

The Consumer Voice in Europe

THE FUTURE OF ENERGY CONSUMERS

Bright or Burdensome?



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Why it matters to consumers

The way consumers engage with energy is changing radically. For example, they will be able to regulate when they consume with more automation, actively participate in the market by selling their electricity or their flexibility and have access to more sophisticated and complex products and services. This change could benefit consumers through lower bills, greater comfort and engagement with sustainable solutions. But there are also risks, from data protection to ending up with higher bills. It is impossible to fully predict what the future will look like. Yet it is vital that we start thinking about how to avoid such risks: energy and horizontal consumer policy need to adapt quickly to these changes, facilitating a transition that is fair for all consumers, without leaving any consumer behind.

Executive Summary

The decarbonisation and decentralisation of energy generation, as well as the digitalisation of the energy sector are bringing big changes for consumers. Member States and their regulatory bodies, consumer organisations, service providers and consumers must adapt to all these changes.

The digitalisation of the energy sector is increasing. Digitalisation in energy comes in different forms. Meters used to be analogue. More and more countries are installing smart meters which can read the consumption at high frequency, express it numerically, and then send this data to consumer's smart phones, other household devices, and energy suppliers and service providers.

This will help suppliers and new types of service providers to propose offers that are adapted to each consumer. They can propose products that help consumers' lower their energy usage, increase energy efficiency, or use energy when there is more renewable generation and avoid consuming when there is more fossil fuel generation. It also means that suppliers and service providers will increasingly use the internet to provide information, market their offers and to communicate with their consumers. This is

For many years, policy makers and regulators have worked on the traditional model where a large supplier provides energy to consumers. A new relationship now needs to emerge.

because the internet makes this much cheaper for them. But many Europeans are in a situation of digital exclusion, especially some consumers in vulnerable situations. **Energy is an essential service, and those still experience digital exclusion should have the same quality of service and access to cheap offers as all other consumers.**

The digitalisation of the energy sector brings opportunities, but it also presents challenges that have already been faced in many other sectors - for instance, in terms of privacy, data protection and who has access to data and cybersecurity. Member States must guarantee the implementation of data privacy and data protection rules. Moreover, they must make sure that non-personal data gathered through energy systems do not end up concentrated in the hands of a few companies, due to anticompetitive behaviour. This could impede

innovation that benefits consumers from thriving. Member States must also guarantee that the energy system and energy-related products connected to the internet are secure from cyber-attacks.

Moreover, flows of data from smart meters and smart grids, the increased use of the internet to shop around and access services, and automated services based on sophisticated algorithms (such as those regulating when to charge an electric car), require significant amounts of electricity. Investment in the digitalisation of the energy system and services, a cost borne by consumers, are often seen as a way of supporting EU-wide targets to decarbonise the energy system. Member States and regulators need to ensure that the benefits of digitalising the system are not thwarted by increasing the use of energy to store and process the data, to the detriment of the consumer who will continue to pay the bill.

Comparison tools have become essential to access information, and vice-versa, as suppliers rely on such tools to reach out to consumers. These tools need to be reliable, give a robust comparison, be accessible by all consumers. Thus, the comparison tools should not be limited to the internet, as some consumers experience digital exclusion. The tools should not take advantage of behavioural biases specific to online shopping and should avoid practices that could be misleading or unfair to customers.

Algorithms, Machine Learning and, Artificial Intelligence will be able to predict how people behave and what triggers them to act or not to act. This can help nudge consumers into making decisions that are beneficial for them, such as changing how we consume to save money and improving our environmental impact. But companies might also use these technologies to increase their profits at the expense of consumers. Moreover, these algorithms can behave in unexpected ways. Thus, adequate safeguards need to be put into place to prevent algorithms from working against consumers.

A regulatory framework that is adapted to the new energy landscape is vital: energy is an essential service, and those in vulnerable situations are most at risk if things go wrong.

There are new ways that consumers can engage with the markets. For example, they can alter the times when they consume the most energy. New offers are reaching the market to reflect this 'flexibility'.

Some suppliers are offering tariffs that are aligned with wholesale market prices. Users can then consume more when there is cheap renewable energy in the system, and less when fossil fuels are needed.

Similarly, new services are appearing where consumers give control of their household energy consumption to a company with the aim to reduce it. This party then sells the flexibility of the household into the market. The company will then remotely control when the household consumes electricity, according to when the grid and system need flexibility.

It is expected that the number of prosumers, consumers who produce part of their own energy needs, will continue to grow. The market for batteries which store energy produced by solar panels is flourishing in many countries. We expect that more and more people will have an electric car. Heat pumps are becoming better known to household consumers and they are more cost-effective under certain circumstances. All these products can provide services to the system, notably flexibility.

This type of consumer needs to be rewarded adequately for the value they bring to the system. Otherwise, those who cannot participate because they can't buy flexible products or have barriers to change their habits will pay to compensate for those who can.

Making decisions will become more complex for consumers, and comparison tools will need to adapt to these new opportunities.

For many years, policy makers and regulators have worked on the traditional model where a large supplier provides energy to consumers. A new relationship now needs to emerge. They need to ensure that consumers benefit from innovation whilst retaining high standards of consumer protection, including on privacy and data protection. This is vital as energy is an essential service, and those in vulnerable situations are most at risk if things go wrong. Regulators will need to step up their cooperation across sectors, ensure that there are no services falling between the gaps and increase links with local authorities and consumer organisations.

1. Recommendations

1.1. Flexible technologies and services for flexible consumption

- **Member States must ensure that consumers providing flexibility services receive fair remuneration.** But they must also ensure that the level of remuneration is not higher than the cost reductions they bring to the grid and electricity systems. **Otherwise it will become a burden for other consumers, especially those on low incomes or in energy poverty.** Technologies which allow flexible electricity consumption, such as storage (including in electric vehicles), smart appliances or heat pumps, can provide significant services to the grid and integrate more renewable generation into the system. This will benefit the system as a whole and benefits must be passed on to all consumers.
- To get consumers on board, **products for flexible consumption should be affordable, and** the remuneration for their flexibility enough to **make it financially interesting for them.** Access to finance, such as low interest green loans can help to make these investments worthwhile for more consumers.
- **Consumers will find it more attractive to invest in products that provide flexibility if they have access to services for flexible electricity consumption.** This could create a virtuous circle, where some consumers are incentivised and society as a whole benefits.
- **Member States must guarantee that consumers have access to alternative dispute resolution mechanisms for all services, including energy services.** Under the Clean Energy Package for all Europeans¹ such schemes will be available to all consumers and mandatory for all energy services. However, some new energy services might not be covered by the existing sectoral legislation. For example, this could be the case for online platforms that sell electricity from consumer to consumer or some third-party intermediaries such as brokerage services. When these new products and services are created, Member States need to guarantee that consumers choosing such models can access alternative dispute resolution and make it mandatory for new service providers to participate.
- **Energy being an essential service, Member States should make sure that consumers,** especially those with less access to digital services or in a vulnerable situation, are not left behind. Those with decreased access to internet services should receive the same level of customer service, with access to effective consumer complaint mechanisms and complete information to compare and find affordable products on equal footing with any other consumer.

¹ European Commission, "[Clean Energy for All Europeans package](#)", last accessed September 2019.

- **Member States, National Regulatory Authorities and other governmental bodies must** acknowledge that not all consumers are the same and consider **the distributional impact of their policies**. They must not only look at an 'average' consumer but also at different consumer groups. They must address the risk that certain consumers can be excluded or be impacted negatively. They should pay special attention to consumers in a vulnerable situation, those on low incomes, tenants living in multi-storey buildings and those who are digitally excluded.
- **Member States must guarantee that consumers have access to at least one comparison tool that includes all energy services and bundled offers.** Under the Electricity Directive, there must be at least one online comparison tool nationally for all electricity supply offers. But the Directive does not make it mandatory to include other electricity services, such as those provided by aggregators² or bundled offers. BEUC asks for Member States to go a step further and ensure that these services are in at least one comparison tool.
- **Member States or the National Regulatory Authorities should step up their efforts in addressing bundled offers.** Jointly with other relevant authorities, they should monitor bundled offers, check if there is lack of transparency in the offers, unfair marketing practices, or lower competition due to lock-in effect. They must intervene where there is potential or proved consumer harm from unfair practices or lower competition.
- **District heating costs reductions must be passed on to consumers.** These reductions might come from, for example, the digitalisation of the sector or the use of waste energy in application of the Clean Energy for all Europeans package.³ Member States or local authorities need to ensure that this is the case, as district heating are regulated markets.

1.2. Digitalisation and automation

- More needs to be done to **enforce data protection legislation and ensure that there is privacy by default and by design**. All companies are expected to obey the law. Thus, enforcement plays a key role in deterring breaches of the rules.
- **Rules on access to data**, either horizontal (applying to all sectors) or specific to the energy sector, **must facilitate competition whilst respecting consumer's data protection rules**. Member States have to guarantee a good implementation of the Electricity Directive in data access.⁴
- Member States must ensure that **consumers using automated decision-making tools, such as auto-switching tools, have the same rights as those contracting directly with a supplier**. More and more services using automated decision-making tools are appearing in the energy market. For example, there are auto-switching sites that will automatically switch the consumer to the cheapest offer in the market. Consumer must retain the rights they have been given by horizontal and energy-specific legislation, such as the right to a cool-off period or

A law is nothing if it is not enforced. More needs to be done to enforce data protection legislation and ensure that there is privacy by default and by design.

² See definition and the consumer perspective on aggregation in section 6.1.1.

³ European Commission, "[Clean Energy for All Europeans package](#)", last accessed September 2019.

⁴ Official Journal of the European Union, "[Directive common rules for the internal market for electricity](#)", 2019/944, 2019.

the right to switch within 24 hours, which needs to be implemented in all Member States before 2026, or the right to receive regular, clear and accurate bills. They must give clear authorisation based on robust information over what the tools can and cannot do on their behalf.

- **We request that all energy suppliers and service providers to abide by the Directive on Security of Network and Information Systems.** Member states should consider all energy suppliers and service providers *Operators of essential service*, irrespective of their size.
- **EU cybersecurity rules must be adapted to address the challenges posed by the Internet of Things.** Many energy services and consumers will rely on IoT. Manufacturers must ensure that they respect product security by design and by default principles.
- **Policy makers at national and EU level must include the energy needs of digitalising the system when making cost benefit analysis,** including the digitalisation happening behind the meter and financed by households.

1.3. Regulation

- **Member States need to make sure that the legislative framework adapts rapidly to the ever-changing energy landscape.** Energy regulators need to find efficient ways to work with other authorities, as energy is increasingly intertwined with other sectors. Member States must guarantee that there is an overarching framework that allows energy regulators to work with, amongst others, authorities overseeing privacy and data protection, competition and horizontal consumer protection rules.
- Sandboxes are a framework where a National Regulatory Authority relaxes some rules and obligations for trialling a new business models in real life. **They should in no way serve as a shortcut to avoid regulation, nor should they be a means to change regulation on a permanent basis.**
- If National Regulatory Authorities set up sandboxes for new energy consumer products that fall out of the traditional supplier-consumer framework, authorities **shall establish criteria on the products that enter the sandbox.**⁵ A business model that might typically fall outside usual energy regulatory frameworks are platforms where households consumers can buy and sell electricity to each other. Regulatory authorities must ensure that consumers using these services have the same level of protection as all consumers.

2. Introduction

The energy landscape is changing rapidly, with decarbonisation, digitalisation and decentralisation at its core. This paper aims to answer the question: how can we ensure that consumers are drivers of the future energy markets, rather than just paying for the energy transition? It provides the consumer perspective in the debate on the future of energy.

⁵ BEUC's recommended criteria for sandboxes regulatory frameworks can be found in section 8.2 of this paper.

Consumers themselves are changing too, with the population in Europe getting older and more urban. This poses challenges for energy. Digital exclusion will be a factor of growing importance for policy makers when they consider new policies and **their distributional impact**.

The way consumers use energy and how they interact with markets will radically change in the next few decades. The priority for policy makers and regulators should be an energy sector driven by consumers' interests and wellbeing. Consumers must be in the driving seat of future energy systems. Beyond sociodemographic changes and their implications for policy, energy affordability is, and will likely remain, the main concern for most energy consumers. **BEUC finds it inadmissible that some consumers could be left behind, especially when they are in vulnerable situations.** As such, Member States or the relevant Authorities must check the distributional impacts of the new trends and policies.

While we cannot predict with certainty what the future will look like, we can identify the trends that are already in motion today.

The **decarbonisation** of energy involves an increase in the proportion of renewable electricity, including for transport, heating and cooling. It will also require investment in energy efficiency.

The **decentralisation** of energy can increase the engagement of consumers with the market, with self-generation and storage from consumers. Self-consumption in households is almost always through renewable generation. Household batteries can stock renewable electricity when there is not enough consumption and put it back to the grid, substituting fossil-fuel generation.

The **digitalisation** of the energy system follows the wider trend of digitalisation and big data in all sectors. This has been possible because of the deployment of smart meters, the Internet of Things and smart appliances.

These three trends can come with significant costs, and the consideration of who pays and who benefits is fundamental.

New business and consumption models are appearing. These models must benefit all household consumers, not only a few consumers or the companies.

BEUC finds it inadmissible that some consumers could be left behind, especially when they are in vulnerable situations.

National Regulatory Authorities are facing big challenges. This is, amongst other things, because of the radical changes in the sector and the stronger interactions between energy and other sectors, for example the digital economy. Old models for protecting the interest of energy consumers might no longer be fit for purpose. Regulators are also innovating to find new ways to approach the future of energy.

In this paper we explore the trends in decarbonisation and decentralization (sections 3 and 4). We then explore the trends, challenges of digitalisation, and look at specific (section 5). We then look at the challenges of the new business models and consumption models that the trends and propose recommendations to safeguard consumers' interest (section 6). We also reflect on other ways in which consumer engagement might change (section 7). We then look into the evolution of regulatory models and how the policy framework can change for the benefit of consumers whilst keeping high standards in consumer protection (section 8).

3. Decarbonisation

EU has a strong commitment to the Paris Agreement: to limit the increase in global average temperatures to 2°C and pursue efforts to keep it to 1.5°C.⁶ The EU has set reductions for 2030 in the areas listed in Figure 1.⁷ Moreover, the European Commission has also set an ambitious goal for a climate-neutral economy by 2050 in its long-term strategy for Clean Planet for All.⁸ These targets mean that for many households there will be a drop in energy consumption thanks to efficiency measures.⁹ It is also expected that consumers will use more electricity to substitute the use of more pollutant fossil fuels. For households ambient heating and transport have high potential to be decarbonised.

BEUC believes that when designing policies to decarbonise the system, specially based on subsidies, Member States must ensure that there is a fair distribution of costs among those who pay and those who benefit of such policies. Furthermore, the European Commission must ensure that future State aid decisions related to energy must better protect the interest of consumers.¹⁰

	GREENHOUSE GAS EMISSIONS	RENEWABLE ENERGY	ENERGY EFFICIENCY	INTER-CONNECTION	CLIMATE IN EU-FUNDED PROGRAMMES	CO2 FROM:
2020	-20%	20%	20%	10%	2014-2020 20%	
2030	≤ -40%	≥ 32%	≥ 32.5%	15%	2021-2027 25%	CARS -37.5% Vans -31% Lorries -30%

Upwards revision clause by 2023

Figure 1: 2030 framework for climate and energy¹¹

While the **electrification of transport through electric cars is often discussed, the decarbonisation of heating**, has been considered in EU policy only to a limited extent. The first drafts of the National Energy and Climate Plans (NECPs) gave little attention to the decarbonisation of this sector. There must be more focus on district heating. This is despite some economies of scale and efficiencies that could be gained through using district heating, for example by reusing waste heat. The European Commission estimated that “the amount of heat produced from industrial processes and wasted in the atmosphere or into water in the EU is estimated to be enough to cover the EU’s entire heating needs in residential and tertiary buildings”.¹²

BEUC recommends that Member States put more decarbonisation efforts also on the heating sector, including district heating. They must ensure that this decarbonisation is affordable, especially focusing on those in vulnerable situation. For example, waste heat is a cheap source for increasing energy efficiency that can be used

⁶ European Commission, “[Paris Agreement](#)”, last accessed September 2019.

⁷ European Commission, “[2030 Energy Strategy](#)”, last accessed September 2019.

⁸ Ursula von der Leyen, “[Mission letter to Frans Timmermans, Executive Vice-President-Designate for the European Green Deal](#)”, September 2019.

⁹ However, so far these have been slow to implement in the previous period.

¹⁰ Monique Goyens, “[Future State aid decisions related to energy must better protect the interest of consumers](#)”, Letter to the European Commission, July 2019.

¹¹ European Commission, “[United in delivering the Energy Union and Climate Action - Setting the foundations for a successful clean energy transition](#)”, COM (2019) 285, 2019.

¹² Fraunhofer et al. “[Study on Mapping and analyses of the current and future \(2020 - 2030\) heating/cooling fuel deployment \(fossil/renewables\)](#)”, 2016, as quoted by European Commission, “[Towards a smart, efficient and sustainable heating and cooling sector](#)”, 2016.

for district heating. Member States must ensure that the use of this waste heat lead to low prices for consumers and is not used to beef up company profits.

4. Decentralisation

More households generate electricity on their rooftops than ever before, or use energy produced by their community or block of buildings. The European Commission pointed out in a study that “around 16GW [of PV] is estimated to have been installed by households. In 2016, we estimate that almost 17GW residential solar PV was installed in the EU”.¹³

This has been partly driven by the lower costs of technologies. With the new Clean Energy for All Europeans package¹⁴ this should become even easier in all Member States. BEUC also expects that thanks to new policies, new technologies and new business models, there will be more opportunities to sell and purchase the electricity from one household to another. These are the so-called peer-to-peer platforms, exchange platforms that could become “the eBay of energy”. Other costs of the energy system such as transport would be added.

Energy storage is becoming more affordable, and households are investing. This storage can help provide electricity locally. Important efforts in research and development deployed in recent years are bearing their fruit. Storage technology is expected to become more efficient and affordable, and this is also the case for all sizes of households and types of consumers: from the household level to a whole neighbourhood.

More households generate electricity on their rooftops than ever before.

For households, the most prominent use model, and the one that is gaining traction across leading countries in the EU, is to combine a solar panel with a battery.¹⁵ Importantly, electric cars can provide storage as well.

Regulators, System Operators, suppliers are looking more and more how to harness flexibility of consumption and generation by households. Most new renewable energy production sites are based on wind and solar energy. We cannot decide when the wind blows or when there will be more sun. The generation of renewable electricity, and the time when people need electricity, are often not aligned. Although we are not able to control this generation, we are able to predict quite accurately how much renewable electricity is generated. This gives an opportunity for some households to adapt when they will consume electricity, for example through change of habits, storage or automation.¹⁶

5. Digitalisation and automation

Smart meters and automation are becoming more common in our homes, offering the opportunity for more efficient and better-informed consumption.

¹³ GfK Belgium, “[Residential Prosumers in the European Energy Union](#)”, JUST/2015/CONS/FW/C006/0127, European Commission, 2017.

¹⁴ European Commission, “[Clean Energy for All Europeans package](#)”, last accessed September 2019.

¹⁵ A study estimated that that Europe’s residential storage capacity would grow fivefold, reaching 6.6 gigawatt-hours by 2024. Wood MacKenzie, “[Europe residential energy storage outlook 2019-2024](#)”, 2019.

¹⁶ We explore more on how this flexibility might work for households in section 6.

Digitalisation and automation open the door to many **new ways for the consumer to interact with the system**. For example, there are already services that help the consumer optimize the use of electricity generated by their solar panels. If the solar panel is attached to a battery, the service automatically decides when to use, when to store or when to sell the electricity generated by the solar panel, and when to buy or store the electricity from the grid.

The progressive sophistication of algorithms, powered by ever-increasing computing power, will be able to process and utilise the vast amounts of data produced by consumers in order to learn more and more about them. This knowledge will be used for purposes and business models that we can't even conceive yet. Business models derived from big data could be beneficial for some consumers, but they could also be harmful for others. For example, this could lead to price discrimination, where each consumer pays a different price for the same product, which we address later in this paper.

5.1. Privacy and data protection

Smart technologies and consumer data-driven products and services could bring several benefits to consumers and the energy system, but they could also undermine the consumer's fundamental rights to privacy and data protection. Surveys show that consumers are concerned about how their personal information is being used, by whom and for what purposes.¹⁷

Companies should embed privacy protections in the way they design their products and service data policies, following the principles of *privacy by design and by default*. Companies should strictly apply the principles of data minimisation and purpose limitation. They should not process more data than they need for the delivery of their services and they should not use data for purposes different from the purpose for which the data was originally collected.¹⁸

The new offers that have come into the market have not always followed through on consumer-centric data protection and privacy provisions. BEUC recently analysed the terms and conditions of six offers for services for flexible electricity consumption. Poor privacy provisions and lack of compliance with the General Data Protection Regulation (GDPR) were the most disappointing conclusions from BEUC's analysis. There were several breaches of GDPR, and many privacy provisions were unfair to consumers. After discussion with the relevant companies, some changed their terms and conditions, aligning them with BEUC's recommendations.

5.2. Access to data

Data from smart meters, smart appliances, electric cars charging points in the household or other products linked to a household consumption can tell us a lot about consumers habits and preferences. Smart grids will also be producing a great deal of data. When this data is analysed, it can be an important source of information to develop new products and services that meet consumer's needs.

Some energy firms might be the de-facto "monopolistic" data holders. For example, in some cases one company holds most of the data generated from smart meters or smart appliances (for example smart thermostats). Moreover, in many Member States it is the Distribution System Operator (DSO) that collect most of the consumption data. DSOs have

¹⁷ European Commission, "[Flash Eurobarometer 443 on ePrivacy](#)", 2016.

¹⁸ European Commission, "[What does data protection by design and by default mean](#)", last accessed September 2019.

control over the data, but they might have an interest in keeping the data as they participate in other parts of the market.¹⁹

These firms can have an incentive to restrict access to data for other parties, even with the consumer's consent. By withholding the data, they can forestall the introduction of new products and prevent new entrants from obtaining a foothold in the market. Thereby, they can maintain a monopolistic (or quasi-monopolistic) position, and a competitive advantage that is detrimental to consumers by undermining competition.²⁰

For example, independent repair and maintenance providers for smart appliances, including boilers and batteries, are likely to become more dependent on the appliances data. If they access the data, they might be squeezed out of the market by those who have the data, that is, those who have produced the appliances. This could in turn reduce competition, reduce consumer choice and ultimately lead to increased service costs.

A healthy digital ecosystem requires a consumer-centric approach to data governance that avoids concentration of data in a few hands, limiting the consumer benefits of a well-functioning market: consumer choice and innovation.

It should go without saying that it is the consumer who should decide who has access to their data, and under which circumstances and conditions it can be used. Existing horizontal legislation is likely to be insufficient in these cases. This is for example the case of Article 20 of the GDPR.²¹

As a leading model of sectoral legislation, the Electricity Directive²² establishes principles of non-discriminatory access to data, **including provisions on the exchange of data among suppliers and aggregators, who can provide flexibility services.** It is for Member States to set the detail, which must respect key data privacy principles. Policies relating to access to data should be designed with the interest of consumers at their core. The main objectives of these policies should be to boost consumer choice, their welfare and the development of services that benefit society. When designing policies, BEUC recommends focusing on 4 pillars: (1) guaranteeing well-functioning competitive markets, (2) protecting consumers, (3) promoting the public interest and (4) ensuring consistent oversight and enforcement.

After the implementation of the Directive, it is important to consider whether similar obligations should be extended to other areas such as data generated by connected devices.

5.3. The Internet of Things (IoT)

The Internet of Things (IoT), where household appliances directly connect to the internet, allows automation and remote control of energy consumption. The number of connected devices is skyrocketing with 31 billion predicted to be used in 2020 and 75 billion by 2025.²³

Electricity usage could theoretically be optimised by a smart box that modifies the household consumption. But the few currently commercially available are still very expensive. The boxes can work through an algorithm which uses data from the internet

¹⁹ The EU third energy package of 2009 asked for an unbundling of large DSOs from generation and supply services.

²⁰ A relevant distinction is data as an 'input', that is the 'raw' data, and data as an 'output', after it has been treated. 'Input' data would be the relevant data to consider access to for developing new products. 'Input' data needs to be interoperable, that is, all parties should be able to use it in practice. 'Output' data will have used algorithms developed by companies, which should remain their property.

²¹ J.Dexl, "[Data Access and Control in the Era of Connected Devices](#)", BEUC, 2018.

²² Official Journal of the European Union, "[Directive common rules for the internal market for electricity](#)", Directive 2019/944, 2019.

²³ Statista, "[Number of connected devices worldwide](#)", last accessed August 2019

(especially on prices) or receives orders from a service provider that gives instructions on usage through the internet. This could be connected to a smart meter or could work independently.

Alternatively, a smart appliance could respond to market prices through information received from the internet. These high expectations of consumers, industry and policymakers from how the Internet of Things can bring them value need to come hand in hand with data and consumer protection, and a legislative framework around access to data that promotes innovation and competition.

5.4. Algorithms, Automated Decision-Making and Artificial intelligence (AI)

Algorithms, machine learning and AI will revolutionize the way we consume energy and the way the electricity system functions. They could help us to decarbonise the system, by having smarter and cheaper ways to prevent fossil fuel use. They could help households cut their bills by using less energy and using it when prices are low.

Automated decision-making tools could also automatically change consumers' suppliers or service providers so that they are always on the product (and tariff) which best suits their needs and their budget.

However, AI and advanced algorithms might be used to the detriment of consumers, too, and benefit only the bottom line of the companies using them.

Moreover, AI and very advanced algorithms are often "black box" systems. Often, neither the companies using them, nor the regulators, nor AI experts, not even those developing them and much less consumers, can grasp how they work. And no one quite understands what kind of consequences they might have.²⁴

This is, amongst others, because machine learning and AI often are designed to evolve on their own and without human intervention, and because sometimes these systems are based on replicating outputs from the past without understanding what is really happening in the market or for consumers.

Decision that is taken by a machine, and not by a human, must not undermine the consumers' right of access to justice.

For example, an AI system used by many suppliers to propose products and prices to consumers can lead to tacit collusion, which is when all suppliers end up proposing the same price instead of competing in price. These algorithms could also lead to price discrimination where different consumers are offered different prices based on their behaviour and exploiting their biases and vulnerabilities.²⁵

Consumers should be sufficiently protected and have adequate rights to be able to reap all the benefits of these sophisticated tools. This requires:

- **Transparency.** Companies must provide meaningful information to consumers using or intending to use their services. The information should be clear and sufficient, so the consumer understands the basics of how the algorithm, or the AI system works and the consequences of its use.

²⁴ Amongst others, the US Defence Advanced Research Projects Agency is researching how to make AI understandable to all users. *Darpa*, "[Explainable Artificial Intelligence](#)", last accessed September 2019.

²⁵ We explore this further in section 6.

- **Relevant control and authorisation from consumers.** Consumers should give adequate authorisation on what an automated decision-making system can do on their behalf. The relevant authorities must monitor and enforce consumer rights rules (from horizontal and sectoral legislation) on automated decision-making tools. For example, we expect that consumers are well-informed about their right to a cool-off period when the decision is automated and can use that right easily. Importantly for entering new and complex contracts, consumers should have the last word. Similarly, some automated decision-making tools might represent loss of consumers' control over their data.
- **Accountability and redress.** When there is a problem, it is simply not enough to say this is caused by the algorithm and that there is no responsible party. The companies using the algorithms must be able to demonstrate that the algorithm is designed to comply with the law. Any algorithm must comply by design with consumer rights. Data protection and privacy must be ensured and follow competition rules. That the decision is taken by a machine, and not by a human, must not undermine the consumers' right of access to justice.

Current EU consumer protection legislation, such as the product liability legislation, is insufficient for the fast-paced evolution of these sophisticated algorithms and AI technology. The applicable EU legal framework should undergo a thorough fitness test, an in-depth evaluation of whether it meets the needs of citizens and business. Such a test should also include energy specific regulations²⁶.

Member States must ensure that the consumers using automated decision-making tools have the same rights as those contracting directly with a supplier.

Particular attention should be given to issues related to transparency, liability, accountability, non-discrimination, competition and consumer redress, where gaps in legal protection are becoming more and more apparent and the need to regulate is more urgent in order to protect consumers in this rapidly changing world.

For energy, automated switching services are now available in some Member States. These services go a step further than the search engine. They regularly propose new deals for consumers and take all necessary steps to make the change from one supplier to another.²⁷

In the UK, Citizens Advice have expressed concerns that some of these services are taking the role of the supplier, relaying billing information and taking meter readings. But as they are not licenced as a supplier, it means that the National Regulatory Authority or the Ombudsmen can't use their powers to ensure consumers are protected in that area. This leaves a gap in the consumer being able to access justice.

Member States must ensure that the consumers using automated decision-making tools have the same rights as those contracting directly with a supplier. Member States must ensure that consumers are still in control when using these tools. Consumers using these tools should not be left in no-man's land. They must keep the consumer rights granted by horizontal and energy specific legislation, such as the ability to have a cool-off period, a 24-hour switching period which will be mandatory in all Member States by 2026. Consumers must give clear authorisation based on robust information to what the tools can and cannot do on their behalf.

²⁶ BEUC, "[Automated Decision Making and Artificial Intelligence](#)", 2018.

²⁷ Test Achats/Test Aankoop offers these services through Gaelle in Belgium. Other similar services exist, such as: Weflip, Migrate and Flipper (UK), or June (BE).

5.5. Price personalization or price discrimination?

People use a multitude of online tools daily. Numerous companies collect information about consumers' online activities, or their consumption data. With this data, they can profile consumers thanks to this information. Sophisticated algorithms mixed with behavioural insights can use this data to learn how consumers behave.

For example, they can understand whether they will switch suppliers easily or whether there are times where they will always consume energy. This knowledge opens the door for companies to provide personalised prices: the same product and service can be offered at a different price for each consumer.

A personalised price can be designed so that each consumer pays the exact price at which they value the product or service. For an essential product, this could be as much as they can pay based on, for example, their income or health needs (such as heating).

Said in a different way, in a market with no price personalization, all consumers pay the same price for the same product. Each consumer will be left with more money than with a market with personalised prices. In a market with personalised prices, this money will go to the companies' revenues.

BEUC considers that personalised prices can have disadvantages for consumers. This is the case if companies implement it by using unfair commercial practices pushing the consumer to pay the highest amount that they are willing to pay for electricity. Further research is needed to assess the impact of personalised pricing on consumers.

Energy is an essential service. Thus, many consumers are willing to pay most of their income for it. BEUC considers unacceptable when those practices harm vulnerable consumers. For example, consumers in a vulnerable situation might be less creditworthy. Suppliers could gather data from different sources to establish creditworthiness, based on criteria like whether they are unemployed. Furthermore, BEUC considers that the current legal framework might not be enough to address the concerns raised by this practice.²⁸

There have been cases of suppliers blocking a consumer from entering an energy contract with them which are situations of extreme price differentiation. For example, in Germany, companies have blocked consumers that are changing suppliers too frequently. Companies make the most money out of loyal customers. Certain companies have blocked contracts with consumers that are profiled as disloyal.²⁹

New policies and regulations should also consider consumer preferences. There is growing evidence that consumers are reluctant to be subjected to price personalisation. According to a survey by our UK member Which? only 13% of the UK population are not worried by the potential ways in which their data could be used. The vast majority feel powerless when it comes to how firms use their data, including for the purpose of tailoring offers.³⁰ Citizens Advice found similar trends in their own survey, with more than 4 in 5 respondents stating that they felt uncomfortable with personalised pricing in essential services, and 3 in 4 stating that they would not trust their provider if it used personalised pricing.³¹

²⁸ BEUC, "[Personalised Pricing in the Digital Era –Note by BEUC](#)", DAF/COMP/WD(2018)129, OECD, 2018.

²⁹ Stiftung Warentest, "[Wenn der versorger Sie als Kunde ablehnt](#)", last accessed September 2019.

³⁰ Which?, "[Control, Alt or Delete? The future of Consumer Data](#)", 2018.

³¹ Citizens Advice, "[A Price of one's own. An investigation into personalized pricing in essential markets](#)", 2018.

5.6. Cybersecurity

In April 2019, the European Commission published a series of recommendations on cybersecurity in the energy sector³². One of its main priorities was to help the energy sector implement existing cybersecurity legislation. Notably, it recommended Member States consistently implement and enforce the Directive on Security of Network and Information Systems (NIS Directive).

BEUC fully agrees with this action point and **encourages all energy suppliers and service providers to comply with the NIS irrespective of their size**. Currently, in certain Member States, smaller companies might be excluded from the scope of the Directive, which can leave many consumers exposed to hacks and which can cause them significant harm.

In addition to the problems related to critical infrastructure, it is important to underline that the current EU cybersecurity rules do not sufficiently address the challenges posed by the Internet of Things. Today, many connected devices available in the EU (including smart meters) are designed and manufactured without the most basic security features embedded in their software.

Our Belgian member, Test Achats, recently tested the security of a smart home: they installed 19 popular smart devices in one household and gave ethical hackers a deadline to exploit potential vulnerabilities.³³ In just 5 days, more than half of the products were found to be vulnerable to hacking.

The lack of security of connected products represents risks to consumers' privacy, safety and security of their property. Importantly, critical infrastructure such as the grid using insecure products could also be open to cyberattacks, leaving entire regions without lights.

It is therefore of key importance that manufacturers of Internet of Things devices implement security *by design* and *by default* principles. Security *by design* means that products and services should include high-level cybersecurity functionalities. Security *by default* means that default settings must always be the secure ones.

Energy service providers, where relevant, must ensure that the products they bundle in their offers and are linked to the internet abide by those principles as well.

5.7. Digital engagement with the market

Energy consumers very often use digital services to hunt for and switch to new deals, obtain better information, and communicate with their energy companies. Consumers often rely on online comparison tools to shop around for gas and electricity offers. For instance, in a consumer survey conducted for the European Commission, 64% of respondents who had compared tariffs of different electricity companies said they had used online comparison tools to do so.³⁴

For the market to be more dynamic, consumers must be able to trust that these tools give them reliable information.³⁵ It is important to note that many EU consumers experience

³² European Commission, [European Commission's Recommendation on cybersecurity in the energy sector, C\(2019\) 2400 final, April 2019](#).

³³ Including a fridge, an alarm system, a thermostat, a printer, a children's tablet, a door lock, a speaker and a vacuum cleaner robot.

³⁴ Directorate-General for Justice and Consumers, ["Second consumer market study on the functioning of the retail electricity markets for consumers in the EU"](#), 2017.

³⁵ ACER, ["Households and Businesses Benefit from Falling EU Energy Prices"](#), 2017.

digital exclusion, and some will remain in that situation in the foreseeable future. They must also have access to robust and comprehensive comparisons of the offers in the market off-line.³⁶

Currently a wide range of organisations provide comparison tools: private, public or from the third sector. The Electricity Directive (Article 14) requires that there is at least one comparison tool at national level that is meeting strict criteria to ensure consumers' trust. For example, this comparison tool must cover the whole market for energy supply offers, including dynamic tariffs, and be independent from energy companies. The comparison tools meeting those criteria can then ask for a "trust mark."

Policy makers must consider the real-life behaviour of consumers in order to help protect their interests when shopping around. Authorities must tackle practices that exploit consumers' behavioural biases which sometimes leads to choosing a deal that was not what they were aiming for.

For example, a report by the Behavioural Insights Team (a leading organization in the study of behavioural science based in the UK) also warns us of the existence of what they call "sludges" when shopping online. *"While some of these [nudges] are helping us [...] others are deployed to more harmful and manipulative ends – exploiting our behavioural biases, adding deliberative frictions to thwart positive choices and harnessing our mispredictions and information deficits."*³⁷

Big data exploitation can be used to push us to make decisions that are not good for us, and that increase company profits.

5.8. Increased use of energy created by digitalisation

Pollution from digital sources is enormous. This is due to three main factors: first, the manufacturing of the devices, second the e-waste, and third the use of energy through charging electronic devices and the high electricity needs of the use of data centres and servers.

If the internet were a country it would have the 3rd biggest electricity consumption in the country, just behind China and the US because of all the data centres and servers needed for its functioning.³⁸ The carbon footprint of the internet (around 300 million tonnes of CO₂ per year in 2010) is equivalent to every person in the UK flying to America and back twice over.³⁹ Sending an email to one person with an email of 1 Mo is equivalent to the consumption of a bulb of 60 Watt for 25 minutes.⁴⁰

The great needs of computing power for making the energy system smart will also require enormous amounts of energy, making it harder and more expensive to decarbonise the energy system. Policy makers need to ensure that they look at the energy needs of digitalised energy systems if they are going to decarbonise the system.

³⁶ For more information see section 7.4.

³⁷ Behavioural Insights Team, "[How can we tackle the challenges facing us online](#)", 2019.

³⁸ T.Laherre, "[Internet : le plus gros pollueur de la planète?](#)", Fournisseurs Energie, October 2018 (in French).

³⁹ D.Clarke, M.Berners-Lee, "[What's the carbon Footprint of the Internet?](#)", The Guardian, August 2010.

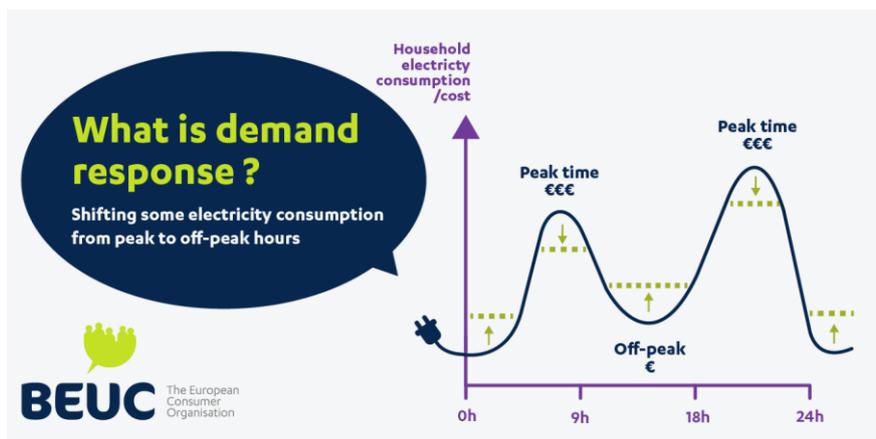
⁴⁰ In view of these shocking statistics, BEUC decided to decrease the size of our collective mail inbox by roughly 15% of its size July 2019 by December 2019. BEUC intends to continue the efforts to diminish our digital pollution in 2020.

6. NEW BUSINESS MODELS, NEW CONSUMER MODELS

6.1. New supply and energy services models

6.1.1. Business models that harness flexibility in household consumption

The Electricity Directive⁴¹ opens the door for new business models to emerge which create value out of a consumer's flexibility. This can be used to balance the system, integrate more and more renewables in the electricity mix, and avoid high costs for the grid. This is referred to as demand response.



From these models, two main families have already become services available to household consumers in some countries.

Dynamic price contracts are an electricity supply offer that reflects prices in the wholesale markets. Consumers are therefore incentivised to decrease energy consumption when the prices are high and decrease when prices are low.



Aggregation contracts are usually provided by third parties, independent from the supplier. They remotely control the consumers electricity use and reward them for it. An aggregator will work with several consumers and then sell the aggregated flexibility (or storage) on electricity markets.

⁴¹ Official Journal of the European Union, "[Directive common rules for the internal market for electricity](#)", 2019/944, 2019.



Dynamic tariffs are quite new for households. Yet night and day tariffs have been available for a while. They can teach us valuable lessons about the consumer's perceptions of variable tariffs. vzbv, BEUC's German member found that two-thirds of consumers want to save money but fear having to pay too much with night and day tariffs. Ease of use and convenience were essential for the surveyed consumers.⁴²

Citizens Advice noted during the Future for All workshops they organised, there was a high degree of scepticism about these new products, and fears of a loss of control. This was the case even where a cost saving could be achieved.⁴³ **Companies offering services for flexible electricity consumption must strike a balance between savings and a level of control consumers are comfortable with to get the consumer on board.**

Moreover, these new offers add a layer of complexity when consumers hunt for deals and decision-making. The Directorate General for Justice and consumers found that "Consumers were [...] less likely to choose the cheapest deal if the price structure was more complicated."⁴⁴

Member States must ensure that consumers can access at least one comparison tool providing comparison of all the aggregation services available in the market, and that they help compare these offers against or in combination with dynamic tariffs and traditional offers. These comparisons could be provided for example by the comparison tools receiving a trust mark as defined in Article 14 of the Electricity Directive. This is especially important as the ability to get adequate returns of investment for some sustainable solutions relies on valuing the flexibility that the product can bring to the system. We will explain this interaction in the New Consumer Models section.⁴⁵

6.1.2. Old players taking on new roles

Cities and neighbourhoods are becoming active in providing new energy services and solutions to their inhabitants. The important role cities can play in lowering carbon emissions was acknowledged in the Paris Agreement, which invites them to act. The signatories of the EU Covenant of Mayors have, as an objective, to accelerate the decarbonisation of their territories, strengthen their capacity to adapt to unavoidable climate change impacts, and allow their citizens to access secure, sustainable and affordable energy. To do so, the signatories submit a Sustainable Energy and Climate Action Plan (SECAP) outlining the key actions they plan to undertake.

⁴² vzbv, "[Variable stromtarife aus Verbrauchersicht](#)", 2015 (in German).

⁴³ Impact, "[Future Energy Models](#)", Study prepared for Citizens Advice, May 2019.

⁴⁴ Directorate-General for Justice and Consumers, "[Understanding and choosing energy deals](#)", 2017.

⁴⁵ For more information, see section 7.2.

Cities have a large role to play on district heating, either by developing and managing the facilities or facilitating their development. They need to ensure that district heating is affordable, that consumer rights are protected, and that the sector is sustainable and contributes to address the climate crisis.⁴⁶

However, BEUC believes that district heating must be better regulated especially when it comes to consumer rights. Consumer organisations' analyses found several shortcomings for consumers using district heating.⁴⁷ Only in a few countries there is an institution that oversees this area and has enough powers to protect consumers connected to district heating. For example, in the UK, there have been calls for more regulation from the UK Competition Authority.⁴⁸

Intervention of Member States or local authorities might be the necessary tool so that price reductions in district heating costs are passed on to consumers. District heating is often a monopolistic activity, but competition forces could come into play in some occasions. As such, district heating should be part of any strategy on climate change, including being addressed in the NECPs.

Suppliers are becoming more service-oriented and are focusing more on digital services. Suppliers are increasingly offering energy services attached to their supply offers, for example boiler maintenance and insurance.⁴⁹ Moreover, the way they interact with consumers has become more digital. For example, online chats are the cheapest way for suppliers to interact with their customers and are increasingly becoming companies' preferred form of communication with their clients. Nevertheless, consumers should be able to contact their supplier in a variety of ways.⁵⁰

6.2. New models of consumption

6.2.1. Electric cars

Europe is betting on electric cars as a key component to decarbonise transport. This has repercussions on the energy consumption of the household. For most electric car users, between 80% and 90% of the charging will be done either at home or at work.⁵¹

A research commissioned by BEUC found that electric cars will be cheaper by 2025,⁵² but only if they have access to electricity 30% much cheaper than they have today. The study predicts that this can be reached through **dynamic tariffs** combined with automation, to charge the car at the cheapest times.⁵³

⁴⁶ An example of how cities have contributed to using waste is the city of London, who developed a [waste heat map](#) to support project developers. London's Borough of Islington is now developing a project which will use waste energy [from the London Underground](#), which is expected to provide heat at very low costs. Another example can be found in [Stockholm](#), where the only district heating company buys excess heat from different third party companies and sells it on to customers. Although currently excess heat only covers 1% of total demand, waste energy has the potential to provide one eighth of the city's heat demand.

⁴⁷ Which? expressed concerns on several problems from District Heating Customers in the UK. *Which?*, "[I have a problem with my district heating, what can I do?](#)", last accessed September 2019.

Arbeiterkammer found similar concerns in Austria. M. Winner, "[Nah- und Fernwärme - Stärkung der Rechte der KonsumentInnen](#)", 2016 (German). See also their other analysis of the district heating market, Arbeiterkammer "[Blackbox Nah- und Fernwärme](#)", last accessed September 2019. (Both in German).

⁴⁸ In the UK, the Competition and Markets authority called for Ofgem (National Regulatory Authority) to have more powers. Competition Markets Authority, "[Heat networks market study-final report](#)", 2018.

⁴⁹ CEER, "[Peer roundtable on bundled products](#)", 2017.

⁵⁰ The Services in the Internal Market Directive (2006) asks for consumers to have a diversity of contacts available to them to put a complaint or request for information: telephone, email, fax, and postal service. *Official Journal of the European Union*, "[Directive on services in the internal market](#)", 2006/123/EC, Art 27.

⁵¹ BEUC, "[Making Electric Cars Convenient](#)", 2019.

⁵² BEUC, "[Low Carbon Cars in the 2020s-brochure](#)", 2016.

⁵³ BEUC, "[Low Carbon Cars in the 2020s-report](#)", p.22, 2016.

There are currently very few services that value flexibility for households, such as dynamic tariffs and aggregators. There is thus little evidence to determine if, for how long and in which countries the 30% reduction in electricity prices is achievable.

The more renewables are integrated into the electricity system, the more electric cars will help achieve the decarbonisation of the transport sector.

The savings will also depend on how flexible consumers can be in their electricity use (for example how much automation there is in their household) and how much the electricity costs vary.⁵⁴ There are other barriers for the development of electric cars, such as accessibility of charging points with transparent and comparable prices, and where the driver can use a wide range of payment methods.⁵⁵

The more renewables are integrated into the electricity system, the more electric cars will help achieve the decarbonisation of the transport sector. The flexibility that the vehicle itself offers can help integrate more renewables in the system. This creates a snowball effect. But it is also important that further flexibility is added to the system to compensate for the increase in demand of electricity from electric cars whilst keeping high proportions of renewables in the energy mix.

The cost of reinforcing the grid needs to be attributed fairly. For households, it is likely that most people will plug their car in roughly at the same time: when they come back from work. This could create peaks for electricity demand, but also put constraints and bottlenecks on the grid.

Services for flexible electricity consumption and automation can help avoid big peaks of consumption in the grid from electric cars and reduce the necessary investments. Yet, some geographical areas with low electrification of energy will still need additional capacity to cope with an increase of electric cars. This is notably the case for countries and cities where heating is largely based on district heating or gas.

The current thinking is that consumers should pay for the exact cost they generate to the grid. But this is difficult to put in place.

6.2.2. Solar panels, storage and peer-to-peer

More and more consumers are installing solar panels in their rooftops.⁵⁶ Solar panels will produce electricity during the day when, typically, consumers are not at home. Most consumers, when allowed, will therefore upload the electricity they don't consume to the grid.

The revised Renewable Energy Directive⁵⁷ obliges the grid to take the electricity, and Member States should ensure that consumers are paid for it. But there is a disconnect between when consumers need electricity, and when the sun shines and the panels produce electricity.

This of course will depend on the season, if it is a weekday or a weekend, or if it's on a weekday or on a weekend. Households tend to use less energy during weekdays. When the sun sets, people come back home and do most of their household activities. They will take electricity from the grid. This can pose challenges for the grid, driving grid costs up.

⁵⁴ BEUC study shows that this level of reduction is already available through night and day tariffs from Ecotricity in the UK and EDF in France (see footnote 32).

⁵⁵ BEUC, "[Making Electric Cars Convenient](#)", 2019.

⁵⁶ European Commission, "[Study on Residential Prosumers in the Energy Union](#)", 2017.

⁵⁷ Official Journal of the European Union, "[Directive common rules on the promotion of the use of energy from renewable sources](#)", 2018/2001, 2018.

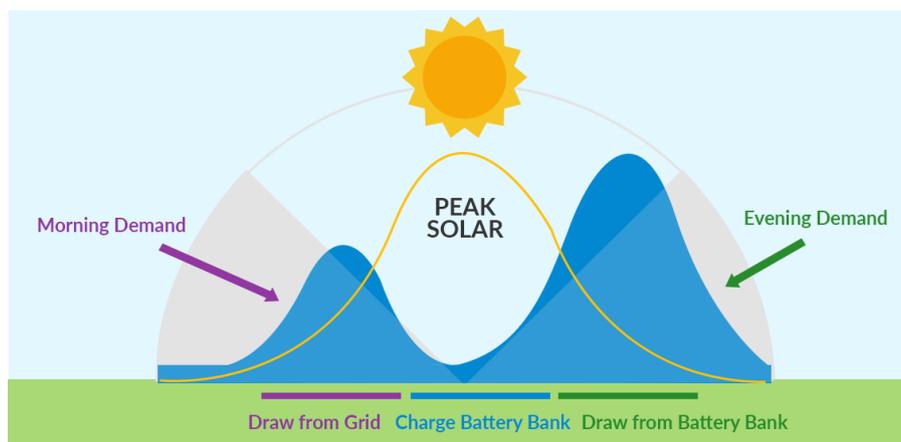


Figure 3: Stylised typical household consumption and solar generation⁵⁸

Storage and optimisation systems can help solve the peak solar production and household consumption being out of sync. Besides batteries, solar panels can be combined with other sources of flexibility and storage: for example, heat pumps, and/or electric cars. Services that value flexibility will make storage and optimization products more attractive to consumers. This in turn will help to better integrate renewables generated in the household or by larger plants connected to the grid.

It is unlikely that many consumers will fully disconnect even if they are self-sufficient.

Being more self-sufficient will be more attractive for consumers if the costs of electricity and gas increase.

Some fear the risk of households (or communities) disconnecting all together. As the richer households tend to be those more able to afford such systems in the first place, less well-off consumers are then left to pay for the infrastructure. This is often called the networks' *dead spiral*.⁵⁹

Some consumers do not trust that taxes and levies will keep adding up to their bill. Similarly, electricity prices are unpredictable. Thus, they prefer to rely as little as possible on electricity sourced from the grid. It is unlikely that consumers will fully disconnect even if they are self-sufficient. They will use the network as a back-up. Future network tariffs will need to reflect how the network is used. That is, it should value both the benefits and the costs that the systems impose.

Consumers will also be able to sell their excess energy in new ways. The Electricity Directive⁶⁰ made it possible to sell electricity from one household to another. This is often referred to as peer-to-peer transactions or trading and is expected to be done through virtual online platforms. The directive specifically points at energy communities as a main player in such transactions. It is particularly challenging to ensure that the interests of consumers are protected when buying through those platforms, especially as energy is an essential service.

There is little experience of such platforms for energy in Europe. But we can learn from other sectors. A study by the European Commission found that 6 in 10 respondents buying from other consumers were not aware or uncertain of their rights and responsibilities for

⁵⁸ source: Let's go solar, "[What is a solar battery](#)", last accessed September 2019.

⁵⁹ N.D.Laws, B.P.Epps, S.O.Peterson, M.S.Laser, G.K.Wanjiru "[On the utility death spiral and the impact of utility rate structures on the adoption of residential solar photovoltaics and energy storage](#)", 2017.

⁶⁰ Official Journal of the European Union, "[Directive common rules for the internal market for electricity](#)", Directive 2019/944, 2019.

these transactions. The same proportion did not know where to turn when things went wrong. Similarly, 4 to 10 sellers also said they did not know or were not assured about their rights and responsibilities.⁶¹ Several BEUC members' organisation highlighted challenges when enforcing consumer protection law when it came to these kinds of platforms.⁶²

6.2.3. Heat pumps

Heat pumps are still relatively unknown products for consumers, when compared to electric vehicles and solar panels. In a survey from the CLEAR 2.0 project in 5 countries, 63% of respondents claimed to know exactly what a solar panel was, compared to 30% for heat pumps.⁶³ Heat pumps are nowadays only profitable under certain conditions that are not met by most consumers in all Member States.

Some of the conditions are external to the energy system: how well the house is insulated, local climate conditions, costs of alternative heating options, having a solar panel or having enough available space in the home. But the profitability also relies on tariffs that can value the flexibility that heat pumps can bring to the system. This flexibility, for many heat pumps models, comes without losing consumer comfort.⁶⁴

Having favourable offers for flexible electricity consumption available in the market will incentivise the installation of heat pumps that can provide flexibility. The more the reward for the flexibility for a stable period, the more likely consumers will purchase a heat pump.

Heat pumps are a form of electrifying heat, and the impact on the gas and electricity network needs to be considered. A large uptake of heat pumps in areas where most people use other sources of energy, such as gas, will have an impact on the grid which might need extra capacity – even with offers for flexible electricity consumption that would reduce peak usage. Moreover, this will reduce gas consumption: investments in the gas grid need to be adapted to avoid unnecessary cost for stranded assets.

Like with electric cars, heat pumps can contribute to reduce carbon emissions only if more renewables get into the energy system. Heat pumps can help their integration thanks to flexibility, but other factors are necessary to increase the renewable share in the system.

6.2.4. Bundled products

Consumer organisations in several countries have registered an increasing number of bundled offers on the energy market. The bundles offered include parallel services such as telecoms but also services from insurance to gift cards. In many cases, additional products or services are not provided by the energy retailer, but by other service providers. In the area of flexible offers and products, we have also observed some bundled offers of aggregation and products that can provide flexibility.

For example, in Germany, Sonnen offers access to energy supply and aggregation bundled with their batteries and extending their guarantees. Aggregators offer their products with the box that gives the signals to increase or slow down consumption.

⁶¹ European Commission, "[Exploratory Study of Consumer Issues in Online Peer-to-Peer Platform Markets](#)", 2017.

⁶² BEUC, "[Ensuring Consumer Protection in the Platform Economy](#)", 2018.

⁶³ GfK on behalf of CLEAR 2.0 project, "[Consumer Survey: Global Drivers and Barriers](#)", 2014.

⁶⁴ J.Shipley, J.Lazar, D.Farnsworth, C.Kadoch, "[Beneficial Electrification Space Heating](#)", Regulatory Assistance Project, 2018.

The National Regulatory Authorities must step up their effort in addressing these emerging products. Jointly with other relevant authorities, they should monitor bundled offers.

For instance, consumers should be able to easily compare bundled offers via comparison tools, switch from each individual service separately and terminate the contract with the provider of the bundled offer at any time and at no cost in case a contract is extended without the customer's consent. At the same time, overlap of competences between National Regulatory Authorities in energy and other regulatory bodies should be addressed. To do so, their cooperation must be strengthened.

7. CONSUMER ENGAGEMENT

Digitalisation, decentralisation and decarbonisation can facilitate and incentivise consumer engagement. Digitalisation can improve the services that help consumers in their decision making. It also makes hunting for a new deal easier and quicker, for example through price comparison tools. Apps and other smart services that are attractive visually and easy to use can also make it more exciting for people to engage with their own consumption. For example, a well-designed app could encourage you to use the "eco" function in your washing machine or your dishwasher, using less electricity and less water.

Many consumers care about the environment, and want to help decarbonise the system, but do not always trust green claims. With costs of solar panels, efficient heat pumps or wood pellets it is much more appealing and tangible for many than trying to navigate green claims. Especially if it also helps to save money on the long run, and they have good support in their decision making as that provided by consumer organizations.⁶⁵

A way to look at this question is three-fold. Will they be able to access the market? Will they be able to assess these different options (assess the market)? Would consumers have the choices to change how and what they consume in terms of energy (act in the market)?⁶⁶

7.1. Barriers to switch

Consumers have traditionally not found it attractive to engage with the energy market. Many consumers have not changed suppliers since the liberalisation of the market, even in markets where there are many suppliers competing and the gains from switching are high. EKPIZO, BEUC's Greek member, found in a survey that only 17% of respondents have ever changed their provider.⁶⁷

Loyalty can come at a great cost to essential services. Consumer organisations like Citizens Advice have asked for regulatory intervention.⁶⁸ There are significant barriers to install sustainable solutions discussed in this paper too: the lack of understanding of the technology and the consumer fear of finding themselves without heating, electricity or hot water.^{69,70}

⁶⁵ see for example the efforts of 6 consumer organizations through the [CLEAR 2.0 project](#).

⁶⁶ The "access, assess and act" is a helpful analytical framework to evaluate barriers of competition from the consumer side. Our UK member Which? used this framework in the past: A. Fletcher, *"The Role of Demand-Side Remedies in Driving Effective Competition"*, London, 2016.

⁶⁷ EKPIZO, *"Do you know how much you spend on electricity"*, last accessed September 2019.

⁶⁸ Citizens Advice, *"Super Complaint on the Loyalty Penalty"*, last accessed September 2019.

⁶⁹ CLEAR project, *"Attitudes, Opinion, Drivers and Barriers and Satisfaction with Regard to Renewable Energy Systems"*, 2015.

⁷⁰ CLEAR 2.0 project, *"Behavioural Survey and Changing Behaviours"*, 2018.

Behavioural insights, generational change, digitalisation and automation, and regulatory changes can help to get more consumers to take an interest in the energy market. But for many, the barriers of loyalty, complex decisions and digital exclusions, or lack of access to finance, will continue. Member States must address these barriers to ensure energy is affordable for everyone.

7.2. Barriers to compare

The number of energy suppliers, the number of offers and products, and the complexity of some offers, has increased over recent years.⁷¹ Different offers increase consumer choice, and this is good as consumers are very different. There is no one-size-fits-all. However, as the complexity of offers increases, the ability to make the right choice for one's self decreases. For example, to know if a dynamic offer is cheaper than a fixed price offer, a consumer or comparison tool will need to forecast consumption patterns and market price patterns. Another example is that as more clean technologies become available, a consumer wanting to invest in them will have to forecast prices in the energy market in the long term and understand the limits of the technology.

Thus, the future consumer will have to make complex decisions that combine short- and long-term information and investments. Consumer organisations are already helping with such decision-making support,⁷² collective purchases that reduce prices, fighting to improve terms and conditions, and organising maintenance negotiations.⁷³ But with limited budgets in many cases, this will not be enough to serve all consumers. More needs to be done to help consumers navigate the different options available to them.

7.3. Barriers for those in vulnerable situations, living in apartments and tenants.

More and more people are going to live in cities.⁷⁴ The increase of population in urban areas creates challenges for consumers and the energy transition. Electricity networks are increasingly strained. More people will live in multi-story buildings and semi-detached houses.

We are living in a Europe where inequality is at an all-time high. The divide in income has increased, and wealth is even more concentrated than before.⁷⁵ Those with lower income and wealth are even more indebted than in the past. It is unclear if we will be able to reverse this trend. Beyond a social policy angle of inequality, this has two important economic consequences for the energy transition:

- **consumers will be more likely to rent than to own a house.** The trend in EU has already been an increase of tenants, although this will look very different country per country.⁷⁶
- **less people will be able to make investments paying upfront, and more will have difficulties accessing enough credit.** This includes investments that will help the energy transition.

Landlords will thus keep a large role in decisions related to investments: on smart or digitalised devices, installing solar panels and charging points for electric vehicles. We will explore the boundaries of tenancy throughout the paper.

The European population is getting older. By 2020 20% of the population will be above 65 years old, increasing to 28% in 2050. In the same period, the proportion of those above 80 years old will go from 5.8% to 11% of the population. Those above 80 in 2050 will not

⁷¹ ACER/CEER, "[Monitoring Report on the Performance of European Retail Markets in 2017](#)", 2018.

⁷² For example: Test Achats, "[Calculateur Energie Renouvelable](#)", Belgium, last accessed August 2019 (in French)

⁷³ For example: OCU, "[III Compra Colectiva de Kits Fotovoltaicos, purchase of solar panels](#)", Spain, last accessed August 2019 (in Spanish).

⁷⁴ BBVA research, "[European Urbanization Trends](#)", 2016.

⁷⁵ OECD, "[Understanding the Socio-Economic Divide in Europe](#)", 2017.

⁷⁶ Eurostat, "[Housing Statistics](#)", last accessed August 2019.

look like those above 80 today. For example, it is likely that even if they master the technologies of today, they might not master the technologies of tomorrow. Policies need to consider this growing share of consumers that are likely to be in a vulnerable situation. Thus, policy makers must put efforts in researching behavioural insights about the older segment of the population.

7.4. Digital exclusion

Digital exclusion will still exist in upcoming years: in 2019 only 57% of the population had basic digital literacy, and 31% had above basic skills. Fixed broadband take-up is growing and in 2019 almost 80% of European households have taken up broadband, whilst broadband coverage should reach 100%.⁷⁷ There is a large divide across countries, but also across social strata, when it comes to digital literacy.

The digital gap can lead to digital exclusion, where some citizens are left behind. And for consumers, it can significantly impact their ability to navigate markets and make informed decisions. More and more companies have added an online chat to communicate with consumers. Moreover, some consumers are using social media to complain about a problem with their suppliers.

Some companies use online comparison tools as their main way to market their products. **As energy is an essential service, Member States should ensure that consumers with lower digital engagement are not left behind.** Those with lower access to internet should receive the same level of customer service, access to effective consumer complaints and complete information to compare and find affordable products.

8. DYNAMIC AND INNOVATIVE REGULATION

The current regulatory framework is based on a logic of one consumer contracting gas and/or electricity with a large supplier. National Regulatory Authorities are asking themselves what the future will look like, how to adapt their policies to better meet consumers' needs and how to ensure consumers are sufficiently protected.⁷⁸

8.1. Working out of silos

More and more, energy regulators are working with regulators in other sectors. For example, the digitalisation of the sector opens interactions with data protection agencies, telecommunications regulators and those monitoring price comparison tools, such as competition authorities. For example, the UK has developed the UK Regulatory Network and the UK Competition Networks, two networks of national authorities to share knowledge, information and conduct cross-cutting projects. In the Netherlands, the ACM merged different regulators. At EU level, the Council of European Energy Regulators (CEER) is exploring such areas of cooperation under the Partnership for the Enforcement of European Rights (PEER) initiative.⁷⁹

All National Regulatory Authorities for energy need to review their regulatory framework so that it is easily adaptable and more able to consider new business and consumer models. They need to work better with authorities from other sectors on cross-cutting issues. CEER can have a central role in helping regulators share best practices.

⁷⁷ European Commission, [Digital Economy and Society Index, indicators 1a2, 2a1, 2a2](#), last accessed September 2019.

⁷⁸ see for example: Ofgem, "[Future of retail market regulation](#)", last accessed September 2019.

⁷⁹ Council of European Energy Regulators, "[Partnership for the Enforcement of European Rights \(PEER\)](#)", last accessed September 2019.

8.2. Regulatory sandboxes

Regulatory sandboxes have already been used in different sectors across the world. There is no single definition for a regulatory sandbox. But broadly speaking it is when a national authority relaxes some rules and obligations for trialling a new business model in real life.

For example, it is understood that a consumer should have a single energy supplier. To test peer-to-peer projects, this obligation needs to be relaxed as a consumer will have more than one supplier. This allows regulators to monitor what happens with the projects in real life, and to change rules if it is adequate to allow these business models to operate. For energy, different forms of sandboxes have been used, are being or are going to be used in UK, Belgium, Italy, the Netherlands and France.⁸⁰

Regulatory authorities started establishing sandboxes because they are considered to foster innovation. BEUC recommends that this happens under the condition that products are assessed on a case-by-case basis to enter the sandbox, where consumers' interests are at the centre of the assessment.

Sandboxes must not become a shortcut to avoid complying with regulation in the long term, but rather short-term tests to see if the regulation is fit-for-purpose for the innovative products that might appear during the radical transformation of the energy sector. To achieve that, strong criteria should be used to establish sandboxes and assess which products should be included in a sandbox:

- **Consumers should have the same level of protection as if the service was not under a sandbox.** No exemptions should be given to rules related to consumer protection and safety, horizontal or sector specific. For example, no exemptions should be given to switching and termination rules, access alternative dispute resolution, cool-off periods, or data protection.
- **The products that enter a sandbox should be given exemptions only to rules that are proven to create a barrier to entry.** Companies should demonstrate the impossibility or high unlikelihood to be deployed without a sandbox and demonstrate which rules are those creating barriers.
- **Authorities approving the requested exemptions of the protection must also have the option of requesting additional consumer protections.** For example, for products where consumers take a lot of risks, the National Regulatory Authority should add safeguards and obligate the company ensure that the consumers are well-aware of the risk involved.
- **The exemptions should be limited in time** (no more than 1 year) and **limited on number of consumers** that can access the pilot to avoid distortions.
- **Authorities should request frequent information from the company about the service or product they are testing. Authorities should be allowed to terminate the exemptions for a pilot if the monitoring shows harm to consumers** and where the company has not found a solution to avoid this harm. The information should assess the overall regulatory framework. But also, to assess the individual project.
- **The real-life evidence gathered through sandboxes can help decision-makers to make the regulation "future proof".** Authorities should use the results of each project as part of their assessments into whether the current regulatory framework is fit-for-purpose for products that have demonstrated benefits for consumers.

⁸⁰ A. Schneiders, "[Regulatory Sandboxes](#)", 2019, Last accessed August 2019.

8.3. Alternative dispute resolution

The Electricity Directive made it compulsory for all electricity companies covered by the directive as “undertakings” to participate in out of court mechanisms. Aggregators, for example, are considered undertakings. Out of court mechanisms are also called alternative dispute resolution.⁸¹

The Electricity Directive also asks Member States to ensure that different alternative dispute resolution entities cooperate when it comes to bundled products including electricity services. These mechanisms are important because they make it simpler and cheaper for consumers to solve any dispute that arises with their service provider. There is increasing interaction and bundling of energy products and services and other sectors.

Thus, BEUC recommends that Member States create an efficient system for cooperation across alternative dispute resolution entities. BEUC also recommends that Member States or National Regulatory Authorities continue monitoring new energy business models and undertakings that do not fall under the definitions of the current Electricity Directive.

While redress and alternative dispute resolution are rather clear when it comes to a customer-supplier relationship, there are question marks with regards to new business models that might not be considered an *electricity undertaking* under the Electricity Directive definition. Any entity that is not an electricity undertaking under the definition of the directive is not mandated to participate in out-of-court mechanisms by the directive.

Moreover, there is a lack of clarity in cases where the contractual relationship involves for instance peer-to-peer exchanges through platforms. In such cases, consumers may not be able to easily access redress and they will, in fact, lack their consumer rights due to an outdated legal framework. For example, the Alternative Dispute Resolution Directive does not apply to consumer-to-consumer disputes or disputes with platforms.⁸²

Member States must ensure that these services are also covered within the out-of-court dispute settlement mechanisms. Member States shall clarify responsibility of new business models and platforms and ensure due consumer protection, especially as energy is an essential service.

9. CONCLUSIONS

There is a technological and political transition on the way to help decarbonise the energy system. This will radically change the energy markets in the next decades. This brings a lot of opportunities for consumers, giving them more choice on how to interact with energy, allowing them to save money and have lower environmental impacts. However, these changes come with risks of higher energy prices, lower overall consumer protection, and leaving some consumers behind, especially those in vulnerable situation. Policy makers and regulators need to urgently look at these issues **to make sure all consumers benefit from the energy transition and fairness and the distributional impacts are addressed.**

⁸¹ If the Member State demonstrates that other existing mechanisms are equally effective, they do not have to comply with this obligation.

⁸² Some of these new business models will be based on the platform economy. BEUC recommends that Member States that platforms become more liable and transparent. Member States must act to stop the use of unfair terms, which are now too widespread. BEUC, "[Ensuring Consumer Protection in the Platform Economy](#)", BEUC-X-2018-080, 2018



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