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Fostering energy markets, empowering **consumers**.

Digitalisation as a driver for better Retail Market functioning – key challenges and actions

Distribution Systems Working Group
and
the Innovation and Retail Markets Work Stream
of the Customers and Retail Markets Working Group

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INFORMATION PAGE

Abstract

This paper (C21-IRM/DS-45-03) presents CEER's views on digitalisation challenges facing retail markets, putting forward recommendations on how to overcome them. The paper also provides supporting case studies to provide empirical examples.

Target audience

Energy suppliers, traders, gas/electricity customers, consumer representative groups, network operators, Member States, academics and other interested parties.

Keywords

Digitalisation, consumer protection, retail markets, consumer empowerment, data protection, price comparison tools, dynamic prices, decarbonisation.

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Related documents

CEER Documents

- CEER Response to the European Commission's consultation on the Action Plan for digitalising the energy sector, January 2022, Ref. C21-DS-CRM-04-03
- CEER Report on Innovative Business Models and Consumer Protection Challenges, September 2021, Ref. C20-CRM-DS-03-03.
- CEER 2022-2025 Strategy Empowering Consumers for the Energy Transition, June 2021, Ref. C21-SSG-06-05.
- CEER Report on Billing Issues in the Clean Energy for All Europeans Package, March 2021, Ref. C19-CEM-132-03.
- CEER BEUC 2030 Vision for Energy Consumers: LET'S ASPIRE!, October 2020.
- CEER Conclusion paper on Dynamic Regulation to Enable Digitalisation of the Energy System, October 2019, Ref. C19-DSG-09-03.
- CEER Report on Implementing Consumer Rights of the Clean Energy for All Europeans Package, August 2019, Ref. C19-CEM-120-03.
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EXECUTIVE SUMMARY

Background

In 2020, the Council of European Energy Regulators (CEER) and the European Consumer Organisation (BEUC) revisited their joint 2020 vision for Europe's energy customers. The former edition was composed of five key principles – reliability, affordability, simplicity, protection and empowerment. Within the latter, a sixth principle was added, inclusiveness, with a view to ensuring no consumer is left behind as we move through the energy transition. All these principles are closely connected to the digitalisation process and provide a good matrix for categorising the challenges associated with digitalisation and ways to tackle them.

Digitalisation is driving change for the whole economy, including the energy sector. By 2030, new business models and technology are likely to fundamentally change retail energy markets. As the availability and value of data increases (e.g. smart meters, network flexibility), the main role for regulators is to consider relaxing or removing rules which get in the way, where relevant to promote interoperability, and to consider whether additional consumer protection measures are needed while taking into account risks associated with data – in particular privacy and data protection.

Digitalisation can also provide cost-saving opportunities for the whole energy system by facilitating energy efficiency and a transition towards demand-side response market models, better integrating local energy retail markets with pan-European platforms and optimising network operations and costs (flexibilities, predictive maintenance, etc).

Objectives and contents of the document

This paper seeks to identify opportunities, challenges and risks of digitalisation and to provide recommendations on how to overcome these challenges. The recommendations are in line with the 2030 CEER-BEUC vision LET'S ASPIRE[1] and previous CEER work.

The paper is divided into six thematic chapters which correspond to the six Vision principles: affordability, simplicity, protection, inclusiveness, reliability and empowerment. After a contextualisation and an overview of the process of digitalising the energy sector, each chapter then focuses on:

- Opportunities & Outcomes and;
- Dependencies & Actions.

Finally, each chapter includes specific examples, in the form of case studies, on different member states, highlighting varying responses at the European level to some of the digitalisation challenges.

Brief summary of the conclusions

It is important to recognise that digitalisation is an ongoing process and individual member states will have advanced at different rates. As such, some of the opportunities will be understood as short-term with a strong potential to rapidly improve consumer outcomes, while others will be understood as long-term and more challenging to achieve.

[1] https://www.ceer.eu/1932

Equally, although digitalisation presents many opportunities, certain changes and developments in the market, both external and those arising as a result of digitalisation, may hinder successful the realisation of benefits, or even harm consumers. To complement the list of possible actions regulators can take to drive desired outcomes, this paper sets out key risks that energy national regulatory authorities (NRAs) are encouraged to consider regarding the impacts of, and their response to, the digitalisation process. These risks also present an opportunity for further research.

1 Introduction

This paper builds on the key priority area of "getting and making the data accessible and useful" identified in the 2030 CEER-BEUC vision's principles.

The main aim of this paper is to identify key challenges and risks in digitalising energy retail markets and provide recommendations on how to handle these challenges. Additionally, in considering the implications of digitalisation for the energy system, CEER's objective is to enable benefits for consumers and to protect them against risks.

Furthermore, to provide empirical examples of how different NRAs have worked to overcome specific barriers and challenges, each chapter concludes with a supporting case study.

The paper is divided into six chapters corresponding to the Vision's six principles[2].

- **Affordability** highlights the importance of correct price signals reaching consumers, but also the importance of consumers reaping the benefits of energy efficiency. The relevant chapter in this paper focuses in particular on the importance of equitable distribution of costs and benefits of digitalisation, both on a consumer and whole-system level, ensuring a fair digital transition.

- **Simplicity** underlines the need for access to be clear, trustworthy and easy to understand information, such as billing, in order for consumers to compare offers and to become an integrated part of the digital transition.

- **Protection** focuses on the importance of fit for purpose legislation and regulation, both sector-specific and general, in the area of data protection and privacy, as well as against unfair commercial practices, and consumer ability to seek redress if necessary.

- **Inclusiveness** highlights the need for policy makers to ensure that new policies are inclusive and do not increase gaps between consumers, especially the more vulnerable. The possibility of reducing energy bills should be a specific focus for energy policy makers. This paper focuses on the principle that no consumer should be left behind in the digital transformation and that digitalisation should not exacerbate pre-existing inequalities. It considers the possibility of using digitalisation to address vulnerability.

- **Reliability** stresses that energy supply is an essential service of general economic interest and that it is therefore essential that energy suppliers are aware of their responsibilities and obligations, acting accordingly. In that context, this paper considers the importance of trust in reliable market operations and processes to give consumers confidence to engage in the energy market.

- **Empowerment** states that the same level of protection should be enjoyed by consumers regardless of whether they have a traditional supplier or rely on new energy services. The focus of this paper is the central role of consumers in the digital transformation of the market. It discusses preconditions for consumer ability to take advantage of the benefits of digitalisation

[2] https://www.ceer.eu/documents/104400/-/-/3b167ae3-9a7a-fd36-a02e-c64ad7595a51

Each chapter is then divided into three subchapters. First, opportunities, individual and whole system outcomes are identified and assessed. Secondly, dependencies and recommendations for specific actions, which regulators can take, are discussed. To conclude, the paper presents potential risks associated with the digitalisation of the energy sector and summarises ways forward for regulators.

2 AFFORDABILITY

Affordability plays a vital role in the digitalisation of the energy system. It is a precondition for a digital-enabled transition to a more efficient, flexible, sustainable, low-carbon system, and a necessary outcome of this transition. As set out below, through a range of opportunities and outcomes, digitalisation is intrinsically linked with a cost-efficient decarbonisation.[3]

Opportunities & Outcomes

One of the 'value propositions' of digitalisation, as identified in the *CEER 2019 Conclusions Paper*[4], are cost savings. Digitalisation is expected to lead to **improved efficiency**, both for individual consumers, and the system as a whole. There is an opportunity to translate wider system efficiencies into lower consumer bills. Table 1 below highlights just some of these examples, such as reduced generation, distribution, and balancing costs, or improving the asset life of the existing infrastructure. On a consumer level, individuals will be able to take advantage of new data-driven products and services. In doing so, they will be able to **actively lower their own costs**, for example by responding to real-time accurate price signals (for more details, please see *Consumer Empowerment*).

Equally, affordability is a key principle behind the energy market transformation, enabling consumer uptake of digital technologies. Many of these technologies will be crucial for a **transition towards net-zero** and meeting decarbonisation targets, including smart appliances, electric heating, transport solutions and microgeneration.

Individual outcomes	Whole system outcomes
Lower system charge component of consumer energy bills	Integration and reduction in the cost of renewable energy sources
	Lower balancing costs (via increased flexibility, improved modelling etc.)
Opportunity to sell back to the system or to peers, or participate in collective self-consumption	Economies of scale from more integrated, productive, digitalised infrastructure
Access to cheaper products and services through an improved competitive environment	Introduction of new business models, driving down costs of clean technologies
Better home/building/business energy efficiency	Reduced energy waste (e.g. excess generation) and material waste (e.g. through longer asset life)

Table 1 - Examples of positive affordability outcomes of digitalisation

Dependencies & Actions

We have identified 3 key areas of dependencies where regulators can take action to ensure that digitalisation is underpinned by the affordability principle and its benefits are realised. These dependencies recognise the instrumental role of consumers in the digital-enabled net-zero transition, as well as the need for a fair allocation of costs and benefits.

[3] For example, 'Decarbonisation at Least Cost' featured alongside digitalisation as one of three pillars of CEER's 3D Strategy (2019-2021).

[4] See CEER Conclusions Paper on Dynamic Regulation to Enable Digitalisation of the Energy System

1. Cost is not an undue barrier for adoption of new products and technologies

Opportunities for individual cost-savings through consumer engagement and the success of an effective transition to a decarbonised system largely depend on consumer uptake of new technologies. These include electric vehicles and accompanying home charging infrastructure, heat pumps or alternative low-carbon heating solutions, smart home systems, or microgeneration.

Although consumers are expected to benefit in the long run, the **upfront costs** of these technologies at present make them inaccessible to large sections of consumers. Unlike large energy and infrastructure projects capable of attracting private or public investment, domestic or small business consumers will likely struggle to cover the full initial costs, even where financial support may already exist.

Furthermore, for some investments, the **payback period** is extended over many years and the scale of net benefits is often uncertain. The uncertainty in terms of financial reward may further discourage consumer participation.

These considerations also extend to existing everyday products, such as home appliances – more expensive appliances often have higher efficiency and therefore lower running costs. Lack of available capital for upfront investment exacerbates the position of low-income consumers who already pay a premium owing to a lack of access to cleaner, more efficient technologies.

Nevertheless, as the pool of early adopters dries up, and with decarbonisation targets set in national energy strategies, it is important to enable, or even drive, an accelerated and wider consumer uptake. NRAs can contribute by reassessing or developing new regulation for the retail market, taking into account the scale of the challenge, the diversity of consumer circumstances and expectations, and the market's financial preparedness.

Actions regulators can take:

- Introduce an affordability principle into their regulatory strategies for retail markets;
- Identify and remove barriers to entry for innovators and investors to drive down the costs of new products and services;
- Promote interoperability through minimum standards to help achieve economies of scale;
- Work with governmental authorities to deliver support schemes (e.g., financial support for green installations) and monitor their outcomes;
- Raise awareness of long-term savings and benefits of new products.

2. Costs of digitalisation are shared fairly and do not outweigh benefits

Digitalisation and a data-enabled transition to a more flexible, low-carbon system will come at a cost. There will be a need for additional investment in the digital infrastructure, for example to manage larger volumes of data and enhance cyber security. This may include additional physical infrastructure in the transition (e.g. smart metering and EV charging assets). The system will also require added resilience to deal with potential increases in volatility of supply and demand. The extent to which efficiencies will result in overall savings will depend on how these costs are expended and shared.

Policy costs can already make up a significant portion of energy bills. To avoid consumers from bearing a disproportionate burden of additional costs due to digitalisation, it is crucial that NRAs continue to ensure that regulated monopolies remain economic and efficient. This includes monitoring and, if appropriate, regulating costs associated with the digital infrastructure (including new kinds of investment and upgrades), ensuring that new projects provide value for money and are aligned with wider digitalisation and decarbonisation strategies, and that costs are passed through to consumers fairly.

Where appropriate, NRAs and governments can also consider regulating new entrants, including EV charge point operators or third-party intermediaries (TPIs), such as price comparison websites.

Actions regulators can take:

- Review price control arrangements for regulated companies;
- Where in the remit, consider introducing appropriate regulatory tools for new entrants (e.g. TPIs).

3. Cost efficiencies are passed on to consumers

Overtime, digitalisation is expected to deliver a range of whole-system benefits, from cheaper generation and distribution of renewable energy, reduction in waste, to increased productivity and efficiency.[5] NRAs should take steps to see these efficiencies flow through to consumers in reduced bills. This is important not least to ensure equity, but also to maintain consumer confidence in the energy transition.

Actions regulators can take

- Set network/distribution charges in a way that passes savings through the value chain to the end-consumer.

Case Studies

We have drawn on examples from NRAs to demonstrate what steps regulators can take to bring about positive and affordable change for consumers through digitalisation.

Regulatory principle – Sharing results between network operators and consumers embedded in the electricity sector legislation and in the tariff code

What has been done [by the NRA]?

In Portugal, since it started regulating the energy sector, ERSE (the Portuguese NRA) has applied some form of incentive regulation to the definition of the allowed revenues of the main network activities. The range of different incentive methodologies applied throughout the past regulatory periods comprised price-cap on OPEX and TOTEX as well as revenue cap on OPEX and TOTEX.

[5] See Section 2 in CEER Conclusions Paper on Dynamic Regulation to Enable Digitalisation of the Energy System

The definition of the initial cost base for a new regulatory period is an important feature of incentive regulation, when the regulator can decide the extent to which past cost savings are shared with the consumers going forward. Without any established rules in the regulatory framework to address the degree of sharing, the regulator can decide to share all or none of the savings, which creates a more uncertain environment for both network operators and consumers.

In the current context of energy transition, where network operators are called upon to invest in the digitalisation of the networks and in the development of new services, whose costs tend to be recovered though network tariffs, it was important to ensure that savings obtained by network operators from those investments would be shared with consumers on an ongoing basis. At the same time, it was also necessary to provide network operators with some visibility and regulatory stability regarding the definition of the cost base over time.

Thus, in 2017 ERSE introduced a new provision in the electricity tariff code (later added to the gas tariff code as well, in 2019) in the form of a general principle which establishes that any savings/losses obtained through incentive regulation during a regulatory period must be shared between operators and consumers when setting the new cost base for the subsequent regulatory period. Before it was enacted, this change (as well as any changes to the tariff code) was subject to a widely participated public consultation.

In 2022 the government published a new law to govern the functioning of the electricity sector (Decree-Law 15/2022, from 14 of January), which also includes this general provision in the tariff principles. Therefore, in addition to the tariff code this principle is now set into law, ensuring that electricity consumers will benefit from any savings obtained by network operators, namely the ones from investments in digitalisation.

How has it helped to deliver against the principle (affordability)?

For the past few years the low voltage distribution network operator has invested in the digitalisation of its network, the deployment of smart meters and in the development of smart grid services, which resulted in increasing cost savings. This sharing principle helps this operator to better assess what will be the gains it will retain when deciding the level of investment in this type of assets, decreasing the regulatory risk of its investment option. Moreover, it ensures that the consumers will benefit from these investment decisions. Thus, when setting the new cost base for the regulatory period that started in 2022, in accordance with the tariff code the regulator, applying that sharing principle, ensured those significant cost savings were passed on to consumers, through lower allowed revenues for this activity. Therefore, the formalization of this principle allows to deliver against affordability by two means: i) indirectly, through a more effective promotion of cost savings due to a more transparent regulatory framework, and ii) directly through the sharing of these costs savings with consumers.

Are there any lessons that can be shared? Areas for further research?

It is important to find a way to monitor in more detail how cost savings are obtained.

3 SIMPLICITY

Simplicity is an important factor for consumer engagement and empowerment. Providing simple, reliable and accessible information to consumers is crucial for their ability to make informed choices about their engagement in the energy market, including spending decisions, consumption and sustainability. Digitalisation and the associated information flows are key drivers to achieve this goal.

Opportunities & Outcomes

As stated in "*CEER 2022-2025 Strategy Empowering Consumers for the Energy Transition*"[6], simplicity translates into the need for clear, trustworthy, and easy to understand information. Digitalisation and better use of data can help drive these outcomes. Using digital tools to improve the quality of information, for example that which is provided on energy bills, can help consumers compare and select the tariff offers most suitable for their individual circumstances, thus helping them to become an integrated part of the energy transition.

Digital **price comparison tools (PCTs),** which are easily readable, regularly updated, and provide accurate information on available tariffs, are one of the key opportunities for improving consumer empowerment through 'simplicity'. Price comparison tools should be facilitated through interlinked databases[7] and smart use of data and should include simple information on prices (traditional, demand response, aggregation) to allow consumers to compare different offers easily while also considering the environmental impact (fuel mix) of such offers.

Equally, on the other end of the cycle, consumers should receive, in an appropriate format, simple and easily accessible **billing** information. Digitalisation has the potential to improve billing,[8] for example, in digital channels by highlighting specific or complementary information on the bill. Digitalisation also provides an opportunity to give consumers more complete and detailed information, through complementary communication tools, such as web portals, which cannot be provided via the bill (e.g. individual consumption profiles).

In addition, digitalisation can drive the **simplification of processes** (e.g. communication with the supplier, switching, dispute resolution) and provision of personalised **advice** (e.g. bespoke energy efficiency advice) based on real data and information giving consumers a better understanding of the energy system, as well as their consumption behaviour and patterns, consequently making them more confident as active participants.

[6] See CEER 2022-2025 Strategy Empowering Consumers for the Energy Transition

[7] Databases from different stakeholders (NEMOs, suppliers etc.), which provide data for PCTs could be mutually interconnected.

[8] Billing should contain (among other information) the price to pay, a breakdown of the price, when the payment is due, consumption data of the billing period, contact details of the supplier, tariff name, and a unique identification code for the supply point.

Individual consumer benefits	Whole system benefits
Empowerment to reduce own energy spending	Consumers are part of energy transition
Access to up-to-date tariff offers	
Tailored of consumption data overview	Reduction in the cost for paper bills and resources for customer support
Improved accessibility and quality of billing information	

Table 2 - Examples of positive simplicity outcomes of digitalisation

Dependencies & Actions

We have identified two areas where NRAs can take action to ensure that the simplicity principle underpins digitalisation and realises its benefits.

1. Available and up-to-date data for PCTs

For consumers to be able to make informed choices, it is crucial that PCTs operate with all data related to offers searched by the consumer, which are provided by the consumer in a voluntary basis and explicit consent. This data should be available to them in an accessible way. It is necessary to secure that each supplier participates in the collection of the data.

Only up-to-date data can provide consumers with information on the current state of the market and actual prices. Operators of PCTs should update their databases regularly. Digitalisation could help make this exercise automatic through the self-collection of data.

Actions regulators can take:

- Promote Price Comparison Tools on their websites and other channels;
- Provide operators with guidance on good practices on how to operate PCTs;
- Establish regulatory guidelines for the submission of supplier data;
- NRAs should cooperate with stakeholders, consumers organisations and ombudsman in developing independent PCTs.

2. Filtering information on the bill

Digitalisation could help simplify billing information, or tailor it to consumer preferences and needs, provided that the mandatory information is retained. To make the bill or billing information more personalised, bills could be customised, especially within digital channels, giving consumers freedom to filter out information relevant for their needs. NRAs should take steps to facilitate and initiate the emergence of such tools.

Actions regulators can take:

- Work with relevant stakeholders to develop guidance on personalisation and simplification of customers' bills and billing information;
- Cooperate with stakeholders to provide consumers with simple advice how to reduce their bills and choose tariffs appropriate for them.

Case Studies

We have drawn on examples from NRAs to demonstrate what steps regulators can take to bring about positive change in providing simple, transparent and reliable information to consumers through digitalisation and better use of data or billing information.

Italian Billing information: bills designed with simplicity in mind

There is an ongoing process in Italy aimed at ensuring that the information disclosed within bills maintains the balance between simplicity and transparency. As far as simplicity is concerned, billing information has been recently updated and reviewed to become more cohesive with key information items that consumers may find elsewhere, namely within the institutional PCT, on the precontractual information, on the contract and also on the *Portale Consumi* (or PC i.e. the institutional consumption data hub dedicated to consumers). This way, billing information becomes a "tool" enabling consumers to better regulate their energy consumption, compare offers and switch suppliers.

Recently some key elements were added to billing information in order to boost said cohesion, among which:

- The "*Codice Offerta*", or the univocal code that distinguishes each individual offer. This information can be used on the PCT to track down the essential information concerning the consumer's current offer and to help compare this offer with others available on the market;
- Total annual expenditure: in every bill the amount spent – and billed – in the last twelve months is updated so consumers may always be informed on how much they are spending for their current contract. The goal is to increase consumer awareness and perhaps engagement in markets as this information (or rather a future estimate, not the real yearly expenditure that is present on bills) can be found on the PCT and on pre-contractual documentation.
- Updating consumption data: with the implementation of second-generation smart meters in the electricity sector, the granularity of data is higher (15') and thus not easy to read on bills. In order to increase simplicity, consumers will be progressively re-directed to the *Portale Consumi* through a direct link on their bill (or through a QR code) to view full details, including historic data, time of use and consumption patterns, also allowing them to make comparisons with previous periods (e.g. the consumption levels of the same month in the previous year). More consumers, as set forth in the Electricity Directive, will be able to view information on standard consumption rates of an "average" consumer with similar characteristics in the PC so as to compare behaviour and check if there is margin to improve consumption behaviour or decrease overall energy usage. The "average" consumer, or benchmark, will be calculated by the PC to avoid bias that may arise if each supplier were to provide this calculation.

Another element of simplicity was introduced by adding a link in every bill to a dedicated page created by ARERA where consumers may look up information on Single Points of Contact, PCT and *Portale Consumi*.

4 PROTECTION

Ensuring consumer protection against unlawful or unfair treatment of their data, fostering the highest level of protection from cybersecurity risks, and protecting consumers against new forms of abuse or price discrimination represent especially relevant aspects in the context of retail markets increasing digitalisation. As presented in this chapter, there are a range of actions regulators can take to tackle these challenges.

Opportunities & Outcomes

Digitalisation acts as a key enabler in the success of the European energy transition by facilitating the integration of renewable energy and decentralised energy sources, improving energy efficiency, leading to the increased flexibility in the electricity sector, facilitating the emergence of new business models, products and services, and fostering consumer participation and engagement.

According to the "*CEER Consultation on Dynamic Regulation to Enable Digitalisation of the Energy System*"[9], many of these benefits come from an increased availability of data, its subsequent analysis (transforming it into information), and its transmission and communication between humans, devices and machines, via digital networks, to give effect to actions.

One of the conclusions included in the "*CEER Report on Innovative Business Models and Consumer Protection Challenges*"[10] regarding data access and protection states that data access is key for the development of innovative services that are beneficial for both consumers and the energy system. In this respect, the report recommends NRAs to ensure that frameworks and technological infrastructure allow access to authorised third parties without excessive technical, administrative or regulatory barriers.

At the same time, third party access mechanisms must be designed with the utmost respect to data protection and privacy, cybersecurity, and competition concerns, so that any specific risks directly associated with data are minimised. The regulatory framework must be designed in such a way that it does not stifle innovation or prevent the development of products and services that would be beneficial to consumers.

Dependencies & Actions

1. Challenges related to data privacy and protection and recommendations

Smart technologies and new data-driven products and services, when governed properly or with adequate oversight, should never undermine consumers' rights to privacy and data protection. According to the "*Flash Eurobarometer 443 on ePrivacy*", published by the European Commission in 2016, European consumers are concerned about how their personal information is being used, by whom and for what purposes.

[9] CEER Conclusions Paper on Dynamic Regulation to Enable Digitalisation of the Energy System, October 2019
[10] CEER Report on Innovative Business Models and Consumer Protection Challenges, September 2021

In accordance with the General Data Protection Regulation (GDPR) and the Clean Energy Package, personal data is owned by the consumer, who is in control of how it is shared. Therefore, it is important to ensure that the new products and services that are offered in the market follow through on consumer-centric data protection and privacy provisions and comply with the GDPR.

According to the European Commission[11], companies should implement technical and organisational measures to safeguard privacy and data protection principles from the earliest stages of the design of their operations ("data protection by design"). Additionally, companies should ensure that personal data is processed with the highest privacy protection, by strictly applying the principles of data minimisation and purpose limitation (they should not process more data than they need for the delivery of their services nor use data for purposes different from the purpose for which the data was originally collected), so that personal data is not made accessible to an indefinite number of parties ("data protection by default").

Actions regulators can take (as far as possible within their competences)

- Work closely with the national authorities responsible for privacy and data protection;
- Identify and share best practices in data protection applied to the energy sector;
- Ensure that consent management systems for data access are consumer-centric;
- Foster a culture of good practice regarding data protection amongst the regulated companies;
- Lead by example – the regulator should demonstrate leadership in the field of data protection by being open and transparent about how they are taking measures themselves with their own data;
- Ensure that the importance of robust data protection is always highlighted where possible in communications with regulated companies, and other stakeholders as appropriate. For example, "we would take this opportunity to remind suppliers of the importance of good data protection practices in line with the requirements of the GDPR".

2. Challenges related to cybersecurity and recommendations

With growing digitalisation, an increase in the number and type of devices connected to the electricity networks, and the resulting interconnectivity in the energy sector, cybersecurity risks are evolving as well. Any lack of security of the connected devices represents a potential risk to consumers' privacy and safety.

Constituting one of the European Union's highest priorities, in December 2020 the new EU Cybersecurity Strategy was published[12]. In this respect, the Directive on Security of Network and Information Systems (NISD)[13] aims at increasing the level of cyber resilience of critical public and private sectors, including the energy grids.

[11] https://ec.europa.eu/info/law/law-topic/data-protection/reform/rules-business-and-organisations/obligations/what-does-data-protection-design-and-default-mean_en

[12] https://digital-strategy.ec.europa.eu/en/library/eus-cybersecurity-strategy-digital-decade-0

[13] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.194.01.0001.01.ENG&toc=OJ:L:2016:194:TOC

It is therefore of high importance that the internet-connected devices and products used by energy service providers comply with the principles of "security by design", so that they include high level cybersecurity functionalities, and "security by default", which means that default settings must always be the most secure ones.

Actions regulators can take (as far as possible within their competences)

- Ensure that all market participants apply cybersecurity standards and measures and have a defined cybersecurity strategy (even those not included in the list of Operators of Essential Services);
- Identify best practices in cybersecurity applied to the energy sector and ensure they are shared so that they can be adopted by other companies;
- Ensure operators comply with the Directive on Security of Network and Information Systems (NISD);
- Ensure cybersecurity remains a key priority, working in close collaboration with experts on that field (i.e. information and communication technologies' companies);
- Monitor the cybersecurity expenditure of regulated monopoly grid operators;
- Ensure that the devices and products used by energy service providers that are linked to the internet implement "security by design" and "security by default" principles.

The above recommendations are in line with the ideas included in the CEER Cybersecurity Report on Europe's Electricity and Gas Sectors[14], published by CEER in October 2018.

3. Challenges related to competition concerns and recommendations

While the increasing use of artificial intelligence, on the one hand, and energy service provider access to detailed information on consumers' energy consumption, on the other hand, enable companies to offer personalised deals, it may also lead to the emergence of new forms of abuse of market power or manipulation of prices.

As analysed in the *CEER Report on Innovative Business Models and Consumer Protection Challenges*[15], the innovative automated switching services that are emerging in some Members States are taking some of the supplier's tasks, having access to billing information and consumption data, but their activity cannot be supervised by the corresponding NRAs since they are not licensed suppliers. In this sense, it is essential to guarantee that all consumers have the same rights and level of protection, independently of the contractual procedure.

Furthermore, companies' access to very detailed customer information, such as switching frequency or level of creditworthiness, may result in situations of price discrimination where different consumers are offered different prices based on their behaviour and specific characteristics, or in suppliers blocking certain types of consumers from entering a contract with them.

[14] https://www.ceer.eu/1517

[15] https://www.ceer.eu/2050

Actions regulators can take

- Monitor and supervise offers to make sure that they don't lead to price discrimination;
- Monitor suppliers' behaviour in order to ensure they are complying with their obligation of treating consumers fairly;
- Ensure they have adequate enforcement powers within the regulatory framework to protect against malpractice regarding anti-competitive behaviour amongst suppliers;
- Identify gaps in the regulatory frameworks around the regulation of TPIs and correct accordingly.

Case Studies

We have drawn on examples from NRAs to demonstrate what steps regulators can take to bring about positive change in protecting consumers through digitisation and better use of data.

Using data management tools to facilitate consumer access to social tariffs in Portugal

Portugal's social tariff for electricity was created in 2010 and consists of a discount on network access tariffs, applicable to economically vulnerable consumers, regardless of their supplier[16]. The national regime for social tariffs is one of the instruments established by the government to support, and protect, these vulnerable consumers.

When it was first established, the consumer had to request the social tariff from his or her supplier, who were required to apply the tariff if the economic vulnerability condition was proven, most often through declarations from social security institutions or the tax authority. At the time, consumers were considered economically vulnerable if they received specific social security benefits and, since 2014, if their income was below a certain threshold.

Due to the somewhat bureaucratic procedure, the lack of consumer awareness and the need for consumers to actively seek out the discount and prove their eligibility, the social tariff had reached less than 100 000 beneficiaries by the end of 2015.

However, from 2016, the social tariff process was simplified and automated for consumers, taking advantage of centralised public administration databases. A cooperation protocol was defined between the General Directorate of Energy and Geology (DGEG), the Portuguese social security institution and the Portuguese Tax Authority, which made it possible to periodically match the social tariff beneficiaries from the lists of consumers provided by suppliers to the DGEG.

[16] The discount is not borne by the supplier, which gets an equivalent discount from the network operator. The cost of the electricity social tariff discount is recovered proportionately via the electricity producers.

Based on this secure data exchange, using official data already housed within national public administration, the social tariff is now applied automatically on the bill by energy suppliers, who thus inform the benefitting customer, although they have the right to refuse it. In this way, the social tariff became a truly inclusive support and protection mechanism, rather than a tool limited by consumer inertia and/or lack of information. The original procedures, which placed the onus on the consumer to qualify for the social tariff, could, in practice, create a barrier for those most in need of support. After the implementation of this change, greatly facilitated by digitalisation, the number of social electricity tariff beneficiaries increased rapidly and reached 800 000 at the end of 2016, a level that has remained relatively stable even after the COVID pandemic and the ensuing energy crisis.

By way of background, it should be noted that the social tariff attribution process also involves distribution network operators, who apply the network access tariff discount to suppliers and verify the condition established by law that contracted capacity be less than 6.9 kVA. The logistics operator for supplier switching is also involved in this process, assuming a pivotal role in the communication between DGEG, network operators and suppliers. A similar model exists for the natural gas social tariff discount.

At all stages, the data used to attribute the social tariffs to eligible vulnerable consumers is managed according to stringent data privacy and protection protocols; those set for public administration and those imposed on energy market actors by law and by ERSE's regulatory codes. For example, the data managed by the logistics operator for supplier switching is anonymised, to ensure the privacy of energy consumers. Indeed, to access client information, the logistics operator must receive express authorisation from the consumer themselves.

This automated process proved to be so effective that the government has since used this centralised list of beneficiaries to distribute a voucher for the purchase of bottled gas, within the context of alleviation measures for vulnerable households due to the cost-of-living crisis.

5 INCLUSIVENESS

Digitalisation has a potential to play a major role in increasing inclusiveness of the energy market for consumers, for example by making it easier to manage energy consumption and costs, and empowering consumers to partake in the transition towards a carbon neutral energy system. However, it is key that for those who are less able to access and use digital-enabled products and services, digitalisation does not create new or exacerbate pre-existing inequalities.

Opportunities & Outcomes

Digitalisation can greatly improve accessibility to data for all consumers. Smart meters provide every household with a simple device to communicate baseline data on their energy consumption, regardless of their socio-economic status or their general interest in, or knowledge of, energy systems. This improved data accessibility can in turn help to engage a broader spectrum of consumers, including those who have hitherto been inactive in the energy market.

Digitalisation can open new communication channels and interactive ways to help consumers better utilise their data, e.g., through price comparison tools, or cost management products and services. Digital energy management systems, combined with internet-of-things technologies, can help consumers engage in demand-side response activities or energy efficiency measures without having to invest in expensive appliances or self-generation units. This way digitalisation can contribute to a more just energy transition and empower disadvantaged groups.

There is also the potential to use data to **identify and address vulnerability** (both financial and non-financial). For example, by proactively monitoring the energy usage patterns of their customers (provided data privacy requirements are met), energy companies can provide them with more targeted and timely support. Better information sharing between energy companies and other parties (e.g. water companies, welfare bodies) can also lead to a more joined-up approach to delivering assistance services to vulnerable consumers.

Individual consumer benefits	Whole system benefits
Improved accessibility to own data	Wider consumer engagement creating more granular and accurate system data, which can be used to shape policies, drive efficiencies in serving different consumer groups, identify vulnerability etc.
New opportunities for disengaged consumers to become active in the market	
Disadvantaged consumer groups are not left behind during transition to net-zero	Maximisation of benefits of collective effort to drive a societal change as part of an energy transition

Table 3 - Opportunities and Outcomes of Inclusive Digitalisation

Dependencies & Actions

We have identified several dependencies for a successful inclusive digitalisation and actions that NRAs can take to help achieve best outcomes.

1. Equal and reliable access to data through appropriate digital infrastructure

While digitalisation has the potential to improve data accessibility and use, not all consumers are yet equipped with the necessary digital tools or have access to appropriate digital infrastructure. This can include access to the internet via computers or smart phones, and, importantly, smart metering infrastructure.

Under the *Third Energy Package*, Member States are required to ensure implementation of smart metering systems (subject to a CBA). In Member States where the smart meter rollout is yet to commence, or where the smart functionality of meters has been reduced or not fully realised, consumers are disadvantaged by lacking access to data, which limits their engagement ability. Equally, it is important that where the rollout has progressed, consumers understand its opportunities and benefits, are brought into the transition, and are able to access the energy data – for example via appropriate consumer access devices.

NRAs have a role in overseeing this transition and, depending on their regulatory remit, can take several actions to oversee or drive the implementation of the smart metering obligation.[17]

Actions regulators can take

- Where appropriate, review the CBA in MS which are yet to commence their smart meter rollout;
- Together with governments, ensure an appropriate regulatory framework is in place to drive a successful rollout of smart meter infrastructure, including smart metering assets;
- Engage with industry on strategies to promote an effective use of smart-metering.

2. Equality of access – inclusiveness of design

A truly inclusive digitalisation depends on equality of access for disadvantaged groups of consumers, including those who are digitally excluded. This comprehends inclusive design of consumer access devices for partially sighted or blind consumers or alternative access to online energy switching services.

The CEER Guidelines of Good Practice on Future-Proof Comparison tools[18] recommended offering at least one additional communication channel (other than the internet) for accessing price comparison tools free of charge or at minimal cost. TPIs (Third party intermediaries) should provide integrated accessibility options for comparison tools (e.g. sound amplifiers, magnification tools, font size/colour adjustment options, voice accessibility) and should continue to adapt to the development of technological devices (smart phones, tablets) to improve accessibility without compromising on accuracy.

Actions regulators can take

- Work with industry and consumer advocacy groups to foster inclusive design for new digital products and services – for example, by promoting sharing of best practice, or setting minimum accessibility standards.

[17] For more information on the smart meter rollout across MS, see Benchmarking smart metering deployment in the EU-28

[18] PC on GGP Comparison Tools - ceer.eu

3. Digital literacy

In addition to having equal and reliable access to data, consumers also require adequate digital literacy skills. Low digital literacy potentially threatens putting groups of consumers in a disadvantaged position relative to their digitally savvy peers by missing opportunities to effectively act on the information they derive from their energy data (and lower their energy demand and costs).

Those who are not yet able to use digital means should be offered assistance or alternative channels, such as telephone and mail services, to receive information and access their data. Energy companies, social institutions and NRAs should work to ensure that consumers are not left behind in an increasingly digitalised energy market.[19]

NRAs can contribute to improving digital literacy in the energy sector, for example by initiating, sponsoring, or taking part in public campaigns, both general, as well as those specifically oriented towards the market transition. Such campaigns are important to help energy consumers gain trust and become active in the energy market.

Actions regulators can take

- Place the obligation on energy suppliers to inform consumers about how they can engage using data they generate;
- consider initiating or participating in public digital literacy campaigns.

4. Smart use of individual and aggregate system data, better information sharing

The amount of data available to consumers can easily become overwhelming. It is therefore important that consumers are able to recognise which data available to them provides useful information. This is intrinsically linked to the principle of *Simplicity.*

At the system level, richer, more granular data can be used to identify and target vulnerability. However, this requires better use of data by the industry, including in cooperation with the government/NRAs. A pilot project in the Northwest of England, in which water and energy companies collaborated on sharing cross-sector non-financial vulnerability data, showed that key challenges to the better use of data in targeting vulnerability include effective training of front-line staff, technical issues in matching data sets, and data accuracy. Evidence showed that human interaction was key in gaining customer consent to share data.[20]

[19] CEER-BEUC-NEON EUSEW event: “A Consumer-Centric Energy Transition: Ensuring Inclusiveness”
Friday, 22 October 2021. A Consumer-centric Energy Transition: Ensuring Inclusiveness (EUSEW 2021 Extended Programme) - ceer.eu

[20] see UKRN cross-sector project: Making better use of data follow-up report | Ofgem

Actions regulators can take

- Consult on and publish a data strategy/guidance for regulated companies;
- Require regulated energy companies to develop and publish their data strategies;
- Support local or national pilot schemes aimed at better data and information sharing;
- Consider introducing vulnerability or priority services registers. Where in place, work with industry to improve data-sharing to help meet emerging vulnerabilities associated with digitalisation and market transition.

Case studies

We have drawn on examples from NRAs to demonstrate what steps regulators can take to ensure that inclusiveness is part of the process of digitalisation.

Switching at the post office in Austria

Since 2016, the Austrian postal services have offered an information, comparison and switching service for electricity and gas, both online and offline.

- The service is carried out by the post office staff; when it was started, E-Control provided information and training to the persons pivotal to the initiative (training the trainer).
- The price comparison tool used accesses the data from E-Control's tariff calculator.
- The service is free of charge for customers, while suppliers pay a charge for each contract concluded through the post office.

The service is designed to reach people for whom online services are less accessible. Being able to switch in person at one of the 400+ post offices or some of the around 1,300 post office partners is making the liberalised energy market more accessible for these parts of the Austrian population.

In 2020, around 30,000 households switched to a different electricity and/or gas supplier through their post office; this makes for about 10% of the overall switching rate.

6 RELIABILITY

Consumer engagement in the energy market must be underpinned by trust in reliable market operations and commercial services. Consumers must be able to trust emerging digital and data-driven technologies in order to engage with them and benefit from innovation in the energy market. Digitalisation can help improve reliability of commercial services and processes and foster consumer trust.

Opportunities & Outcomes

As set out in CEER's Response to the European Commission's Consultation on the action plan for digitalising the energy sector,[21] digital tools and smart technologies (e.g. smart meters) have a role to play in improving consumer access to their consumption data. Introducing tariffs using actual data, as opposed to estimates, can improve consumer trust in the billing process (for example by giving consumers comfort that they only pay for the energy they really use). This, in turn, can boost consumer willingness to participate in the energy market.

Digitalisation can also help to bring about significant market reforms. Faster and more reliable switching processes and customer support can improve consumer experience, creating trust and encouraging engagement. Delayed, erroneous or slow switching decreases consumer's confidence and increases passive engagement. Centralised data hubs, such as the dual fuel (i.e. electricity and gas) registration service being implemented in Ofgem's Switching Programme[22], for example, have the potential to eliminate issues such as crossed-meters,[23] provide real-time access to metering point data and drastically decrease the time required to switch suppliers.

Digitalisation also plays a role in helping to improve crisis management processes such as the Supplier of Last Resort (SOLR) mechanism. Data-driven solutions, such as improved and centralised databases, can facilitate the appointment of a properly hedged SOLR. Consumers can then be moved faster and more effectively to a new supplier. These developments are increasingly relevant in the current market crisis context, where this process has been activated repeatedly, following supplier insolvencies caused by high and volatile wholesale electricity and gas prices.

Access to reliable historical consumption data has benefits for both the energy system as a whole, allowing for cost-reflective tariff setting, and for the individual consumer. Access to clear billing and invoicing information that accurately reflects historical consumption data improves consumer trust and promotes active consumer involvement in energy markets.

Digitalisation has the potential to allow access to better and more reliable customer service by centralising information, providing automated and efficient support that provides streamlined advice for different types of consumers, as well as using apps, web portals, algorithm-based solutions and data hubs to promote an overall better customer experience.

Finally, information and communication technology such as websites, social media platforms and apps can help to mitigate aggressive and misleading commercial practices through public information campaigns and targeted advice to consumers.

[21] https://www.ceer.eu/2210

[22] https://www.ofgem.gov.uk/publications/switching-programme-full-business-case

[23] Meter numbers recorded as being issued to a different property to the originally intended.

Individual outcomes	Whole system outcomes
Access to reliable and accurate historical consumption data	Improved SoLR processes
Faster and more reliable switching	Improved consumer trust in market processes potentially leading to greater engagement
Improved access to information and streamlined advice for consumers	Mitigation of aggressive commercial practices through improved communication strategies

Table 4 - Examples of positive reliability outcomes of digitalisation

Dependencies & Actions

We have identified three major areas where regulators can support and promote the digitalisation process in order to ensure reliability and improve consumer trust in the energy market.

1. Widespread access to reliable historical consumption data, reliable customer service and effective dispute resolution mechanisms

Consumers need to be able to trust that their energy bills accurately reflect their consumption patterns. As described in the CEER-ACER Annual Monitoring Report on Energy Retail and Consumer Protection (2021),[24] invoicing and billing are some of the most common reasons why European energy consumers file complaints, both in the electricity and gas sector. As mentioned in previous chapters, billing clarity and simplicity are also essential requirements for reliability, as consumers should not be expected to hold a high level of expertise to be able to, for example, check if their consumption is accurately reflected in their energy bills.

Furthermore, as described in the *CEER Report on Innovative Business Models and Consumer Protection Challenges*[25], the full potential of smart-meter data is not yet fully materialised in the consumer perspective. Regulators have a role to play, both in terms of facilitating data sharing, interoperability and protecting consumers' privacy, in order to drive innovation in a reliable and trustworthy manner. Widespread smart-meter roll-out allows for a higher level of automation, thus facilitating faster, more effective customer service and access to more reliable consumption data. Consumers must be able to trust the meter substitution process in order for all parties to fully benefit from these new technologies. In this regard, regulators must ensure consumers and suppliers alike are informed about all stages of the substitution process.

Actions regulators can take:

- Inform consumers about the available complaint channels and dispute resolution mechanisms;
- Help to ensure third-party access to accurate historical consumption data, while protecting consumers' privacy in accordance with the General Data Protection Regulation (GDPR);
- Use historical consumption data to define cost-reflective tariff schemes;
- Ensure system interoperability.

[24] www.ceer.eu/documents/104400/7244444/211108+Retail+markets+and+consumer+protection+MMR+2020.pdf/5b5cd7af-3b76-3cb5-a387-925a88a7281f

[25] https://www.ceer.eu/2050

2. Reliable switching driving increased competition and consumer trust

Improving switching processes by making them faster and more reliable contributes to consumer trust and increases consumer engagement. Erroneous or delayed switching can have a negative impact on consumer's perception, potentially resulting in lock-in-effects, benefiting the incumbent supplier in detriment of the consumer, who will not be able to take full advantage of a competitive energy market.

As mentioned on the previous chapters on *Simplicity* and *Inclusiveness*, regulators can help promote higher switching rates by providing comprehensive and reliable Price Comparison Tools. In addition, regulators can initiate, and carry out, reviews of existing arrangements to identify and address specific issues precluding effective switching. This may include, for example, reviewing the ability of parties involved in the switch to access the right and up-to-date meter registration data. The use of dual-fuel centralised data hubs with reliable metering point information, input manually and checked by algorithm-based technology, can help decrease faulty switching, avoid cross-meters and improve consumer trust. Likewise, NRAs can review the timeliness of the switching process and the overall consumer experience, for example, reviewing the effectiveness of existing dispute resolution processes. Some improvements may require regulatory interventions.

Actions regulators can take:

- Review of current switching arrangements, e.g., consumer satisfaction, timelines, prevalence of errors;
- Consider better use of data to create up-to-date databases of metering points;
- Set obligation on switching parties to use data to deliver better switching;
- Put in place mandatory dispute resolution processes.

3. Mitigating aggressive or misleading commercial practices

The digitalisation of the energy sector must be underpinned by the reliability principle and consumer trust in new business models that can propel the energy transition and assist in decarbonising our economies. In this context, regulators must ensure consumers are properly informed about potential misleading practices and risks and have access to simplified, reliable, and accurate information. This can be achieved by targeted consumer information campaigns, for example by publishing dedicated webpages displaying previous examples of misleading commercial practices, that simultaneously allow consumers to report abusive commercial practices. In addition, ad-hoc notification mechanisms through dedicated apps can help consumers stay up to date with identified breaches. These types of solutions assume an even more crucial role in crisis situations.

Actions regulators can take

- Use web portals and social media platforms to inform consumers about potential misleading practices;
- Promote consumer information campaigns (trainings, customised advice, etc.)

Case Studies

We have drawn on examples from NRAs to demonstrate what steps regulators can take to improve reliability of the retail systems through digitalisation.

1. ARERA (Italian NRA)

From the start, the Italian NRA (ARERA)'s attention in the roll-out of smart meters has been to ensure that consumers are aware of the benefits and functionalities enabled by second generation smart electricity meters and are fully on-board, or positively involved in the process.

ARERA set forth minimum requirements for DSO roll-out plans, aimed at guaranteeing that throughout all phases of substitution, the benefits for end customers as well as their rights and the services guaranteed are explained clearly and in a way that ensures that this information is effectively conveyed (i.e. through dedicated web portals, pamphlets, fliers, billboards, townhalls, etc). Therefore, communication with both consumers and suppliers must effectively cover the pre-, post- and substitution phases. ARERA was also dedicated to explaining to consumers that meters are part of electricity system infrastructure, and their substitution is not in any way connected to commercial practices but functional improvements for a more reliable service.

ARERA's overall objective is to promote an effective customer experience and maximise customer's confidence in the substitution process. This also entails ensuring reliability of the information conveyed. That's why one of the key requirements defined by ARERA was that detailed information on substitution, alongside traditional paper channels, distribution companies are required to set up their own web portal and/or apps specifically dedicated to meter replacement activities for consumers.

More specifically, in the private area of these portals or apps (accessible via individual and private customer codes) specific communications sent to consumers throughout the various substitution phases, including substitution plans and dates, can be found. Following substitution, consumers can also find the replacement report. Among the information presented within (date of substitution, etc.), the report must inform on the status of remote reading of the replaced meter (i.e. if the meter, when replaced, was remotely readable or not) and present a log of the last reading. Consumers must be guaranteed the possibility to request the verification of the reading registered at time of removal, as well (in cases in which the replaced meter was found not remotely readable) a metrological verification of the replaced meter. This is also to ensure that consumers can trust the removal process and billing, following meter substitution. The private area must include the contact information of the relevant DSO for cases of unsuccessful replacement attempts.

Thanks to this digital approach, ARERA makes sure that roll out plans and meter substitution process are viewed as safe and reliable by end consumers across Italy.

2. OFGEM: Switching programme

The Switching Programme (also known as "faster and more reliable switching") is an Ofgem-led programme that aims to improve consumers' experience of switching energy suppliers, leading to greater engagement in the retail energy market and enabling greater competition in the marketplace.

The programme has been delivered over seven years in collaboration with key industry stakeholders and has involved designing and implementing a new switching process that is reliable, fast and cost-effective. This includes:

- reducing the instances of consumers being let down by delayed, unsuccessful or unwanted switches;
- offering consumers control over when they switch, including providing the capability to do so as fast as the next working day, and by no later than the end of the fifth working day after a consumer has entered into a new contract;
- improving consumer's overall experiences of the switching process.

To deliver these outcomes, the reform package introduces a new system architecture design that harmonises business processes across the electricity and gas markets. This includes, for example, redesigned registration systems for electricity and gas metering points and upgraded communication and processing of messages between suppliers and the registration systems.

To govern the operation of faster and more reliable switching arrangements, Ofgem has introduced a new code known as the Retail Energy Code (REC). The REC consolidates a number of existing industry codes into one and provides market participants with a more accessible and comprehensible set of regulations to comply with.

More information can be found at: www.ofgem.gov.uk/energy-policy-and-regulation/policy-and-regulatory-programmes/switching-programme

3. ERO: Managing the transfer to a Supplier of Last Resort

In 2021, 16 energy suppliers failed in the Czech Republic resulting in 960,000 customers being transferred to a SOLR (Supplier of Last Resort). This represented approximately 10% of the total energy consumers, an unprecedented amount for that mechanism.

Despite the fact, that customers faced extremely high prices, the SOLR had to procure energy on a prompt-basis. This was possible due to data-driven solution provided by the market operator. Digitalisation thus facilitated the data transfer to the appointed SOLR. Consumers were moved faster and more effectively first to the SOLR, then after to a new supplier.

This is increasingly relevant in the current market crisis context where this process has been activated repeatedly, following supplier insolvencies cause by high and volatile wholesale electricity and gas prices.

7 CONSUMER EMPOWERMENT

Empowering consumers to become active participants in the energy market and make informed and impactful decisions about their energy management underpins both the transition to a more flexible retail market and the realisation of its benefits. Digitalisation is a key enabler in this journey.

Opportunities & Outcomes

A key outcome of successful 'consumer empowerment' is the ability for consumers to better manage their consumption. Consumers can already take advantage of new digital tools to better understand their consumption, make energy efficient decisions and navigate the market. In the long-run, consumer will be able to engage in the market through demand-side response.[26] In response to more accurate price signals and incentives, consumers will be able to adjust their energy consumption (for example by shifting it away from peak-times) or sell energy back to the grid or directly to peers. They will also be able to better evaluate the cost-benefit of energy efficiency or self-generation investments. This shift will be facilitated through the rollout of smart meters, and supported by smart, consumer-focused products and services unlocked by wider access to richer data.

Individual consumer benefits	Whole system benefits
Improved home energy efficiency	Ability to cope with a higher demand from electrification
Potential reduction/offsetting of costs	Allows more efficient use of a wider generation mix
New, tailored products and services	Efficient settlement, lower total system costs
Easier switching	Room for innovation and new business models

Table 5 - Examples of positive consumer empowerment outcomes of digitalisation

Through digital and data-enabled products such as…	
Dynamic Time of Use (ToU) tariffs	Smart export tariffs
Energy management apps	Energy efficiency advice and services
Vehicle to Grid (V2G) functionality	Electric Vehicle (EV) charging products
Improved switching services	Peer-to-peer trading
Energy as a Service (EaaS)	Demand Side Response (DSR) aggregation

Table 6 – Digital and data enabled products for consumer empowerment

[26] On the basis of how consumers respond to signal, we can distinguish 3 main demand-side response models:

1. Implicit model, in which the consumer optimises its consumption patterns in response to ToU or real time pricing (e.g. EV charging overnight to take advantage of lower prices, storing PV production during the day and withdrawing it at peak times in response to higher ToU prices)
2. Explicit model, in which the consumer can be contractually asked to change its consumption at a specific price (e.g. reducing consumption at peak time, increasing EV charging in response to excess RES, or changing storage injection/withdrawal in response to balancing prices.)
3. Ongoing engagement, allowing the consumer to make investment decisions that have a permanent impact on their consumption pattern (e.g. making a decision to install PV panels, to purchase more efficient/smart home appliances, or invest in an electric heating system)

For more details, please see Regulatory and Market Aspects of Demand-Side Flexibility (CEER, 2013)

Dependencies & Actions

Some of the benefits of consumer empowerment are already materialising, while others remain subject to specific dependencies or barriers. The role of NRAs in creating the right regulatory environment to drive the benefits of digitalisation was recognised in the *CEER 2019 Conclusions Paper*[27]. Building on the paper's conclusions, we have identified three key areas of dependencies for digitalisation-driven consumer empowerment, where NRAs can take action.

1. Efficient and reliable digital infrastructure and regulatory frameworks, which together enable generation and use of the right type of data

For consumers to respond to price signals, and for the market to generate those signals, it is vital that all parties have access to timely, accurate, traceable, and transparent system data at an appropriate level. The generation and use of this data is contingent on having in place a robust digital infrastructure, a suitable regulatory framework, as well as industry processes and procedures. NRAs have a role to play across these areas.

Data from smart meters can already provide information about individual energy consumption profile and associated costs. For consumers, this information is a precondition for an effective home or business energy management and market engagement (e.g. to select new dynamic products, sign-up for auto-switching, or seek bespoke energy efficiency services). As a recognised form of 'personal data', meter-level granular data is subject to the requirements of GDPR. In order to be used at a system level, it must therefore undergo appropriate aggregation or anonymisation.[28] NRAs can help develop best practice or frameworks for an effective use of data in the context of data protection.

In aggregate, the system-level data is crucial for a faster, more accurate settlement, enabling the setting of the right price signals. To provide the best possible incentives, it is crucial that these **price signals are sufficiently granular in time and location** and reflect the whole-system picture.

Actions regulators can take

- Provide a suitable regulatory framework for the rollout of smart metering and associated infrastructure;
- Lead on data best practices to guide the generation and use of energy system data;
- Develop procedures for aggregation and anonymisation of consumer data;
- Set criteria for authorised third party access to historical consumption data;
- Adapt the settlement process to better reflect price signals.

2. A competitive market offering data-enabled products and services

Consumer empowerment further depends on the existence of a competitive supply-side, both in terms of the range of data-driven products and services, and the variety of market participants offering those. Using the data available to them, retailers should be encouraged to innovate, optimise, and develop new products (e.g., dynamic ToU – time of use – tariffs), to promote a more engaged customer base.

[27] See CEER Conclusions Paper on Dynamic Regulation to Enable Digitalisation of the Energy System

[28] For more details on this issue, please see chapter 4: *Protection in the context of digitalisation.*

Equally, barriers should be removed for new business models and technologies[29] to enter the market and for consumers to easily engage with them, without being 'locked in' with a particular provider. This can apply to both emerging technologies, e.g. EVs[30], as well as new products and services introduced by incumbent energy suppliers.

Actions regulators can take

- **Support innovative business models, e.g. through sandbox service**
- **Promote level playing field, e.g. by setting interoperability standards**
- **Ensure that energy service contracts do not preclude consumers from switching between energy suppliers**

3. Consumer education and trust

To be able to meaningfully participate in a flexible market and make informed decisions, consumers must be educated about the changes in the market. This includes understanding the new ways in which they can engage or being informed about the risks and benefits of emerging technologies.

It is also vital that consumers have trust in the energy system as a whole to avoid rejection of technology or engagement, including in terms of how their own personal data can be processed

Actions regulators can take:

- Work with other stakeholders on consumer-focused communication and education strategies;
- Be more visible to consumers;
- Set expectations or, where appropriate, put in place regulation on how regulated companies should engage with consumers, e.g., minimum information provision, such as on the benefits and risks of dynamic pricing, or the use of data for settlement;
- Develop consent management procedures so that consumers can trust to authorise access to their consumption data.

[29] CEER Report on IBM and Consumer Protection challenges CEER report, CEER DS Paper on Regulatory sandboxes in incentive regulation and CEER / RBM WS report on dynamic regulation (which also deals with sandboxes).

[30] 2022 WP: DS/CRM deliverable on EVs – in preparation

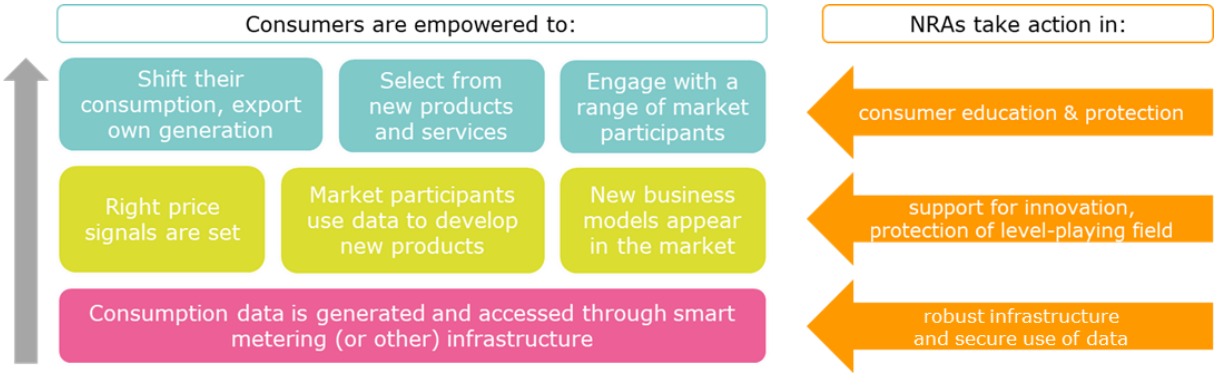

Figure 1 – NRA actions to support consumer empowerment

Case Studies

We have drawn on examples from NRAs to demonstrate what steps regulators can take to bring about positive change in empowering consumers through digitalisation and better use of data.

1. Ofgem: Settlement Reform

What has Ofgem done?

Ofgem is in the process of implementing a series of reforms of the electricity retail settlement system, known as market-wide half-hourly settlement (MHHS). Under the reforms, electricity retail settlement will use actual granular consumption and export data from domestic and small non-domestic consumers' smart meters, down to 30-minute resolution. This high-resolution time-of-use data will replace the currently used estimated data derived from widely spaced meter readings from traditional non-smart meters. The reforms are expected to be fully implemented by late-2025.

How has it helped to deliver against the principle ('empowered consumers')?

Using actual time-of-use data in the settlement system will expose suppliers to the true cost of supplying their customers in every 30-minute period of the year. As the cost of supply varies based on a number of factors, including the volume of available renewables, variable network costs, time of day etc., suppliers will be incentivised to develop products and services that will allow customers to shift their consumption to times when electricity is cheaper / more plentiful. This will, in turn, empower consumers to take greater control of their personal consumption patterns to enjoy the available benefits.

2. Ofgem: Energy Regulation Sandbox

Digitalisation is part of a wider transformation of the energy system, where innovation will have a central role. However, regulation can sometimes place barriers to new entrants and innovators. Ofgem's sandbox is a demand-led service which helps innovators experiment and bring to market new products, services, methodologies or business models without some of the usual rules applying.

There are a range of available tools that innovators can use through this service:

- Bespoke guidance: for example, on specific existing rules and regulations
- Comfort: Where an innovator considers that there is a high degree of risk involved in their trial, the Sandbox can provide comfort about what we as the regulator consider to be compliant behaviour, and our approach to enforcement.
- Confirmation: While the Sandbox cannot endorse a specific product/service, it can confirm whether a type of activity is permissible. This can help provide reassurance for potential investors.
- Derogation: to provide temporary or enduring relief to holders of licences where a desirable innovation is blocked by existing rules

To grant a Sandbox, Ofgem have to be satisfied that a proposal meets their eligibility and desirability criteria, these include:

- being genuinely innovative
- having the potential to deliver consumer benefits
- risks not being transferred from the innovator to consumers
- creating new energy system value
- existence of a definable regulatory barrier inhibiting the innovation; and
- supporting the path to Net Zero

While the service enables companies to experiment in live energy markets, it is not a means for innovators to change policy or regulation on a permanent basis. Nevertheless, Ofgem use the insights and cooperation with innovators to inform policy and permanent reform.

8 Conclusions

Through the lens of six consumer-focused principles, this paper considered a range of opportunities arising from the digitalisation of the energy retail market. Each chapter sought to set out how digitalisation can improve consumer outcomes. In considering possible barriers or dependencies, each chapter also presented a set of actions that regulators can take to help drive the benefits of digitalisation and deliver according to the key principles presented throughout the text.

It is important to recognise that digitalisation is an ongoing process and individual member states will have advanced at different stages. As such, some of the opportunities will be understood as short-term with a strong potential to rapidly improve consumer outcomes, while others will be understood as long-term and more challenging to achieve. To help provide insights into how different regulators have approached digitalisation in their national energy retail market, each chapter offered an illustrative case study that other NRAs are encouraged to consult when considering changes within their remit.

	Actions regulators can take
Affordability	▪ Introduce an affordability principle into their regulatory strategies for retail markets; ▪ Identify and remove barriers to entry for innovators and investors to drive down the costs of new products and services; ▪ Promote interoperability through minimum standards to help achieve economies of scale; ▪ Work with government to deliver support schemes (e.g. financial support for green installations) and monitor their outcomes; ▪ Raise awareness of long-term savings and benefits of new products; ▪ Review price control arrangements for regulated companies; ▪ Where in the remit, consider introducing appropriate regulatory tools for new entrants (e.g. TPIs); ▪ Set network/distribution charges in a way that passes savings through the value chain to the end-consumer.
Simplicity	▪ Promote Price Comparison Tools on regulators' websites and other channels; ▪ Provide PCT operators with guidance on good practices on how to operate it; ▪ Establish regulatory guidelines for submission of supplier data; ▪ NRAs should cooperate with stakeholders, consumer organisations and ombudsman in developing independent PCT; ▪ Establish guidance with stakeholders on personalisation and simplification of customers' bills and billing information; ▪ Cooperate with stakeholders to provide consumers with simple advice on how to reduce their bills and which tariff is appropriate for them.
Protection	▪ Ensure that all market participants apply cybersecurity standards and measures and have a defined cybersecurity strategy (even those not included in the list of Operators of Essential Services);

	▪ Identify best practices in cybersecurity applied to the energy sector and ensure they are shared so that they can be adopted by other companies; ▪ Ensure operators comply with the Directive on Security of Network and Information Systems (NISD); ▪ Ensure cybersecurity remains a key priority, working in close collaboration with experts in that field (i.e. information and communication technologies' companies); ▪ Monitor the cybersecurity expenditure of regulated monopoly grid operators; ▪ Ensure that the devices and products used by energy service providers that are linked to the internet implement "security by design" and "security by default" principles; ▪ Monitor and supervise offers to make sure that they do not lead to price discrimination; ▪ Monitor suppliers' behaviour in order to ensure they are complying with their obligation of treating consumers fairly; ▪ Ensure they have adequate enforcement powers within the regulatory framework to protect against malpractice regarding anti-competitive behaviour amongst suppliers; ▪ Identify gaps in the regulatory frameworks around the regulation of TPIs and correct them accordingly.
Inclusiveness	▪ Where appropriate, review the CBA in MS which are yet to commence their smart meter rollout; ▪ Together with governments, ensure an appropriate regulatory framework is in place to drive a successful rollout of smart meter infrastructure, including smart metering assets; ▪ Engage with industry on strategies to promote an effective use of smart meters; ▪ Work with industry and consumer advocacy groups to foster inclusive design for new digital products and services – for example, by promoting sharing of best practice, or setting minimum accessibility standards; ▪ Place obligation on energy suppliers to inform consumers about how they can engage using data they generate; ▪ Consider initiating or participating in public digital literacy campaigns; ▪ Consult on and publish a data strategy/guidance for regulated companies; ▪ Require regulated energy companies to develop and publish their data strategies; ▪ Support local or national pilot schemes aimed at promoting better data and information sharing; ▪ Consider introducing vulnerability or priority services registers. Where in place, work with industry to improve data-sharing to help meet emerging vulnerabilities associated with digitalisation and market transition.
Reliability	▪ Inform consumers about the available complaint channels and dispute resolution mechanisms;

	▪ Help to ensure third-party access to accurate historical consumption data, while protecting consumers' privacy in accordance with the General Data Protection Regulation (GDPR); ▪ Use historical consumption data to define cost-reflective tariff schemes; ▪ Ensure system interoperability; ▪ Review of current switching arrangements, e.g., consumer satisfaction, timelines, prevalence of errors; ▪ Consider better use of data to create up-to-date databases of metering points; ▪ Set obligation on switching parties to use data to deliver better switching; ▪ Put in place mandatory dispute resolution processes; ▪ Use web portals and social media platforms to inform consumers on potential misleading practices; ▪ Promote consumer information campaigns (trainings, customised advice, etc).
Empowerment	▪ Provide a suitable regulatory framework for the rollout of smart metering and associated infrastructure; ▪ Lead on data best practice to guide the generation and use of energy system data; ▪ Develop procedures for aggregation and anonymisation of consumer data; ▪ Set criteria for authorised Third Party Access to historical consumption data; ▪ Adapt the settlement process to better reflect price signals; ▪ Support innovative business models, e.g. through sandbox service; ▪ Promote a level playing field, e.g. by setting interoperability standards; ▪ Ensure that energy service contracts do not preclude consumers from switching between energy suppliers; ▪ Work with other stakeholders on consumer-focused communication and education strategies; ▪ Be more visible to consumers; ▪ Set expectations or, where appropriate, put in place regulation on how regulated companies should engage with consumers, e.g. minimum information provision, such as on the benefits and risks of dynamic pricing, or the use of data for settlement; ▪ Develop consent management procedures so that consumers can trust to authorise access to their consumption data.

Equally, although digitalisation presents many opportunities, certain changes and developments in the market, both external and those arising as a result of digitalisation, may hinder successful benefits-realisation, or even result in consumer harm. To complement the list of possible actions regulators can take to drive desired outcomes, below we list the key risks that NRAs are encouraged to think about when considering the impacts of, and their response to the digitalisation process. These risks also present an opportunity for further research.

Although the focus of this paper is on the key challenges and opportunities of digitalisation in terms of the joint CEER-BEUC Vision for energy consumers, regulators acknowledge that the current geopolitical uncertainties in Europe may further escalate concerns of energy affordability and reliability of supply among its citizens. These factors may potentially play a detrimental role in the digital agenda. In particular, some categories of consumers, especially vulnerable ones, may be less able or willing to invest in digital solutions or lose trust in innovative business models. On the other hand, high prices may drive the demand for more efficient energy management solutions or incentivise some categories of consumers to engage more in the market. Regulators must be aware of these dynamics and help support the different needs of consumers through a flexible regulatory framework[31].

Risks

In terms of **Affordability**, in the short term, there is a risk that high costs and low investment will hinder efforts to kick start consumer journeys towards a more demand-side oriented system. This risk is even more pronounced at a time where the retail market and consumers across Member States experience disruption and price volatility.

In the long run, there is a continued risk of enduring cost pressures, whether as a result of amortisation of high infrastructure costs or failure of benefits realisation and/or distribution. In particular, there is a risk to affordability for consumers who may never be able to fully engage – for example those on low incomes or with inflexible demand capability.

Despite improved data collection, described in the **Simplicity** chapter, PCTs may not fully reflect the breadth of available offers in the market. This could hinder consumer ability to find the best deal available to them. PCTs may not be independent from energy suppliers (where run by private operators) or sufficiently transparent in providing the data and algorithms on the way they operate. PCTs may also not be adapted to the continuing development of technology and reflect the evolution of the market (demand side response, electric vehicles, smart meters, dynamic prices), as this will represent additional costs to update the tools.

Some of the risks for the billing issues were already identified in “CEER Report on Billing Issues in the Clean Energy for All Europeans Package”[32] which concluded that receiving a bill via an individual account on the electricity provider’s website may create accessibility issues, caused by digital illiteracy, lost passwords or other login credentials, or simply, due to consumer inactivity (opening a letter to receive a bill may seem less burdensome than having to log in online – depending on the design of the web portal).

When it comes to **protection** in the context of digitalisation, consumers face a potential risk associated with the unlawful or unfair treatment of their data that may arise if smart technologies and new data-driven products do not comply with data protection principles. In addition, cybersecurity risks are evolving with growing digitalisation, the increase in the number and type of devices connected to electricity networks and the resulting interconnectivity in the energy sector. In this sense, any lack of security of the connected devices represents a potential risk to consumers’ privacy and safety.

[31] For further insight on how regulators may cater to the different demands of the market based on consumer categories, please refer to CEER Report on Innovative Business Models and Consumer Protection Challenges.

[32] See CEER Report on Billing Issues in the Clean Energy for All Europeans Package

On the other hand, the increasing use of artificial intelligence, and energy service provider access to very detailed customer information, such as switching frequency or level of creditworthiness, may lead to the emergence of new forms of abuse of market power or price manipulation, when resulting in situations of price discrimination or in suppliers blocking certain types of consumers from entering a contract with them.

In terms of **inclusiveness**, as the process of digitalisation and innovation accelerates, there is a risk that regulation will not be able to keep up with its the pace. For example, a forced transition towards a more remote and digital life during COVID-19 may have accelerated digitalisation without ensuring accessible communication channels and exacerbating pre-existing inequalities.

There is also a risk of 'technological optimism' on the part of governments, NRAs and the industry, i.e., a belief that data and digitalisation will 'automatically' improve consumer outcomes. However, as described in the "Inclusiveness" chapter, the increased volumes and complexity of available data may prove too challenging to manage and, consequently, not deliver the intended benefits to some sections of the population.

As mentioned in the **Reliability** chapter, digitalisation has the potential to increase consumer engagement in energy markets. However, if consumers lack trust in basic smart metering systems and other emerging technologies and business models, consumer willingness to adopt digital/data-enabled services and tools is compromised. The digital divide also poses the risk of leaving less tech-savvy consumers behind. These types of consumers might not understand the benefits of their participation in these data-driven opportunities, which may lead to lack of willingness to share their individual data and potentially hinder the development of reliable and robust new services.

Increased switching rates enabled by faster switching also pose the risk of decreasing consumer trust in case of double invoicing. More broadly, there is a risk that focus on frequent switching coupled with relaxed regulation around market entry can lead to aggressive below-cost competition among suppliers. A possible solution to this risk is using automated technology to immediately inform the incumbent supplier about the switch.

Overall, consumers and third parties alike, must have access to reliable, accurate and updated data. It is therefore paramount that energy suppliers and market actors, in accordance with the different national legal frameworks, are aware of their responsibilities, acting accordingly and providing complete, and transparent information to consumers that also takes into account the heterogeneity of the consumer base, ranging from the most well-informed, active consumer, to the average and to the vulnerable consumer.

In regard to the **Consumer empowerment** chapter, bringing about a behavioural shift in market engagement on a societal scale carries a number of inherent risks, for which NRAs should actively develop mitigation strategies.

Finally, a transition to a more dynamic market can create winners and losers and result in an unequal benefits distribution. Those who are better placed to engage with the market and take advantage of the emerging opportunities may be more likely to see greater and earlier material benefits than those who are either unable or unwilling to engage. In particular, there is a risk of a digital education divide, threatening to exacerbate existing inequalities and undermine the rationale of a holistic societal change.

Annex 1 – List of abbreviations

Term	Definition
CEER	Council of European Energy Regulators
GGP	Guidelines of Good Practice
MS	Member State(s)
NRA	National Regulatory Authority
PCT	Price Comparison Tool
DGEG	(Portuguese) General Directorate of Energy and Geology
CBA	Cost-benefit analysis
TPI	Third Party Intermediary
REC	Retail Energy Code
SOLR	Supplier of Last Resort Mechanism
ToU	Time of Use
MHHS	Market Half-Hourly Settlement

Annex 2 – About CEER

The Council of European Energy Regulators (CEER) is the voice of Europe's national energy regulators. CEER's members and observers comprise 39 national energy regulatory authorities (NRAs) from across Europe.

CEER is legally established as a not-for-profit association under Belgian law, with a small Secretariat based in Brussels to assist the organisation.

CEER supports its NRA members/observers in their responsibilities, sharing experience and developing regulatory capacity and best practices. It does so by facilitating expert working group meetings, hosting workshops and events, supporting the development and publication of regulatory papers, and through an in-house Training Academy. Through CEER, European NRAs cooperate and develop common position papers, advice and forward-thinking recommendations to improve the electricity and gas markets for the benefit of consumers and businesses.

In terms of policy, CEER actively promotes an investment friendly, harmonised regulatory environment and the consistent application of existing EU legislation. A key objective of CEER is to facilitate the creation of a single, competitive, efficient and sustainable Internal Energy Market in Europe that works in the consumer interest.

Specifically, CEER deals with a range of energy regulatory issues including wholesale and retail markets; consumer issues; distribution networks; smart grids; flexibility; sustainability; and international cooperation.

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More information is available at www.ceer.eu.