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CEER Report on Innovative Business Models and Consumer Protection Challenges

Customers and Retail Markets Working Group & Distribution Systems Working Group Project team

Ref: C20-CRM-DS-03-03
20 September 2021

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INFORMATION PAGE

Abstract

This report (C20-CRM-DS-03-03) presents CEER's assessment of innovative business models and their impact on regulatory frameworks as well as their implications for consumer protection. The report provides key takeaways and ways forward on the identified regulatory challenges.

Target Audience

Gas/electricity consumers, energy suppliers, traders, consumer representative groups, network operators, Member States, academics and other interested parties.

Keywords

Innovative business models, consumer protection, data protection, regulatory challenges, new entrant access, consumer choice, principal-agent problem, self-consumption, data access.

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Related Documents

CEER documents

- CEER 2022-2025 Strategy Empowering Consumers for the Energy Transition, June 2021, Ref. C21-SSG-06-05.
- 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.
- Implementing Technology that Benefits Consumers in the Clean Energy for All Europeans Package, July 2019, Ref. C19-IRM-16-04.
- Report on Regulatory Aspects of Self-Consumption and Energy Communities, June 2019, Ref. C18-CRM9_DS7-05-03.
- CEER 3D Strategy for 2019-2021, January 2019, Ref. C18-BM-124-04.
- CEER Key Positions on the "New Deal for Consumers", on proposed Directive on Better Enforcement and Modernisation of EU Consumer Protection Rules, October 2018, Ref. C18-CRM-123-06.
- CEER Report on Smart Technology Development,, June 2018, Ref. C17-RMF-101-04.
- Roadmap to 2025 Well-Functioning Retail Energy Markets, February 2018, Ref. C17-SC-59-04.
- CEER Position Paper on the Future DSO and TSO Relationship, September 2016, Ref. C16-DS-26-04.

External documents

- European Commission (2019), Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June on common rules for the internal market for electricity and amending Directive 2012/27/EU
- https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L0944
- European Commission (2018), Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources
- https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018L2001

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EXECUTIVE SUMMARY

Background

In 2012, the Council of European Energy Regulators (CEER) and the European Consumer Organisation (BEUC) launched their joint 2020 vision for Europe's energy customers The vision was centred around five key principles for consumers that should form the core of European energy legal frameworks – reliability, affordability, simplicity, protection and empowerment.

The vision was refreshed in 2020 as the "CEER-BEUC 2030 Vision for Energy Consumers – LET'S ASPIRE"[1]. A sixth key principle was added, inclusiveness, with a view to ensuring no consumer is left behind as we move through the energy transition. Europe's energy markets are becoming ever-increasingly underpinned by improvements in 4G/5G communications and the ongoing rollout of smart meters, capable of recording and transmitting consumption and export readings down to 15-minute increments. Granular network charging and settlement systems are introducing time-of-use price signals, resulting in innovative retail tariffs that incentivise the shifting of consumption away from peak periods to times of the day when electricity is cheaper and more readily available. Improvements in technology are resulting in an increasing prevalence of distributed generation and battery storage, allowing consumers to generate their own energy and even to trade any surplus. Growing numbers of electric vehicles are introducing new challenges for electricity networks. Smart appliances, part of the "internet of things" (IoT), allow consumers to take greater control over when they consume energy for different purposes.

All these factors in combination create new opportunities for innovative business models to emerge in Europe's liberalised retail markets. Innovation by its very nature is fast moving and unpredictable, bringing new challenges for regulators. Whilst innovation can be a good thing for consumers, it is important that regulators foresee these challenges and mitigate against undesirable impacts. The key is to strike the balance, allowing innovation to flourish in an environment that protects all consumers, leaving no one behind.

The challenge now is to ensure that those six key tenets of the CEER-BEUC 2030 vision for Europe's energy consumers are reflected in the legal and regulatory frameworks across Europe, as we navigate through this ever evolving and increasingly complex energy retail market.

Objectives and contents of the document

The emergence of new innovative business models across Europe provides an opportunity for individual states to share knowledge and best practice, based on their own experiences, from which others may benefit. We can use emerging examples of innovative business models to understand what some of these challenges might be, and how to design a regulatory framework to deal with them.

This paper seeks to identify and describe some of these emerging business models and suggests what appropriate regulatory action may be required to protect consumers in line with the 2030 CEER-BEUC vision LET'S ASPIRE.

[1] CEER-BEUC 2030 Vision for Energy Consumers, 13 October 2020.

Several business models are described across five themes:

- Community Access;
- Engagement Enablers;
- Energy as a Service;
- Network Optimisation; and
- E-mobility.

Four key themes of consumer protection challenge associated with these models are then described in detail:

- New entrant access;
- Consumer choice and the "Principal-agent problem";
- Self-consumption; and
- Data access and protection.

Finally, several recommendations are put forward for how National Regulatory Authorities (NRAs) may address these challenges and mitigate against undesirable impacts.[2]

Brief summary of the conclusions

The key recommendations for NRAs under each theme of consumer protection challenges can be described as follows:

New entrant access and innovation

- Equal access to all stakeholders. Regulators must simultaneously ensure that incumbents do not unduly benefit from resources inherited from their regulated activity, such as their customer database;
- Equipment interoperability should be encouraged, and ultimately even be made mandatory, to prevent incumbents from locking-in the market, using non-interoperable equipment; and
- To benefit from the full potential of demand-side management and EVs development, it is necessary to adapt rules regulating actor's participation in flexibility markets.

Consumer choice and the 'Principal-Agent Problem'

- NRAs should try to find ways to diminish lock-in effects of certain contracts, for example by enforcing businesses opening up the product for third-party access or taking measures to reduce the risk on high pricing or poor quality.
- Consumers must be adequately informed about new technologies and basic financial concepts, and/or that information is presented to them as clear and simple as possible in order that the consumer is able to make an informed choice; and
- NRAs must ensure that the regulatory framework in the individual state provides for the adequate regulation of agents. This may not necessarily lie within the remit of the NRA for energy in all cases, and thus may be more appropriately placed within the remit of the consumer competition authority (or similar).

[2] This report does not include network optimisation.

Self-consumption

- NRAs should define rules to ensure that self-consumers fully understand the business model and are able to fully exercise their rights. This is particularly important if "supplier-centric" solutions become dominant;
- Self-consumption should be integrated into balancing rules, such as those regarding independent aggregators, in order to clearly define the delimitation of balancing responsibilities; and
- NRAs should adapt retail market monitoring to better understand the impact of self-consumption in market dynamics, namely on offers, prices and switching rates involving self-consumers.

Data access and protection

- Data access is the key for the development of innovative services, beneficial to both consumers and the energy system. NRAs have to ensure that frameworks and technological infrastructure for third party data access are designed to be transparent and simple. They must allow access to authorised third parties without excessive technical, administrative or regulatory hurdles;
- Said frameworks and infrastructures must also be technology-neutral, allowing for innovation without promoting or discriminating a particular technology;
- NRAs, along with the responsible parties (namely utilities), should ensure that consumers are on-board and trusting of the underlying technology that enables data access. Smart meter installation processes, for instance, must be consumer-friendly and not perceived as bothersome, invasive or with other negative connotations;
- Consent management systems for data access should be consumer-centric. This entails that they are reliable by design, yet simple to understand and user-friendly. Consumers should feel confident that their personal data is safeguarded and treated with all due respect for data privacy;
- Data protection should not result in excessive regulatory barriers and should not hinder the emergence of new services and new market players; and
- NRAs must also ensure cybersecurity remains a key priority, possibly in close collaboration with experts from outside the energy sector.

1 Introduction

Building on the themes of CEER's 3D strategy paper[3], the central aim of this report is to assess the impact on the regulatory framework and the implications for consumer protection of innovative business models, products and services emerging in the energy sector and beyond.

In addition, this work is expected to assess whether energy systems are responsive to changing consumer needs, behaviours, concerns and preferences, as active trialling of new technologies and business models continues. It also investigates the measures required to protect customers against possible emerging risks.

The report identifies several innovative business models and supporting case studies.

The project was structured in two distinct phases:

Phase I: Identification and analysis of innovative business models and relevant supporting case studies. This work was performed by a consultant, CEPA. Their work categorised innovative business models into five key themes:

- Community access;
- Engagement enablers;
- Energy as a Service;
- Network optimisation; and
- E-mobility.

Phase II: Discussion of the potential challenges for regulation that each of the five themes of innovative business models create. This work was performed by a project team, comprising members of the CEER Innovation and Retail Markets (IRM) workstream and Distribution Systems (DS) Working Group, building on the findings of phase one.

The challenges for regulation have been categorised within four key themes:

- New entrant access;
- Consumer choice / The principal-agent problem;
- Self-consumption; and
- Data access and protection.

Please note, whilst Phase I of the project identified five themes of regulatory challenge, it was decided in Phase II to combine consumer choice and the principal-agent problem theme into one, as both issues were deemed to share commonalities.

[3] CEER 3D Strategy for 2019-2021, January 2019, Ref. C18-BM-124-04.

2 Phase I – CEPA study:

This chapter summarises the main findings from the CEPA study.

2.1 Themes of Business Models

As noted, CEPA categorised their identified case studies into five key themes:

Community access

Business models under this theme give end users, in particular prosumers, greater access to energy markets. They include peer-to-peer (P2P) platforms and energy communities, which allow market actors to trade directly without the need for intermediaries. The business models often make use of consumers' increasing desire to be part of the energy transition, in which they can work together as a community with their neighbours or other likeminded consumers.

Engagement enablers

These business models allow end consumers to better engage with their own energy usage and the provenance of the energy they are consuming. This is often enabled by smart metering and other data-intensive technologies.

Energy as a Service

Businesses offering Energy as a Service (EaaS) promise to provide value to consumers by simplifying their interactions with the energy market. Typically for a subscription fee, the company can manage energy costs for the consumer. At the same time, by managing the aggregated actions of multiple consumers, these business models can also benefit the network as a whole, for example, helping to balance demand or provide flexibility services.

Network optimisation

While the examined case studies focused on the impact of emerging business models on the end consumer, a clear theme to emerge from this research is of new technologies and approaches being applied to make the use of the energy network more efficient for all stakeholders.

E-mobility

Parallel to the energy transition, the transport sector is undergoing a significant change driven by decarbonisation policies, making use of emerging technologies. The case studies identified here involve the interaction between these two sectors. In particular, these business models use innovative approaches to utilising electric vehicles (EVs) for the benefit of both end consumers and the energy system as a whole.

2.2 Consumer protection issues

CEPA identified a number of key cross-cutting consumer protection issues relevant across the case study themes noted on the previous page.

Ensuring new entrants have sufficient access

By its nature, an innovative business model will claim to add value by offering products and services either not currently provided by incumbents, or by achieving an outcome more efficiently than the incumbent. A number of the case studies explored in this work come from mature parties in the energy market – for example EDF's vehicle-to-grid (V2G), offering to businesses with EVs, or gridX's partnership with the BMWi; E.ON and other companies as part of the SmartQuart energy transition project. However, many of the business models considered are offered by newly established entrants into the market. A classic regulatory challenge is ensuring incumbents are not able to unfairly exploit their position to significantly limit market penetration by new entrants.

Consumer choice

Another common regulatory challenge is to ensure that consumers have sufficient choice and variety in the products and services available to them. In this way, competition between providers can help incentivise high quality of service. Two related issues are that of asymmetric information and captive consumers, which have a negative impact on consumer choice.

The implications of self-consumption

A key enabling trend for a number of the case studies explored is the increasing uptake of self-consumption and distributed energy resources (DER). This can come, for example, in the form of renewable energy being generated by a household, or EVs that can store energy and discharge it back into the household when required. As innovative business models and self-consumption technologies shift more consumption 'behind the meter' (i.e. off the energy network), there will be significant implications for the nature of network tariffs in particular.

Data access and protection

It has been noted in interviews conducted as part of this research that the requirements of the General Data Protection Regulation (GDPR) can often be an advantage when businesses are looking to expand their service provision globally. The EU's regulations are often seen as a gold standard in the protection of personal data, and so this provides potential non-European clients assurance that protection is appropriate. However, as well as issues relating to the protection of personal data, companies in the energy sector face two further issues: data access and cybersecurity.

The 'Principal-Agent Problem'

The Principal-Agent problem is another standard regulatory challenge. The problem of how person A can motivate person B to act for A's benefit rather than following self-interest. The problem is how to devise incentives which lead agents to report truthfully to the principal on the facts they face and the actions they take, and to act for the principal's benefit. Incentives include rewards such as bonuses or promotion for success, and penalties such as demotion or dismissal for failure to act in the principal's interests[4].

[4] Principal–agent problem. *Oxford Reference.* Retrieved from https://www.oxfordreference.com/view/10.1093/oi/authority.20110803100346712

3 Phase II – Regulatory challenges

Phase II of the project built on the findings from Phase I. Here, each of the four themes of regulatory challenge are addressed in turn. For each theme the report addresses:

- Introduction and legal framework;
- Current relevance of the issue (Why is this an issue now?);
- Discussion of the specific regulatory challenges; and
- Conclusions and way forward for regulators to address these challenges.

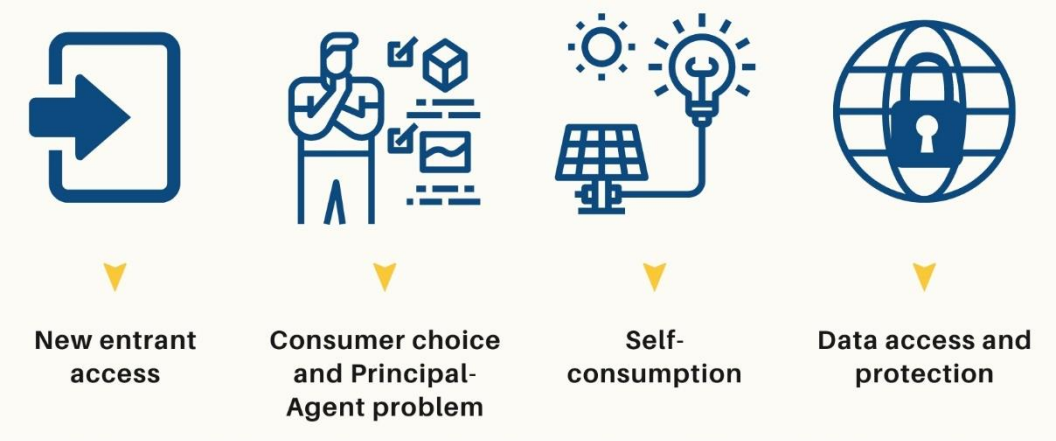
Table 1 below sets out how CEPA mapped each of the four themes of regulatory challenges to the five identified themes of emerging new business models identified in Phase I (see previous chapter). For example, new entrant access is recognised as a challenge across all five themes of emerging business models, whereas the challenges of self-consumption are only judged to be directly relevant to business models within the community access and e-mobility themes.

Issue	Community access	Engagement enablers	Energy as a Service	Network optimisation	E-mobility
New entrant access	x	x	x	x	x
Consumer choice and the Principal-Agent problem	x	x	x		x
Self-consumption	x				x
Data access and protection	x	x		x	

Table 1 – New business models and regulatory challenges

However, subsequent CEER analysis in Phase II disagreed slightly with this classification. For example, the theme of self-consumption was not regarded as applicable to the e-mobility business models but was instead felt to be related closely to Energy as a Service. Similarly, data access and protection is regarded as an issue that, in fact, spans all five themes of business model, including Energy as a Service and e-mobility.

For each issue, the following pictograms are used to provide simplified classification.



3.1 New entrant access and innovation

3.1.1 Introduction and legal framework

In the energy sector as with many others, competition depends on the ability of new entrants to challenge incumbent providers. New entrants play a key role in developing innovative products and services, and by using new business models, in creating downward pressure on prices. They are often more flexible and responsive to new consumer demands, bring innovative ways of thinking, and are more likely to experiment with new business models and services, thanks to their adaptability skills. From the CEPA study, this is especially true for new actors moving into energy from other sectors.

Ensuring equal market access to all actors is a common challenge for regulators. Suppliers and energy service companies generally face a broad range of hurdles to enter the energy market. Such classic entry barriers are related to the advantage of vertically integrated market players, limited customer awareness, limited market or customer value and uncertainty over the future regulatory framework. This report does not focus on classic entry barriers which have already been addressed[5], but instead on new entry barriers related to innovative business models identified in the CEPA study.

3.1.2 Current relevance of the issue: Why is this an issue now?

New entrant access in the energy sector, a sector which is often dominated by former public monopolies, has been an issue ever since we started to witness the gradual introduction of competition to the energy supply chains across Europe. This represented the first step to wholesale and retail market liberalisation, allowing “new players” to enter the sector, including energy traders and companies dealing with energy generation and/or supply.

Today, after a decade of complete market liberalisation across Europe, some of these former new players have become well established competitors in retail markets and created healthy competition for energy supply, generation and trading, even as some still experience setbacks or disadvantages relative to dominant long-established incumbents.

We are now witnessing a shift to the next phase of competition. New technologies are emerging to enable consumers to better monitor and manage their energy consumption. In addition to where and through whom they source their supply, consumers are now increasingly interested in energy services and management, including monitoring their consumption patterns, consuming green energy, activating their flexibility, generating energy locally, driving electric vehicles, etc. As such services rely on new and ground-breaking technology, innovation is at the heart of the process. This second phase of new competition harnesses the huge amount of data generated by energy consumers, and valued by energy services providers, as detailed in section 3.4.

[5] One can, for example, think about the specific report from the European Commission, “European Barriers in Retail Energy Markets”, published in February 2021, which tackles the issue of classic entry barriers in the energy sector.

New entrants in the field of energy management services offer innovation opportunities that suppliers could also take advantage of and incorporate in their business models to structure their own innovative electricity and gas offers. Such partnerships enable new suppliers to stand out from competitors, usually incumbents, by adapting their business strategies and targeting specific customer segments.

A particularly interesting aspect of this second "competition revolution" is the convergence of different sectors, driven by the growing need for technologies. The emerging energy services are based on hardware and software technologies which, in turn, involve further new actors such as equipment and device manufacturers, vehicle constructors, telecommunication operators, GAFAM (Google, Apple, Facebook, Amazon, Microsoft) etc.

This recent wave of innovation, therefore, highlights the importance of new entrants, not only from the energy sector, but also from other sectors. Ensuring equal market access to all players is complex, as newcomers from adjacent sectors may already possess significant resources and, while new to the energy sector, could already act as dominant market players elsewhere.

3.1.3 Regulatory challenges

The first challenge for energy regulators lies in the risk of ignoring new entrants from other sectors. As energy regulators are used to interacting with "conventional" energy players, such as producers, suppliers and, even, aggregators, they may not pay due consideration to entrants from other sectors, such as vehicle manufacturers or GAFAM who would have traditionally been out of scope. Regulators must, therefore, consider in their analysis more unconventional newcomers from adjacent sectors and recognise the benefits and risks that they may bring to customers. In these cases, as will be pointed out in the section concerning data access, regulators may need to identify new regulatory models or approaches to deal with these issues that go beyond allowing network or market access. This may entail cooperation with regulators from other sectors with experience in addressing similar issues.

The second challenge is to find a compromise between allowing a variety of new actors to enter the market and compete on a level playing field with traditional energy players and ensuring that any existing market power of new entrants inherited from other sectors does not create a barrier for competition for other emerging third parties, such as start-ups or other brand-new players not transitioning in from other sectors.

The example of e-mobility is particularly interesting as it covers the full value chain from car manufacturers to energy suppliers. Electric vehicles (EVs) primarily address consumers' mobility needs, but they also enable them to play an active role in the energy market via the use of Information Communication Technology (ICT). As EVs represent one of the most promising markets of energy services for consumers in the (near) future, many actors in the automotive value chain are undertaking EV trials, experiments, and initiatives:

- Car manufacturers, in addition to their traditional roles, are deploying EV charging facilities. Some also embed software within the car such that consumers can remotely control the charging schedule;
- Energy suppliers are adapting their offers to the new needs of consumers, offering innovative contracts which may include low prices at night to charge EVs, for example. Some also act as charging point operators;
- Aggregators are launching platforms to aggregate the storage potential of EVs to provide flexibility services to network operators. Utilities or network operators are leveraging the opportunities created by these new services to better and more

efficiently operate their networks and fulfil secondary flexibility needs. This may also lead to a reduced need for network investments, such as reinforcement projects;

- Charging point manufacturers and operators deploy and operate public charging stations. Some network operators also deploy their own public charging station[6];
- Mobility operators provide "universal mobility passes" to EV users so that they can recharge at any charging station; and
- ICT actors are also involved, as this new potential relies heavily on advancements in information technology, including the exponentially increasing amounts of data being exchanged between mobility operator, customers, aggregators, network operators and suppliers.

The following four issues may prevent new actors from competing on a level playing field with traditional energy players:

Data access

Contrary to newcomers, suppliers have privileged access to valuable information like a customer database, electricity prices and peak/off-peak consumption patterns of their consumers. Therefore, newcomers may lack data access, and suppliers could prevent new entrants to the market by restricting access to valuable information such as electricity rates. This might be an issue for new business models like the ones provided by Fresh Energy[7] and FlexiDAO[8].

In order to gain access to clients, Fresh Energy goes through suppliers who possess a competitive advantage in terms of their established customer base. Fresh Energy's business model involves displaying electricity invoices in real time, requiring access to the client's energy supply contract. It is therefore necessary to partner with suppliers.

Meanwhile, FlexiDAO collects generation and consumption data from the national data hub, smart meters and the energy management system of the grid operator. To permit such innovative businesses to emerge, equal access to databases and transparency and neutrality of grid operators must be ensured. In particular, data from smart meters must be equally available to suppliers and third parties. Challenges related to data access are further discussed in section 3.4.

Lack of interoperability

Some energy services require expensive equipment such as charging points or intelligent devices. Incumbents could easily lock in customers through non-interoperable expensive equipment: enrolled customers will not be willing to switch service provider if it requires them to pay for new equipment. This would prevent new players without existing customer bases from easily acquiring new clients. In markets requiring expensive equipment such as the V2G market, this can be an issue.

[6] Thereon, European Directive 2019/944 conditions network operator's ability to deploy charging station to the absence of private initiative in that sense, as the idea is to develop competitive markets in this area.

[7] https://www.getfresh.energy/

[8] https://www.flexidao.com/

Bundled contracts

Even if all equipment were universally interoperable, flexibility service providers could still lock in customers through bundled offers. French energy supplier EDF similarly provides a 33% discount on its domestic battery product for customers that sign up to its 10-year grid services package. Customers who leave before the end of the contract are charged the pro-rated discount as an exit fee. In this way, incumbents can use their customer base to quickly lock in the market via bundled offers. For more detail on this issue of consumer captivity refer to sub-section 3.2.3.

Participation rules in flexibility markets are not adapted to distributed generation

In services based on load shifting and flexibility, such as EV smart charging, a key barrier identified was that participation rules in flexibility markets managed by grid operators prevent the inclusion of small-scale assets such as EV charging points. Certification processes are often too cumbersome for smaller, distributed generation assets, and performance controls are not always adapted to EV consumption patterns. It may be noted that this barrier is relevant to both new players and incumbents.

3.1.4 Takeaways and way forward

To remove barriers preventing newcomers from innovating and bringing positive change for the energy sector and ultimately for consumers, regulators must be vigilant in regard to the following topics:

Ensuring fair data access to every stakeholder

The challenge for regulators is to strike a balance between protecting data and safeguarding equal data access. Possible solutions might be as follows: as well as ensuring equal access to all stakeholders, regulators must also ensure that incumbents do not unduly benefit from resources inherited from their regulated activity, such as their customer database.

To give access to consumers data such as price information to non-suppliers, a simple solution could be to mandate that suppliers must share price details to third parties when consumers consent to it. However, obliging market actors to share price information could imply revealing confidential information. Therefore, a balance needs to be found.

Regarding EVs, free access to a database providing information on public charging stations information, such as technical data, location and V2G compatibility, would be a way to allow new actors to develop offerings using standardised data.

Encouraging interoperability between equipment

To prevent incumbents from locking in the market via non-interoperable equipment, equipment interoperability should be encouraged, or even be made mandatory.

Regarding EVs, a European directive already requires interoperability in terms of physical plug and billing systems for public stations. This interoperability requirement could be extended to private charging points, so that consumers are not tied to a specific service provider due to the initial equipment they installed.

Simplify market rules to enable small-scale assets to participate

To benefit from the full potential of demand-side management and EVs development, it is necessary to adapt rules regulating actors' participation in flexibility markets. Certification processes may be too heavy for small, distributed generation, and performance controls are not always adapted to the consumption patterns of EVs.

The inclusion of small-scale assets in flexibility markets raises questions in terms of data and anonymisation, discussed later in chapter 3.4.

Regarding the need to simplify regulation, sandboxes are useful regulatory tools to experiment with rules tailored for specific actors. Numerous European countries have launched sandboxes to create testing environments and collect experiences. Current existing examples include Great Britain and the regulatory sandbox initiative in 2016; France and "*Bac à sable réglementaire*"; Austria and "*Energie.Frei.Raum*"; and *Germany: "7th Energy Research Programme*".

Lessons learnt from regulatory sandboxes are valuable both for regulators and innovators. It helps regulators to understand whether regulation should change permanently and provides innovators an opportunity to test their products/services/ business models in almost-real conditions.

3.2 Consumer choice and the 'Principal-Agent Problem'

3.2.1 Introduction and legal framework

One of the main goals of the implementation of the internal electricity market is the delivery of real choice for all consumers in the European Union, such that they can benefit from efficiency gains, competitive prices and higher standards of service.

Under the existing European Directives, electricity consumers' rights include the ability to choose their supplier and pricing offers, the ability to compare offers with one-another such as via a price comparison tool, and the option to select offers based on non-price related characteristics such as the percentage of supply made up of renewable energy. The Electricity Directive 2019/944 on common rules for the internal market for electricity states that the comparability of offers should be improved, and barriers to switching suppliers should be minimised without unduly limiting consumer choice by eliminating products that reward consumer loyalty[9]. Article 4 of the Directive establishes that Member States shall ensure that all customers are free to purchase electricity from the supplier of their choice, and can have more than one electricity supply contract at the same time if they choose. Additionally, customers must be free to purchase and sell non-supply related electricity services independently from their supply contract, and from an electricity undertaking of their choice.

Regarding information availability, consumers must be made aware of new information and learn how to process it and understand what the information means and how they can use it to their advantage. Furthermore, information to consumers needs to be user-friendly to foster informed choices. Overloading consumers with too much information may create confusion and have a detrimental effect on consumer choice.

It is well understood that many customers are disengaged and are not motivated to interact with the electricity market due to factors such as insufficient choice of product/service, lack of spending power or lack of consumer information. Nearly 25 years since the earliest residential electricity markets were liberalised in Europe, the default pre-disposition of many electricity consumers, who theoretically have a right of choice, is to do nothing and/or choose the utility that they know.

According to the report on "*European Barriers in Retail Energy Markets*"[10], recently published by the European Commission, if there is no trusted central resource allowing them to compare offers from different suppliers, customers may struggle to make an informed choice. The report also notes that if customers perceive all energy companies as irresponsibly profit-driven or providers of a poor service, they may feel there is nothing to be gained from switching.

In its "*Report on commercial barriers to supplier switching in EU retail energy markets*"[11], CEER notes that information about price changes should be available for customers in a timely manner, allowing the customer to compare and switch before they are exposed to the new prices. Additionally, information about the end-date of the electricity contract is essential for customers to make informed choices and know when it is time to re-evaluate their contract.

As new innovative and complex business models emerge, regulators face new challenges in upholding the fundamental principles of consumer choice. This can involve ensuring that consumers are able to compare complex product offerings with one another, or that they retain their fundamental consumer rights when entering complex contracts such as handing over management of an asset to a third party. This section investigates some of these emerging issues related to consumer choice in a fast changing and innovative future electricity retail market.

3.2.2 Current relevance of the issue: Why is this an issue now?

The issues relating to consumer choice are becoming more prevalent in modern energy retail markets.

Firstly, the traditional roles and structures within the energy market are changing as a result of the energy transition. Innovative business models with new products and services are entering the market, triggering new regulatory challenges regarding consumer choice. Moreover, the role of consumers in the energy market is changing. Whereas, traditionally, energy is mostly produced by a small number of large-scale and centralised companies, the consumer is increasingly in charge of his/her own energy production and consumption. The increasingly active role of the consumer poses new challenges around facilitating these opportunities for consumers whilst at the same time protecting their fundamental consumer rights.

[10] European Commission, European Barriers in Retail Energy Markets, February 2021.
[11] CEER Report on commercial barriers to supplier switching in EU retail energy markets, Ref: C15-CEM-80-04, 7 July 2016.

Secondly, many of these business models are enabled by technological innovations which are becoming ever more commonplace in consumers' homes, such as smart meters and mobile applications (apps). The ever-increasing electrification of heat and transport mean that more of these types of business models are emerging, such as heat as a service, or smart electric vehicle charging. Meanwhile, consumers are increasingly driven by a desire for convenience, which can often be achieved by engaging a principal to perform certain actions on their behalf without requiring their input. 4G and 5G technology is in turn further increasing the viability of such business models due to improved communications infrastructure and the possibility to transmit large volumes of data instantaneously. Finally, as more consumers engage, the realisation of economies of scale mean that the potential benefits on offer for both principals and agents become ever greater, further incentivising take-up on both sides. Anti-competition effects are exacerbated as these niche business model providers are often able to benefit from monopolistic market conditions.

3.2.3 Regulatory challenges

A common regulatory challenge is the need to ensure that consumers have sufficient choice and variety in the products and services available to them.

Competition between providers can help incentivise high quality of service. Several of the business models examined by CEPA illustrate how the evolving energy market is providing consumers much greater choice. Labrador[12] is one example of many businesses that offer automated energy supplier switching, helping to tackle the issue of the "*loyalty penalty*" which affects customers who do not regularly re-examine the prices they pay, and are therefore at risk of getting a poorer deal than new customers.

Other innovative business models such as Einhundert Energie[13], which helps building managers establish solar panel systems which tenants can then consume energy from, offer the opportunity for consumers who may not otherwise have the ability to benefit from new and expensive green technologies to do so.

We are also seeing the emergence of the types of business models where a consumer is able to employ a third party to perform certain actions on their behalf, with little or no input from the consumer required. This could be, for example, a domestic consumer engaging a private business to manage his/her energy consumption on his/her behalf in exchange for some form of benefit, such as reduced bills.

However, the risk of the consumer being excluded from the full range of benefits still exists. In fact, all the innovative business models identified by CEPA within the categories of community access, engagement enablers and Energy as a Service were identified as posing potential regulatory challenges regarding consumer choice.

This sub-section describes some of the consumer choice-related regulatory issues that we see emerging. These issues can broadly be grouped into three categories: customer captivity, inequality due to differences in consumer skills and financial means, and the principal-agent problem.

[12] https://www.thelabrador.co.uk/home
[13] https://einhundert.de/en/

Consumer captivity

This describes the scenario where consumers are 'captured' by a product or service, which makes them less likely to switch to alternative providers. In the positive scenario, this would be the result of a positive experience with the service or product, or due to them receiving a highly competitive product or service in terms of quality or price. Consumer captivity, however, becomes an issue for regulators when consumers are no longer responsive to market signals. This could be caused by long-term contracts without accessible options for termination, investments made by the consumer in products that can no longer be used after switching to other service providers, or by lack of information for the consumer.

The case studies analysed by CEPA demonstrate that some innovative business models provide bundled services that may result in lock-in effects. For example, Einhundert Energie does not allow tenants to benefit from the supply of energy from the building's solar panels while also being supplied their remaining energy from an alternative 'conventional' supplier. Contracts for services that are bundled with contracts for energy supply could in this way add to the already identified barriers for supplier switching. These additional services could be regarded as production innovation for energy suppliers but could also be harmful to competition in this market (especially if done by incumbents, see the section 3.1 "New entrants access and innovation").

Consumer captivity might also be a risk in the case of bundled products. For example, Sonnen[14] offers a bundled product that combines software (energy management software) and hardware (a recyclable battery). This poses challenges to consumers who would like to use different providers and cannot do so. Moreover, innovative business models, such as Fresh Energy, may offer a product that can only be used by consumers who have a contract with an energy company that partners with Fresh Energy. This potentially limits the consumer's choice in energy suppliers.

Upfront investments might also harm consumer choice. This might be the case if an investment in a product is bundled with a mandatory service contract. It is also possible that a service is only provided if the consumer purchases a compatible product, like in the case of SecondGrid by Elemize Technologies, which requires consumers to purchase a compatible solar panel system, potentially restricting future use of panels with other offerings.

Upfront investments in products that can only be used in combination with a service contract with a specific provider, leave consumers with no viable choice if the service quality turns out lower than expected, other than divesting the product when terminating the contract. A solution for this would be to enforce opening the product for third-party access if possible, making it possible for the consumer to contract another supplier while still benefiting from the investment.

Inequality due to differences in consumer skills and financial means

The recently published CEER-BEUC 2030 Vision for Energy Consumers considers "simplicity" as one of its ASPIRE principles.[15] This principle implies that information provided to consumers must be simple, readily accessible, comparable and must make it easy for them to make informed choices. It also means clarity and transparency on how processes that affect customers operate.

[14] https://sonnengroup.com/

[15] CEER-BEUC 2030 Vision for Energy Consumers, 13 October 2020.

Another ASPIRE principle is “inclusiveness”, meaning that all consumers must have equal opportunities to participate in the market regardless of their technical equipment, skills or level of digital literacy.

Within the case studies that have been identified by CEPA, some innovative business models included in the category of community access, such as Sonnen, imply bundled offers which are very difficult for consumers to understand due to their complexity and the wide range of applicable rules. In order to be able to choose the best offer, consumers would need to be informed about the regulations that apply in the different markets at play in the bundled offer (e.g. financial and energy markets). It is also difficult for customers to balance the advantages and disadvantages of the bundled offer, as higher costs for one product may be offset by lower costs in another part of the offer. Moreover, the lifecycle of technical facilities (storage or photo voltaic (PV)) and the associated financing contracts may feature very long periods of commitment with the company offering the service, and therefore present more challenges for consumers in assessing the offer to make an appropriate choice.

In other business models, such as WePower[16], a blockchain-based green energy trading platform that helps renewable energy producers to raise capital by issuing their own energy tokens, energy buyers must engage in Contracts for Difference (CfD)[17]. Thus, for consumers to be able to understand the offered service, they must have a basic knowledge of financial concepts and derivatives, as well as blockchain skills. As a result, only consumers with a certain level of technical skills and knowledge would be able to engage in this type of service. Additionally, energy consumers without smart meters cannot participate in the power purchase agreements offered by this platform. There is therefore a risk of inequality between energy consumers with access to P2P trading networks and those who cannot access them.

Similar regulatory challenges arise in the case of FlexiDAO[18], a technology start-up that develops software solutions to help energy companies improve and automate how they manage data and electricity flows. It is based on a platform which works as a subscription service that enables real-time tracking of energy origin by creating blockchain-based clean energy certificates that match generation and consumption. Therefore, customers must have certain knowledge in blockchain and digital technologies to be able to engage with the platform.

When it comes to innovative business models within the category of Energy as a Service, most require large upfront investments in technical facilities, such as solar panels, batteries, smart sensors, etc. For example, Einhundert Energie, a business that provides solar as a service model targeted at landlords and building developers, acting as the energy supplier for tenants in the building, requires a long-term financial investment in case PV panels are not installed yet.

[16] https://wepower.com/#

[17] CfD is a contract between a project owner and an energy buyer, stipulating that the owner will pay the buyer the difference between the electricity spot price and a fixed price agreed under the PPA for the contracted electricity output. If the difference is negative, then the buyer pays the owner. CfDs ensure that the project owner will receive a fixed price for of its generated electricity, whilst enabling the energy buyer to reduce their overall energy costs.

[18] https://www.flexidao.com/

Similarly, for customers to access the services provided by Elemize Technologies, they must first buy a solar panel and a battery system, which is then installed, maintained and remotely managed by the company for a fixed monthly fee. In the case of Leanheat[19], a residential energy consumption optimisation solution that calibrates heating in centrally heated apartment blocks, the installation of the IoT sensors and artificial intelligence (AI) the system uses requires an initial investment with a payback period that may range from one year to 3-4 years in the worst-case scenario.

These types of long-term investments are not easy to assess by potential customers, whilst lower income households may not have the resources or the ability to participate at all. This results in some innovative services only being accessible by customers with enough available capital.

Principal-Agent problem

The principal-agent arrangement describes the situation where a party (the 'principal', usually a consumer) engages a second party (the 'agent', usually a business or service provider) to perform actions on their behalf in return for a fee. This could be, for example, a domestic consumer engaging a private business to manage their energy consumption on their behalf in exchange for some form of benefit. The provider makes it possible for the consumer to benefit from market offerings without having to actively participate, mostly by automation of process or the abstraction of market information to the consumer's benefit.

The arrangement is usually of mutual benefit to both parties. By recruiting a number of customers, the business is able to realise benefits arising from economies of scale which are then passed back in part to the consumer, for example in the form of ever-cheaper bills. The provider is incentivised to provide a good service to the consumer to retain their business and to attract more customers as they are able to demonstrate the benefits the business model can provide. Both parties are incentivised to continue the mutually beneficial relationship.

Such business models are desirable as they enable more consumers to take a more active role in the energy market, many of whom may otherwise be disengaged.

The principal-agent problem is an issue that impacts on consumer's ability to make free and informed choices. The problem can occur for two main reasons:

- Divergence of incentives between consumer/service provider; and
- Asymmetry of information between consumer/service provider.

A divergence of incentives could occur if the agent stands to benefit from an action that causes the consumer detriment. An example would be if a consumer engaged a third-party Demand Side Response (DSR) aggregator to manage their storage battery on their behalf and provide flexibility services to the grid in exchange for reduced bills[20]. In these cases, the agent would in theory be incentivised to cycle the battery as many times as possible to maximise their revenue, potentially causing detriment to the consumer whose battery would be shortened in lifespan. A divergence of incentives occurs as it is not in the agent's interest to consider the short-term effects of cycling the battery on the long-term health of the asset.

[19] https://leanheat.com/

[20] Sonnen and EDF are examples of two companies that offer such services, though this description is, of course, theoretical and does not refer to these two companies.

Asymmetry of information meanwhile occurs in circumstances where the agent is in possession of information that the principal is not party to, which the agent then uses to its commercial advantage. An example would be an automated price comparison/switching service[21]. In such cases the consumer would reasonably expect to be offered the best value proposition on the market, however the provider may prefer to only serve offers that pay them the highest fee, information that the consumer is not aware of. There may also be better value offerings in the market that the provider is unable to offer as they are not signed up to their service, which again the consumer may not be aware of. The provider is therefore able to make decisions that are not necessarily in the best interest of the consumer.

Principal-agent problems can be further exacerbated by the kinds of contractual effects described under consumer captivity, such as minimum contract lengths or exit fees that prevent the consumer from engaging an alternative provider, or through situational effects such as where one Energy as a Service (EaaS) provider acts as a monopolistic provider of energy services to all residents in a tower block.

These problems are also more prevalent in certain circumstances related to consumer inequality due to limited financial means, as described above. An example would be a model where a product requires significant up-front investment but the benefits are paid out over a long period of time, such as a rooftop solar installation. In these circumstances a principal-agent arrangement can be enjoyed between a domestic customer and a solar panel provider who recoups the cost of installing the panels through the revenue generated over a long period of time, but the aforementioned consumer choice-related issues are increased.

The final and perhaps most critical point to note is that many of the providers of such principal-agent type services are not licensed parties, and are therefore not subject to regulation by the NRA for energy. This creates the risk that these issues slip through the cracks between the jurisdictions of different market regulators. Therefore, the wider question of how such providers should be regulated, if at all, and how this regulation interacts with the legal framework that suppliers are already subject to, is crucial.

Potential consequences for consumers

Consumer captivity issues may result in a number of potential consequences for consumers:

- *Lock-in effects* – Certain contracts may result in lock-in effects, meaning that consumers become locked-in long term to a contract with no possibility to exit early, or only by paying prohibitively high exit fees or no longer being able to (optimally) use the products they invested in. An example could be a contract in which the consumer repays the cost of a solar panel installation to the provider over the course of 20 years, thereby being captured for a long period. In extreme cases it may lead to complicated ownership disputes if a consumer does not technically own an asset situated on his/her property, like a rooftop solar array installed by a third party that has not yet been paid off, leading to legal issues when the consumer tries to sell the property.

- *Unreasonable pricing* – Consumers may face unreasonable prices if they are held captive in a contract without any bargaining power. This is particularly an issue when a consumer is locked into a long-term contract, as subsequent market forces and

[21] Labrador is an example of a company offering such a service, though this description is, of course, theoretical and does not refer to this company.

developments may lead to better value offers being available from competitors, which the consumer is unable to benefit from.

- *Diminished quality of service* – Similarly, consumers may face detriment due to poor service, again, without having the possibility to switch to an alternative.

Lack of knowledge / skills or financial means may result in certain subsets of consumers being excluded from taking up certain products and services. This may lead to two-tier markets emerging, whereby certain consumers are able to engage whereas others are not, and may occur for a number of reasons:

- *Difficulty in assessing offers* – Consumers may find it difficult to assess and compare bundled offers due to their complexity and the wide range of rules and regulations applicable, restricting their ability to make an informed choice. Offers implying very long periods of commitment with the company offering the service may also pose a challenge for customers to make an appropriate/informed choice;

- *Need of specific skills* – In order for consumers to be able to benefit from some innovative products and services they must possess specific knowledge, for example in financial concepts and derivatives, digital technologies or blockchain skills. Again, this can result in a two-tier market, where only the most well-informed/specially-educated consumers are able to benefit;

- *Lack of enabling technology* – Consumers who are not equipped with certain technological devices such as smart meters may not be able to engage in the services offered by some innovative companies; and

- *Significant upfront investments required* – Most innovative business models within the category of Energy as a Service require large upfront investments in technical facilities (solar panels, batteries, etc.) with long payback periods. These may not be accessible by consumers with limited economic resources.

Divergence of incentives and/or asymmetry of information between the principal and the agent can result in further detrimental consequences to consumers:

- *Consumer misunderstanding* – Consumers may be charged for products or services that they do not understand or enter into contracts that have complex conditions attached that they do not fully comprehend. This could be due to lack of information being provided to the consumer, or through misinformation, whereby they are mis-sold offerings under the pretence that it was in their best interests;

- *Mismanagement of consumer property* – Consumers may find their property is mismanaged by an agent, due to a divergence of incentives; and

- *Inefficient policy implementation* – Price signals intended to promote flexibility may not reach consumers in the event of a divergence of interests between the principal and the agent and may not achieve the intended policy outcomes.

3.2.4 Takeaways and way forward

These potential consequences for consumers raise a number of challenges for regulators, who must act to introduce ex-ante measures to protect consumers whilst not stifling innovation and competition.

Consumer captivity

The challenge for regulators regarding consumer captivity is to overcome perverse contract effects, while enabling innovative business to successfully grow. Regulators should try to find ways to diminish lock-in effects of certain contracts, for example by forcing businesses to open up the product for third-party access or taking measures to reduce the risk on high pricing or poor quality[22]. At the same time, regulators should be aware of the risk of overregulation that might inhibit successful growth of innovative businesses or stifle innovation.

Inequality due to differences in consumer skills and financial means

Regulators must ensure that energy consumers are adequately informed by energy service companies about the technologies and basic financial concepts that are necessary to understand how the product or service offered works, and/or that information is presented to consumers as clearly and simply as possible, as to enable the consumer to make an informed choice. This is particularly the case for bundled products, which must be presented in a way that is not overly complex.

Regulators must also ensure that there is no discrimination between consumers, in the sense that all have the same opportunity to participate in the market regardless of their technical equipment, skills or level of digital literacy.

Principal-Agent problem

Many of the same challenges mentioned above are relevant to the principal-agent relationship, but to an even greater extent.

In addition, NRAs must ensure that the regulatory framework in the individual country provides for the adequate regulation of agents. For example, this may not in all cases necessarily lie within the remit of the NRA for energy and may be more appropriately placed within the remit of the consumer competition authority (or similar such agency). Regulators in an individual country with different responsibilities must ensure between them that such parties offering new and innovative business models in the energy space are appropriately regulated, and that the consumer is protected.

[22] Current legislation might form a useful basis in this regard. For example, article 4 of Directive 2019/944 that ensures the free choice of supplier, and article 12 of Directive 2019/944 that prohibits switching related fees.

3.3 Self-consumption

3.3.1 Introduction and legal framework

The Clean Energy Package (CEP) provides the legal framework for self-consumption and energy communities, which aims to support individuals or groups of consumers to generate electricity for their own consumption, storage, sharing or selling back to the market.

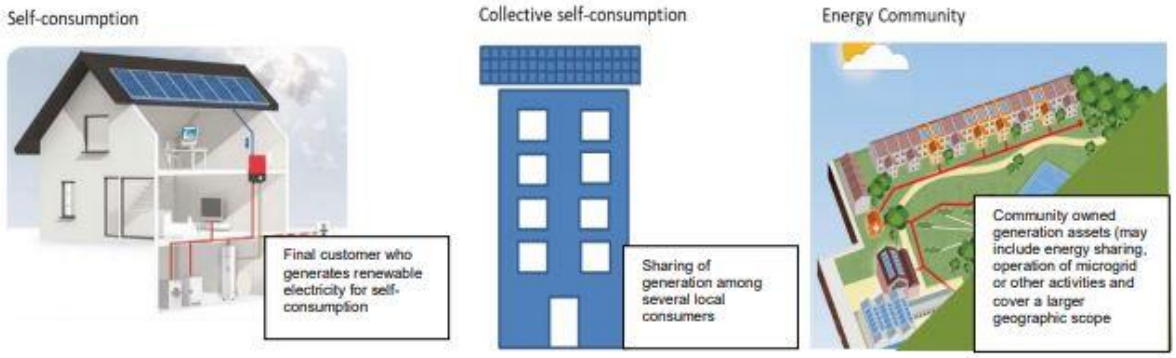


Figure 1 – Self-consumption and energy communities
Source: CEER Report on Regulatory Aspects of Self-Consumption and Energy Communities, 2019.

Individual Self-Consumption

As it is already stated in the CEER Report on Regulatory Aspects of Self-Consumption and Energy Communities,[23] self-consumption is not a new concept, and individual self-consumers are already relatively widespread in many EU Member States. The recast Electricity Market Directive[24] and updated Renewable Energy Directive (REDII)[25] formally recognise self-consumers as final consumers that are entitled to consume or store electricity generated within their premises, and to sell this electricity.

Renewable self-consumers can only use electricity generated from renewable sources. Active consumers, on the other hand, can use other energy fuels and have rights beyond generation, such as participation in flexibility or energy efficiency schemes.

Collective Self-Consumption

The CEP also enables the model of self-consumers acting jointly in building complexes or apartments, known as collective self-consumption. The Electricity Market Directive sets out the definition that active customers can include groups of jointly acting final customers, whereas the REDII provides a slightly different definition which restricts jointly acting renewable self-consumers to be located within the same building or multi-apartment block.

[23] CEER Report on Regulatory Aspects of Self-Consumption and Energy Communities, Ref: C18-CRM9_DS7-05-03, 25 June 2019.
[24] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast)
[25] Directive (EU) 2018/2021 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast)

Energy Communities

The CEP introduces the possibility for local actors to organise themselves collectively to perform energy activities. The definition of "Citizen Energy Community" (CEC) in the recast Electricity Market Directive and of "Renewable Energy Community" (REC) in the REDII are related but not identical concepts. Although CEC and REC fulfil the same purpose and involve the same activities, they differ in the conditions of membership and control.

Energy communities may act as a supplier, as a service provider or as a grid operator, dependent on the legislative framework within each Member State. Although some of the business models identified in CEPA's study are described as involving the concept of the energy community, they do not necessarily align with the CEP definition of energy communities, instead operating more as platforms to provide services to its members. Examples of such cases are Community SolarPlatform[26], Powerpeers[27], Sonnen[28] or Elemize.

Roles and responsibilities affected by self-consumption

Below is a brief description of the roles and responsibilities affected by self-consumption. The way in which the effects of self-consumption manifest themselves in these roles and responsibilities are analysed throughout this chapter. The consumer buys electricity from a freely chosen supplier at an agreed price. The supplier will usually be his/her point of contact for problems or questions[29].
The electricity supplier sells the electricity consumed from the grid by its customer, at an agreed price. The former is responsible to buy electricity in the market, from electricity producers or through a balance responsible party (BRP), and to pay the grid usage fees to network companies[30].
The network operator is responsible for operating its network, distributing and transporting electricity. It is usually responsible for the measurement of consumption and production connected to its network[31], which will determine the consumption data to be included in invoices from suppliers to customers, from network operator to suppliers and in the imbalances charged to the BRP. This concept includes:

- The Distribution System Operator (DSO) – responsible for operating, maintaining and developing the distribution system in a given area and, where applicable, its interconnections with other systems, as well as for ensuring the long-term ability of the system to meet reasonable demands for the distribution of electricity[32] ; and
- The Transmission System Operator (TSO) – responsible for operating, maintaining and developing the transmission system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the transmission of electricity.[33] This includes ensuring real-time balance between consumption and generation. It will invoice the BRP for imbalances in its portfolios.

[26] https://ignitisinnovation.com/2019/12/19/community-solar-platform/
[27] https://www.powerpeers.nl/
[28] https://sonnen.de/
[29] This might differ from country to country. In some countries, such as Norway, the customer enters into a separate contract with the DSO and questions/complaints regarding quality of supply and other technical aspects related to the grid service will be directed to the DSO.
[30] In countries where the consumer enters into a separate contract with the DSO, grid usage tariffs will be paid directly by the consumer to the DSO.
[31] This role is usually assumed by the network operator, but it can be performed by other entities.
[32] As defined in Article 2(29) of the Directive (EU) 2019/944.
[33] As defined in Article 2(29) of the Directive (EU) 2019/944.

The BRP establishes commercial schedules for its portfolio. It is responsible for imbalance[34] settlement with the TSO.
Besides affecting the roles described above, self-consumption will add new roles to the electricity business architecture, such as companies providing self-consumption solutions that can range from providing or managing renewable production installations to storage solutions, financial solutions, etc.

3.3.2 Current relevance of the issue: Why is this an issue now?

The growth of self-consumption has enabled direct consumer participation in energy production and management, empowering them and allowing them to be more independent from traditional actors. Besides that, community energy projects aim to create more opportunities for those who would otherwise be acting independently.

Citizens are now more aware than ever of their consumption impact and, consequently, seek environmentally friendly solutions. This has contributed to the growth of self-consumption projects and the local deployment of renewable energy, helping to reach the EU's decarbonisation targets.

The cost reduction of decentralised production and the avoidance of network costs can, in some cases, make self-consumption competitive compared with consumption from the grid, leading to reductions in consumer bills. Additionally, the organisation of "communities" of self-consumers allows for the exchange of surpluses between their members and the enhancement of demand management services[35].

3.3.3 Regulatory challenges

The regulatory challenges identified here are based on the CEPA study's case studies with provision of services to prosumers involved in self-consumption, namely Community Solar Platform, Powerpeers, Sonnen, WePower, Elemize, and on the CEER "Regulatory Aspects of Self-Consumption and Energy Communities" report.[36]

Consumer Protection

The Electricity Directive and REDII provide provisions regarding the rights of active consumers. REDII establishes that renewable self-consumers, in particular household customers, are entitled to maintain their rights and obligations as final consumers and should receive equal and non-discriminatory treatment when participating in a renewable energy community.

New business models and service provision imply an increasing complexity for the end user/consumer. As addressed in the consumer choice section, this becomes even more relevant as offers are bundled and consumers take on additional roles in the market[37]. Therefore, the task of supporting and protecting consumers, for example by establishing a consumer friendly regulatory and legal framework, is very relevant to ensure effective, active market participation.

[34] Differences between commercial and real consumption/production schedules.
[35] Namely through storage.
[36] CEER Report on Regulatory Aspects of Self-Consumption and Energy Communities, Ref: C18-CRM9_DS7-05-03, 25 June 2019.
[37] The Sonnen case study was referred as an example of a bundled product combining software and hardware, which might pose challenges to consumers who would like to use different providers but may not be able to do so.

Other implications of business models based on self-consumption are that some will imply behind-the-meter activity, an area not traditionally within scope of network regulation, as it is not typically visible to the network companies or their regulators. In cases such as Powerpeers or Elemize, where the company manages consumers' energy supply using both network sources and behind the meter generation, it may become challenging to ensure consumers are receiving a high quality of service for both aspects of their supply.

Business Architecture

To better analyse the impact of self-consumption on existing business architecture, two types of self-consumption are considered:

- Individual – the production unit is located "behind the meter" at the consumer's premises, so only net consumption is visible to the network; and
- Collective – several self-consumers are associated with a production unit. Production is shared with consumers and deducted from the measured consumption[38]. The difference between the measured consumption and the shared production is sourced by the consumer's supplier. Self-consumed electricity may or may not use the public grid, depending on the location of production and consumption units[39].

Two types of self-consumption integration approaches are considered:

- Supplier centric – the supplier assumes a central role in integrating the self-consumer. It will supply the consumption not sourced by self-production, purchase self-consumption surpluses or facilitate exchanges with self-consumers in its portfolio, and it will act as the BRP; and
- Separated activities – establishment of different contracts for specific activities. Consumption not covered by self-production is sourced from a traditional supplier, surpluses are sold to an aggregator or to other self-consumers on peer-to-peer (P2P) type exchanges, and system services are provided through an independent aggregator.

Installation, financing and operation of self-production units are business services that can technically be provided by a supplier. However, they should be considered additional services out of the scope of electricity regulation.

Commercial relations among stakeholders

Although bill savings are the main driver for self-consumption investment, there are other possible sources of revenue, such as selling self-consumption surplus or to provide system services, for which the self-consumer needs to establish specific contractual relations.

In the supplier centric approach, the consumer will find in one single entity the solution for its needs. Thus, at least for smaller self-consumers, it may be the preferable solution for simplicity reasons. However, suppliers providing the "full package" might take advantage of the fact that they are offering a bundled product to increase their margins, thereby disadvantaging the consumer.

[38] Measured at the consumer connection point to the grid.
[39] According to the REDII a "'renewables self-consumer' means a final customer operating within its premises located within confined boundaries or, where permitted by a Member State, within other premises, who generates renewable electricity for its own consumption,…".

In the case of self-consumers using the grid to perform self-consumption[40], a commercial relationship with the DSO needs to be established, directly or through a third party, to pay the applicable access tariffs. Imposing the self-consumer's supplier with the obligation to establish such a relationship with the DSO could simplify the commercial relations for self-consumers (network tariffs concentrated in one entity) and for the DSO (commercial relations limited to suppliers). However, this would represent an additional role for suppliers, over and above their core business of supplying electricity. In countries where grid tariffs are already paid directly by the consumer to the DSO, the emergence of self-consumption will not raise any issue on this matter.

An appropriate architecture for the commercial relations among stakeholders, involving self-consumption, namely regarding the usage and payment of network tariffs, needs to be defined taking into account the complexity of the adopted architecture and the impacts on the stakeholder's activity.

Balancing of self-consumption

Balancing is a relevant issue for any prosumer[41], not necessarily one involved in self-consumption. It is particularly relevant for consumers providing active demand side response, such as those with storage capabilities[42], who can intentionally change their import /export schedule from the grid. Balancing is also important for rules applying to independent aggregators, which should soon be addressed in specific EU regulation on demand side response[43]

However, the exchange of surpluses between self-consumers, referenced several times in the business cases identified by CEPA, seems more feasible when self-consumers are under the same BRP. Establishing such schemes among different BRP seems more complex, as the TSO would need to know imports and exports of each BRP portfolio.
For collective self-consumption, where production units are not physically connected to the consumption units, sharing of production among self-consumers reduces the volumes purchased from the supplier, or may, in some circumstances, even generate a surplus. The adoption of different balancing responsibility perimeters will have different impacts. For example, if balancing of the production unit associated with self-consumption is conducted separately and independently from the consumption units, variations in production would not affect the consumers' BRP.

An appropriate architecture for balancing involving self-consumption needs to be established taking into account the described above and the specificities of each set of national rules.

Sharing of production among self-consumers

In collective self-consumption, the process of sharing generation amongst self-consumers affects the amount of energy charged in all relevant commercial relationships (namely, supplier-self-consumer, supplier-DSO or BRP-TSO), as values metered by the grid operator might no longer be sufficient.

[40] Either by injecting surpluses to the grid or by consuming self-generated electricity that is fed into the public grid.
[41] In the context of this report, we consider a prosumer a self-consumer of renewables or an active customer.
[42] In the Sonnen case study, the existence of storage was particularly relevant.
[43] According to the Energy System Integration Strategy, the European Commission will start the formal procedure for a possible Network Code on Demand Side Flexibility at the end of 2021.

Models where self-consumers have the responsibility, directly or through a service provider, to define the daily shared amounts, offer more flexibility on self-consumption management, which could be interesting for more complex forms of self-consumption, namely with storage units or grid usage. However, robust procedures must be in place to avoid errors affecting all parties.

The centralisation of the sharing process on a regulated entity, that would apply a pre-defined sharing rule would allow for the identification of any errors in the sharing process. However, such a role can be burdensome, especially if more complex sharing rules are introduced, and self-consumers would have less flexibility to implement a more dynamic allocation process. Costs and cost recovery of this activity would also need to be addressed.

Impact on retail market functioning

The CEER "Regulatory Aspects of Self-Consumption and Energy Communities"[44] document identifies possible impacts of self-consumption on the traditional supplier's business model. The report demonstrated that it may lead to additional costs on the part of the supplier (per kWh sold), such as the reduction of the overall amount of energy supplied, or the obligation of supply when self-generation is not possible, which may coincide with periods of high market prices.

These impacts will generate different responses from suppliers in terms of how they address the market. Some might adopt a "supplier centric" positioning, offering a bundled service to the self-consumer which can increase the consumer captivity effect, reducing willingness to change supplier and increase the overall level of prices. Others, who prefer to maintain a traditional approach may regard self-consumers as unattractive, due to lower consumption levels and more volatile consumption patterns, and may segment their offers accordingly, which would raise prices faced by these consumers on the electricity supplied from the grid. This is not necessarily an inefficiency of the market, but rather an efficient reaction of suppliers reflecting the added cost of serving these customers.

Network cost recovery

The CEPA study identifies network costs recovery as a regulatory challenge associated with self-consumption. As self-consumed electricity is often exempt[45] from grid costs and other systems charges, the increase of self-consumption solutions may impact the revenues recovered by network companies, particularly in systems based on volumetric tariffs. Revenue recovery also can be affected if self-consumption leads to disconnections from the grid. Consequently, network tariffs supported by other network users might increase.
Since the costs of network companies are mostly dependent on the maximum amount of capacity that they will need to provide for, to network users, the growth of self-consumption might not reduce the costs of network companies, given that with variable RES sources, it is not likely that self-consumption will significantly reduce peak demand. However, self-consumption can also bring benefits to networks, for example, when other distributed resources, such as storage or demand side response, are in place. Those benefits must therefore be taken into consideration, including the avoidance of investments in upstream networks.

[44] CEER Report on Regulatory Aspects of Self-Consumption and Energy Communities, Ref: C18-CRM9_DS7-05-03, 25 June 2019.
[45] In most cases, self-consumed energy will not use the public network.

The tariff structure of distribution grids is one of the main tools available to address this challenge. The recent EU Agency for the Cooperation of Energy Regulators (ACER) "Report on Distribution Tariff Methodologies in Europe"[46] provides a status review of distribution tariff structures across the 27 EU Member States, complementing the ACER 2019 report on practices regarding transmission tariff methodologies[47].

This report underlines the role of tariff methodologies, not only in providing correct incentives to system operators' performance[48], but also in supporting overall system efficiency in the long term through price signals to network users, bearing in mind both costs and benefits for the system, regardless of the specific technology or activity. The fact that tariff charges can constitute a considerable cost to the network users increases the relevance of tariff setting in providing additional incentives to their behaviour, on top of energy prices.

Since tariff design is an intrinsically complex process, especially at the distribution level, where specific conditions and regulatory approaches in each country must be considered, the elaboration of recommendations on this topic requires specific expertise. For this reason, this paper does not intend to provide specific recommendations on how to deal, through tariff structures, with the revenue recovery challenge induced by self-consumption, but rather to highlight its importance.

Indeed, the fact that tariffs are designed taking into account a series of tariff-setting principles (e.g. cost recovery, cost reflectivity, efficiency, non-discrimination, transparency, non-distortion, simplicity, stability, predictability and sustainability), some of them conflicting, makes it difficult and complex to achieve the right balance.
Moreover, the increasing penetration of self-consumption is only one aspect of the energy transition in a rapidly evolving energy system. Tariff design and setting will need to consider other aspects of the energy transition, such as the increased integration of renewable energy sources[49], increased demand by electrification, as well as the more active role played by network users. Some of these factors may smooth the revenue recovery challenge posed by self-consumption, such as significant demand from transport electrification.

The magnitude of the effects caused by each of these factors will vary from country to country, influencing the solutions adopted. Whichever approach is taken, it is important that tariff methodologies and tariff setting follow the recommendations of the ACER report, namely, allowing stakeholders to reasonably predict the tariff evolution, ensuring adequate transparency and stakeholder involvement, adopting a multi-year transition process when changes have significant impact on individual grid users, and contributing to system efficiency in the long run.

[46] ACER Report on Report on Distribution Tariff Methodologies in Europe, February 2021.
[47] ACER Practice Report on Transmission Tariff Methodologies in Europe, December 2019.
[48] On the third paragraph of the Executive Summary, page 4 of the ACER Report on Distribution Tariff Methodologies in Europe: "…to increase efficiencies, to foster market integration and security of supply, to support efficient investments, to support related research activities, and to facilitate innovation in the interest of consumers in areas such as digitalisation, flexibility services and interconnection."
[49] For purposes other than self-consumption.

Other issues

Other potential challenges arise from dispute resolution. For example, WePower[50], a block-chained green energy trading platform which enables renewable energy sources (RES) producers to raise capital, may face this issue as the number of parties involved in P2P are ever-increasing. Defining dispute resolution between multiple parties in the chain raises important questions.

An additional challenge to regulators, not addressed in this chapter, is related with those cases where the energy community involves operations as a DSO. CEPA's study did not identify any such cases in their innovative business models case studies.

3.3.4 Takeaways and way forward

Self-consumption adds complexity to existing business models as it comprises several activities. NRAs should define rules to ensure that self-consumers fully understand the business model and are able to fully exercise their rights. This is particularly important if "supplier-centric" solutions become dominant.

Self-consumption should be integrated into balancing rules, such as those regarding independent aggregators, in order to clearly delineate balancing responsibilities.

The responsibility of the sharing of production amongst collective self-consumers must be clearly defined in order to easily solve conflicts in case of dispute resolution.

The attribution to regulated entities of responsibilities in the collective self-consumption sharing process carries associated cost. Therefore, cost recovery solutions should be defined.
NRAs should adapt retail market monitoring to better understand the impact of self-consumption in market dynamics, namely on offers, prices and switching rates involving self-consumers. Special attention should be paid to regulations ensuring that participation in self-consumption or energy communities does not lead to a restriction in the rights of self-consumers.

NRAs should monitor the impact of self-consumption on network costs and network cost recovery, as it can be significant, depending on the specifics within each country. Any exercise for the adaptation of tariff methodologies should consider not only impacts from self-consumption, but also from other changes in the electricity sector, while respecting tariff-setting principles.

[50] https://wepower.com/

3.4 Data access and protection

3.4.1 Introduction and legal framework

As digitalisation and increased interconnection in the energy sector rapidly modify standing paradigms and drive the energy transition forward towards a more efficient and flexible system, energy data is also steadily assuming a crucial role in its own right. The great potential of data is, however, still largely left unexplored. Indeed, up until recently the benefits of smart metering technology, for example, have been limited to improving the performance of actors along the energy chain, mainly DSOs and suppliers, thanks to the availability of more accurate and transparent energy usage information. However, in the future, as identified by CEPA in many of the examined case studies, this information will play an increasingly key role in the development of new business models and innovative services.

Unlocking the real value of data may be facilitated by energy regulators if a balance can be found between two potentially opposing forces:

- ensuring that emerging services are able to deliver benefits to both end-users and to the energy system as a whole; and
- guaranteeing that access to, and processing of personal data occurs in full compliance to data protection and privacy rules and regulations.

Energy regulators might therefore need to adjust their regulatory frameworks in order to recognise data as a valuable asset for a competitive market. Consequentially, frameworks should be able to:

- Protect consumer rights: guaranteeing a customer-centric model, wherein access to data is carried out in the customer's best interests and, in collaboration with regulators from other sectors, ensuring that adequate levels of data protection and privacy are respected;
- Promote competition: ensure a non-discriminatory level playing field for all actors;
- Stimulate innovation: providing a technology-neutral regulatory framework that can adapt, evolve and remain fit for purpose; and
- Recognise new tasks for traditional players: fair and equal remuneration for system operators concerning new task occurring in relation to data management and guaranteeing data access.

This section will address the first three points, highlighting tools to support consumers while not hindering competition and innovation. The fourth point lies out of the scope of this paper[51].

Energy data

Energy data can be of two principal types:

- System data: data that is, for example, necessary for system operators to perform network operation and services, or to maintain quality and security of supply. This data cannot be attributed to an identifiable individual; and
- Personal data: data that can be related to an individual, such as granular electricity consumption data from a consumer's smart meter.

[51] For further information concerning the remuneration of system operators for acting as neutral facilitators and on recognising additional duties in tariff models, please see the CEER Conclusions Paper on the Future Role of DSOs, Ref: C15-DSO-16-03, 13 July 2015. .

For the purpose of this chapter, we will focus on personal data. When a consumer's electricity consumption data, or more generally speaking, metered data, is retrieved from a smart meter, it also contains associated information that could potentially be used to determine the identity of the individual to whom it relates, usually a meter serial number or identifier. It is therefore generally accepted that this data is highly sensitive and would be classified as personal data, and is thus subject to the requirements of Regulation (EU) 2016/679, also known as The General Data Protection Regulations (GDPR)[52]. The GDPR provides individuals with control over their personal data and defines the framework to which organisations and other third parties in possession of an individual's personal data must adhere to. The provisions of GDPR also apply to personal metered data that is processed and stored, including in data hubs.

System data by contrast is not sensitive as it is not relatable to an individual and is therefore not subject to data protection legislation.

There are several simple methods which can be applied to reduce or eliminate the sensitivity of granular personal data, such as aggregating it to higher level data, such as data pertaining to a street or town, or anonymising it such that the individual can no longer be identified. In both cases the data is no longer personal and is, therefore, not subject to the requirements of GDPR[53].

3.4.2 Current relevance of the issue: Why is this an issue now?

To address the question at hand, a description (from a regulatory viewpoint) of the main characteristics of consumption data – and energy consumption data in particular – coupled with the roles and responsibilities of traditional actors along the energy value chain is provided. A mapping of the roles of third parties offering innovative energy services is juxtaposed in order to illustrate the differences between the two models.

Consumption data: main characteristics

Access to personal data, specifically, energy consumption data, is fundamental to the development of new business models and services for two main reasons. Firstly, data generated by smart metering technology, as opposed to the output of traditional mechanical meters, is characterised by a greater granularity, is produced in larger quantities, and is available in near real time. Secondly, this sophisticated data is potentially of real interest to external actors or "third parties", as a lot of potentially valuable information regarding consumers can be extracted, such as consumption patterns and behaviours . This information is additional to what is typically required for the traditional services offered by utilities, such as billing to end-users. Third parties are also emerging in this scenario, as many of the new services identified by CEPA's work may not be supplied by system operators due to national and European unbundling rules[54].

[52] See the text of the GDPR here.

[53] However, anonymisation methods can sometimes become penetrable over time. See page 37 of the CEER Conclusions Paper on Dynamic Regulation to Enable Digitalisation of the Energy System, Ref: C19-DSG-09-03, 10 October 2019.

[54] See also the CEER Status Review on the Implementation of TSO and DSO Unbundling Provisions –Update and Clean Energy Package, C18-LAC-02-08, 14 June 2019.

Consumption data is unique in that it is owned by the consumer who generates it. It cannot be treated by regulators as a public asset in a traditional sense. Regulators must be creative in terms of allowing access to personal data. This means not just defining measures to promote competition, but also creating rules to ensure that the customer is able to exercise his/her right, as recognised by Directive 944/2019[55], to be an active consumer. Regulators can sustain consumers' right to be active through:

- Protection: offering a baseline or minimum requirement that must be met in order to ensure that no consumer is left behind; and
- Empowerment: providing instruments to sustain informed, stronger, and more confident consumers, especially in knowing and claiming their rights.

These dimensions, as described in further detail below, may also be defined in terms of the consumer's propensity to be active, or readiness to engage, and the tools regulators can employ to support them in activities relating to data access.

Data access and third parties

From a regulatory viewpoint, what distinguishes data access for emerging services, as opposed to traditional services, is the number and type of actors involved and the type of consent granted for data access and processing. Take for example a traditional service, such as energy billing to end consumers: here a consumer generates consumption data, an actor (generally a DSO or a meter operator depending on the national arrangement) is responsible for collecting metering data; data is then transferred to the supplier (sometimes through a data hub) which uses that data exclusively for the purpose of billing. In this case, traditional actors access consumption data under a general contract in order to carry out their duties as a public utility and guarantee the supply of an essential service; they are regulated activities and thus bound to legal obligations under the scrutiny of energy regulators. In other words, there is a legal basis under which the data controller may legitimately process that individual's personal data.

In the case of data access for new services, in addition to the traditional players and processes, third parties also seek access to data. Not only does data pass through more parties, but many lie outside of the scope of regulated activities. Regulators, therefore, face a challenge of creating/enforcing rules relating to this process, often in collaboration with other authorities, as there is no defined legal basis by which the data can be processed.

Roles and responsibilities of actors, as well as data flows in tradition vs innovation services may be summarised as follows:

[55] European Commission (2019), Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June on common rules for the internal market for electricity and amending Directive 2012/27/EU

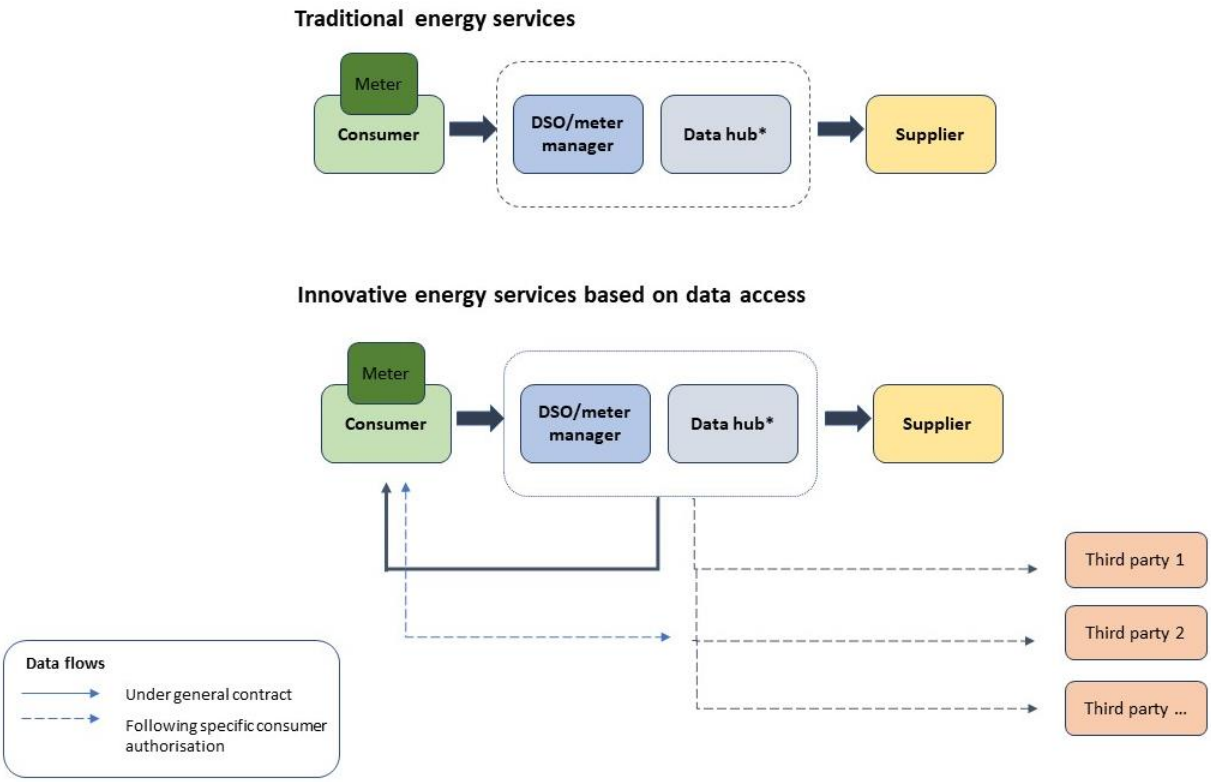


Figure 2 – Responsibilities and data flows in traditional energy services vs innovative energy services
**Where provided for in national schemes.*

Enabling data access to new players means new services for consumers, and potentially positive economic and environmental outcomes for the system. Regulators must, however, take all necessary measures to ensure that data access is carried out in compliance with relevant privacy and cybersecurity legislation and standards. European legislation on data protection, such as the GDPR, must be viewed as an instrument and not a hindrance. GDPR provides the golden standard of 'proportionality'[56], meaning personal data can be processed if the data controller regards the use to be proportionate. However, as the legislation is still relatively new , there is little or no precedent in the legal system to assist data controllers in assessing what may reasonably constitute proportionality under different scenarios.

Data access for emerging services, as well as how data should be accessed and exchanged and under what conditions, is also being explored at an EU-level with the expected creation of a pan-European data market, in which all Member States must ensure interoperability. Current activities include the creation of guidelines for the mapping of national practices, as well as the creation of a reference model where roles and responsibilities of actors are defined[57]. The aim of this activity is to provide harmonised guidelines for data access that are neutral and transparent for interested actors on one hand, and that guarantee consumer protection on the other.

[56] In particular, for general principles concerning proportionality in the processing of personal data for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes, please refer to Recitals 4, 49, 156 and 170. With regard to the lawfulness of processing please refer to Article 6.

[57] This activity is aimed towards the creation of the implementing acts referred to in the Electricity Directive under Article 24. Initially, the scope is to cover consumption data for downloading and sharing data with third parties and real time non-validated data. The convergence will then grow to reach different types of data generated by smart metering to include demand side response, switching, and other services in the future. For further information please see here.

3.4.3 Regulatory challenges

CEER's 3D Strategy (2019-2021)[58], and related consultations and reports, have addressed issues broadly regarding the energy transition, referring to the underpinning role of data to enable new services[59]. However, data access, as a standalone regulatory issue is relatively new, both from the point of view of consumers and third parties.

Many of the case studies developed by CEPA demonstrate that access to appropriate consumption data is crucial to emerging business models. Of the 18 business models evaluated, 16 were based upon the key technological enablers – *digitalisation and the internet of things* and/or *smart meters and settlement* – both of which are ultimately based on fluid data access, either directly by consumers and/or by different third parties and devices. With specific regard to personal consumption data, many of the case studies within the themes of *engagement enablers* and *community access* in some way provide end users with greater direct access to the energy market, thanks to the availability of granular metered consumption data.

Moving forward from CEPA findings

In terms of new services, access to consumption data can imply both:

- Increasing the quality and types of data and/or the channels they may be accessed through for consumers; and
- Facilitating and increasing the number of third-party actors with permission to access consumption data.

Third parties, particularly those from outside the energy sector, bring new expertise and experiences. This "cross-fertilisation" can be beneficial when proper regulatory oversight ensures that regulatory frameworks are adaptable to change and remain fit for purpose. This implies that regulatory frameworks should be, at once, robust enough to ensure that the consumer's best interest is always the priority, both in terms of protection and empowerment, and flexible enough to ensure that the reasonable demands of different actors involved are met, in order to facilitate competition and innovation.

Regarding consumers' best interests, this may entail developing a new array of tools in order to cater to the needs of different segments of consumers, to avoid exacerbating the digital divide. Examples of potential tools are provided in the Table 2 below. Regulators must also acknowledge that regulatory frameworks should be adaptable to varying levels of consumer readiness to engage, and to varying data access needs.

In terms of readiness to engage, while acknowledging that there exists a wide spectrum, consumers may be divided into two end-member subgroups:

1 Those willing/intending to be active market participants. The focus of data access regulation here should be mainly to provide adequate tools to enable new forms of data access, and to empower this category of consumers; and
2 Those exhibiting low levels of participation. Regulatory attention here should be aimed at ensuring that new forms of advanced data access do not translate into disadvantages for these consumers.

[58] CEER 3D Strategy for 2019-2021, January 2019, Ref. C18-BM-124-04.
[59] For further details on previous CEER publications on this matter, please refer to section 3.3 on self-consumption.

Consumers may be eager to embrace new services, such as demand response, to achieve better economic outcomes. If these consumers are keen on becoming active participants in the energy system, regulatory frameworks must focus on removing barriers that hinder new services, allowing for data to transfer freely to interested actors, with due concern for privacy regulations.

In addition to their readiness to engage, consumers also have different, and occasionally, opposing demands. In some cases, there will be a greater need for simplicity, where it is the duty of the regulator to ensure that data access is carried out in a clear and user-friendly way. However, focus on traditional services must be maintained, as less-active consumers will likely not be ready to engage in new services or fully enjoy the benefits of data access. At the other end of the spectrum, some consumers require detailed data on energy consumption levels and patterns. Regulators should guarantee that these consumers may enjoy full transparency and access to data, possibly in formats that allow for different usages and purposes.

These two dimensions of readiness to engage and consumer demands may be crossed with one-another, such as in Table 2 below, to produce four distinct categories of consumers, each characterised by a specific regulatory response in terms of enabling data access:

1. **Unengaged**: consumers characterised by low level of readiness to engage and high demand for simplicity. They are generally unaware or uninterested in data access solutions;
2. **Informed**: consumers characterised by low level of readiness to engage and a high demand for transparency. They may be wary of new services and prefer full access to their own data, rather than to delegate it to third parties;
3. **Passively engaged**: consumers show high level of readiness to engage and a demand for simplicity. They may prefer simple, turn-key solutions; and
4. **Actively engaged**: consumers with high level of readiness to engage and a demand for transparency. They are often inclined to participate in advanced data access and sharing schemes.

For each category of consumer identified, the table below illustrates some of the tools and responses regulators could employ to address consumer access to their own consumption data, and to allow for proper oversight for third-party access. The table also highlights some business cases identified by CEPA that correspond to the relative demands of each group of consumers.

Note that many objectives may be valid for all four types of consumers and are therefore highlighted where they are deemed most relevant.

	CONSUMER DEMANDS	
LEVEL OF CONSUMER READINESS TO ENGAGE	**Simplicity**	**Transparency**
LOW: Focus on protection	**1. Unengaged** Consumer is not able to, or interested in engaging in data access procedures. Framework must: • Provide simple and easily accessible information through traditional channels (paper, call centre); and • Not enhance the digital divide, ensuring that vulnerable consumers are not left out or harmed by a lack of participation in data sharing schemes **Examples of CEPA business models:** No relevant cases were identified for this category.	**2. Interested** Consumer is not able to, or interested in, engaging in new services or data access schemes, but is keen on raising their level of awareness. Framework must: • Guarantee accessibility to one's own data with high levels of granularity, equal to the level it was generated at; • Focus on consumer's right to manage and download free and easily accessible consumption data first-hand; • Allow a step-by-step approach to third party data access, i.e. one time or for single services rather than through an "umbrella delegation"[60]; • Enforce robust consent management schemes (this may or may not be within the regulator's remit dependent on national frameworks); and • Engage consumers to gain trust in data sharing mechanisms and procedures. **Examples of CEPA business models:** Fresh Energy, a service to offer transparent information of residential energy consumption on a mobile app.
HIGH: Focus on empowerment	**3. Passively engaged** Consumer is ready to engage and prefers simple "one-stop-shop solutions", whereby data may be directly shared with third parties, sometimes even without first person access. Framework must: • Remove possible barriers for solutions and platforms based on broader data access and sharing, that allow consumers to	**4. Actively engaged** Consumer is ready to actively engage, accessing and potentially sharing their data with multiple actors. Framework must: • Guarantee consumer and third-party access to granular data in as close to real time as possible (this may also entail focus on system operators); • Promote means for consumers to actively participate in markets through schemes and business

[60] This could be done, for example, through more personalised or one-time delegations (e.g. to consumer advocacy organisations) for a single service, rather than through an umbrella delegation with a more ample time span.

	CONSUMER DEMANDS	
	easily/passively engage in new business models and schemes; • Check and govern customer satisfaction and experience in data sharing arrangements, making sure services are both consumer friendly and fully respectful of regulatory and privacy requirements; and • Foresee an official registry or point of accreditation of third parties, offering turn-key solutions and/or operating on behalf of consumer. **Examples of CEPA business models:** Labrador, a switching service that performs automatic switches, or an EV recharging turn-key solution for optimal recharging; Enel-X; JuiceNet.	models based on "free" data flows between more actors; and • Ensure level playing fields and no barriers for data access, sustaining the development of new services. **Examples of CEPA business models:** Energy communities or P2P trading platforms, such as WePower and Powerpeers.

Table 2 – Regulatory tools to ensure access to data by consumers

Regulatory frameworks will need to be resilient and future-proof in order to address emerging business models. This will be increasingly essential in the future as digitalisation will inevitably lead to some consumers being more ready to engage than others. Furthermore, with the roll-out of smart meters, consumers will produce and have access to greater volumes of data, and in particular consumption data with higher levels of granularity. This, in turn, may lead to different levels of disclosure and demands for services. While the highest level of protection should always be guaranteed to the consumer, tools to further promote empowerment are also required and may be customised to fit the type of consumer.

3.4.4 Takeaways and way forward

The one underlying issue that is valid for all types of consumers, described above, is consumer trust. Without it, meaningful innovation will not be possible, because consumers would likely be wary of allowing data access and correlated services. Gaining consumer trust from the start means that utilities and regulators should guarantee the best experience possible for consumers from the very first step of data access onward (i.e. smart meter installation). Regulators should, therefore, ensure that smart meter installation processes, for instance, are consumer-friendly and not perceived as bothersome, invasive or as having other negative connotations. This means that regulation should also aim to engage consumers through effective communication strategies and programmes focused on data access and related activities, including informing consumers about their consumer rights relating to their smart meters. Secondly, consent management must be a first-class service. Procedures in place for data access must be robust and secure, but also extremely clear and user friendly. This, however, may or may not be within the regulator's scope, depending on the national framework. Respect for privacy must be viewed by consumers as a plus, and not as a burden.

Furthermore, as consumption data is ultimately the property of the consumer who generated it, access must be evaluated by regulators both in first-person terms – promoting simplicity and tools to manage and download one's own data, and third-party access – encouraging competition and innovation on a level, technology neutral, playing field. In all four consumer scenarios, regulators have the task to ensure frameworks are technology-neutral, meaning that they allow innovation without promoting or discriminating against a particular technology. This may be achieved by defining high-level objectives or prerequisites for services. One potential approach to promote competition, highlighted by CEPA, is to ensure there is plenty of choice of companies with similar business models, so that there are alternatives to switch to, if any one company provides a poor service. However, this requires consumers to be informed and engaged.

Increased regulatory oversight is ever more important as new actors may be out of scope for energy regulators, so traditional regulatory tools may not be applicable to data access issues. This oversight may require close cooperation with regulators from other sectors. Similarly, energy regulators may also benefit by looking outside the energy sector for proven solutions, for example, in the fields of medical and security services.

Regulators must also ensure cybersecurity remains a key priority, once again, possibly in close collaboration with experts from outside the energy sector[61]. As more actors become involved in data handling and more devices are smart and connected, the system will be exposed to ever-increasing vulnerability.

Finally, data protection should not result in excessive regulatory barriers, and should not hinder the emergence of new services and new players. Data is and can be the most important asset to the future of energy systems; if properly governed within a regulatory framework that recognises the demands of all types of consumers, it can create unlimited value. In this context, the GDPR is not just a strict set of rules; it allows for flexibility because it ensures that personal data can be processed under the right conditions, and that the benefits of doing so are proportionate to the costs and risks.

[61] Please also see ACER's work in field of cyber security here.

4 Conclusions

The main objective of this CEER Report was to assess the impact of new business models on the regulatory framework, as well as implications for consumer protection issues.

Some of the key takeaways and way forward for each chapter include:

New entrant access and innovation

- Equal access to all stakeholders. Regulators must simultaneously ensure that incumbents do not unduly benefit from resources inherited from their regulated activity, such as their customer database;
- Equipment interoperability should be encouraged, and ultimately even be made mandatory, to prevent incumbents from locking-in the market, using non-interoperable equipment; and
- To benefit from the full potential of demand-side management and EVs development, it is necessary to adapt rules regulating actor's participation in flexibility markets.

Consumer choice and the 'Principal-Agent Problem'

- NRAs should try to find ways to diminish lock-in effects of certain contracts, for example by enforcing businesses opening up the product for third-party access or taking measures to reduce the risk on high pricing or poor quality.
- Consumers must be adequately informed about new technologies and basic financial concepts, and/or that information is presented to them as clear and simple as possible in order that the consumer is able to make an informed choice; and
- NRAs must ensure that the regulatory framework in the individual state provides for the adequate regulation of agents. This may not necessarily lie within the remit of the NRA for energy in all cases, and thus may be more appropriately placed within the remit of the consumer competition authority (or similar).

Self-consumption

- NRAs should define rules to ensure that self-consumers fully understand the business model and are able to fully exercise their rights. This is particularly important if "supplier-centric" solutions become dominant;
- Self-consumption should be integrated into balancing rules, such as those regarding independent aggregators, in order to clearly define the delimitation of balancing responsibilities; and
- NRAs should adapt retail market monitoring to better understand the impact of self-consumption in market dynamics, namely on offers, prices and switching rates involving self-consumers.

Data access and protection

- Data access is the key for the development of innovative services, beneficial to both consumers and the energy system. NRAs have to ensure that frameworks and technological infrastructure for third party data access are designed to be transparent and simple. They must allow access to authorised third parties without excessive technical, administrative or regulatory hurdles;
- Said frameworks and infrastructures must also be technology-neutral, allowing for innovation without promoting or discriminating a particular technology;

- NRAs, along with the responsible parties (namely utilities), should ensure that consumers are on-board and trusting of the underlying technology that enables data access. Smart meter installation processes, for instance, must be consumer-friendly and not perceived as bothersome, invasive or with other negative connotations;
- Consent management systems for data access should be consumer-centric. This entails that they are reliable by design, yet simple to understand and user-friendly. Consumers should feel confident that their personal data is safeguarded and treated with all due respect for data privacy;
- Data protection should respond to proportionality principles set forth in the GDPR and thus should not result in excessive entry barriers or otherwise hinder the emergence of new services and new market players: and
- NRAs must also ensure cybersecurity remains a key priority, possibly in close collaboration with experts from outside the energy sector.

Annex 1 – List of abbreviations

Term	Definition
ACER	EU Agency for the Cooperation of Energy Regulators
AI	Artificial Intelligence
Apps	Applications
BEUC	the European Consumer Organisation
BRP	Balance Responsible Party
CEC	Citizen Energy Community
CEER	Council of European Energy Regulators
CEP	Clean Energy Package
CfD	Contracts for Difference
DER	Distributed Energy Sources
DS WG	Distribution Systems Working Group
DSO	Distribution System Operator
DSR	Demand Side Response
EaaS	Energy as a Service
EV	Electric Vehicle
GAFAM	Google, Apple, Facebook, Amazon, Microsoft
GDPR	General Data Protection Regulation
ICT	Information Communication Technology
IoT	Internet of Things
IRM WS	Innovation and Retail Markets Work Stream
kWh	Kilowatt-hour
NRA	National Regulatory Authority
P2P	Peer-to-Peer
PV	Photo Voltaic
REC	Renewable Energy Community
RED II	Renewable Energy Directive (II)
RES	Renewable Energy Sources
TSO	Transmission System Operator
V2G	Vehicle-to-grid

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 non-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 experiences 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.

CEER wishes to thank, in particular, the following regulatory experts for their work in preparing this report: Gloria Mármol Acitores, Eleonora Bettenzoli, Bruno Caetano, Jana Haasová, Tomáš Kupčiha, Patrícia Lages, Alasdair MacMillan, Anna Renata Maggioni, Aurélien Paillard and Daphne Clarijs-ter Telgte.

More information is available at www.ceer.eu/.