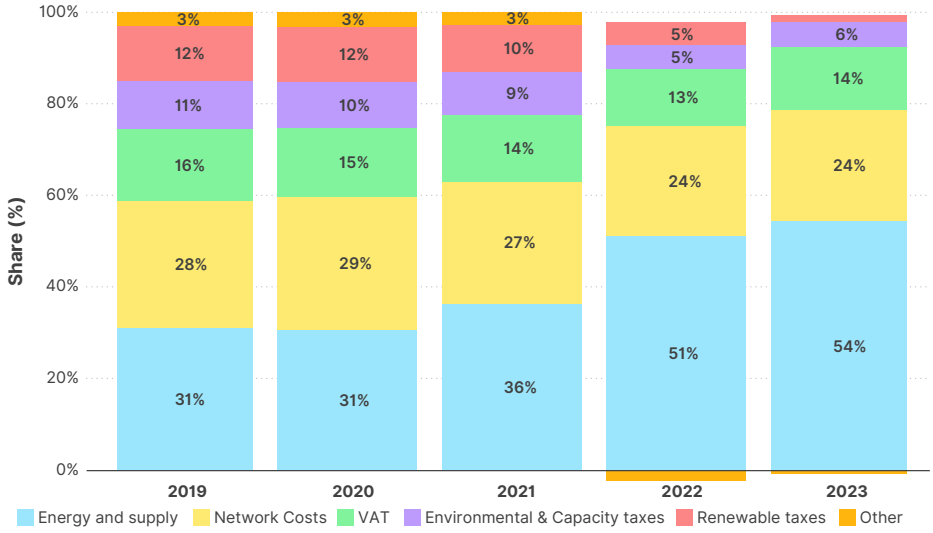


NB: Reference methodology and metadata used by Eurostat can be found here.

Source: ACER calculations based on Eurostat data: Band DC, 2 500–5 000 kWh (electricity price components, nrg_pc_204_c); updated in July 2024.

166 Figure 28 shows the breakdown of price evolution from 2019 to 2023. The EU-27-weighted average energy component increased in response to rising wholesale energy prices. It is this component that has driven the price increases borne by final consumers over the last 2 years. VAT and tax cuts were also implemented in response to the energy crisis to ease the burden on energy consumers.

Figure 28: Breakdown of the weighted average final electricity price for households in the EU-27, 2019–2023 (%)



NB: Reference methodology and metadata used by Eurostat can be found here.

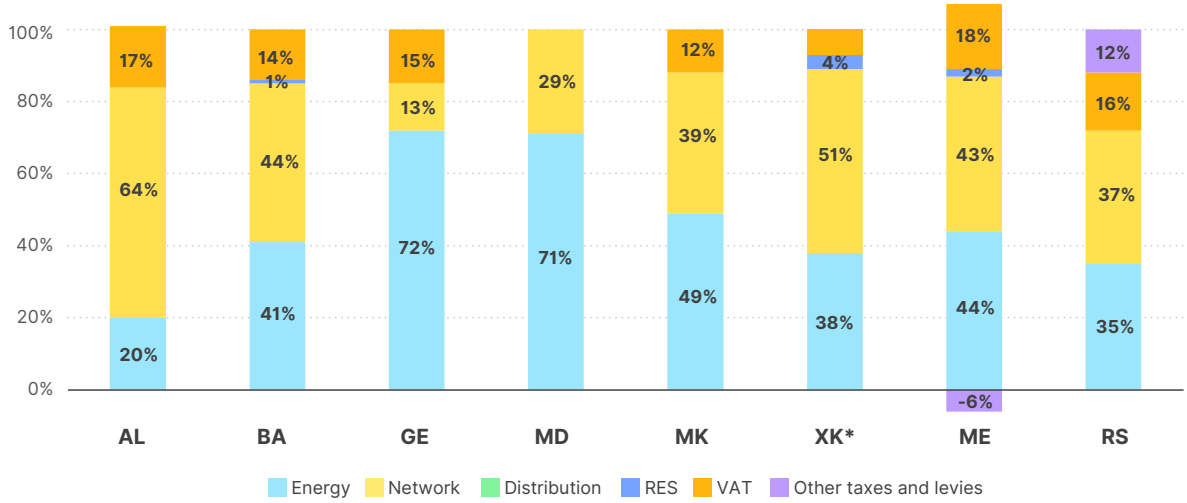
Source: ACER calculations based on Eurostat data: Band DC, 2 500–5 000 kWh (electricity price components, nrg_pc_204_c); updated in July 2024.

167 Figure 29 shows the breakdown of the final electricity price for households in the EnC Contracting Parties in 2023. The composition of this price varies greatly across these markets. The share of energy component is the highest in Georgia (72%) and Moldova (71%) and the lowest in Albania (20%). The share of network costs in the total electricity price for households ranged between 13% in Georgia to 64% in Albania.

168 For three EnC Contracting Parties- Bosnia and Herzegovina, Kosovo* and Montenegro, RES support is shown separately in the price structure. In North Macedonia, the RES charge is included in the energy component, while in Serbia, the category “other taxes and levies” comprises RES support, energy efficiency support and excise duty.

169 In comparison to the previous year, the share of energy component increased in Moldova, Kosovo* and Serbia. In North Macedonia, the VAT share increased i.e. returned to the pre-crisis level.

Figure 29: Breakdown of electricity prices for households in the EnC Contracting Parties in 2023 (in %)



Source: EnC Secretariat calculations based on EUROSTAT, Band DC, August 2024.

3.3. Retail suppliers and concentration

170 This section analyses active nationwide suppliers, defined as those offering contracts to household and/or non-household customers across the country and with at least one customer. Member States often record more country-specific suppliers than nationwide ones. Nationwide suppliers significantly influence switching dynamics and potential market share variations, and their entry–exit activity indicate the level of consumer choice and the options available in each national market. Competitive markets are crucial for fostering a flexible electricity consumer base by encouraging innovation, better pricing and improved service offerings, ultimately benefiting consumers.

171 It is important to note that a small number of suppliers may be driven by the relative size of a particular market. Smaller energy markets or even larger markets with specific conditions should not necessarily imply a competition problem if they have a low concentration level, low entry–exit barriers and low mark-ups. Thus, the number of suppliers alone is not a definitive indicator of market health. For a well-functioning retail energy market, new suppliers must be able to enter and compete. Further insights into the barriers to demand response and the dynamics affecting supplier entry can be found in ACER's barriers to demand response 2023 market monitoring report. However, it is not sufficient to look only at the number of nationwide suppliers, because their market penetration levels also matter.

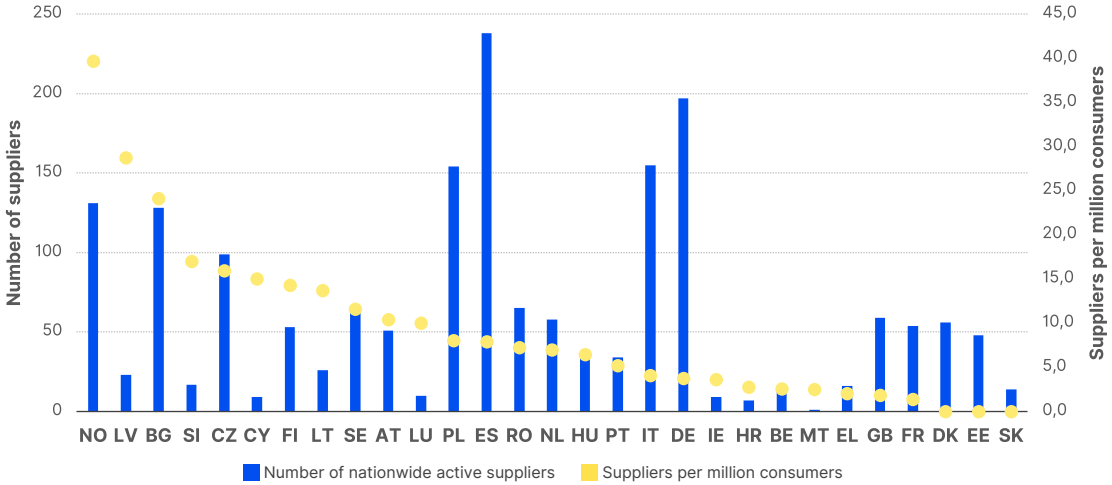
3.3.1. Supplier entry and exit

172 This analysis on supplier entries and exits reveals both growth and decline trends, emphasising the need for ongoing monitoring and adaptation within regulatory frameworks. Table Annex 5 presents the number of active nationwide suppliers and the total number of consumers in each Member State in 2023, along with the relative change in the number of active nationwide suppliers compared with the previous year and over the 5-year period 2019–2023.

173 In 2023, the largest number of nationwide suppliers were recorded in Spain, Germany and Italy. Regarding consumer choice, consumers in Norway and Latvia had the highest level of choice per consumer. Conversely, Malta and Croatia had the fewest suppliers, with one and seven, respectively. Significant customer bases were also observed in Great Britain, with 32.4 million customers, and France, with 39.7 million customers, highlighting the diversity in market sizes. The top 5 increases and decreases are highlighted in bold in the table below. Increases may show greater resilience in these markets, while decreases may still carry the impact of the energy crisis. Further analysis would be required to establish what effectively drives these developments[60].

60 See Table Annex 5 for more information.

Figure 30: Total number of active nationwide electricity suppliers and suppliers per one million consumers – 2023



Source: ACER based on data provided by National Regulatory Authorities.

174 The analysis of active nationwide suppliers and consumer numbers in 2023 reveals significant variability across European countries. Continued monitoring and adaptive policies are essential to address the challenges and opportunities within the European energy markets.

175 Among the EnC Contracting Parties, by far the greatest electricity market of Ukraine recorded 79 active supplier exits in 2023, related to the deteriorating economic situation. In Albania and Serbia, one supplier in each country left the market in 2023, while Kosovo* and North Macedonia registered each two market entries in the same year.

3.3.2. Market concentration of the electricity retail markets

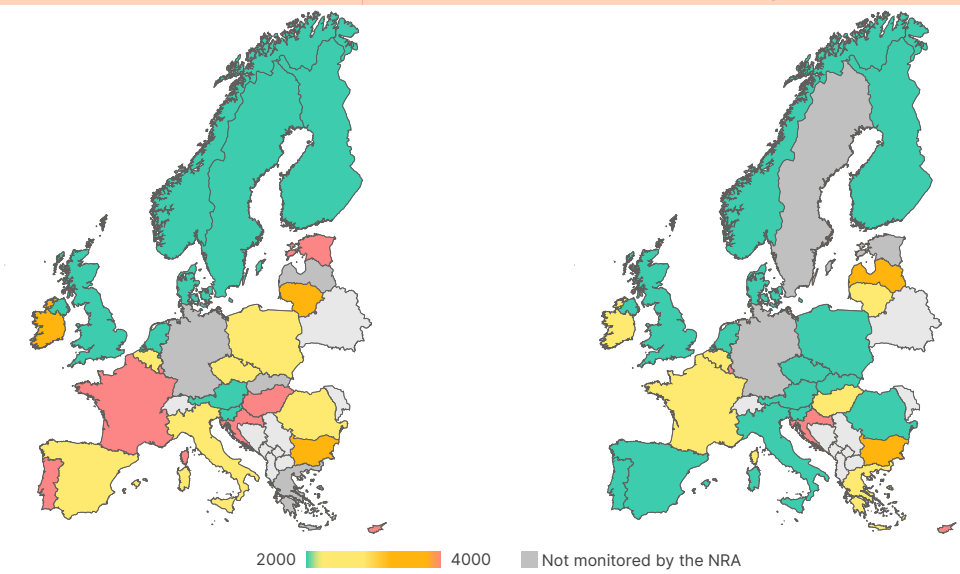
176 Market concentration is measured by market share, and the Herfindahl–Hirschman Index (HHI) score is commonly used, where a lower score indicates a competitive market and conversely, a high HHI the opposite[61].

177 In 2023, 7 out of 24 NRAs reported low concentration (HHI < 2 000), 10 reported high concentration (HHI 2 000–4 000) and 7 reported very high concentration levels (HHI > 4 000). The coloured map provides detailed information about these increases and decreases (Figure 31)[62].

61 The concentration ratio 3 (CR3) measures market concentration by the combined market share of the three largest suppliers in each Member State. Markets with a CR3 score of between 70 % and100 % are considered highly concentrated. Smaller Member States often have fewer suppliers and a higher CR3 level. HHI and CR3 values for the household electricity market in 2023, and compared with 2022 and 2019 by country, can be found in Table Annex 6.

62 Table Annex 7 presents HHI and concentration ratio of the three largest suppliers, called 'CR3' for the non-household electricity market in 2023, along with the relative change in the HHI compared with 2022 and over a 5-year period (2019–2023). Out of 26 respondent NRAs, 13 reported lower concentration levels (HHI < 2 000) in 2023, 9 reported high concentration levels (2 000 < HHI < 4 000) and 4 reported very high concentration levels (HHI > 4 000).

Figure 31: Herfindahl-Hirschman Index for the household (left) and non-household (right) electricity markets – 2023



NB: Table Annex 6 presents the numerical values for concentration ratio 3 (CR3) and the HHI for the household electricity market in 2023 and changes in HHI values compared with 2022 and 2019. Table Annex 7 presents the numerical values for CR3 and the HHI for the non-household electricity market in 2023 and changes in HHI values compared with 2022 and 2019[63].

Source: ACER based on data provided by National Regulatory Authorities.

178 The concentration trends between 2022 and 2023 are summarised as follows.

- Altogether, 13 countries reduced their concentration index in 2023, and between 2019 and 2023, the more significative concentration reductions were registered by Cyprus (– 1.299, – 13 %), Croatia (– 786, – 11 %) and France (– 414, – 13 %).

- In seven countries the concentration index in 2023 increased, with Hungary (+ 327, + 17 %), Poland (+ 300, + 19 %) and Slovenia (+ 131, + 11 %) standing out. During the 5-year period, the most significant increases were registered in Lithuania (+ 1.101, + 63 %), Denmark (+ 1.090, + 407 %) and Hungary (+ 594, + 35 %).

179 In 2023, only two NRAs of the EnC Contracting Parties reported the HHI indices lower than 2000 - Ukraine for both household and non-household market segments and North Macedonia for the non-household market part.

3.4. Vulnerable consumers and energy poverty

180 As the EU and the EnC transitions to a more sustainable energy system, addressing the needs of vulnerable consumers becomes increasingly crucial. These households often face higher energy costs relative to their income, making them more susceptible to energy poverty.

181 A definition[64] of vulnerable consumers is available in nearly all Member States, according to NRAs. Some Member States, such as Lithuania, Austria and Poland, define vulnerable consumers as households receiving specific social benefits. In most other Member States, vulnerable consumers are broadly defined with reference to their living conditions. In Finland, the definition of a vulnerable consumer is included in the constitution, from which the right to social security is derived. In Germany, a definition is set by social security law. It is important to note that non-household consumers are excluded from all (available) national definitions of vulnerability. NRAs in Bulgaria, Cyprus, Denmark, Estonia, Luxembourg

63 Because a limited number of suppliers offering nation-wide in Austria, incumbent suppliers often remaining dominant in their origin network area despite higher prices, relatively low switching rates and other reasons, it is the DSO network area which should be used as the most appropriate geographical market delineation of the electricity and gas household markets. Subsequently, HHI based on nation-wide market demarcation, as presented here, are flawed, and vastly overestimate the level of competition in Austria.

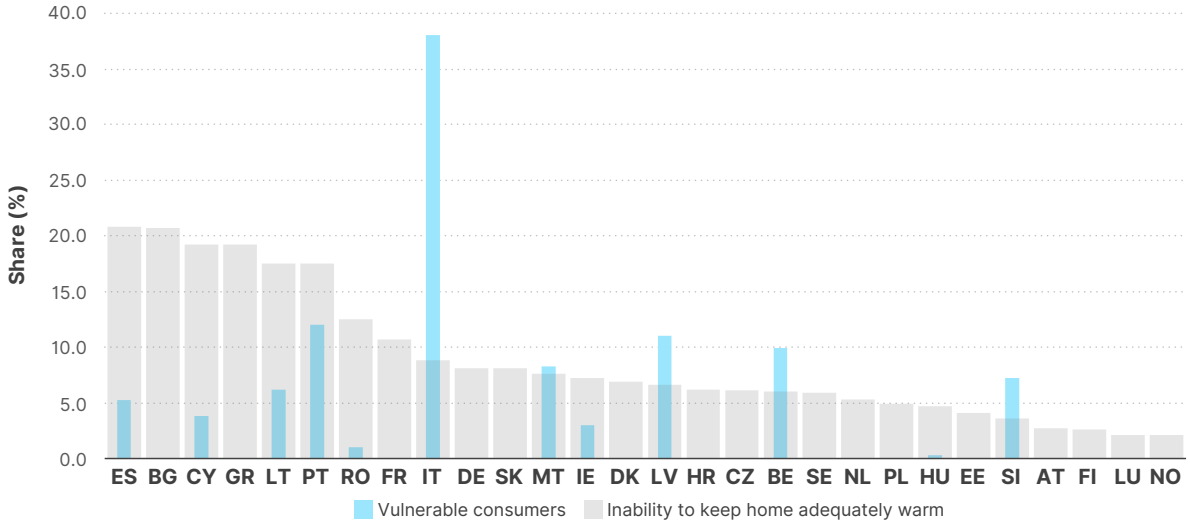
64 Article 28 of Directive (EU) 2019/944 mandates that Member States define the concept of vulnerable consumers, basing it on factors such as income level, share of energy expenditure relative to disposable income, home energy efficiency, critical dependence on electrical equipment for health reasons, and age. Regulation (EU) 2023/955, Article 2(10) specifies that vulnerable households include those in energy poverty or, within the context of the social climate fund, households significantly affected by the price impacts of including greenhouse gas emissions from buildings.

and Norway have not provided a legal definition of vulnerable consumers. Despite the widespread availability of (some) definitions, most NRAs were not able to provide any data on the percentage of vulnerable consumers (Figure 32).

182 The EU now offers a clear legal understanding on energy poverty:

- Directive (EU) 2023/1791, Article 2(1) defines energy poverty as "a household's lack of access to essential energy services, where such services provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing national social policy and other relevant national policies, caused by a combination of factors, including at least non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes".

Figure 32: Percentage of vulnerable consumers and energy-poor households in the EU, EEA member Norway and Great Britain – 2023



Source: ACER, based on energy-poor household data from Eurostat (EU Statistics on Income and Living Conditions) and vulnerable consumer data from National Regulatory Authorities.

183 National definitions of energy poverty exist in 11 countries, often linked to social benefits or broader living conditions. Only nine NRAs report involvement in addressing energy poverty, usually in an advisory role. Consequently, NRAs may not be comprehensive sources of definitions and measures related to energy poverty[65].

184 All EnC Contracting Parties have definitions of vulnerable customers in their legislation. Yet, similarly to the EU Members States, most EnC NRAs were not able to provide any data on the percentage of vulnerable consumers. Nevertheless, the following shares of vulnerable consumers were provided: Kosovo*-5%, Montenegro-6%, North Macedonia-1%, Serbia-5%[66]. Definitions of energy poverty exist only in three Contracting Parties (Moldova, North Macedonia and Serbia), however all of them propose policies and measures for their protection in their adopted or draft NECP.

3.5. Public price interventions in 2023

185 This section sets out the status of public price interventions in 2023. It provides information on interventions[67] in price setting for household and non-household customers in the electricity market.

186 Under Directive (EU) 2019/944, Member States may apply price interventions, including below cost, for the supply of electricity to energy-poor and vulnerable consumers. Equally, Member States may also

65 In Italy, in the absence of a national definition, energy-poor households are those eligible for public economic support under a government decree. Vulnerable customers include the energy poor and primarily households with members over 75 years old.

66 These shares refer to the number of consumers receiving support, rather than the number of consumers that would be entitled for subsidies.

67 'Price intervention' refers to the energy component of the energy customer's bill, which is a price subject to regulation or control by a public authority such as a government or an NRA.

apply price interventions for the supply of electricity to household customers and small and medium-sized enterprises for a transitional period. Both interventions are allowed subject to certain conditions and are accompanied by several measures.

187 The data provided highlight the prevalence and impact of these interventions across different European countries, for both household and non-household consumers. A table (Figure 33) summarises the main features of these measures.

188 Countries in which **100 % of households receive price interventions** are listed below, where the government plays a strong role in subsidising electricity prices.

- **Bulgaria and Cyprus.** 100 % of households receive price interventions. No data are available on non-households. No date has been set for the removal of these interventions.
- **Croatia and Czechia**. 100 % of both households and non-households receive interventions. These are scheduled to be removed in 2024.
- **Hungary.** 100 % of households and 30 % of non-households receive interventions. No date has been set for removal.
- **Poland.** 100 % of households receive interventions, with a removal date set for 2024.

189 These measures might be aimed at protecting consumers from market volatility and ensuring affordability yet have broader market implications on the ability of new players to enter and compete in the retail markets.

190 Countries in which **some households receive price interventions** are listed below in an alphabetic order. The level of interventions differs in this group, including whether countries have provided information about the removal date of the measures.

- **Estonia.** Only 7 % of households receive interventions. These are scheduled for removal in 2024.
- **France.** 61 % of households and 47 % of non-households receive interventions. No date has been set for the removal of these interventions.
- **Italy.** 29.1 % of households receive interventions, with a removal date set for 2024.
- **Lithuania.** 57 % of households and 13 % of non-households receive interventions in 2023.
- **Portugal.** 16.5 % of households and 2.9 % of non-households receive interventions, which will end in 2025.
- **Spain.** 29.26 % of households receive interventions. No date has been set for removal.
- **Great Britain:** 89 % of households receive interventions[68]. No date has been set for removal.

191 These countries have a more targeted approach, and the specific percentages suggest efforts to combine market dynamics with consumer protection.

192 Countries like **Latvia, Greece, Malta, and Slovenia** did not provide data. The lack of data makes it difficult to assess the level of public price interventions and indicates low levels of transparency on interventions.

193 **Price interventions shall be monitored closely** to understand:

- **Market distortion.** Extensive public price interventions can lead to market distortions, reducing incentives for energy efficiency and investment in renewable energy. It can also limit competition among suppliers.

68 Energy prices in Great Britain are regulated via an energy price cap that sets a limit on the unit rates and standing charges that energy suppliers can charge for their standard variable tariffs. The rate is set by Office of Gas and Electricity Markets, the UK energy regulator, and is reviewed four times a year.

- **Future trends.** The scheduled removal of interventions in countries such as Croatia, Italy, Lithuania and Portugal indicate a move to price liberalisation. A concern about consumer backlash on energy transition given high and volatile prices is a broader policy concern, where policies are used to create more stability.

- **Data transparency.** The variation in data availability highlights the need for improved transparency and increased reporting standards across Member States. Consistent and detailed data are crucial for assessing the effectiveness and impact of public price interventions.

- **Consumer protection.** Countries with a high level of public price interventions aim to protect consumers from high energy costs and market volatility. This is particularly important during economic crises or periods of high market instability.

Figure 33: Percentage of household and non-household consumers in receipt of price interventions – 2023

Country	Percentage in receipt - households	Percentage in receipt - non-households	Date for removal
Bulgaria	100	No data	No date
Cyprus	100	100	No date
Croatia	100	100	2024
Czechia	100	100	2024
Estonia	7	No data	2024
France	61	47	No date
Greece	100	100	2023
Hungary	100	30	No date
Italy	29.1	0	2024
Latvia	No data	No data	No date
Lithuania	57	13	2023
Malta	No data	No data	No date
Poland	100	0	2024
Portugal	16.5	2.9	2025
Romania	No data	No data	2025
Slovakia	No data	No data	No date
Slovenia	No data	No data	No date
Spain	29.3	0	No date
Great Britain	89	0	No date

Source: ACER based on data provided by National Regulatory Authorities.

194 In all EnC Contracting Parties except Montenegro, household electricity consumers are entitled to regulated end-user prices and, in 2023, all of them were supplied at these prices[69]. In the non-household market segment, most consumers were also protected in 2023. The percentages of non-households benefiting from price interventions range from almost 100% in Kosovo*, Moldova and Georgia, to 89% in Bosnia and Herzegovina, 80% in Ukraine, 72% in North Macedonia and 62% in Serbia[70]. The price interventions in North Macedonia and Ukraine were limited in time, to April 2023 and May 2024 respectively.

3.6. Switching rate

195 Monitoring the switching rate helps regulators understand market dynamics, the effectiveness of competition and areas needing intervention to protect consumer interests and promote a healthy,

69 In Serbia, 0.2% of households are supplied at non-regulated prices.

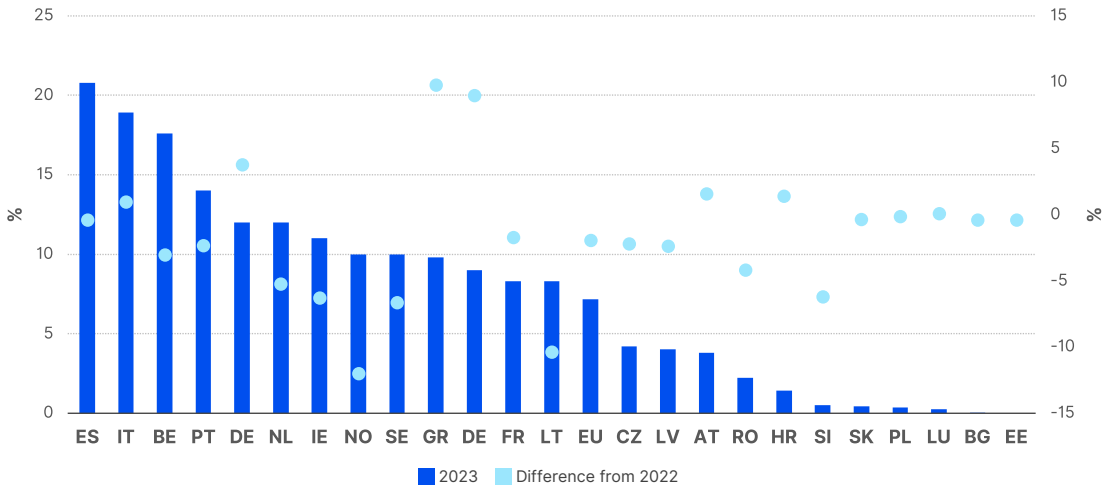
70 NRA of Albania did not provide this information.

competitive market. A high switching rate suggests a competitive market while a low switching rate can indicate market concentration, limited supplier options, or consumer inability to play an active role due to perceived risks or lack of trust.

3.6.1. Switching rate of household electricity consumers

196 The switching rate of household electricity consumers is measured by metering points. 2023 switching rates and the percentage change from 2022 are displayed in Figure 34.

Figure 34: Household consumer switching rate by metering points in 2023 and change in switching rate compared to 2022 (%)



Source: ACER based on data provided by National Regulatory Authorities.

197 The average switching rate of household electricity consumers was 7.15 %. In comparison with 2022 there was a decrease in average switching rate of almost 2 percentage points. 16 Member States registered a decrease in the switching rate compared with the previous year. Decreases in the switching rate can be attributed to the following reasons.

- Insecurity / lack of trust in the energy market suppliers following the energy crisis.
- Limited ability for electricity suppliers to provide alternative offers during the energy crisis which may have reduced the incentive for consumers to switch.
- Interventions in electricity price setting in 2023 can also dampen consumer motivation to switch suppliers by creating a perception of a false market stability and leading to the reduction of price variation among providers, limiting competition.

198 Particularly noticeable is the increase in switching rates of household electricity consumers in Germany from 3.80 percentage points to 12 % compared to 2022, due to a fall in retail electricity prices and despite the implemented price brake. Also, 2022 is an outlier year for supplier switching due to significantly limited supplier switching options and a sharp rise in retail electricity prices for new customers.

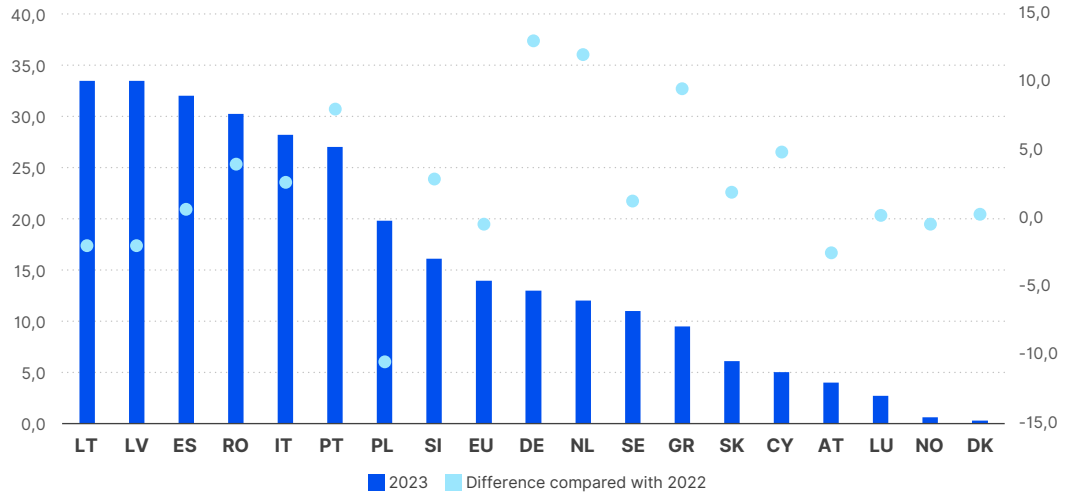
199 The switching rate of household consumers varies significantly among Member States. The following variations were observed:

- The share of households with dominant suppliers is 73 % in Member States where the switching rate is less than 10 %.
- The percentage of household customers receiving price interventions is lower in Member States where switching rates are higher than 10 % (> 10 %: 16.92 %; < 10 %: 65.63 %). Thus, price interventions play a significant role and reduce the incentive to switch suppliers.
- There are almost no regulated fixed-price contracts in Member States with a high switching rate and a significant number of offers.

3.6.2. Switching rate of non-household electricity consumers

200 The average switching rate of non-household electricity consumers in 2023 was 13.94 % (Figure 35). Thirteen Member States registered an increase in the switching rate compared to the previous year. Four Member States registered a decrease in supplier switching. Altogether, 10 NRAs did not provide any information for 2023.

Figure 35: Non-household consumer switching rates by eligible volume 2023 and change in switching rates from 2022



Source: ACER based on data provided by National Regulatory Authorities.

201 Overall, non-household consumers were slightly more active than household consumers, unsurprisingly and given the fact that the average electricity consumption of non-household consumers is higher leading to greater financial savings.

202 The external switching rate for non-household consumers varies significantly among Member States. The following are some reasons for these variations.

- **Market concentration.** In countries with a switching rate above 10 %, the three largest suppliers hold 54.17 % of the market share, compared with 78.05 % in countries with a lower switching rate.
- **Supplier availability.** Member States with a high switching rate have more nationwide suppliers, possibly offering a wider range of commercial options.

203 In the EnC Contracting Parties, there were only a few households switching their supplier in 2023. Namely, the switching rates were 0.02% in Serbia and 0.01% in North Macedonia, in other Contracting Parties 0%. In the non-household market segment, the highest switching rates were registered in North Macedonia- 16% and Serbia- 2,7%. For Ukraine, the NRA provided only the overall switching rate for all consumers for 2023, and it amounted to 0.39%. In Bosnia and Herzegovina and Kosovo*, four non-household consumers changed suppliers.

3.7. Spotlight on consumer rights and protection

204 This section touches upon billing practices, disconnection policies, supplier of last resort provisions and consumer complaints, allows evaluating the effectiveness and fairness of retail energy markets. Today's practices identify common challenges and emphasise the importance of the regulatory frameworks to protect consumer interests and promote transparency and reliability of energy supply.

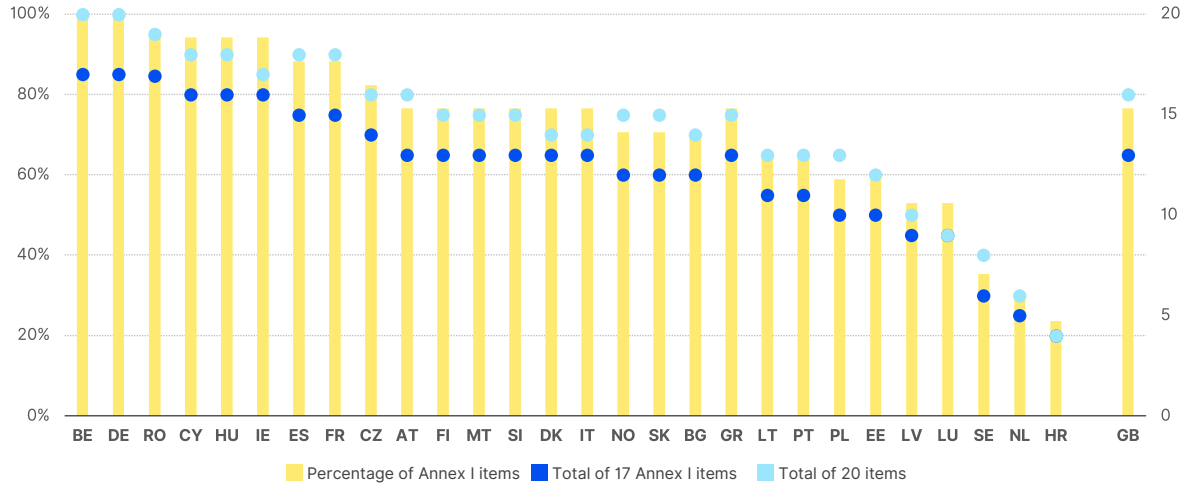
3.7.1. Billing

205 Energy bills are the main medium through which consumers receive information regarding their energy consumption. Annex I to Directive (EU) 2019/944 outlines the minimum information required on bills, including price, price breakdown, consumption and payment due date. Figure 36 shows that only a

few of the 17 required items consistently appear on bills across all countries – mainly the price and consumption details. Other required information, such as switching details, links to comparison tools and consumption comparisons, are less commonly found across the countries. Some national bills also include current prices, cancellation reminders and the type of consumption record (actual or estimated).

206 Only Belgium's, Germany's, and Romania's electricity bills contain all 17 items required by Directive (EU) 2019/944. Bills in Cyprus, Hungary, Ireland and Romania include 16 out of 17 items, while bills in France and Spain include 15. In contrast, Sweden (6 items), the Netherlands (5) and Croatia (4) fall significantly short of these requirements.

Figure 36: Billing information – 2023



NB: Information items in bold are required by Annex I to Directive (EU) 2019/944.

Source: ACER based on data provided by National Regulatory Authorities.

207 Billing frequency varies across Member States. Most household consumers in Czechia, Germany, the Netherlands and Austria receive annual bills. In 15 Member States[71], monthly billing is the most common. With the roll-out of smart meters, monthly billing is expected to become more widespread across Europe.

208 Billing issues represent the most common reason for consumer complaints in Member States where NRAs monitor household customer complaints. Billing accounted for the highest share of complaints in nine countries[72], while price accounted for the highest share in six countries. These complaint categories are often connected to one another. See section 3.7.4 for information on consumer complaints.

3.7.2. Disconnections

209 Disconnection of energy services occurs when consumers fail to pay their electricity or gas bills. This measure is usually a last resort to encourage payment and ensure the financial stability of utility providers. Most Member States implement a process involving multiple reminders and warnings to prevent premature disconnection and give consumers ample opportunity to settle overdue payments.

210 Most Member States use a two-step process to alert consumers to due payments. Disconnection times vary widely from 3 working days in Denmark, where only a final warning is issued, to 50 working days in the Netherlands, where a first reminder is sent 10 weeks before disconnection and a final warning 2 weeks before. In Belgium, there are at least 60 working days between the final warning and disconnection, while the full disconnection process takes significantly longer than that, sometimes years. In 15 Member States, EEA member Norway and Great Britain, the disconnection process lasts at least 20 working days, allowing households 4 weeks or more to settle their bills.

211 In general, disconnection rates for both electricity and gas are low across the EU. For electricity, Greece (3.8 %), Portugal (2.7 %), and Italy (2.5 %) recorded the highest percentage of disconnections in 2023. For gas, again, Greece (3.6 %), Portugal (3.5%) and Slovenia (2 %) recorded the highest levels of consumer disconnections.

71 Belgium, Bulgaria, Estonia, Spain, Greece, Croatia, Hungary, Lithuania, Latvia, Norway, Portugal, Romania, Sweden, Slovenia, and Slovakia.

72 Czechia, Ireland, Spain, Italy, Luxembourg, Austria, Poland, Portugal and Slovenia.

212 In Portugal, the relatively high electricity disconnection rate of 2.9% leads to 7% of all household complaints, the highest share among Member States. Notably, many NRAs have failed to provide disconnection rates, despite being required to monitor them under Directive (EU) 2019/944.

3.7.3. Supplier of last resort

213 Household consumers across Europe have access to a supplier of last resort (SOLR) for electricity, except in Malta. For gas, an SOLR is available everywhere except Bulgaria[73].

214 An SOLR typically serves as a safeguard against supplier or DSO failures, such as market exits due to business problems. In some Member States, an SOLR also protects inactive consumers or those with payment difficulties, creating a more nuanced system of consumer protection under the same label.

215 In 2023, an SOLR was hardly ever invoked in its function as a safeguard against supplier failure. Altogether, 11 electricity SOLR cases and one gas SOLR case were reported in Spain; an SOLR was invoked in other incidences only in its inactive consumer protection function.

216 The percentage of households with an SOLR varies significantly between 0 % and 100 % across the EU. In Cyprus, everyone is supplied by an SOLR because there is only one supplier active in the household electricity market. In Hungary (91 %), Ireland (52 %), Spain and Italy (both 29 %), however, households with an SOLR are widespread despite the existence of numerous electricity suppliers. In many other Member States, the percentage of consumers using an SOLR is very low, often below 1 %.

3.7.4. National regulatory authorities' monitoring of household complaints

217 NRAs monitor complaints by household customers[74] except where the Member State has delegated the task to another authority. In this case, the information resulting from the monitoring is made available to the regulatory authority as soon as possible. Only Denmark and France have delegated this role to a non-NRA. Altogether, 26 NRAs report that they are fulfilling this obligation.

218 The sources that NRAs use for monitoring varies across Europe. All NRAs, except Denmark and France, use data on complaints sent by household consumers directly to the NRA, nine use complaint data from other public bodies, such as alternative dispute resolution bodies or ombudsmen[75], and 14 report that they have access to and monitor data on complaints received by suppliers and/or DSOs[76].

219 It is only in Belgium, Greece, Spain, Cyprus, Luxembourg, Malta and Austria where the NRA uses all the abovementioned sources.

What do European household electricity customers complain about?

220 Figure 37 shows that billing and price were the most common reasons for complaints in the European electricity market in 2023. Billing accounted for the largest share of complaints in eight countries, while price was the main issue in six countries out of the 22 where the NRA was able to report complaint data.

221 However, the number of complaints tracked by NRAs varies significantly between countries, ranging from just 14 in Cyprus and 20 in Finland to 959,245 in Spain. These differences can be attributed partly to varying numbers of customers and differing methods of handling and registering complaints.

222 NRAs in Denmark, Germany, Greece, Malta, the Netherlands, Norway and Great Britain did not report any data on household electricity customer complaints.

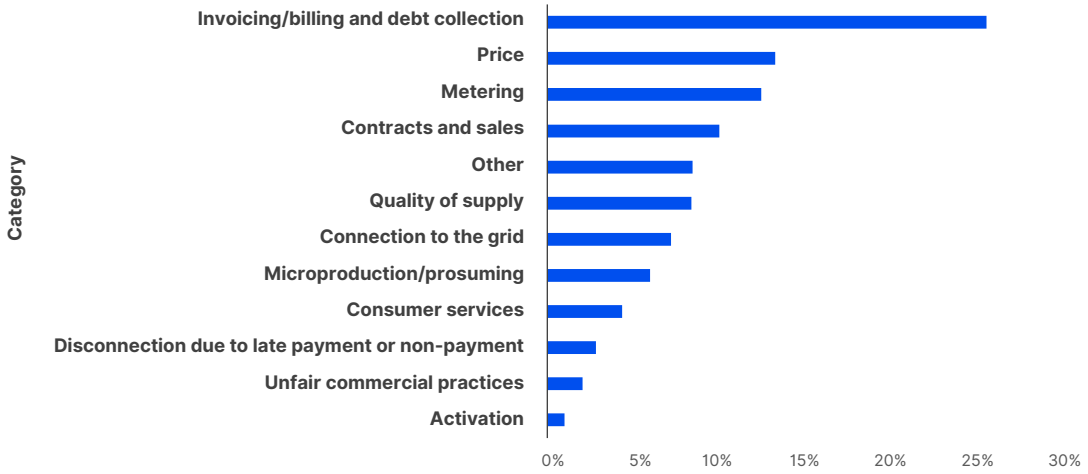
73 This system ensures that consumers have a safety net in case their current energy supplier fails or exits the market.

74 Article 59(o) of Directive (EU) 2019/944.

75 Estonia, Ireland, Greece, Spain, Cyprus, Luxembourg, Malta, Austria and Poland.

76 Bulgaria, Ireland, Greece, Spain, Croatia, Italy, Cyprus, Lithuania, Luxembourg, Hungary, Malta, Portugal, Slovenia and Slovakia.

Figure 37: Average EU share of household electricity consumer complaints reported by NRAs in 21 Member States in 2023 (%)



NB: Table Annex 8 contains the total number of complaints received by National Regulatory Authorities and the share of the most popular complaint category by country.

Source: ACER based on data provided by National Regulatory Authorities.

3.8. Conclusions

223 Electricity demand across Europe has generally declined from 2021 to 2023, particularly in households, while the non-household sector shows mixed results due to energy efficiency, economic activity, and policy shifts.

224 Retail electricity prices have dropped since late 2022, driven by lower wholesale costs. However, the removal of broad energy supports might lead to higher prices for some consumers in 2024, highlighting the need for targeted assistance that protects the most vulnerable without burdening state finances.

225 Public price interventions, though essential in times of crisis, risk distorting markets and could hinder the progress of decarbonisation efforts. As these interventions are scaled back in favour of market-driven approaches, there's a need for social policy measures to protect consumers and maintain fair competition at national level. Over-reliance on such interventions can create market imbalances, discourage innovation, and slow down the transition to a more sustainable energy system.

226 Inconsistent data on vulnerable households underscores the need for better monitoring by regulators, particularly during crises, to develop effective policies that support those most in need and address energy poverty.

227 Differences in switching rates between households and non-households reveal varying levels of market engagement. Non-households switch more often due to higher energy usage and savings potential, while households switch less frequently, often due to limited options and trust issues. These patterns are crucial for understanding how to improve market competition and consumer benefits.

228 In summary, while public interventions have provided necessary protection, they must be carefully managed to avoid market distortions that could impede decarbonisation. A balanced approach that supports market liberalisation, robust regulation, and consumer protection is essential for a sustainable energy transition.

4. Gas markets and decarbonisation

4.1. Introduction

229 The EU is shifting towards electrifying its energy system while anticipating a significant reduction in natural gas consumption. However, replacing gas is challenging, as it currently meets twice the energy needs compared to electricity and costs less in terms of nominal energy and transport. Despite this shift, the increased use of renewable and decarbonised gases will ensure gas remains relevant in the energy mix.

230 This chapter offers an overview of the retail gas market in 2023, comparing the evolution of selected market health and price metrics over time. The chapter then discusses ways the gas sector can contribute to the overall decarbonisation goals and the challenges ahead.

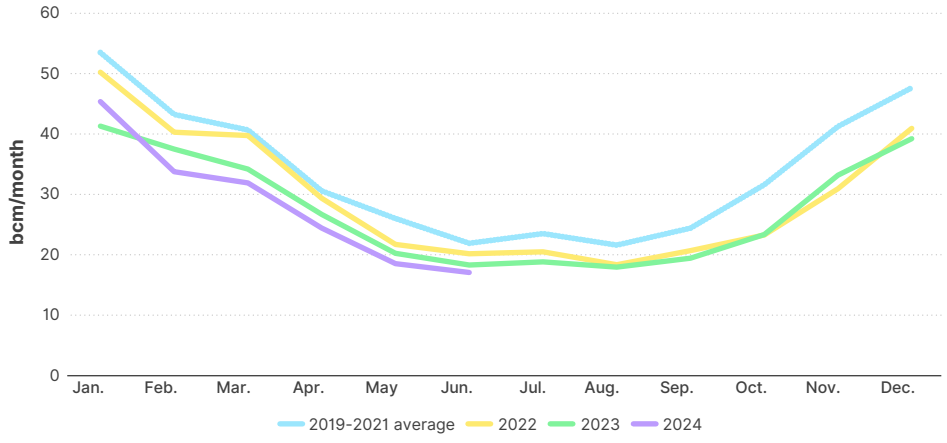
4.2. Gas consumption and gas prices

4.2.1. Consumption trends

231 EU gas consumption continued to drop in 2023 to below the level observed in 2022[77] (a further 8 % year-on-year drop in 2023 relative to 2022, and a 22 % drop in comparison to the 2019–2021 average; see Figure 38). Benign weather conditions, stagnant economic activity and growth in low-carbon electricity generation were some of the main factors that kept demand falling.

232 When focusing on household consumption, the largest drops in gas consumption occurred in winter 2022/2023 and winter 2023/2024. The drops were the result of gradually increasing supply costs reaching supply contracts, seasonality in heating demand (larger consumed volumes resulting in larger expenditure and hence triggering adaptive measures) and enhanced public attention to the need to save energy. It is important to note that the trend of low aggregate gas consumption continued in 2023 even as wholesale prices gradually fell[78]. Despite this, industrial consumption partly recovered in the first quarter of 2024 relative to the first quarter of 2023 in certain Member States, amid more competitive prices.

Figure 38: Evolution of monthly EU-27 gas demand – 2019–2021 average versus 2022, 2023 and 2024 (bcm)



Source: ACER, based on Eurostat data (nrg_cb_gasm).

233 Variations in Member States' yearly demand reflected heterogeneous local dynamics. Relevant factors are the size of the gas-intensive industry, penetration of gas-fired plants in the individual market's power systems, actual retail price level and weather patterns. Final gas demand dropped in 22 out of 27 Member States in 2023[79]. The largest decrease in demand, relative to the 2019–2021 average,

77 In 2022, final EU gas consumption dropped by over 50 bcm, marking a historical 14 % year-on-year decrease. The decline was primarily driven by soaring gas prices, which impacted industrial and household consumption and prompted demand destruction, as well as offering incentives to invest in efficiency measures.

78 All three demand sectors – household, industrial and gas for power generation – experienced year-on-year decreases, ranging from 7 % to 10 % in 2023, relative to 2022.

79 Final gas demand increased only in Croatia, Malta, Poland, Finland and Sweden.

was registered in Member States where gas consumption by industries and households is significantly driven by colder weather: the Baltic and Nordic markets (– 33 % on average), the Netherlands (– 28 %) and Luxembourg (– 26 %).

234 Gas consumption in the EnC Contracting Parties also decreased in the period between 2021 and 2023, with the biggest drops of around 43% in Moldova and 30% in Ukraine. While the demand drop in Ukraine is a consequence of Russian aggression, Moldovan demand decrease was due to substantial price increases. On the other side, Georgian consumers increased their gas consumption in the same period because of the neglectable changes in gas prices in the country.

4.2.2. Gas prices

235 Average gas retail prices in the EU remained higher in 2023 than in 2022, despite the significant decrease registered in wholesale gas prices since their summer 2022 peaks. This discrepancy can be attributed to several factors.

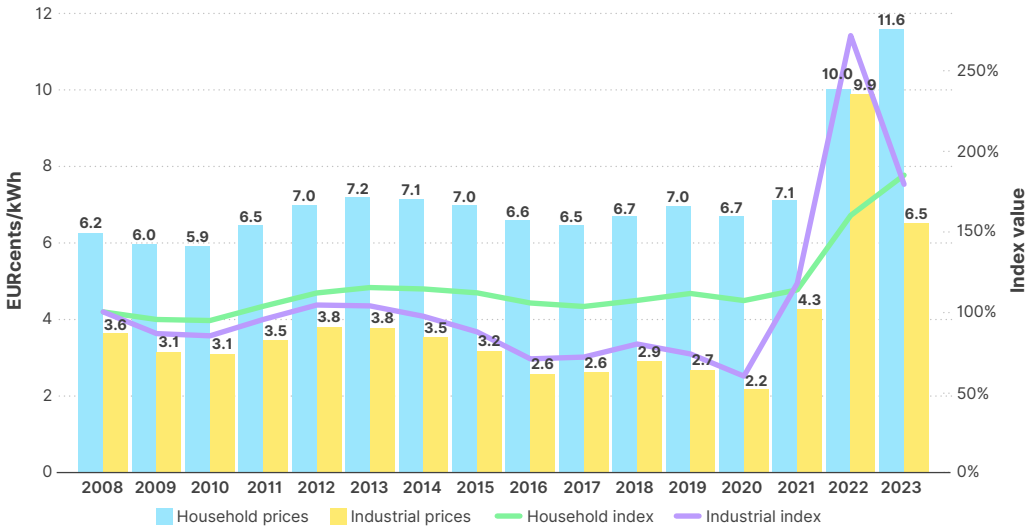
236 Firstly, the gradual phasing out of subsidies that helped stabilise household gas prices throughout 2022 were progressively lifted in 2023, contributing to this outcome. However, the primary factor influencing this trend was the dynamics of price hedging. Many final gas consumers, and particularly household consumers, are subject to fixed pricing to some extent. While those fixed pricing mechanisms shielded consumers from the sharper increases in spot gas wholesale prices during 2022 (depending on contract types and clauses), they seem to have resulted in higher prices in 2023 relative to 2022 in various jurisdictions.

237 As Figure 39 shows, the EU weighted average final household gas prices[80] increased by 16 % in 2023 relative to 2022, reaching 11.6 cents/kWh, despite the decreases observed in the non-household and wholesale prices. As Figure 41 shows, although this increase was present in most Member States, nine internal markets saw a decrease in prices compared with the previous year.

238 Overall, households' enduring preference for fixed and hedged pricing options provides greater stability and predictability – an aspect that benefited many final EU consumers during the energy crisis – but it has curtailed the potential savings achievable from more dynamic contracts.

239 In the case of industrial prices, where variable contracts are more predominant, there is a more aligned move in prices relative to wholesale prices, with average industrial prices decreasing from the historical highs of 2022, yet not reaching the levels that used to be the norm.

Figure 39: Trends in final gas prices for household and industrial consumers in the EU – 2008–2023 (EUR cents/kWh and index change; 2008 = 100)



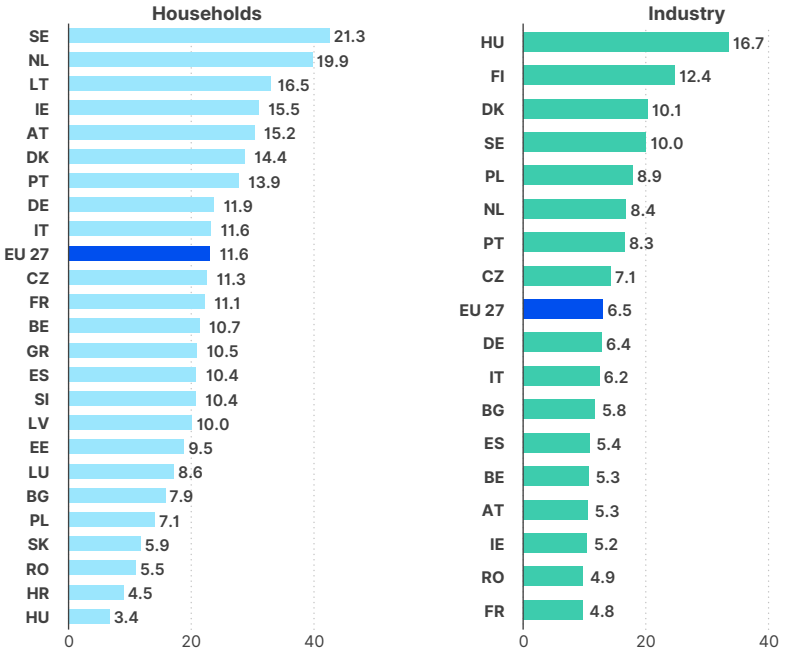
NB: The index change tacks the percentage change in nominal prices since 2008, where the base year equals 100 %.

Source: ACER calculations based on Eurostat data: Band D2, 20–200 GJ (household gas consumption, nrg_pc_202) and Band I5, 1 000 000–4 000 000 GJ (industrial gas consumption, nrg_pc_203); updated in July 2024.

80 Final energy prices reflect the real costs incurred by consumers for energy consumption, including all taxes, levies, subsidies and allowances imposed on and received by the consumers.

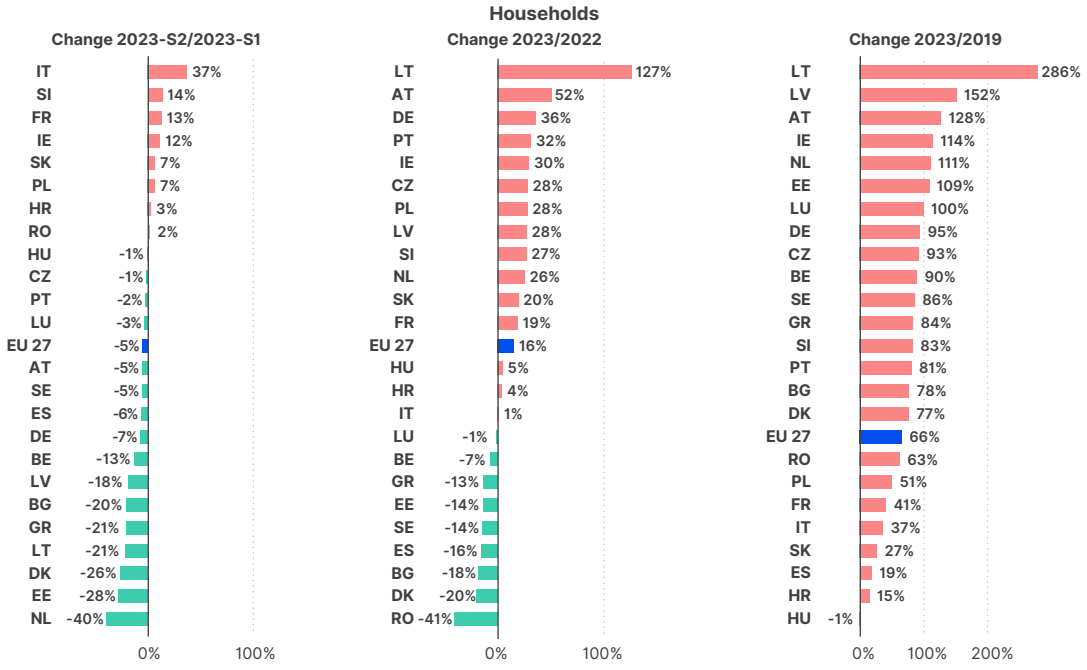
240 The analysis per Member State reveals that, in the case of gas, Swedish and Dutch household consumers faced on average the highest prices (at 21 and 20 cents/kWh, respectively) while Croatia and Hungary once again benefited from the lowest (4.1 and 3.4. cents/kWh, respectively), primarily due to the prevailing subsidies and price regulation. In contrast, industrial consumers in Hungary reported on average the highest cost of gas consumption, at 16.7 cents/kWh, while French industrial consumers recorded the lowest ones, at 4.8 cents/kWh. The price levels of gas have a large impact on the competitiveness of diverse sectors (Figure 40).

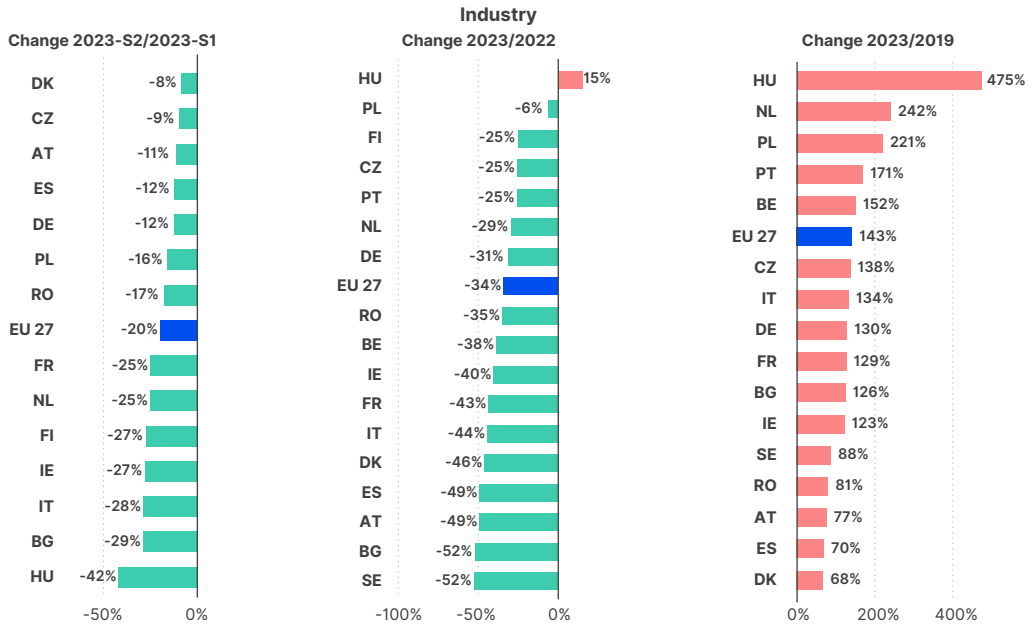
Figure 40: Average final gas prices for households and industrial consumers in Member States and EEA member Norway – 2023 (EUR cents/kWh)



Source: Eurostat, Band D2, 20–200 GJ (household gas consumption, nrg_pc_202), and Band I5, 1 000 000–4 000 000 GJ (industrial gas consumption, nrg_pc_203); updated in July 2024.

Figure 41: Changes to final gas prices for households and industrial consumers in Member States and EEA member Norway between 2019 and 2023 (%)

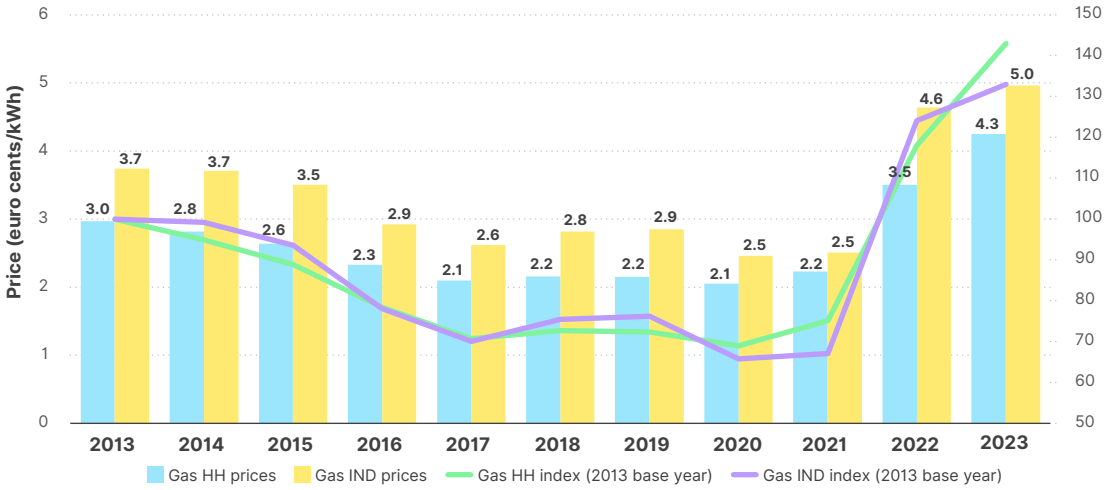




Source: ACER calculations based on Eurostat data: Band D2, 20–200 GJ (household gas consumption, nrg_pc_202), and Band I5, 1 000 000–4 000 000 GJ (industrial gas consumption, nrg_pc_203); updated in July 2024.

241 In 2023, gas prices in the EnC Contracting Parties continued to increase, although less than in the previous year. The average EnC gas price for households increased by 21% to 4.25 cents/kWh, while industrial prices rose by 7% on average and reached 4.96 cents/kWh. The average household price in the EnC was still around 50% of the average EU household price. The average industrial price in the EnC was 1.54 cent/kWh lower than for the EU industry.

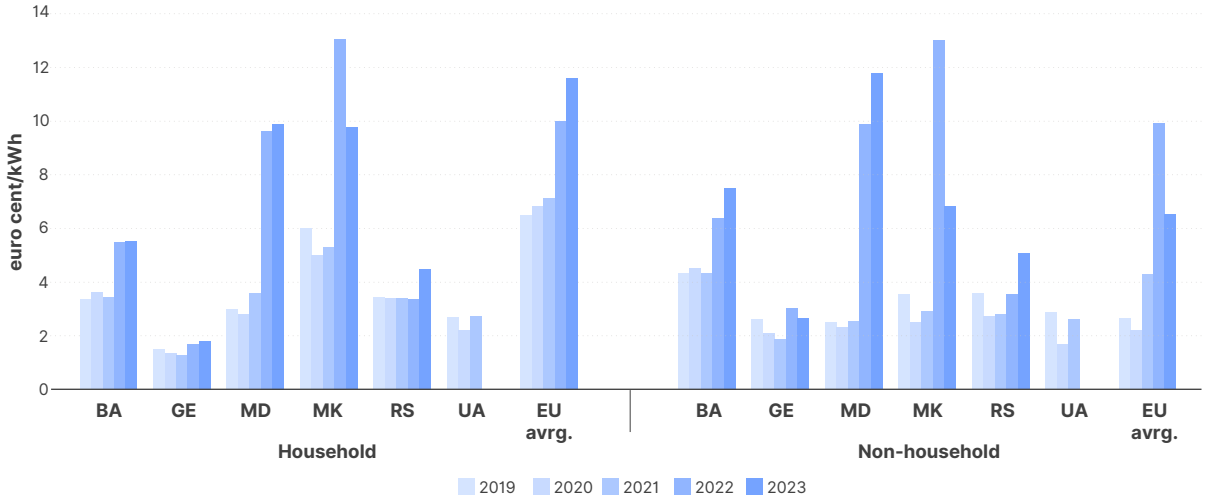
Figure 42: Trends in final gas prices for household and industrial consumers in the EnC Contracting Parties, except for Ukraine- 2013-2023 (cents/kWh and index change 2013=100)



Source: EnC Secretariat calculations based on EUROSTAT (Band D2: 20-200GJ and Band I4: 100 000- 999 999 GJ)

242 Figure 43 shows major differences in gas prices among the EnC Contracting Parties. More specifically, in 2023 household gas prices ranged from 1.79 cents/kWh in Georgia to 9.88 cents/kWh in Moldova. Very low gas prices in Georgia are explained by the existence of long-term gas supply contracts in Georgia. The highest increase of prices for households was recorded in Serbia- 33%. Serbia registered also the highest increase in prices for industry in 2023- 43% on average. These increases of gas prices in Serbia in 2023 occurred after the subsidies provided during the crisis had been lifted. After soaring increase of around 300% in the period 2021-2022 in Moldova, average final gas prices for industry dropped by around 48% in 2023, following the developments on the wholesale gas markets.

Figure 43: Gas prices for household and industrial consumers in the EnC Contracting Parties 2019-2023 (cents/kWh)



Source: EnC Secretariat calculations based on EUROSTAT.

4.2.3. Bill breakdown

243 Household final gas prices are determined by the sum of various components, which include energy costs, network charges, renewable energy charges, additional taxes and charges, and VAT.

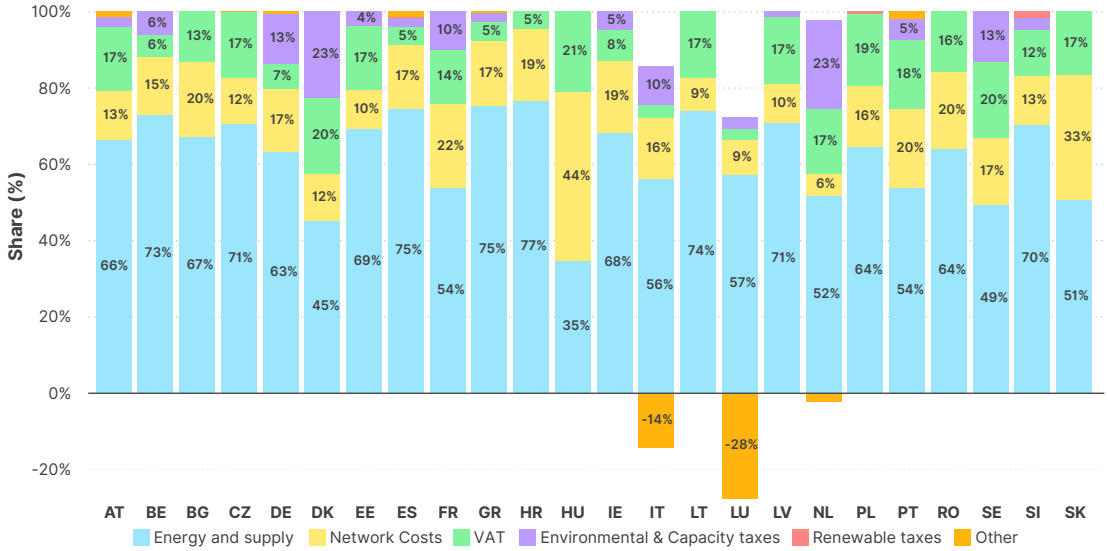
244 Figure 44 illustrates the diverse composition of the final gas bill for household consumers across Member States[81]. The energy component continues to constitute the largest portion of the final household price, accounting for a weighted average of 59 % across the EU. The energy component accounts for the largest share of the bill in Croatia (77 %), Greece (75 %) and Spain (75 %), while it accounts for the lowest share in Hungary (35 %), again because of price regulation, and in Denmark (45 %), Sweden (49 %) and the Netherlands (52 %), in view of their higher relative taxes and levies.

245 As can be seen in Figure 45, the weighted average EU energy component as a share of total cost remained at the same level in 2023 as in the year prior and was 15 % higher than the 2021 share. In nominal terms, however, the component increased by 25 % year-on-year (7.2 cents/kWh in 2023 versus 5.8 cents/kWh in 2022) and more than doubled since 2021 (3 cents/kWh). This is mainly due to the unwinding of subsidies and the predominance of fixed prices curtailing the potential savings achievable from more dynamic contracts. The energy component has been the primary driver of the price hikes borne by consumers over the past 2 years.

246 While network electricity costs represent 24 % of the EU average, for gas it is lower, at 16 %. The remaining portion of final gas prices consists of taxes, including both VAT and energy taxes.

81 The analysis was completed with data sourced from Eurostat. According to Eurostat guidelines, Member States are required to report national prices that accurately represent the entire country. These reported prices are weighted averages, utilising the market shares of surveyed gas supply companies as weighting factors.

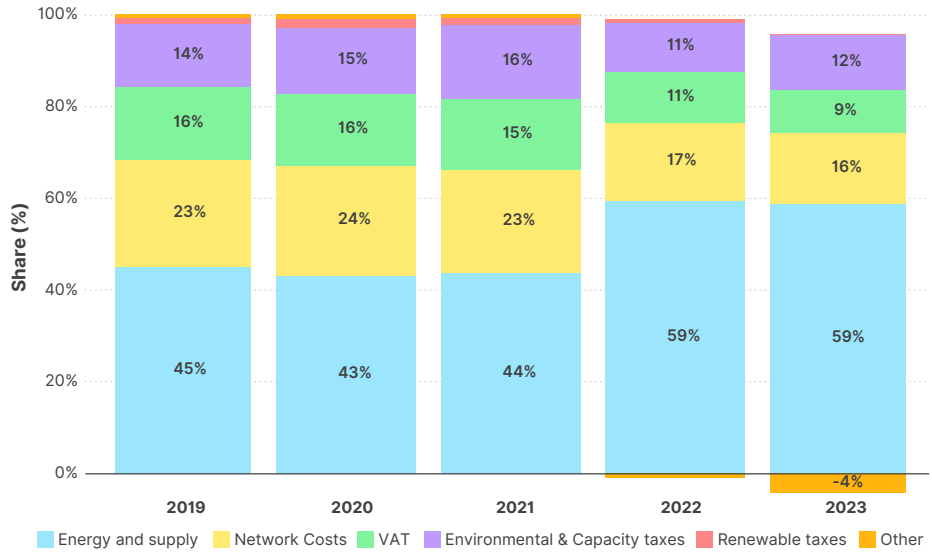
Figure 44: Breakdown of the final gas price for households by Member States in 2023 (%)



NB: Reference methodology and metadata used by Eurostat can be found here.

Source: ACER calculations based on Eurostat data: Band D2, 20–200 GJ ('Gas prices components for household consumers – annual data', nrg_pc_202_c); updated in July 2024.

Figure 45: Breakdown of the average gas price for households in the EU-27 – 2019–2023 (%)

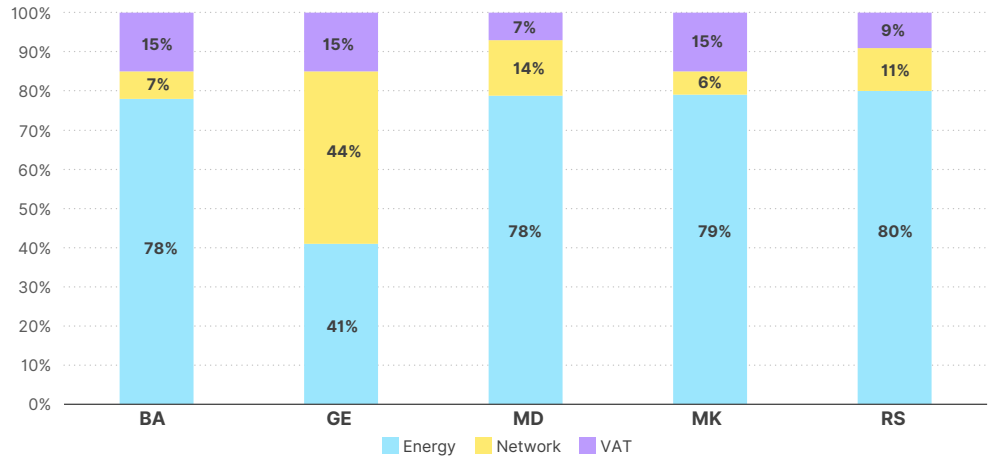


NB: Reference methodology and metadata used by Eurostat can be found here.

Source: ACER calculations based on Eurostat data: Band D2, 20–200 GJ ('Gas prices components for household consumers – annual data', nrg_pc_202_c).

247 Figure 46 shows the breakdown of the gas prices for households in the EnC Contracting Parties, where data was available, and a gas market exists. The share of energy component was close to 80% in most Contracting Parties, with the lowest relative share of 41% in Georgia. The share of network costs is usually substantially lower than the EU average, ranging from 6% in North Macedonia to 44% in Georgia.

Figure 46: Breakdown of gas prices for households in the EnC Contracting Parties in 2023 (%)



Source: EnC calculations based on EUROSTAT data, Band D2 (August 2024)

4.3. Gas retail market structure and functionality

248 To understand competition dynamics in gas, the report will keep relying on concentration levels. In general, a high number of suppliers and low market concentration are indicators of a competitive market structure. However, as stated earlier, it is not sufficient to look only at the number of nationwide suppliers, because their market penetration levels also matter.

249 Figure 47 presents HHI values for the household and non-household gas markets in 2023[82].

250 The analysis of the household market revealed the following.

- Nine countries saw a reduction in their concentration index in 2023, with Slovakia[83] (– 1.252, – 19 %), Austria[84] (– 449, – 12 %), Czechia (–305, – 11 %), Greece (– 305, – 9 %) and Portugal (–209, – 7 %) experiencing the greatest reductions. During the period 2019–2023, the most significant concentration reductions were registered in Greece (– 1.953, – 39 %), France (– 838, – 19 %) and Portugal (– 788, – 22 %).

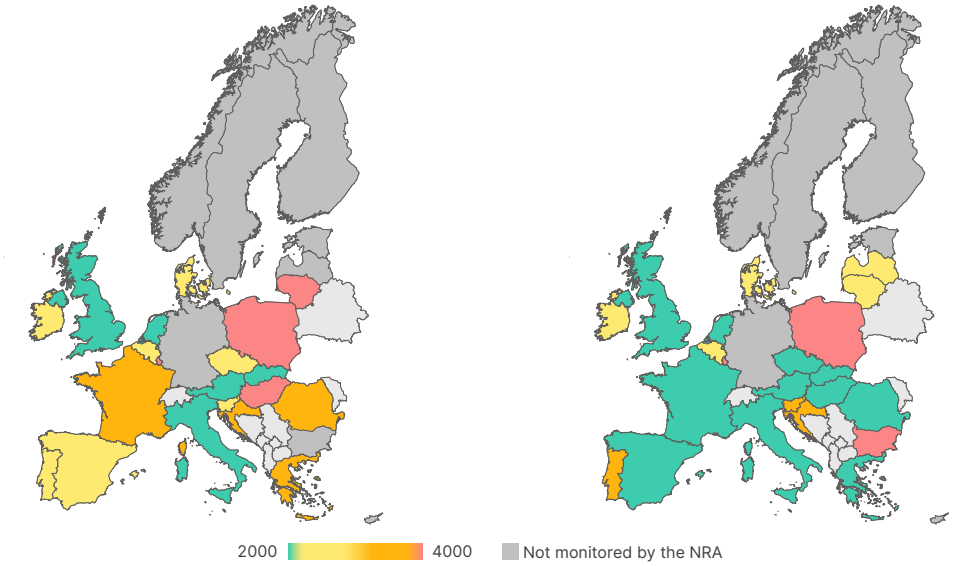
- In contrast, nine countries saw an increase in their concentration index in 2023, with Great Britain (+ 264, + 18 %) standing out. During the 5-year period, the most significant increases were registered in Croatia (+ 1.573, + 74 %), Great Britain (+ 528, + 44 %) and Czechia (+ 393, + 18 %).

82 HHI and CR3 values for the household gas market in 2023, and compared with 2022 and 2019 by country, can be found in Table Annex 9.

83 This reduction has offset the strong HHI increase in 2021–2022 and brings the Slovakian HHI for the gas household market to 2019 levels.

84 Austria's strong reduction offsets the sudden HHI increase in 2022, resulting in an index 240 points lower than in 2019. However, because a limited number of suppliers offering nationwide in Austria, incumbent suppliers often remaining dominant in their origin network area despite higher prices, relatively low switching rates and other reasons, it is the DSO network area that should be used as the most appropriate geographical market delineation of the electricity and gas.

Figure 47: HHI scores for the household (left) and non-household (right) gas markets – 2023



NB: Table Annex 9 presents the numerical values for CR3 and the HHI for the household gas market in 2023 and changes in HHI values compared with 2022 and 2019. Table Annex 10 presents the numerical values for CR3 and the HHI for the non-household gas market in 2023 and changes in HHI values compared with 2022 and 2019.

Source: ACER based on data provided by National Regulatory Authorities.

251 The analysis of the non-household market revealed the following.

- Eight countries saw a reduction in their concentration index in 2023, with Lithuania (– 1 134, – 34 %), Latvia (– 535, – 19 %) and Austria[85] (– 402, – 28 %) accounting for the greatest reductions. During the period 2019–2023, the most significant concentration reductions were registered in Lithuania (– 3,589, – 61 %), Latvia (– 2,365, – 52 %) and Portugal (– 1,078, – 24 %).

- In contrast, nine countries saw an increase in their concentration index in 2023, with the largest increases in Slovakia (+ 526, + 15 %) and Ireland (+ 300, + 12 %). During the 5-year period, the most significant increases were registered in Slovakia (+ 1.545, + 61 %), Croatia (+ 1.276, + 71 %), Bulgaria (+ 859, + 26 %), Ireland (+ 711, + 34 %) and Hungary (+ 500, + 47 %).

4.3.1. Analysis of active nationwide suppliers

252 This section focuses on an analysis of active nationwide suppliers, defined as those that offer contracts to either household and/or non-household customers throughout the country. Nationwide suppliers should have a stronger impact on switching dynamics and thus on potential market share variation.

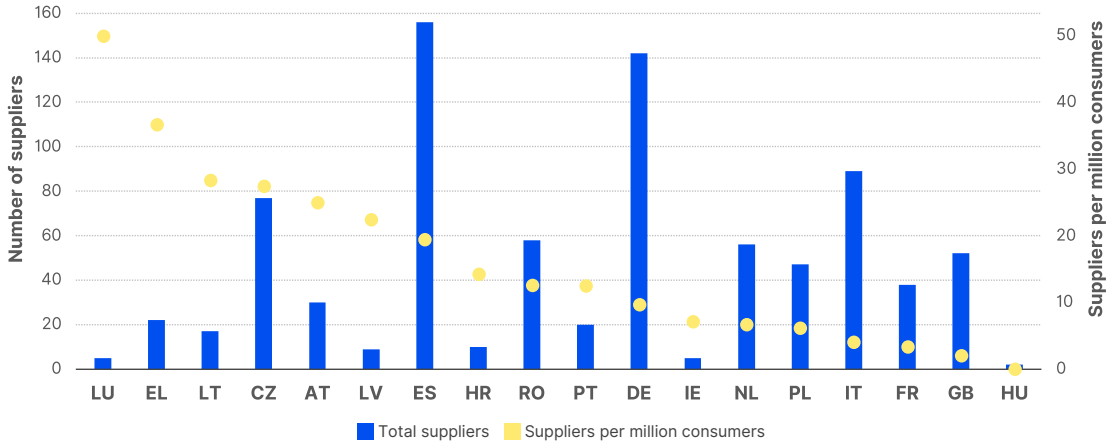
253 Supplier activity provides an indication of the level of competition within a specific market. If suppliers are active and competing, they create favourable market conditions[86]. To achieve a well-functioning retail energy market, new suppliers must be able to enter the market and compete with existing suppliers. Therefore, the total number and entry–exit activity of suppliers provides an indication of consumer choice and of the available options in each national market.

254 Figure 48 presents the number of nationwide gas suppliers, the total number of gas consumers and the number of suppliers per million customers in each Member State in 2023. Compared to the previous year, in 13 out of 26 countries a decrease in the number of suppliers was recorded.

85 HHI values based on nationwide market demarcation as presented may not fully represent the situation in Austria due to local suppliers not being counted.

86 It is important to note that a low number of suppliers may be driven by the relative size of a particular market and, even in the case of larger markets, does not necessarily imply a competition problem, as, for instance, it can be combined with low concentration levels, low entry–exit barriers and low mark-ups.

Figure 48: Total number of active nationwide gas suppliers and number of suppliers per million customers in the entire retail market in Member States and Great Britain - 2023.



ACER based on data provided by National Regulatory Authorities

255 Retail gas markets of the EnC Contracting Parties are still highly concentrated, with stable and limited changes in the numbers of active nationwide suppliers over the years. These numbers range from only one in Moldova to 24 in Serbia, 28 in Georgia and 212 in Ukraine. Ukrainian gas market unsurprisingly saw a decline in the number of active suppliers for households- from 60 in 2022 to 15 in 2023. On the other side, the number of active suppliers of non-households increased by two over the same period. The shares of three largest suppliers in gas markets of the EnC are above 80% in all Contracting Parties, with Moldova and North Macedonia having this share of 97%.

4.4. Gas sector contribution to decarbonisation targets

256 The European gas sector is undergoing a substantial transition aimed at achieving carbon neutrality by 2050. This challenging objective hinges on increasing the adoption of renewable and low-carbon gas options[87]. The price competitiveness of these new options will be a determining factor in its actual future reach.

257 This transition is unfolding amid a notable decline in gas consumption – a trend expected to persist as the EU energy system increases its electrification rates.

258 With the provision of renewable gases, household gas consumers can contribute to the decarbonisation of the energy sector. However, improving the energy efficiency of their homes and reducing their actual energy consumption continue to have the most impact. The potential for savings is significant, as building stock represents more than one third of EU final energy consumption. Furthermore, space heating and water heating account for the majority of household energy consumption.

259 However, the investment required is significant, and public policies[88] will therefore need to play a driving role in incentivising and ultimately ensuring investment. It is important to note that the revised energy performance of buildings directive adopted in April 2024 tasks Member States with establishing long-term renovation strategies aimed at decarbonising their national building stock by 2050[89].

260 At the same time, a reduction in households' conventional natural gas consumption will result from enhanced electrification of their heating systems – or from the use of other renewable energy options as an alternative to conventional gas[90]. The revised Energy performance of buildings directive has

87 Member States' national energy and climate plans and EU strategies project an exponential rise in both hydrogen and biomethane production in the coming years, with, for example, European Commission scenarios targeting more than 50 bcm of equivalent natural gas by 2030 – and hundreds more by 2050.

88 Renovations of buildings prove economically beneficial in the mid to long run, as they lead to significant savings on energy expenditure. Nonetheless, there are various barriers to these renovations. To address this issue, Member States' national building renovation plans should facilitate the allocation of sufficient funding and facilitate private investment on a large scale.

89 Each Member State will adopt its own national trajectory to reduce the average primary energy use of residential buildings by 16 % by 2030 and by 20–22 % by 2035, allowing for sufficient flexibility to consider national circumstances.

90 See footnote 25. listing alternative renewable solutions as identified in the revised energy performance of buildings directive.

introduced a legal basis to achieve phasing out of fossil fuels in heating by 2040. This target could eventually lead to national bans on installing boilers fired by fossil fuels in the Member States[91]. A ban on installing fossil-fuel fired boilers, including those fuelled by conventional natural gas, will apply from 2030 onwards for new and retrofitted buildings[92]. However, the directive still allows the installation of equipment if compatible with hydrogen or biomethane[93]. It is anticipated that the directive will influence the penetration of gas-fired heating solutions from now onwards, due to the life cycle of the equipment[94]. Moreover, the directive mandates that public incentives to install gas heating solutions must terminate from 2025. In addition, in accordance with the directive, solar rooftops will need to be deployed in all new residential buildings from 2030 (and fitted progressively elsewhere), reducing the scope for natural gas solutions.

261 Overall, the use of heat pump solutions (e.g. air-to-water equipment) is seen as key to gradually replacing gas combustion solutions. For example, REPowerEU scenarios state that heat pump solutions have the potential to substitute 20 bcm of conventional gas consumption by 2030 (with 3 million heat pump units installed in 2022 alone, the objective is to install at least 10 million additional heat pumps by 2027[95]). Improving the energy efficiency of buildings by means of enhancing insulation is also important for enabling the most optimal operation of heat pumps, as they are low-temperature heating systems. Interestingly, highly electrified heating solutions would also contribute to promoting households' demand response opportunities. On the other hand, rising reliance on heat pump solutions – particularly if combined with electric vehicle charging – will create challenges related to the ability of the existing grid to adequately meet capacity needs. Therefore, innovation in smart appliance management, a higher dimensioning of distribution networks, technological improvements along with the management of rising network charges is needed.

262 In addition to electrification, switching to renewable and low-carbon gas solutions can be an option. Technically, biomethane solutions will be easier to implement in existing buildings that currently rely on gas-fired heating solutions, as they will not require large investments at the user level or the distribution network level.

263 Presently, there are approximately 88 million gas boilers installed in the EU, with an additional 3 million residential gas boilers being installed annually. Overall, to meet the energy performance of buildings directive 2040 target, a significant portion of conventional gas heating systems will need to be replaced or adjusted by 2030 (estimates range from 10 % to 30 %). This will result in millions of residential heating system adaptations. The phasing out of conventional natural gas in the heating sector hence presents a massive investment challenge. Millions of households will be required to transition to alternative heating systems, while housing companies and private landlords may be reluctant to invest in heating system replacements that primarily benefit tenants. Despite these challenges, Member States have identified such transitions as imperative for substantially enhancing the energy efficiency of Europe's building stock.

264 Public financial support will be instrumental in achieving high adaptation and replacement rates. Narrowing the gap between electricity and natural gas prices and reducing the costs of equipment solutions is also crucial to accelerating the uptake of sustainable heating. While electricity prices are expected to trend downwards following an increase in the uptake of renewable energy sources, lowering certain taxation elements would help further build the case for heating electrification solutions.

91 While the revised energy performance of buildings directive does not mandate an EU-level phase-out date for installing new fossil fuel boilers, it introduces a clear legal basis for national bans, allowing Member States to set requirements for heat generators based on greenhouse gas emissions, the type of fuel used, or a minimum part of renewable energy used for heating. Several capital cities (e.g. Vienna and Amsterdam) and governments (e.g. Germany) have initiated legislative measures to accommodate the intended ban on conventional natural gas in household heating systems by 2040. For example, in Germany, only heating systems using more than 65 % renewable energy can be installed in new buildings from 2024. These can be hybrid systems combining heat pumps with condensing boilers.

92 In zero-emission buildings (i.e. all new buildings from 2030), where technically and economically feasible, total annual primary energy use will have to be covered by renewable energy generated on-site, nearby or from a renewable energy community; energy from an efficient district heating and cooling system; or energy from carbon-free sources.

93 The ban applies to stand-alone boilers fired by fossil fuels (i.e. coal, natural gas and fossil liquefied petroleum gas). However, hybrid systems comprising a gas boiler alongside other renewable energy sources (e.g. solar panels or heat pumps), as well as boilers fired by renewable gas sources, such as hydrogen or biomethane, will be allowed.

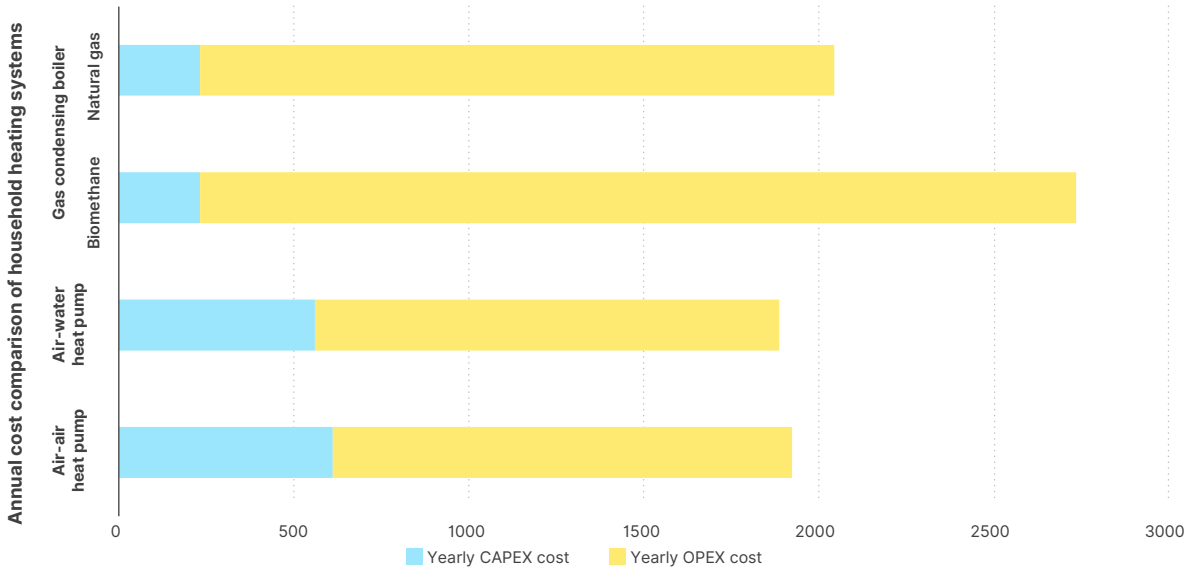
94 Even if existing of newly installed boilers will not need to be replaced by 2040 if they allow the use biomethane or hydrogen. The European Commission will issue guidance to Member States by the end of 2024 to clarify the categorisation of fossil fuel-fired boilers.

95 Heat pumps are already among the most installed space heating systems in new buildings, where this equipment needs can be better considered during construction phases (see European Commission projections for heat pump penetration and economic impacts, linked to repowerEU plans).

265 For the non-household consumer, electrification is also challenging. However, its feasibility may be increasing. A recent report[96] by McKinsey highlights that the electrification of industrial heat is not only technically feasible but also increasingly cost-competitive. It emphasises that such electrification can significantly reduce carbon emissions across various sectors, including food, manufacturing and chemicals. Furthermore, it suggests that companies can achieve cost savings and resilience by combining electrification with renewable energy sources. However, the report also identifies barriers to adoption, such as perceived technical and economic challenges and a lack of knowledge about available technologies. To overcome these barriers, the report recommends improved forecasting capabilities, dynamic pricing and operational incentives.

266 Figure 49 presents an analysis of the current costs of various heating technologies, assuming EU average costs for 2023. Heat pumps generally offer similar or more economical heating for new buildings compared with conventional gas solutions, despite higher upfront costs. Their higher efficiency results in lower operational expenses, leading to comparable or lower levelised costs over the equipment's life cycle. Enhanced insulation investments are even more cost-effective. However, transitioning from existing gas-fired to electric heating requires further discussion, particularly the potential use of low-carbon gas. Future competitiveness of heating options will depend on changes in energy prices, carbon costs, technical advancements and policy signals aimed at decarbonisation, which are difficult to predict and beyond the scope of this analysis.

Figure 49: Comparison of normalised annual household heating costs using different technologies – 2023 (EUR per year)



NB: The figure illustrates the normalised annual cost for different heating technologies. It is calculated as the annual operating expenses (OPEX) plus the normalised annual capital expenditures (CAPEX) over the lifetime of the technology. Assumptions were made as follows: annual energy load for space heating 10 MWh and for hot water 2 MWh, based on International Energy Agency data; end-user gas price equal to EUR 116/MWh, based on Eurostat average EU prices in 2023; end-user biomethane price at EUR 166/MWh, based on market intelligence reporting EUR 50/MWh premium over conventional gas prices; end-user electricity prices equal to EUR 288/MWh, based on Eurostat average EU prices in 2023; heat pump efficiency equal to 320 %; and gas boiler efficiency equal to 85 %. The CAPEX investment cost (and lifetime) considered: air-to-water heat pump EUR 11 000 (18 years); air-to-air heat pump EUR 8 000 (12 years); and gas condensing boiler EUR 3 800 (15 years).

Source: ACER, based on the International Energy Agency's residential heating costs calculator.

96 McKinsey, Net-zero Electrical Heat: A turning point in feasibility, 2024.

4.5. Conclusions

267 While the EU continues its transition towards greater electrification, natural gas will remain significant soon, due to its price competitiveness and current widespread use. Eventually, the sector's role in decarbonization will depend on the adoption of renewable and low-carbon gases.

268 Retail natural gas consumers are also important to EU's decarbonisation goals, particularly through reducing gas consumption – which is mainly devoted to heating – and improving home energy efficiency ratings. This is because buildings account at present for over a third of the EU's energy use. Measures like better insulation, switching to renewable energy systems, and electrifying heating with heat pumps solutions will be essential to that goal. In that scenario, the recently revised Energy Performance of Buildings Directive supports these efforts by setting targets to phase out fossil-fuel heating by 2040, mandating solar rooftops in new buildings by 2030, and encouraging shifts towards electricity heating options but also allowing low-carbon gases.

269 Competitive retail gas markets will play a crucial role in this transition. Although less dynamic than electricity markets, the latter benefiting from smart meters and real-time pricing, gas retail markets can still foster innovation, particularly by incorporating low-carbon gases for sectors that are harder to electrify, such as gas-intensive industries. However, challenges remain, including the substantial investments required for households to transition to electric heating or retrofit buildings. Public policies, financial incentives, and ensuring grid capacity at the distribution level will be essential to overcoming these barriers.

Annex

Table Annex 1: Roll-out of smart meters, consumer access to near real-time data, and consumption data intervals in Member States, EEA member Norway and Great Britain – 2023

Country	Percentage with smart meters	All consumer access to near real-time consumption data	Consumption data interval
Austria	80	Yes	15 minutes
Belgium	35	No	15 minutes
Bulgaria	0*	No	No response from NRA
Croatia	24	No	15 minutes
Cyprus	0	No	No response from NRA
Czechia	3	No	60 minutes
Denmark	100	Yes	15 minutes
Estonia	99	Yes	60 minutes
Finland	100	Yes	15 minutes
France	94	Yes	30 minutes
Germany	1	Yes	15 minutes
Great Britain	62	Yes	30 minutes
Greece	6*	No	No response from NRA
Hungary	9	No	15 minutes
Ireland	69	Yes	30 minutes
Italy	100	Yes	15 minutes
Latvia	99	Yes	60 minutes
Lithuania	58	Yes	15 minutes
Luxembourg	99	Yes	15 minutes
Malta	94	Yes	15 minutes
Netherlands	90	Yes	15 minutes
Norway	99	Yes	60 minutes
Poland	27	No	15 minutes
Portugal	86	Yes	15 minutes
Romania	23	No	15 minutes
Slovakia	15	No	15 minutes
Slovenia	95	Yes	15 minutes
Spain	99	Yes	60 minutes
Sweden	100	Yes	60 minutes

NB: For countries that have not provided data, 2022 values were used. For Greece, smart meter penetration data were sourced from Euroelectric's Power Barometer.

Source: ACER based on data provided by National Regulatory Authorities.

Table Annex 2: Percentage of households and total consumers that generate their own electricity and total energy injections in Member States, EEA member Norway and Great Britain – 2023

Country	Percentage of households generating electricity	Percentage of non-household consumers generating electricity	Total energy injected by household prosumers (GWh)	Total energy injected by non-household prosumers (GWh)
Austria	No data	No data	No data	No data
Belgium	23.7 %	No data	No data	No data
Bulgaria	No data	No data	No data	No data
Croatia	No data	0.5 %	No data	No data
Cyprus	No data	9.5 %	No data	No data
Czechia	1.5 %	3 %	No data	No data
Denmark	3.9 %	No data	No data	No data
Estonia	No data	No data	No data	No data
Finland	No data	3 %	No data	No data
France	2.5 %	1.1 %	2 370	74 960
Germany	6.4 %	7 %	54 300	509 100
Great Britain	3 %	3 %	8 900	No data
Greece	No data	No data	No data	No data
Hungary	3.2 %	No data	No data	No data
Ireland	3 %	3 %	67	5
Italy	4.5 %	4.1 %	3 942	19 271
Latvia	2.4 %	2 %	0.16	No data
Lithuania	3.5 %	2 %	378	166
Luxembourg		1.2 %	No data	No data
Malta	9.5 %	8.4 %	141	169
Netherlands	28.9 %	30 %	7 102	No data
Norway	0.9 %	0.9 %	96	67
Poland	7.9 %		7 156	165
Portugal	2.7 %	3 %	No data	No data
Romania	1.1 %	0.9 %	347	219
Slovakia	No data	No data	No data	No data
Slovenia	4.8 %	4.7 %	420	600
Spain	1.5 %	1.5 %	1 500	10 000
Sweden	4.8 %	No data	No data	No data

Source: ACER based on data provided by National Regulatory Authorities.

Table Annex 3: Smart meter penetration, availability of dynamic contracts and presence of dynamic contracts in comparison tools – 2023

Country	Share of household consumers with smart meters	Dynamic contracts offered to household consumers	Consumers can compare dynamic contracts using a comparison tool
Austria	80	Yes	Yes
Belgium	35	Yes	Yes
Bulgaria	0	No	No
Croatia	24	Yes	No
Cyprus	0	No	No
Czechia	3	No	No
Denmark	100	Yes	Yes
Estonia	99	Yes	Yes
Finland	100	Yes	Yes
France	94	No	No
Germany	1	Yes	No
Great Britain	62	Yes	No
Greece	6	No	No
Hungary	9	No	No
Ireland	69	No	No
Italy	100	Yes	No
Latvia	99	Yes	Yes
Lithuania	58	Yes	Yes
Luxembourg	99	No	No[97]
Malta	94	No	No
Netherlands	90	Yes	Yes
Norway	99	Yes	Yes
Poland	27	No	No
Portugal	86	No	No
Romania	23	Yes	No
Slovakia	15	Yes	No
Slovenia	95	Yes	No
Spain	99	Yes	Yes[98]
Sweden	100	Yes	Yes

Source: ACER based on data provided by National Regulatory Authorities.

97 In Luxembourg, the comparison tool is technically capable of comparing dynamic-price contracts; however, no dynamic-price contracts are offered in the market.

98 In the Spanish NRA comparison tool, the regulated dynamic price is compared with the rest of the market offers. However, free market dynamic prices are not included.

Table Annex 4: Total consumption of electricity for household and non-household consumers in the EnC Contracting Parties

Country	Total demand – 2023 (TWh)	Change in demand – 2021 vs 2023	Change in demand – 2022 vs 2023	Change in household demand – 2021 vs 2023	Change in household demand – 2022 vs 2023	Change in non-household demand – 2021 vs 2023	Change in non-household demand – 2022 vs 2023
Albania	6.4	– 2.5 %	2.8 %	1 %	1.4 %	– 5.5 %	4.1%
Bosnia and Herzegovina	10.3	– 3 %	– 3.6 %	1.8 %	1.4 %	– 7 %	– 7.8 %
Georgia	6.8	2.7 %	2.3 %	4.2 %	2.6 %	1.7 %	2.1 %
Kosovo*	5.2	0.8 %	4.8 %	– 0.06 %	0.4 %	2.3 %	12.3 %
Moldova	3.9	– 6.4 %	– 4 %	–11.3 %	–6.6 %	–2.7 %	–2.1 %
Montenegro	2.6	–12.3 %	– 0.4 %	9.6%	6.4%	–30%	–8.1%
North Macedonia	5.6	–18%	–8.6%	–9.7%	–2.7%	–26%	–14.6%
Serbia	30	–1.4%	–0.7%	–6.3%	–2.7%	1.2%	–0.5%
Ukraine	83	–33%	–3.2%	–17%	–3.1%	–39%	–5.1%

Source: Energy Community Secretariat's calculations based on data provided by the National Regulatory Authorities.

Table Annex 5: Total number of active nationwide electricity suppliers, metering points in the retail market and percentage of electricity supplier changes– 2023

Country	Number of nationwide active suppliers	Customers (millions)	Supplier change 2022/2023	Supplier change 2019/23
Austria	51	4.9	– 12 %	– 22 %
Belgium	16	6.2	– 11 %	– 24 %
Bulgaria	128	5.3	66 %	
Croatia	7	2.5	0 %	0 %
Cyprus	9	0.6	50 %	800 %[99]
Czechia	99	6.2	10 %	14 %
Denmark	56	0.0	No data	87 %
Estonia	48	0.0	– 14 %	14 %
Finland	53	3.7	56 %	4 %
France	54	39.7	2 %	29 %
Germany	197	52.1	– 7 %	
Great Britain	59	32.4	– 2 %	– 34 %
Greece	16	7.7	– 36 %	– 36 %
Hungary	37	5.7	19 %	48 %
Ireland	9	2.5	– 25 %	– 36 %
Italy	155	38.1	– 25 %	4 %
Latvia	23	0.8	– 8 %	– 12 %
Lithuania	26	1.9	8 %	8 %
Luxembourg	10	0.3	11 %	43 %
Malta	1	0.4	0 %	0 %
Netherlands	58	8.3	0 %	9 %
Norway	131	3.3	– 5 %	- 20 %
Poland	154	19.1	– 10 %	13 %
Portugal	34	6.5	17 %	6 %
Romania	65	9.0	8 %	– 13 %
Slovakia	14		0 %	– 39 %
Slovenia	17	1.0	31 %	– 11 %
Spain	238	30.2	– 2 %	– 7 %
Sweden	65	5.6	– 8 %	– 7 %

Source: ACER based on data provided by National Regulatory Authorities.

99 Because of market opening in the non-household market, Cyprus has passed from one market player to nine, and from a concentration index of 10.000 to 8.701.

Table Annex 6: CR3 and HHI scores for the household electricity market in 2023 and changes in HHI score compared with 2022 and 2019

Country	HHI household, 2023	2023/2022	2023/2019	CR3
Austria	1 365	– 9 %	– 6 %	48
Belgium	2 761	0 %	15 %	78
Bulgaria	3 502	0 %	0 %	100
Croatia	8 489	2 %	3 %	100
Cyprus	10 000	0 %	0 %	100
Czechia	2 799	– 2 %	12 %	78
Denmark	1 370	No data	104 %	50
Estonia	No data	No data	No data	No data
Finland	1 032	– 3 %	18 %	48
France	4 860	– 1 %	– 8 %	93
Germany	No data	No data	No data	No data
Great Britain	1 559	0 %	60 %	59
Greece	3062	-43%	-57%	82
Hungary	5 059	0 %	33 %	100
Ireland	3 108	4 %	5 %	79
Italy	2 878	– 24 %	– 39 %	65
Latvia	No data	No data	No data	No data
Lithuania	3 749	– 46 %	– 63 %	87
Luxembourg	8 272	7 %	7 %	100
Malta	10 000	0 %	0 %	100
Netherlands	2 032	0 %	– 2 %	72
Norway	736	2 %	5 %	36
Poland	2 441	0 %	– 23 %	77
Portugal	4 829	– 10 %	– 23 %	No data
Romania	2 071	– 4 %	– 26 %	65.57
Slovakia	No data	No data	No data	No data
Slovenia	1 895	– 1 %	21 %	No data
Spain	2 490	– 3 %	– 7 %	82
Sweden	852	12 %	1 %	No data

Source: ACER based on data provided by National Regulatory Authorities.

Table Annex 7: CR3 and HHI scores for the non-household electricity market in 2023 and changes in HHI scores compared with 2022 and 2019

Country	HHI non-household, 2023	2023/2022	2023/2019	CR3
Austria	1 158	– 5 %	– 4 %	48
Belgium	2 518	– 5 %	16 %	72
Bulgaria	3 532			0
Croatia	6 386	– 5 %	– 11 %	96
Cyprus	8 701	– 9 %	– 13 %	97
Czechia	1 178	No data	No data	49
Denmark	1 358	No data	407 %	86
Finland	760	– 14 %	5 %	36
France	2 686	4 %	– 13 %	66
Great Britain	885	– 5 %	1 %	41
Hungary	2 302	17 %	35 %	68
Ireland	2 254	– 13 %	– 7 %	90
Italy	1 034	– 7 %	10 %	44
Latvia	3 176	– 9 %	7 %	84
Lithuania	2 843	– 8 %	63 %	85
Luxembourg	5 133	2 %	1 %	98
Malta	10 000	0 %	0 %	100
Netherlands	2 091	No data	No data	65
Norway	860	– 5 %	16 %	42
Poland	1 875	19 %	22 %	70
Portugal	1 648	6 %	– 5 %	No data
Romania	694	4 %	– 10 %	35.37
Slovakia	1 612,7	– 19 %	32 %	No data
Slovenia	1 299	11 %	14 %	No data
Spain	1 374	– 6 %	– 4 %	55
Sweden	No data	No data	No data	No data

Source: ACER based on data provided by National Regulatory Authorities.

Table Annex 8: Total number of complaints received by NRAs and the share of the most popular complaint categories by country – 2023

Country	Bills	Price	Metering	Contracts & sales	Quality of supply	Grid Connection	Prosuming	Disconnection	Total complaints
Austria	29 %	17 %	6 %	3 %	0 %	4 %	7 %	4 %	2 141
Bulgaria	0 %	6 %	31 %	4 %	36 %	8 %	5 %	5 %	687
Cyprus	14 %	0 %	7 %	7 %	14 %	7 %	0 %	21 %	14
Czechia	48 %	0 %	1 %	31 %	0 %	0 %	0 %	2 %	7 571
Estonia	8 %	34 %	5 %	8 %	15 %	16 %	3 %	2 %	166
Spain	32 %	13 %	20 %	13 %	9 %	3 %	1 %	1 %	959 245
Finland	25 %	15 %	40 %	10 %	5 %	0 %	5 %	0 %	20
France	20 %	27 %	26 %	3 %	3 %	5 %	0 %	2 %	16 063
Croatia	19 %	0 %	14 %	1 %	46 %	13 %	0 %	1 %	202
Hungary	13 %	0 %	0 %	8 %	4 %	28 %	30 %	1 %	588
Ireland	39 %	6 %	10 %	8 %	5 %	2 %	9 %	1 %	459
Italy	33 %	2 %	6 %	20 %	11 %	2 %	0 %	2 %	227 382
Lithuania	22 %	13 %	14 %	13 %	2 %	30 %	0 %	0 %	1 662
Luxembourg	53 %	10 %	10 %	0 %	0 %	2 %	8 %	6 %	51
Latvia	25 %	27 %	7 %	7 %	7 %	7 %	0 %	0 %	85
Poland	31 %	12 %	4 %	14 %	6 %	6 %	14 %	1 %	7 605
Portugal	27 %	4 %	9 %	8 %	6 %	5 %	4 %	7 %	18 162
Romania	0 %	37 %	11 %	10 %	4 %	5 %	14 %	0 %	20 364
Sweden	9 %	25 %	18 %	18 %	2 %	6 %	14 %	1 %	1 224
Slovenia	81 %	2 %	2 %	2 %	0 %	1 %	0 %	0 %	7 930
Slovakia	17 %	34 %	3 %	18 %	2 %	2 %	7 %	1 %	184
Belgium	7 %	4 %	26 %	8 %	3 %	4 %	7 %	2 %	2 086

Source: ACER based on data provided by National Regulatory Authorities.

Table Annex 9: CR3 and HHI scores for the household gas market in 2023 and changes in HHI scores compared with 2022 and 2019

Country	HHI household, 2023	CR3	2023/2022	2023/2019
Austria	3 298	69	– 12 %	– 7 %
Belgium	2 632	77	0 %	21 %
Croatia	3 710	81	0 %	74 %
Czechia	2 539	76	– 11 %	18 %
Denmark	2 879	41		
France	3 562	89	– 4 %	– 19 %
Great Britain	1 739	64	18 %	44 %
Greece	3 062	80	– 9 %	– 39 %
Hungary	10 000	100	0 %	0 %
Ireland	2 760	79	3 %	1 %
Italy	1 271	55	1 %	– 2 %
Lithuania	9 967	100	0 %	0 %
Luxembourg	4 923	100	0 %	– 2 %
Netherlands	2 031	71	0 %	– 1 %
Poland	9 540	99	2 %	– 1 %
Portugal	2 786		– 7 %	– 22 %
Romania	3 962	91	– 1 %	5 %
Slovakia	5 169		– 19 %	– 7 %
Slovenia	2 056		3 %	15 %
Spain	2 880	81	– 1 %	– 11 %

Source: ACER based on data provided by National Regulatory Authorities.

Table Annex 10: CR3 and HHI scores for the non-household gas market in 2023 and changes in HHI scores compared with 2022 and 2019

Country	HHI non-household, 2023	CR3	2023/2022	2023/2019
Austria	1 053	49	– 28 %	– 14 %
Belgium	2 395	66	6 %	27 %
Bulgaria	4 145	78		26 %
Croatia	3 085	73	– 3 %	71 %
Czechia	1 526	60		
Denmark	2 347	81		
France	1 460	62	11 %	33 %
Germany		21		
Great Britain	1 335	53	7 %	28 %
Greece	1 474	44	1 %	4 %
Hungary	1 572	61	13 %	47 %
Ireland	2 833	84	12 %	34 %
Italy	1 085	49	20 %	2 %
Latvia	2 211	76	– 19 %	– 52 %
Lithuania	2 251	74	– 34 %	– 61 %
Luxembourg	4 668	99	– 1 %	5 %
Malta	10 000	100		
Netherlands	2 022	66		
Poland	7 671	94	4 %	23 %
Portugal	3 362	80	– 1 %	– 24 %
Romania	1 927,32	76	– 8 %	29 %
Slovakia	4 098		15 %	61 %
Slovenia	3 171	77	– 3 %	8 %
Spain	1 244	55	– 2 %	13 %

Source: ACER based on data provided by National Regulatory Authorities.

Table Annex 11: Total consumption of electricity by household and non-household consumers in Member States, Norway and Great Britain in 2023 (TWh) and demand change from 2022 and 2021 (%).

Country	Total demand – 2023 (TWh)	% demand change – 2021 vs 2023	% demand change – 2022 vs 2023	% change in household demand – 2021 vs 2023	% change in household demand – 2022 vs 2023	% change in non-household demand – 2021 vs 2023	% change in non-household demand – 2022 vs 2023
Austria	55	-7	-5	-14	-6	-5	-5
Belgium	61	-6	-13	-30	-8	0	-15
Bulgaria	31	-3	0	No data	4	No data	-2
Croatia	16	0	-2	-2	-1	1	-3
Cyprus	4	-1	-2	-3	2	0	-4
Czechia	52	-8	-4	-13	-4	-5	-3
Denmark	33	-3	1	No data	No data	No data	No data
Estonia	7	-14	-6	No data	No data	No data	No data
Finland	39	-55	-52	-10	6	-69	-68
France	405	-8	-4	-12	-3	-5	-4
Germany	424	-6	-2	-7	-4	-5	-1
Greece	41	-6	-15	-12	No data	-2	No data
Hungary	38	-6	-4	-10	-9	-5	-1
Ireland	31	3	4	No data	-1	No data	7
Italy	306	-5	-4	-8	-4	-4	-5
Latvia	7	-2	1	-13	-6	1	3
Lithuania	107	-3	-2	-2	-5	-4	-1
Luxembourg	6	-8	-5	0	0	-9	-5
Malta	3	5	No data	2	No data	7	No data
Netherlands	98	-14	-8	No data	No data	No data	No data
Norway	127	6	14	1	19	9	12
Poland	142	-4	-4	0	0	-6	-5
Portugal	46	3	1	4	2	2	-1
Romania	46	-10	68	-8	-3	-10	137
Slovakia	32	53	14	-4	-3	76	19
Slovenia	11	-14	-12	-6	-2	-17	-15
Spain	219	-4	-2	-6	0	-3	-3
Sweden	125	-2	1	97	No data	-43	No data
Great Britain	247	-5	-2	-14	-4	-3	-1

Source: ACER based on data provided by National Regulatory Authorities.

Table Annex 12: Household electricity switching rates by metering points

Country	2021 (%)	2022 (%)	2023 (%)	Difference compared with 2022	Share of non-switching households
Austria	3.80	2.20	3.80	1.60	96.73
Belgium	24.68	20.60	17.60	– 3.00	79.04
Bulgaria	—	0.42	0.02	– 0.40	99.85
Croatia	0.41	—	1.40	1.40	99.10
Cyprus	—	—	—	—	100.00
Czechia	15.40	6.40	4.20	– 2.20	91.33
Denmark	7.40	—	9.00	9.00	91.80
Estonia	12.00	2.10	—	—	92.95
EU	**8.74**	**9.08**	**7.15**	**– 1.92**	**91.91**
Finland	16.21	—	—	—	91.90
France	13.00	10.00	8.30	– 1.70	89.57
Germany	9.70	8.20	12.00	3.80	90.03
Great Britain	16	3.1	6.3	3.2	91.53
Greece	8.62	**9.06**	9.8	0.7	92.27
Hungary	—	21.20	—	– 0.40	100.00
Ireland	—	17.28	11.00	– 6.28	85.86
Italy	15.70	17.90	18.90	1.00	82.50
Latvia	5.37	6.36	4.00	– 2.36	94.76
Lithuania	2.13	18.63	8.28	– 10.35	90.32
Luxembourg	0.15	0.12	0.23	0.11	99.83
Malta	—	—	—	—	100.00
Netherlands	20.70	17.20	12.00	– 5.20	83.37
Norway	24.10	22.00	10.00	– 12.00	81.30
Poland	0.78	0.44	0.34	– 0.10	99.48
Portugal	16.50	16.30	14.00	– 2.30	84.40
Romania	3.68	6.37	2.23	– 4.14	95.91
Slovakia	5.10	0.79	0.44	– 0.35	97.89
Slovenia	4.00	6.70	0.50	– 6.20	96.27
Spain	16.64	21.20	20.80	– 0.40	80.45
Sweden	10.70	16.60	10.00	– 6.60	87.57

Source: ACER based on data provided by National Regulatory Authorities.

Table Annex 13: Non-household switching rates by volume

Country	2021 (%)	2022 (%)	2023 (%)	Difference compared with 2022	Share of non-switching non- household consumers
Austria	8.00	6.50	4.00	– 2.50	93.83
Cyprus	0.12	0.14	5.00	4.86	98.25
Czechia	No data	No data	No data	No data	No data
Denmark	No data	No data	0.30	0.30	No data
EU	**13.84**	**14.35**	**13.94**	**– 0.41**	**86.35**
Germany	No data	No data	13.00	13.00	93.00
Great Britain	15.40	14.50	15.90	1.40	84.73
Greece	11.73	No data	9.50	9.50	89.39
Ireland	No data	13.66	No data	No data	No data
Italy	22.40	25.50	28.17	2.67	74.64
Latvia	22.28	26.96	33.43	– 1.96	No data
Lithuania	13.70	35.39	33.43	– 1.96	72.49
Luxembourg	3.10	2.52	2.74	0.22	97.21
Netherlands	No data	No data	12.00	12.00	88.00
Norway	6.00	1.00	0.60	– 0.40	97.47
Poland	19.23	30.29	19.81	– 10.48	76.89
Portugal	24.90	19.00	27.00	8.00	76.37
Romania	18.13	26.22	30.21	3.99	75.15
Slovakia	6.58	4.13	6.08	1.95	94.40
Slovenia	12.82	13.20	16.10	2.90	85.96
Spain	27.70	31.30	32.00	0.70	69.67
Sweden	10.20	9.70	11.00	1.30	89.70

Source: ACER based on data provided by National Regulatory Authorities.

Table Annex 14: Total number of active nationwide gas suppliers, total number of metering points in the entire retail market and number of gas supplier entrants and exits in 2023 – household and non-household sector

	Total suppliers	Number of consumers (millions)	2023/2022	2023/2019
Austria	30	1.2	– 9 %	– 29 %
Belgium	16	0.0	0 %	– 24 %
Bulgaria	45	0.2	32 %	88 %
Croatia	10	0.7	0 %	– 41 %
Czechia	77	2.8	– 22 %	– 38 %
Denmark	13	0.0		– 7 %
Estonia	24	0.0	– 57 %	– 23 %
Finland	18	0.0	125 %	
France	38	11.2	– 5 %	3 %
Germany	142	14.6	173 %	168 %
Great Britain	52	25.2	– 5 %	– 45 %
Greece	22	0.6	57 %	– 12 %
Hungary	2	35	0 %	0 %
Ireland	5	0.7	– 44 %	– 50 %
Italy	89	21.8	– 36 %	– 5 %
Latvia	9	0.4	13 %	– 40 %
Lithuania	17	0.6	– 51 %	6 %
Luxembourg	5	0.1	– 17 %	– 38 %
Netherlands	56	8.3	– 5 %	4 %
Poland	47	7.6	– 20 %	– 43 %
Portugal	20	1.6	11 %	54 %
Romania	58	4.6	– 15 %	
Slovakia	17		– 15 %	– 35 %
Slovenia	19		58 %	58 %
Spain	156	8.0	12 %	66 %

Source: ACER based on data provided by National Regulatory Authorities.

Table Annex 15: Availability of billing items on consumer bills in Member States, EEA Member Norway, and Great Britain

Country	Price	Consumption	Break down	Due date	Supplier details	ADR rights	Tariff name	Switching code	Contact for consumer organisations	Various website addresses	Company fuel mix	Consumption comparison	Contract duration	Product fuel mix	Comparison tool	Switching info	Peer comparison	Type of consumption record	Current actual prices	Cancellation reminders	% of Annex I items
Austria	X	X	X	X	X	X	X	X		X	X	X		X			X	X	X	X	76 %
Belgium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	100 %
Bulgaria	X	X	X	X	X	X	X	X	X	X	X		X						X	X	71 %
Croatia	X	X	X				X														24 %
Cyprus	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		94 %
Czechia	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X		X	82 %
Denmark	X	X	X	X	X	X		X	X	X			X		X	X	X	X			76 %
Estonia	X	X	X	X	X	X	X	X						X	X			X	X		59 %
Finland	X	X	X	X	X	X	X		X	X	X	X	X				X	X	X		76 %
France	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	88 %
Germany	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	100 %
Great Britain	X	X	X	X	X	X	X	X	X	X		X	X			X		X	X	X	76 %
Greece	X	X	X	X	X	X	X	X	X	X	X		X		X			X		X	76 %
Hungary	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X		94 %
Ireland	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X			94 %
Italy	X	X	X	X	X	X	X	X			X	X	X	X		X		X			76 %
Latvia	X	X	X	X	X	X	X	X					X						X		53 %
Lithuania	X	X	X	X	X		X	X	X	X		X					X	X	X		65 %
Luxembourg	X	X				X			X	X	X	X		X			X				53 %
Malta	X	X	X	X	X	X	X	X	X	X	X	X		X				X	X		76 %
Netherlands	X	X	X	X	X													X			29 %
Norway	X	X	X	X	X	X	X	X	X	X			X		X			X	X	X	71 %
Poland	X	X	X	X	X		X	X	X	X	X							X	X	X	59 %
Portugal	X	X	X	X	X	X	X	X			X			X		X		X	X		65 %
Romania	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	94 %
Slovakia	X	X	X	X	X	X	X			X	X	X	X	X				X	X	X	71 %
Slovenia	X	X	X	X	X	X	X	X	X	X	X	X		X				X	X		76 %
Spain	X	X	X	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	88 %
Sweden	X	X	X	X		X					X							X	X	X	35 %
Total	25	25	24	23	23	21	21	20	18	17	16	16	16	14	11	10	9	22	17	10	

Source: ACER based on data provided by National Regulatory Authorities.

List of Figures

List of Tables