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ABSTRACT

The EU Clean Energy Package sets the EU energy efficiency and renewable energy ambitions for the 2030 horizon. It also updates the rules that govern the functioning of the internal electricity market and the transmission and distribution grids. The package, proposed by the European Commission in November 2016, includes 8 legislative proposals on the electricity market and consumers, Energy Efficiency and Energy Efficiency of buildings, Renewables & bioenergy sustainability as well as governance of the Energy Union. The Council agreed on its negotiating position for four legislative proposals of the EU Clean energy package in December 2017. For the different topics selected for this report, we will present the Commission proposals as well as the Council position included in the electricity Directive and Regulation. The positions of the different stakeholders of the EU electricity sector will also be stated at the end of each discussed topic.

Keywords: European regulation, public interventions in electricity prices, network tariffs, capacity mechanisms, network codes, EV charging infrastructure, electricity storage, DSO planning, DSO active network management, procurement of flexibility services, DSO-TSO cooperation, EU DSO entity, active customers, smart metering, dynamic pricing, aggregators, local energy communities

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Abbreviations

ACER: Agency for Cooperation of Energy Regulators, also called the agency

BEUC: The European Consumer Organisation

BRP: Balance responsible party

BSP: Balance service provider

CA: Capacity auction

CACM: Regulation establishing a guideline on capacity allocation and congestion management

CBA: cost-benefit analysis

CCP: Critical peak pricing

CEDEC: the European Federation of Local Energy Companies

CEP: Clean Energy Package

CEER: Council of European Energy Regulators

CHP: Combined Heat and Power

CM: Capacity mechanism

CO: Capacity obligation

CO2: Carbon dioxide

CRM: Capacity remuneration mechanism

CP: Capacity Payments

DCC: Regulation establishing a network code on demand connection

DER: Distributed Energy Resources

DNDP: distribution network development plan

DP: dynamic pricing

DR: Demand Response

DSO: Distribution System Operator

EBGL: Regulation establishing a guideline on electricity balancing

EC: European Commission

EDSO for Smart Grids: Distribution System Operators' Association for Smart Grids

FBCC: flow-based capacity calculation

ENTSO-E: European Network of Transmission System Operators for Electricity

EENS: expected energy not served

EFET: European Federation of Energy Traders

EP: European Parliament

EPOV : European Energy Poverty Observatory

E-Directive: Proposal for a revised electricity Directive on common rules for the internal market in electricity

ER: Regulation establishing a network code on electricity emergency and restoration

E-Regulation: Proposal for a revised electricity Regulation on the internal market for electricity

EU: European Union

EURELECTRIC: The Union of the Electricity Industry

Europex: Association of European Energy Exchanges

EV: Electric vehicle

FCA: Regulation establishing a guideline on forward capacity allocation

FSR: Florence School of Regulation

GB: Great Britain

Gr: gram

HVDC NC: Regulation establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules

IEM: Internal Energy Market

kW: Kilowatt

kWh: Kilowatt hour

LEC: Local energy community

LOLE: Loss of load expectation

LOLP: Loss of load probability

MMR: Market Monitoring Report

MS: Member State

MW: Megawatt

MWh: Megawatt-hour

NC: network code

NIS Directive: The Directive on security of network and information systems (NIS Directive)

NRA: National Regulatory Authority

NTC: net transfer capacity

Ofgem: Office of Gas and Electricity Markets (GB)

RE: Renewable energy

REScoop: European federation of renewable energy cooperatives

RES-E: Electricity from Renewable Energy Sources

RfG NC: Regulation establishing a network code on requirements for grid connection of generators

RO: Reliability options

ROC: Regional Operation Centre

RSC: Regional Security Coordinators

RSCI: Regional Security Coordination Initiatives

SEDC: Smart Energy Demand Coalition

SO: System operation

SOGL: Regulation establishing a guideline on electricity transmission system operation

SoS: Security of supply

SR: Strategic reserve

T&L: taxes and levies

TFEU: Treaty on the Functioning of the European Union

ToU: Time of Use

TSO: transmission system operator

UK: United Kingdom

VAT: Value-Added Tax

VOLL: Value of Lost Load

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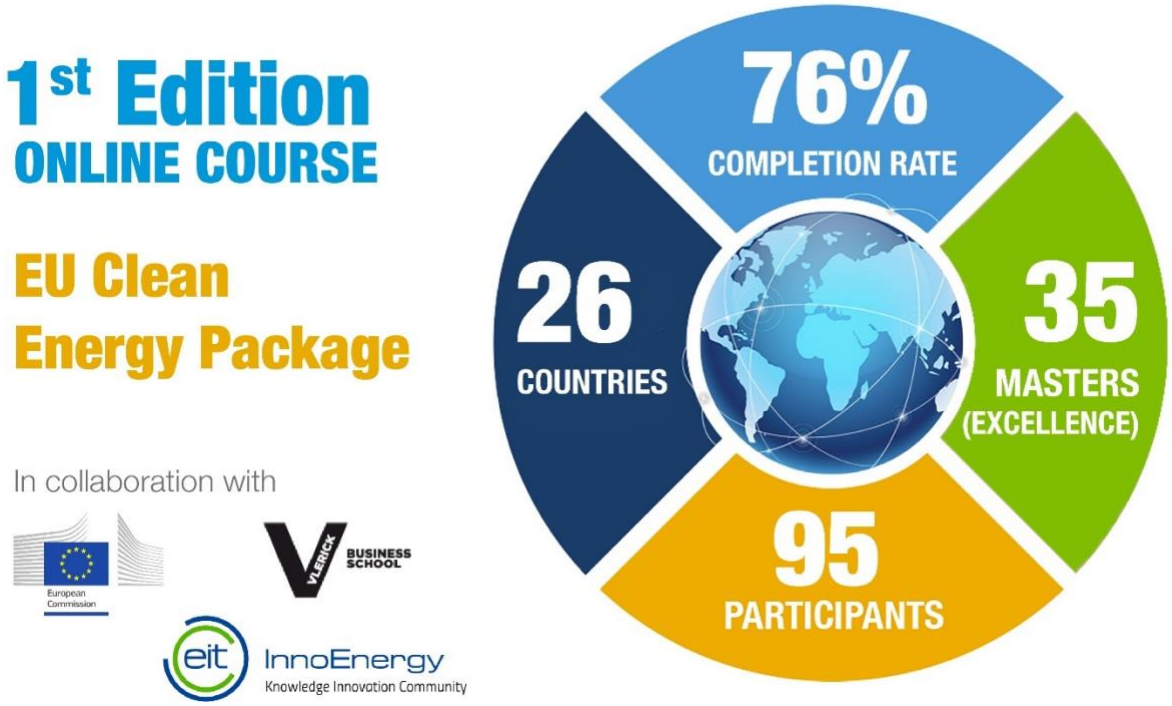

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Disclaimer: The authors are responsible for any errors or omissions. The underlined text in this report, reflects the authors selected important points.

Introduction

The EU Clean Energy Package (CEP) includes a set of measures that the European Commission (EC) proposed in November 2016 to push forward the energy transition. The European Council published its agreed negotiating position on these proposals in December 2017[1]. Currently, the Council, representing the EU Member States, the European Parliament (EP), representing EU citizens, and the European Commission are conducting 'trilogue' negotiations concerning the eight proposals (four Directives and four Regulations) included in the Package. The process is expected to be concluded before the next European Parliament elections in 2019. As the process is ongoing, the text starts from the European Commission proposals and their impact on the European internal electricity market rules compared to the framework established by the Third Energy Package, including the first generation of network codes.

In this text, we will focus on two of the eight proposals in this course; the proposals for the Directive on common rules for the internal market in electricity (E-Directive) and the Regulation on the internal market for electricity (E-Regulation).

The structure of this text follows the structure of the online course. The first section on Electricity Markets is 'Ensuring the internal market level playing field'. The second section on Electricity Grids is 'Adapting to the decentralisation of the power system'. The third, on the New deal is 'Empowering customers and citizens'.

[1]The document can be found at: http://www.consilium.europa.eu/en/documents-publications/public-register/

1. Ensuring the internal market level playing field

In this section, we first set the scene by introducing the different components of the typical electricity bill. We then focus on three key measures in the CEP proposals to ensure the level playing field in the internal electricity market, i.e., the phasing out of public intervention in setting electricity prices, the harmonisation of network tariffs, and the limitation of the use of capacity mechanisms. We conclude the section by highlighting the interlinkage of the CEP with the network codes (NC) on topics related to the internal electricity market such as bidding zones, balancing responsibilities, system operation regional governance and the calculation of interconnectors' capacity. We also refer to the second generation of network codes that are included in the CEP proposals.

1.1. Setting the scene: the different components of the electricity bill

End-user electricity prices consist of the sum of three main components: the energy component, network charges and taxes and levies[2] (T&L). The European average for the energy component is about 40% of the total bill for households. It declined by 15% from 2008 to 2015 as stated in (ACER and CEER, 2017). Note that for countries with a high share of renewable energy sources (RES) like Germany or Denmark[3], the T&L, which include also RES contributions, constitute the main part of the electricity bill. Figure 1, gives an overview of the composition of end-user electricity prices across EU capital cities.

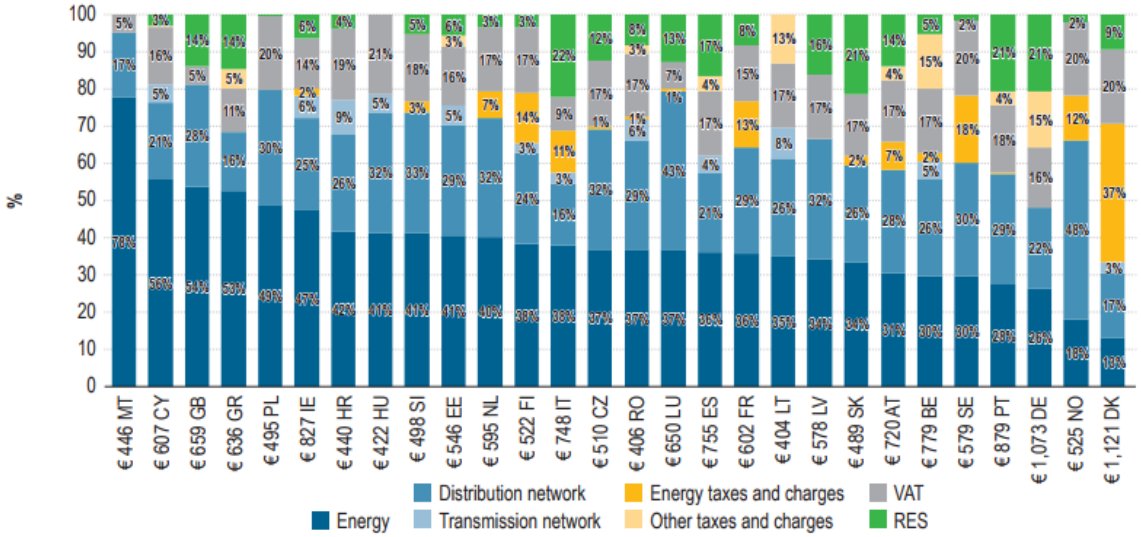

Figure 1: End-user electricity prices breakdown of incumbents' standard offers for households in EU capital cities – November–December 2016 (%), source: (ACER and CEER, 2017a)

Electricity prices differ significantly across MSs for several non-market reasons. For households, they increased for non-market reasons at an average annual rate of 3.2% between 2008 and 2015 (ACER 2017). This increase is due to significant rises in non-contestable charges (network charges and T&L) in absolute terms (EC, 2016a), while the shares of network charges (%) in the electricity bill, as shown in Figure 2, have remained almost unchanged (ACER and CEER, 2017a).

[2] Please take into account that RES subsidies are considered in this text as T&L. Indeed, RES are not a necessary cost for grids, however, they bring significant positive externalities for the environment and promote energy transition.

[3] In the case of Denmark, even though the share of renewable energies is expected to increase, this part of the bill will decline in the coming years, because costs for renewable energies are going to be gradually moved from the electricity bill to the national budget. (Blomgren-Hansen and Rye-Andersen, 2017).

The energy component is determined by two main factors: wholesale prices and costs associated with the retail activity (EC, 2016b). There are three main drivers for wholesale electricity prices: fuel shares in the electricity generation mix, commodity prices, and market features (i.e., the degree of competition, access to resources, and regional market integration). Retail costs include supply operating costs (i.e., billing and marketing) and a profit margin for providing retail services[4].

The network component, including subcomponents of transmission and distribution, represented 28% of the EU electricity bill for households in EU capital cities (and Oslo) in 2016 as stated in (ACER, 2017). Distribution charges represented on average 23% of the EU electricity bill in 2016, while transmission charges represented 5% of households' electricity bill in EU capital cities.

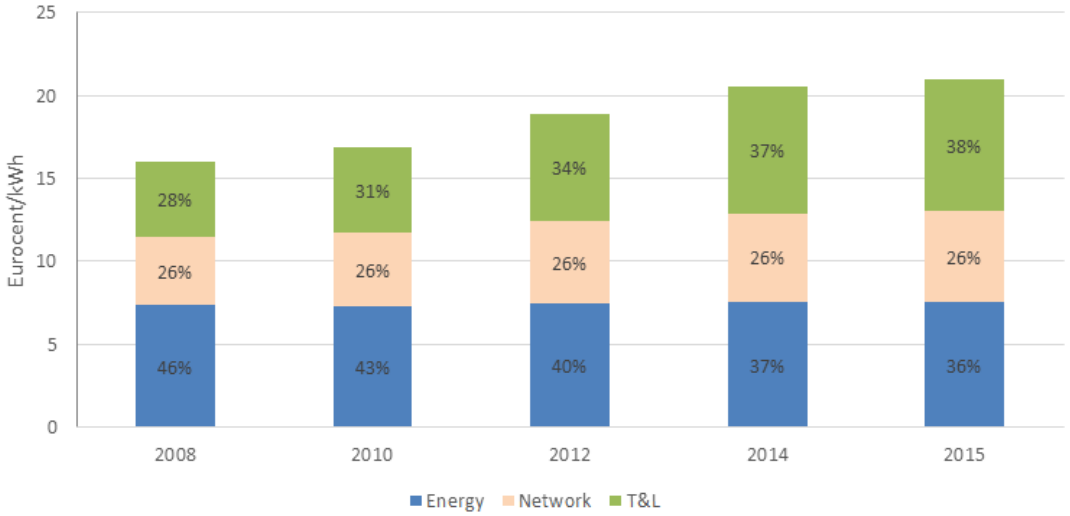

Figure 2: Weighted EU average end-user electricity price components, data from (EC, 2016c)

The T&L component has increased for electricity since 2008 as shown in Figure 2. This increase is mainly due to support mechanisms for electricity from renewable energy sources (RES-E) and cogeneration or combined heat and power (CHP) across Europe[5]. The applied value-added taxes (VAT) on household electricity prices are percentages of these prices, including all other T&L (EC, 2016b). Therefore, VAT nominal effects increased with the increase of total prices. Some MSs additionally raised the VAT rate. Also, the tax rates for consumers vary across MSs depending on factors such as consumption and grid connection.

1.2. Phasing out public interventions in electricity market prices

In this part, we will start by providing an overview of the current practices for electricity price regulation. Then we present the proposed measures to phase out public interventions in setting electricity prices as well as the transitional measures aiming to ensure customers' protection and a smooth phasing-out of regulated prices. Finally, we present the different stakeholder's positions on this matter.

[4] Note that in some reports the energy component doesn't include the retail costs. This would mean that the electricity bill will contain four components (CRU, 2017).

[5] In some countries (Italy, for example) RES are paid by mean of a specific fee added to the electricity bill. Levies to remunerate RES are usually not included in the network component but rather in the T&L one to allow a comparison between different MSs.

1.2.1 Current practices

In Europe, the majority of MSs have opted for retail liberalisation with non-regulated electricity market prices. Article 21 of the European Directive 2003/54/EC requires that non-household electricity consumers should be able to freely choose their supplier from 1 July 2004 and for household electricity consumers starting from 1 July 2007. Today, around 40% of Member states still have regulated end-user electricity prices, as presented in (ACER, 2017). Countries in eastern Europe as well as France, Spain and Portugal still have public interventions in setting electricity prices, either for the entire retail market or only for the household segment. EU countries practices in the matter of price regulation are shown in Figure 3[6].

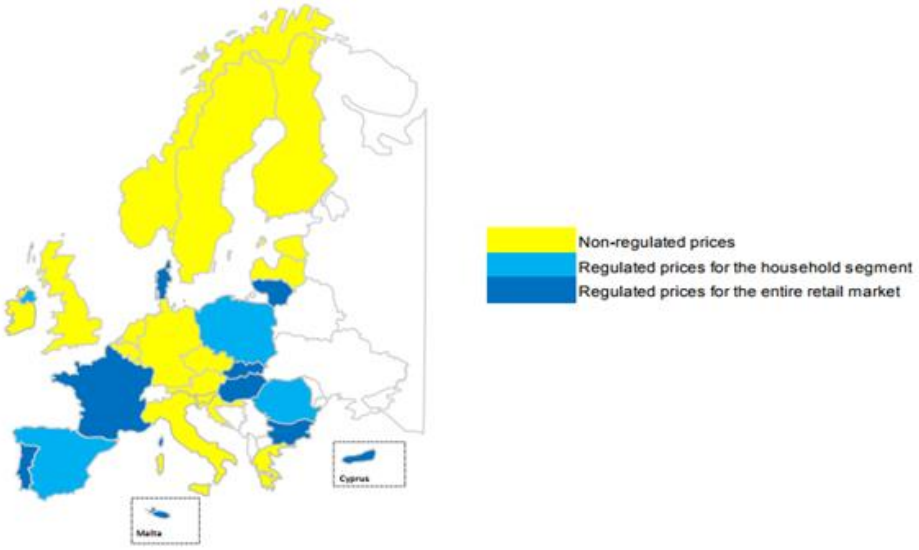

Figure 3: Application of regulated prices – households and industry, based on CEER National Indicators Database (2016)

MSs have adopted different approaches with regard to retail competition following the European Directive 2009/72/EC. **Article 3(3)** of this Directive states that '*Member States shall ensure that all household customers, and (…) small enterprises, (…), enjoy universal service, that is, the right to be supplied with electricity of a specified quality within their territory at reasonable, easily and clearly comparable and transparent prices'*. The directive adds in **article 3(14)** that '*the interests of the Community include, inter alia, competition with regard to eligible customers*'. This Directive was interpreted differently by MSs, and the degree of market liberalisation varies significantly between them; their reluctance to lose control over energy prices can explain this. Also, the introduction of a 'supplier of last resort'[7] has paved the way for adapting the Directive at national levels.

According to the EC (2015a), the phasing-out of regulated prices should be pursued with a mechanism protecting vulnerable consumers which is necessary to address energy poverty. This would preferably be provided *'through the general welfare system. If provided through the energy market, it could be implemented through schemes such as a solidarity tariff or as a discount on energy bills.'*

[6] Please not that this figure indicates the countries that still offer regulated electricity prices regardless of their shares compared to competitive retail offers. For instance, in Portugal, 80% of electricity customers were under a liberalised tariff regime in January 2018 (Baratti, 2018). Also in Denmark, the price-regulated supply obligations are being phased out according to (IEA, 2017).

[7] **Article 3** of the Directive 2009/72/EC states that *'to ensure the provision of universal service, Member States may appoint a supplier of last resort'.*

1.2.2. Proposal for phasing out public intervention in electricity market prices

The EC (2016d) encourages MSs to establish a roadmap for the phasing out of public interventions in electricity prices where such intervention still exists. The European Commission states in the E-Directive that '*the new market design aims at ensuring competitive supply prices without public intervention, and only with duly justified exceptions.'*

The newly added **recital 15** of the E-Directive, on public authorities' price regulation, emphasises the distorting effect of public interventions on price regulation. It states that '*Member States should maintain a wide discretion to impose public service obligations on electricity undertakings in pursuing objectives of general economic interest. (…) Nevertheless, public service obligations in the form of* ***supply price regulation*** *constitute a fundamentally distortive measure that often leads to the accumulation of tariff deficits, limitation of consumer choice, (…).*' It adds that *'a fully liberalised retail electricity market would stimulate price and non-price competition among existing suppliers and incentivise new market entries therefore improving consumers' choice and satisfaction.'*

In **article 5** of the E-Directive, the Commission proposes a gradual phasing-out of regulated electricity prices by the Member States, starting with prices below costs. MSs shall adopt appropriate measures to promote effective competition among electricity suppliers, which shall be able to freely set the electricity supply price.

The European Council adds, in **recital 15** of its position for the E-Directive (Council, 2017), more clarifications on the provisions to mitigate the distorting effects of public service obligations. It states that interventions in electricity supply price regulation must not lead to direct cross-subsidisation between different categories of consumers.

1.2.3. Transitional measures for phasing out public intervention in electricity market prices

The proposal for phasing out regulated prices includes retail market monitoring by MSs and at the same time allows a transitional price regulation blanket for vulnerable consumers and households in a situation of energy poverty.

- Retail market monitoring for a smooth transition

On the MSs monitoring role obligations, **article 12** of the E-Directive promoting retail competition states that MSs shall ensure that *'the right to switch suppliers is granted to customers in a non-discriminatory manner as regards cost, effort or time.'* Also, MSs shall ensure that *'a customer wishing to change supplier, while respecting contractual conditions, is entitled to such change within three weeks*[8]*'*. Additionally, MSs shall safeguard that *'customers are not charged any switching-related fees.*'

Derogations for contract termination fees, charged on customers willingly terminating fixed-term supply contracts before their maturity, can be given. According to **article 12(3)**, 's*uch fees may only be charged if customers receive a demonstrable advantage from these contracts. Also, such fees shall not exceed the direct economic loss to the supplier of the customer terminating the contract, including the cost of any bundled investments or services already provided to the customer as part of the contract.*'

[8] The council adds that '*by no later than 2025, the technical process of switching supplier shall take no longer than 24 hours and shall be possible on any working day, unless a Member State concludes there is a negative cost–benefit analysis'.*

On retail offer comparison tools, **article 14** of the E-Directive states that *'Member States shall ensure that customers have access, free of charge*[9]*, to at least one tool comparing the offers of suppliers that meets the certification criteria set out in Annex I. The comparison tools may be operated by any entity, including private companies and public authorities or bodies. Customers should be informed of the availability of such tools.*' Moreover, the existence of *'an independent competent authority responsible for certifying comparison tools and ensuring that certified comparison tools continue to meet the criteria set out in Annex I*', should be ensured by MSs.

Article 59 of the E-Directive on 'Duties and powers of the regulatory authority' adds that NRAs have to monitor *'the level and effectiveness of market opening and competition at wholesale and retail levels, including on electricity exchanges, prices for household customers including prepayment systems, switching rates, disconnection rates, (…).*'

- Protective measures for energy-poor and vulnerable customers

Regarding energy poverty, the E-Directive indicates, in its explanatory memorandum, that *'Member States shall define a set of criteria for the purposes of measuring energy poverty*.' To support MSs, the Commission has launched the European Energy Poverty Observatory (EPOV), confirming the need for a common EU-wide effort to face energy poverty. For more information see Bouzarovski (2018).

The European Energy Poverty Observatory (EPOV)
In December 2016, the European Commission launched the European Energy Poverty Observatory (EPOV), a 40-month research project that aims to improve the state of the art on energy poverty detection and the measures to tackle it. It aims also to support the EP Committee on Industry, Research and Energy (ITRE) evaluation of the related legislative proposals of the CEP. In the near future EPOV is expected to become a decision support tool for the new European energy policy and legislation.

Maroš Šefčovič, Vice-President of the EC in charge of Energy Union, declared during the launch of EPOV that '*the context in which energy poverty occurs varies greatly among our Member States. That is why we do not attempt to create a universal definition of energy poverty.*' Regarding this approach to identifying energy poverty he added that '*at the same time, Member States will be the ones to define the criteria for measurement, and cost-effective solutions. We leave flexibility and leeway for each country to fine-tune it.*'

Also, the E-Directive adds, in its explanatory memorandum, that while the MSs are encouraged to phase out regulated prices, *'vulnerable consumers can be protected by a transitional price regulation*.*'* MSs should also identify vulnerable consumers and put measures in place that give them adequate attention. The **recital (4)** of the E-Directive emphasises the protection of vulnerable consumers and states that *'the Energy Union Framework Strategy sets out the vision of an Energy Union with citizens at its core, where citizens take ownership of the energy transition, (…) and where vulnerable consumers are protected*'. **Article 5 (2)** of the E-Directive adds that '*Member States shall ensure the protection of energy poor or vulnerable customers in a targeted manner by other means than public interventions in the price-setting for the supply of electricity.*'

[9] The Council proposes that this free of charge access should be ensured at least for household customers, and microenterprises with an expected yearly consumption of below 100,000 kWh. A microenterprise, according to article 2(5a) of the Council E-Directive, *means an enterprise which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million.*

Public interventions in price setting for energy-poor or vulnerable household customers may continue to be applied by MSs '*up to five years from the entry into force of this Directive*', according to **article 5 (3)** of the E-Directive. This option allows for transitional price regulation for vulnerable consumers. After five years, MSs, as indicated in **article 5(4)**, '*may still apply public interventions in the price-setting for the supply of electricity for vulnerable household customers in so far as it is strictly necessary for reasons of extreme urgency.*'

In addition to that, MSs are obliged to monitor the number of households in energy poverty to provide targeted support. According to **article 29**, '*Member States shall continuously monitor the number of households in energy poverty and shall report on the evolution of energy poverty and measures taken to prevent it to the Commission every two years as part of their Integrated National Energy and Climate Progress Reports in accordance with Article 21 of [Governance Regulation as proposed by COM(2016)759].*'

The Council adds further clarification on the conditions for using public interventions in **article 5(3b)**. On the derogation of the phasing out of regulated prices, the Council removes the five-year transitory deadline, introduced by the Commission, and links the public intervention to the support programme and the implementing documents [under the European Stability Mechanism[10]], (**article 5 (3c)** of the Council position).

Commission proposal

- Main measures

- Gradual removal of regulated end-user prices.

- NRAs efforts are required to enhance retail markets competition, ensuring efficient competition and guaranteeing consumer protection.

- Transitional measures

- Price public interventions to protect vulnerable household customers may continue for up to five years after the entry into force of the E-Directive. Derogations for continuing price regulation after that exist.

- A transitional price protection for vulnerable consumers can be set in the phasing out process.

- MSs shall define sets of criteria for measuring energy poverty and report its evolution every two years.

Council position

- More clarification on provisions for using price regulation such as not leading to cross-subsidisation.

- Removing the five-year deadline for phasing-out regulated electricity prices.

1.2.4. Stakeholders' positions

Regarding the Commission's proposal, the joint statement by EURELECTRIC[11], Wind Europe, Europex [12] and EFET [13] (EURELECTRIC et al., 2018) states that '*consumers will only be empowered through a combination of measures – such as efficient price signals, certified comparison tools and easy switching. Should retail prices continue to be regulated in some Member States, the benefits brought by the Clean Energy Package would be severely weakened.*' It adds that *'retail price regulation is also a serious obstacle*

[10] The European Stability Mechanism (ESM) is '*an intergovernmental organisation located in Luxembourg City, which operates under public international law for all euro zone Member States having ratified a special ESM intergovernmental treaty.'* For more information, see www.esm.europa.eu/about-us.

[11] The Union of the Electricity Industry

[12] Association of European Energy Exchanges

[13] European Federation of Energy Traders

to competition among electricity supply companies. It reduces the incentive on companies to become more efficient, it discourages the emergence of new market participants and it stifles the development of value-added services, including dynamic pricing.' The four associations added that *'other structural measures (i.e. direct payments, dedicated tax breaks, enhanced social policy and energy efficiency measures) should be promoted, instead of regulated prices, to ensure vulnerable consumers protection*.' They kindly request that the European Council and Parliament *'make sure that the Electricity Directive enacts a clear process and timeline for the prompt phase-out of regulated prices.'*

CEER also promotes the use of different policies to protect energy poor or vulnerable customers. CEER, (2017a) states that '*targeted protection of energy poor or vulnerable customers can play an important policy role. However, this should not be based on regulated prices being below market price as this can damage retail competition and harm consumer welfare. Instead, vulnerable customers may benefit both from retail competition and targeted interventions where policy instruments are compatible with energy competition. For example, appropriate policy instruments including general social welfare system do not interfere with competition in the energy market while still allow for the protection of vulnerable customers.'*

BEUC[14] (2017a) policy paper states that '*successive legislative initiatives have pushed Member States to create market places and break up monopolies. However, the process is far from complete and many markets lack of truly dynamic competition. Some consumers are suffering from significantly higher tariffs subsidising others.*' BEUC proposes to amend article 5 of the E-Directive as follows: *'Where there is evidence that markets are failing, price intervention in the energy market should be permitted especially for specific tariffs (such as default tariffs). The price should be set at the level allowing an efficient supplier to make a reasonable level of return*.' It adds that *'given that energy markets are in different stages of liberalisation, national policy makers and National Regulatory Authorities should pay particular attention when consumers switch from a regulated to a deregulated market, ensure a smooth transition and avoid bill shocks caused by unintended switch to a deregulated market.*' Additionally, on the protection of vulnerable consumers, BEUC states, with regards to article 5 and 28 of the E-Directive, that '*Member States should define a set of criteria to measure energy poverty in the energy market, analyse if these consumers[15] are sufficiently protected and add protections where needed, esp. in case of a deregulation process.'* It adds that customers' disconnection *'shall be prohibited until the dispute between the supplier and the customer is settled*' and that *'Member States should establish rules for protection of customers who are indebted (such as by establishing deposit limits) and rule out disconnections during the winter time.'*

1.3. Harmonising network tariffs

In this part, we first present the current practices for network tariffs across Europe. Then, we describe the CEP proposal for harmonising them and the different stakeholders' positions.

1.3.1. Current practices

Transmission tariffs design across Europe

In Europe, there are different systems of electricity transmission pricing and associated tariff structures. Transmission access is generally charged via capacity component and/or energy (volumetric) component. Also, transmission tariffs can be applied to electricity generators and consumers, or in some cases only to the consumers. Figure 4 shows the differences across Europe based on ENTSO-E data.

[14] The European Consumer Organisation, from the French name Bureau Européen des Unions de Consommateurs

[15] Energy poor consumers and those in vulnerable situations.

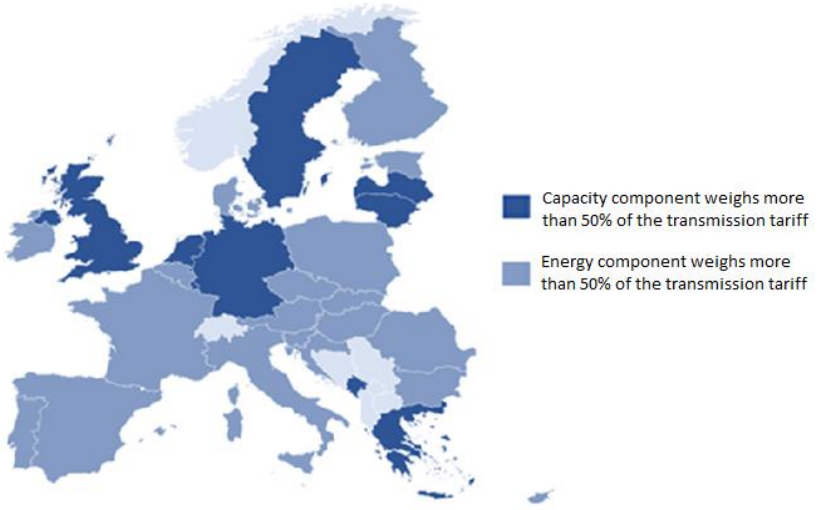

Figure 4: Status quo on energy and capacity transmission tariffs components among MSs, based on (ENTSO-E, 2017a)

The current situation is the result of nationally established transmission tariff policies and different national contexts. Some MSs (i.e., Germany, the UK, and Sweden) have implemented a capacity-based tariff whereas some other MSs (i.e., France, Spain and Italy) have implemented an energy-based tariff. In some tariff designs, system ancillary service costs and network losses costs can be charged through transmission tariffs (partially or totally) (such as Austria and France (ENTSO-E, 2017a)), rather than through market mechanisms (such as Spain and Portugal). Another difference between TSO charges in the EU is the share between generation (G-charge) and load (L-Charge) network charges as well as the seasonal and locational differentiation. This implies a certain complexity at the EU level.

Distribution tariffs design across Europe

The methodologies and structures for distribution tariffs are also different across Europe. As with transmission tariffs, the shares of energy/capacity components for distribution tariffs, shown in Figure 5, vary significantly across EU countries. Most European DSOs' revenue is currently based on volumetric tariffs, i.e., 69% of the revenue for households, 54% for small industrial consumers and 58% for large industrial consumers. For more details please refer to EC (2016e).

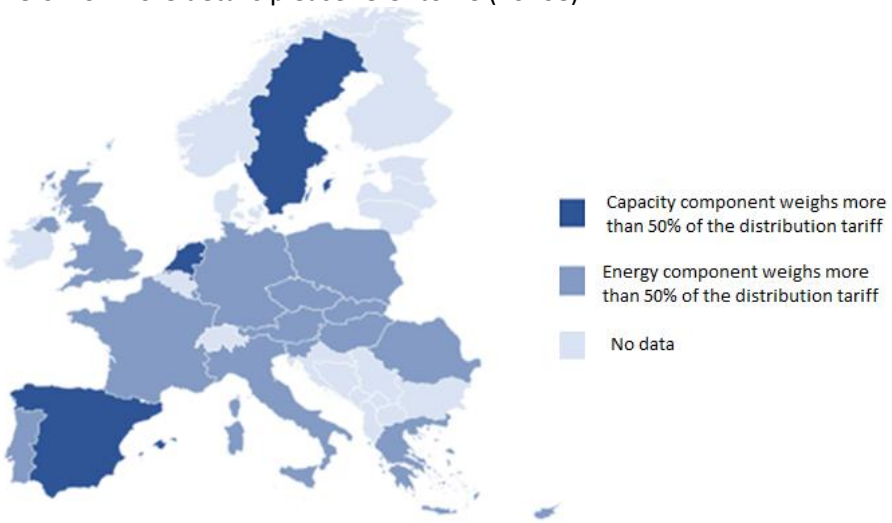

Figure 5: Status quo on energy and capacity distribution tariffs components among MSs for household consumers, based on (EC, 2016e)

Interesting cases are the Netherlands and Great Britain (GB). In the Netherlands the distribution tariff has been based on the capacity of the connection of the household to the local feeder since 2009 and there is no energy component in the tariff. In GB, part of the network charges paid are intended to reflect the consumers' contribution to the system peak. For more information, please consult CEER (2017b) guidelines of good practice for electricity distribution network tariffs.

1.3.2. Proposal for harmonising network tariffs

The CEP brings new measures for distribution tariffs harmonisation and links them to the transmission tariffs harmonisation process.

Article 16 of the Commission proposal for the E-Regulation indicates that '*tariffs shall grant appropriate incentives to transmission and distribution system operators, over both the short and long term, to increase efficiencies, including energy efficiency, foster market integration and security of supply, and support investments and the related research activities.*' It adds that three months after the entry into force of the Regulation, ACER shall provide a recommendation addressed to NRAs on the progressive convergence of transmission and distribution tariff methodologies as stated in **article 16(9).** '*The recommendation shall address at least:*

(a) the ratio of tariffs applied to producers and to consumers;
(b) the costs to be recovered by tariffs;
(c) time differentiated network tariffs;
(d) locational signals;
(e) the relationship between transmission and distribution tariffs, including principles relating to non-discrimination;
(f) methods to ensure transparency in the setting and structure of tariffs;
(g) groups of network users subject to tariffs, including tariff exemptions.'

On this proposal, the Council position has introduced a best practice report on tariff methodologies that should be issued by ACER, instead of the ACER recommendation proposed by the Commission. The report should address the same points proposed by the Commission in **article 16(9)**. The Council adds that ACER shall update its report at least once every two years. This measure aims to leave sufficient room for MSs to take into account national specificities.

For the implementation of harmonised network tariffs, the Commission proposes that this issue should be handled through network codes as indicated in **article 55(1)(k**) of the E-Regulation. Indeed, it adds the harmonisation of distribution tariffs in the areas to be covered by network codes next to the transmission tariffs ones. The Council position on the E-Regulation, however, has removed the addition of the harmonisation of distribution tariffs from the same article.

It should be noted that the harmonisation of transmission tariffs has been first introduced in the Regulation (EC) No 714/2009 of the third energy package (**article 8**) in the focus areas of network codes. However, this focus area has not been developed in a tariff network code[16] so far.

[16] There are tariff network codes only for the gas sector. For the electricity, the developed network codes are on market, grid and connection.

Commission proposal

-Tariffs shall give appropriate incentives to TSOs and DSOs to foster market integration and security of supply (SoS) as well as to increase efficiencies and support investment and R&D.

- Distribution tariffs harmonisation should be covered by network codes focus areas in addition to the transmission tariffs ones.

-Harmonising national policies/ methodologies concerning the principles for distribution tariffs.

-ACER is responsible for providing a recommendation on the progressive convergence of transmission and distribution tariff methodologies to NRAs.

-NRAs should consider ACER recommendation when approving or fixing transmission tariffs or their methodologies.

Council Position

-The harmonisation of distribution tariffs in network codes was removed.

-ACER shall provide a best practice report transmission and distribution tariff methodologies instead of the recommendation.

1.3.3. Stakeholders' positions

EURELECTRIC agrees, in its position paper on the E-Regulation (EURELECTRIC, 2017a), with *'the provision stating that ACER should provide a recommendation assessing the need for progressive convergence of transmission and distribution tariff structures. We also believe that such recommendation should provide guidance to NRAs to ensure a homogeneous implementation of the high-level principles listed under Art. 16. However, it seems unrealistic to foresee only 3 months for ACER to issue such recommendation based on sufficient stakeholders' involvement*.'

CEER (2017b) welcomes, in its white paper on distribution and transmission network tariffs and incentives, '*the proposals in the Clean Energy Package requiring network tariffs that are cost reflective and which give appropriate incentives to increase the efficient use of the networks. However, CEER considers that harmonisation of both transmission and distribution tariffs at European level could be inefficient and not lead to the right outcomes for European consumers. Similarly, providing the appropriate incentives for efficient network use is complex and varies based on the regulatory framework and the characteristics of the industry in each Member State. The diversity in DSOs and their sheer number across the EU mean that National Regulatory Authorities are best placed to consider the best regulatory choices within the European framework. Implementing a 'one size fits all' approach risks inefficient incentives for network use on a Member State level, particularly with the emergence of more local energy models*.'

EDSO, (2017a), amendments of the E-Regulation state that an '*EU-wide harmonisation of network tariffs is not merited*'. While EDSO supports the E-Regulation's proposal that '*tariffs need to incentivise network users to adapt their behaviour in such a way that it overcomes local congestion and constraints, and unnecessary costs where possible*', it states that *'the diversity of distribution tariffs across member states implies that any future implementation can be best addressed at the national level. Therefore, EDSO cautions against any EU-wide harmonisation of network tariff systems*'. It adds that '*network and geographical characteristics are very diverse throughout Europe, leading to diverging best practices in terms of network tariffs structures. Network codes do not seem to be the right tool to efficiently enhance distribution tariff structures at European level.*'

On network charges, REScoop states in its position paper 'What local energy communities need from the Clean Energy Package' (REScoop, 2017a), that '*the market design should require distribution tariffs and compensation to reward smart behaviour and incentivise investments from citizens and communities that benefit both themselves and the system in the long term. Furthermore, national regulators should have a duty to ensure that network tariffs for distributed energy resources are calculated according to an objective and transparent long-term cost benefit analysis that takes into account their wide range of benefits to the energy system, society and the environment. At the very least, distribution tariffs should be required to promote flexibility in order to optimise when renewables self-consumers and energy communities feed into or draw out of the grid.*'

BEUC, (2018a) policy recommendations state that '*the Clean Energy for All Europeans package should keep the National Regulatory Authority as the independent body setting tariffs. National Regulatory Authorities should be obliged to make the methods and cost components used for the calculation of the network charges publicly available.*' It adds that '*National Regulatory Authorities should redesign tariffs for all consumers, so that they reflect the costs and benefits to the system and the real use of the grid. The revision should apply to all consumers, and avoid exemptions for heavy industry. New tariffs should not unduly increase the financial burden for households, for example for those with a low level of consumption or living in remote areas.*' Also, BEUC adds that '*Member States should be allowed to use net metering in a transitional period.*'

1.4. Limiting the use of capacity mechanisms

In this part, we will start by describing the current practices on capacity mechanisms' (CMs) use in Europe and the CEP proposals to limit their use, discrimination against emerging business, their impact on climate goals and the related cross-border concerns. Finally, we will present the different stakeholders' positions.

1.4.1. Current practices in capacity mechanisms

During recent years, some EU Member States have decided to implement different CMs (see Figure 6). In February 2018, six capacity mechanisms, also called capacity remuneration mechanisms (CRMs), were approved by the EC, under EU State aid rules, in Belgium, France, Germany, Greece, Italy and Poland, (EC, 2018a). The Commission found that those measures will contribute to ensuring SoS while preserving competition in the single market. The approved mechanisms are the following: strategic reserves, in Belgium and Germany, two market-wide capacity mechanisms in Italy and Poland, as well as a demand response[17] (DR) tender in France and an interruptibility scheme in Greece[18].

Currently, the most common capacity mechanism is strategic reserve (EC, 2016f). This kind of mechanism is used in Belgium, Germany, Poland, Sweden, and Finland. In Germany, for instance, the strategic reserve mechanism requires network operators to procure and hold 2GW of capacity outside the market, starting in winter 2018/2019 and lasting initially for two years (BMWi, 2018). For Italy, a reliability option scheme is planned for 2019. The procurement of capacity, in this scheme, will be through competitive tenders for reliability option contract.

[17] DR operators can choose either between a certification of DR as capacity or a reduction of consumption as supplier obligation.
[18] 'Interruptibility schemes' are mechanisms '*in which industrial customers are asked by the network operator to reduce their demand in scarcity situations, are also considered a form of "reserve", as they provide capacity that is only activated when a supply shortfall occurs',* (EC, 2016f).

Figure 6: CM implementation in Europe

In Figure 7 below, the classification of CRMs is shown according to their characteristics, based on ACER and CEER (2017a):

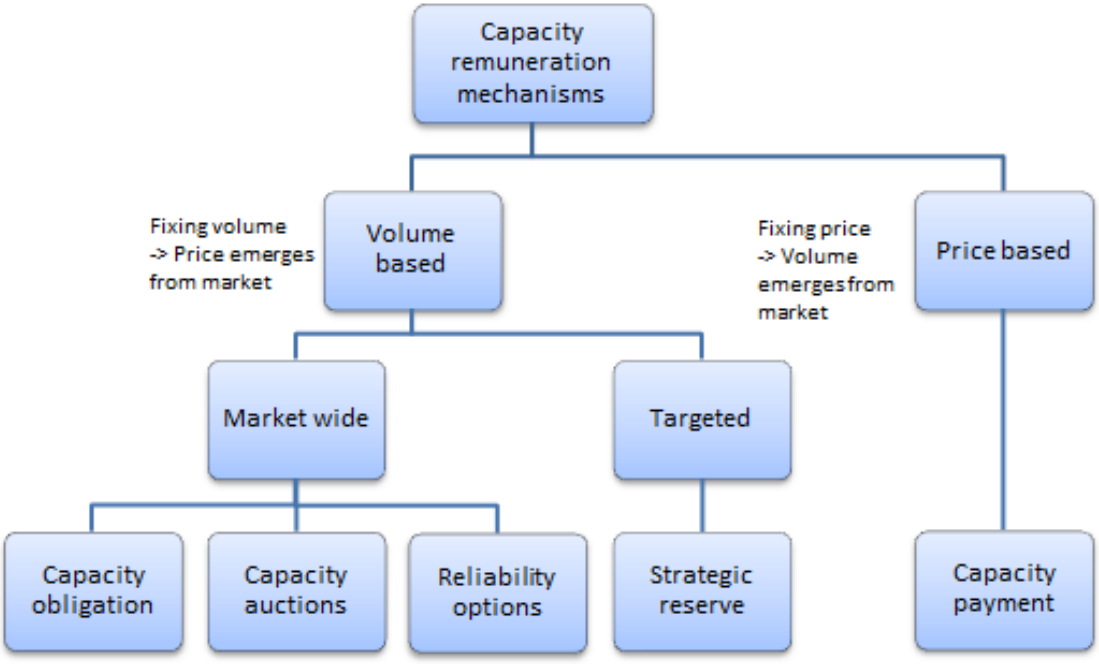

Figure 7: Taxonomy of capacity mechanisms

- In the volume-based schemes, the total amount of capacity required is determined in advance by policymakers or by a designated entity, i.e. a TSO. A market-based process is then used to establish the price to be paid. They are divided into market-wide mechanisms which provide support to all market participants that are required to meet the reliability standard and they, in principle, reward all capacity providers. On the other hand, targeted mechanisms reward only specific plants or technologies, i.e. they provide support only to the extra capacity required in addition to that provided by the market without the subsidies.

- In the price-based schemes, a price is set by policymakers at a level calculated to achieve investment in the amount of capacity required. The investors decide how much they are willing to invest for the given price.

The box below gives a description of the different capacity mechanisms[19] used in Europe (EP, 2017).

Box: Description of the different capacity mechanisms

Capacity obligation (CO): It is an obligation on suppliers or large consumers to contract with generators for a certain level of capacity. This capacity is determined by TSO/regulator and related to their self-assessed future (e.g. three years ahead) consumption or supply, plus a reserve margin. If not enough capacity is contracted, the supplier or consumer will pay a buy-out price/fine. The price for capacity is determined in a decentralised way, through the contracts; this model could also include a market of exchangeable obligations (secondary market).

Capacity auction (CA): The capacity volume to be auctioned is decided centrally (by the TSO or regulator) a few years in advance. The price is determined by auction and is paid to all resources (existing and new) clearing the auction. Capacity providers bid to receive a payment that reflects the cost of building new capacity. The new capacity participates in the energy-only market.

Reliability options (RO): RO is based on a forward auction (e.g. three years ahead). A capacity provider enters into an option contract with a counterparty (a TSO or a large consumer or supplier). The contract offers the counterparty the option to procure electricity at a predetermined strike price. The capacity provider must be available to the system operator for dispatch above the strike price.

Strategic reserve (SR): A central agency (transmission system operator or government agency) decides upon the amount of capacity needed to make up any shortfall in the market few years in advance. The level of payment of the contracted capacity (strategic reserve) is set through a competitive tendering process. The contracted power plants cannot participate in the electricity market and are only activated in case of extreme conditions.

Capacity Payments (CP): CP is a price-based mechanism. It pays a fixed amount (set by the regulator) for available capacity to all generators. The plants receiving capacity payments continue to participate in the energy-only market. The payment could be given also when the plant does not run, but certain availability criteria have to be met.

1.4.2. Current practices in adequacy assessments

Many MSs have not adequately established their appropriate level of SoS before applying a CM. Table 1, based on replies to the sector inquiry, shows the methods of assessing resource adequacy among MSs[20]. These methods vary widely, making a comparison between them difficult. This view is supported by EC (2016g) sector inquiry report which state that '*many resource adequacy assessments take a purely*

[19] For more details on the different uses of capacity mechanisms, please see ACER (2013), Hancher et al. (2015) and EC (2016g).

[20] There were eleven markets under this assessment: Belgium, Croatia, Denmark, France, Germany, Ireland, Italy, Poland, Portugal, Spain and Sweden (EC, 2016h).

national perspective and may substantially differ depending on the underlying assumptions made and the extent to which foreign capacities as well as demand side flexibility are taken into account.'

For adequacy assessment methods, there are deterministic approaches that compare the sum of all generation capacities with the peak demand for a single one-off moment. On the other hand, there are probabilistic models that consider a wide range of variables and assess their behaviour under different scenarios. The probabilistic approach is gradually replacing the deterministic one in some MSs as electricity systems are becoming more complex.

Table 1: Probabilistic Vs Deterministic approaches to adequacy assessments, source: (EC, 2016h)

Adequacy Assessments							
Country	Y/N	Who?	What?	Country	Y/N	Who?	What?
Belgium	Y	TSO	Probabilistic assessment based on LOLE	Italy	Y	TSO	EENS, LOLE, LOLP and Capacity Margin are calculated
Denmark	Y	TSO	EENS, LOLE and LOLP	Poland	Y	TSO	Capacity Margin
France	Y	TSO	LOLE	Portugal	Y	TSO + Gov	Load Supply Index (supply/demand per hour)
Germany	Y	TSOs + NRA	Calculation of EENS, LOLE, LOLP and Capacity Margin	Spain	Y	TSO	Capacity Margin
Ireland	Y	TSOs + NRA	Probabilistic assessment based primarily on LOLE	Sweden	Y	TSO	EENS, LOLE and LOLP are measured

The level of capacity needed to ensure SoS is expressed by the reliability standards. There are different metrics used across MSs to set reliability standards depending on the adopted adequacy assessment approach. Each one of them represents a way of measuring SoS based on consumers' willingness to pay.

Deterministic approaches assess the generation adequacy level via the capacity margin, which is the relation between peak demand and the reliably available supply, as a percentage[21]. This approach, however, does not give a reliable picture of the adequacy situation due to the increase in renewable energies in electricity systems. Probabilistic approaches consider variations in demand over the years. In the probabilistic approach, generation adequacy can be measured through the calculation of the loss of load probability (LOLP), '*which quantifies the probability of a given level of unmet demand over a certain period of time*.' In many cases LOLP is expressed as a loss of load expectation (LOLE) representing the number of hours per annum in which, over the long-term, supply is statistically expected not to meet demand (EC, 2016h). Both LOLP and LOLE, however, do not measure the shortfall in capacity that arises when there are disconnections, and neither LOLP/LOLE nor capacity margins can measure the unmet demand. This would require a measurement of expected energy not served (EENS), which represents the amount of electricity demand (in MWh) that is expected not to be met by generation for a given year. Note that to obtain the economic value of adequacy, it is necessary to quantify the Value of Lost Load (VOLL). As the name suggests, VOLL measures the damage suffered by consumers when the supply is curtailed[22]. It is crucial to implement a cost-effective adequacy level.

[21] For instance, a system with 11 GW of installed capacity and 10 GW of peak demand has a 10% capacity margin. In two of the eleven Member States only this relatively simple capacity margin is calculated.

[22] VOLL calculation is quite complex. It is normally based on surveys and includes several factors such as types of customers, duration of interruption, frequency and occurrence time.

Table 2, based on replies to the sector inquiry, shows the MSs practices in setting a reliability standard. There are some MSs that do not measure this level, and others that have not even defined a reliability standard when introducing capacity mechanism.

Table 2: MSs practice in setting a reliability standard, source: (EC, 2016h)

Legal Reliability Standard or Target?							
Country	Y/N	Which?	Link with VOLL?	Country	Y/N	Which?	Link with VOLL?
Belgium	Y	LOLE (average) < 3h LOLE (extreme 95%) < 20h	N	Italy	N	In the future: LOLP	Possible future regime: curve linked to VOLL of 3000,-
Denmark	N	Non-legislative target for TSO to ensure max. 5 min. of disconnections per consumer/year (LOLE < 0.25).	N	Poland	Y	Reserve capacity levels	N
France	Y	3 hrs LOLE	Yes, 20.000,-	Portugal	Y	Reserve Margin and LOLE 8hrs	N
Germany	N	n.a.	N	Spain	Y	Capacity margin of 10%	N
Ireland	Y	LOLE < 8h	Y, 10.898,-	Sweden	N	Reserves to meet N-1 is target for TSO	N

1.4.3. Limiting the introduction of capacity mechanisms

Considering the views of EC (2016g) sector inquiry report, the CEP E-Regulation includes a proposal to limit the implementation of capacity mechanisms. A European resource adequacy assessment is proposed as a binding measure, against reliability standards, to justify the use of a CM. Also, the Commission promotes, in the proposal, the use of market reforms, in case of generation adequacy concerns, before the implementation of capacity mechanisms.

A European resource adequacy assessment

According to the E-Regulation, the implementation of capacity mechanism should be justified by a European adequacy assessment. **Article 18** of the E-Regulation states that MS shall monitor resource adequacy within their territory based on this assessment. If the European assessment has not identified a resource adequacy concern, MSs are not allowed to apply any capacity mechanisms.

The European resource adequacy assessment shall cover the '*overall adequacy of the electricity system to supply current and projected demands for electricity for a ten-year period from the date of that assessment, in a yearly resolution*', (**article 19** of the E-Regulation). It should be developed every year by ENTSO-E. The necessary data for its development shall be provided by TSOs to ENTSO-E. The assessment should be based, according to **article 19(4)**, on harmonised methodological standards ensuring, inter alia, that it is carried out on bidding zone level and is based on appropriate scenarios of projected demand and supply.

An additional national assessment proposed by the Council

The Council proposal for the E-Regulation added, in **article 18 & 19a**, a national resource adequacy assessment to be performed by MSs next to the European assessment. It states, in **article 18(1)** that '*Member States shall monitor resource adequacy within their territory based on the European resource adequacy assessment pursuant to Article 19 and may perform in addition national resource adequacy assessment pursuant to Article 19a.*' The national assessment shall use the *'same modelling tools as used*

by the ENTSO for Electricity for the European resource adequacy assessment and the same input data and other data to reflect national scenarios, sensitivities and assumptions.'

When there is a divergence[23] between the national and the European resource adequacy assessment with regard to the same bidding zone, **article 18 (3a)** states that '*the body governing the national resource adequacy assessment shall consult the ENTSO for Electricity and request for an opinion of the Agency.*' A report reasoning on the occurring divergence shall be submitted by the body governing the national resource adequacy assessment to ENTSO-E and ACER, within one month from the publication of the national assessment. The concerned Member State shall take due notice of the ENTSO-E assessment on these divergences and ACER opinion.

Reliability standards

The E-Regulation also proposes the development of EU-wide methodologies for calculating coherent reliability standards, representing the basis for capacity mechanism implementation decisions. **Article 20** of the E-Regulation states that '*when applying capacity mechanisms Member States shall have a reliability standard in place indicating their desired level of security of supply in a transparent manner*'. Reliability standards shall be set by the national regulatory authority based on the methodology pursuant to article 19(5). This article states that *'by [OP: six months after entry into force of this Regulation], the ENTSO for Electricity shall submit to the Agency a draft methodology for calculating:*
(a) the value of lost load;
(b) the "cost of new entry" for generation, or demand response; and
(c) the reliability standard expressed as "expected energy not served" and the "loss of load expectation".'

Article 20(3) adds that '*reliability standard shall be calculated using the value of lost load and the cost of new entry over a given timeframe.*' Also, '*the parameters determining the amount of capacity procured in the capacity mechanism shall be approved by the national regulatory authority*' (**article 20(4)**).

Market reforms before implementing capacity mechanisms

To address the regulatory distortions at the level of MS, **article 18(3)** of the E-Regulation states that MSs shall publish a timeline for adopting measures to eliminate these distortions. The same article adds that *'when addressing resource adequacy concerns Member States shall in particular consider removing regulatory distortions, enabling scarcity pricing, developing interconnection, energy storage, demand side measures and energy efficiency.'*

According to EC (2016g) sector inquiry, when the adequacy assessment has identified resource adequacy concerns, Member States should assess the regulatory distortions causing these concerns before introducing capacity mechanisms. They are required to put in place measures to address these distortions, such as market reforms, as shown in Figure 8. The sector inquiry report highlighted four market reforms that can address the security of supply concern and may even remove the need for capacity mechanisms. Member States that have introduced capacity mechanisms should also make appropriate efforts to integrate market reforms as they are not substitutable by capacity mechanisms. The market reforms are:

- Removing excessively low price caps to allow price spikes, reflecting consumers' willingness to pay and situations of scarcity. This will provide signals for new investment in the adequate capacity needed ensuring reliability and flexibility or for keeping existing capacity operational.

[23] A divergence means that the national resource adequacy assessment identifies a concern with regards to a bidding zone and the European resource adequacy assessment has not identified a concern.

- Increasing demand response participation is another market reform for addressing the adequacy of supply. Efficient real-time responsiveness of demand to prices can flatten demand peaks and substitutes additional generation needs.

- A de-lineation of bidding zones can form appropriate local prices incentivising local generation capacity investments as well as transmission network expansion.

- A balancing market reform to increase competition as well as to standardise balancing products and procurement rules from neighbouring countries.

Figure 8 explains the process the Commission has proposed to address adequacy concerns in MSs.

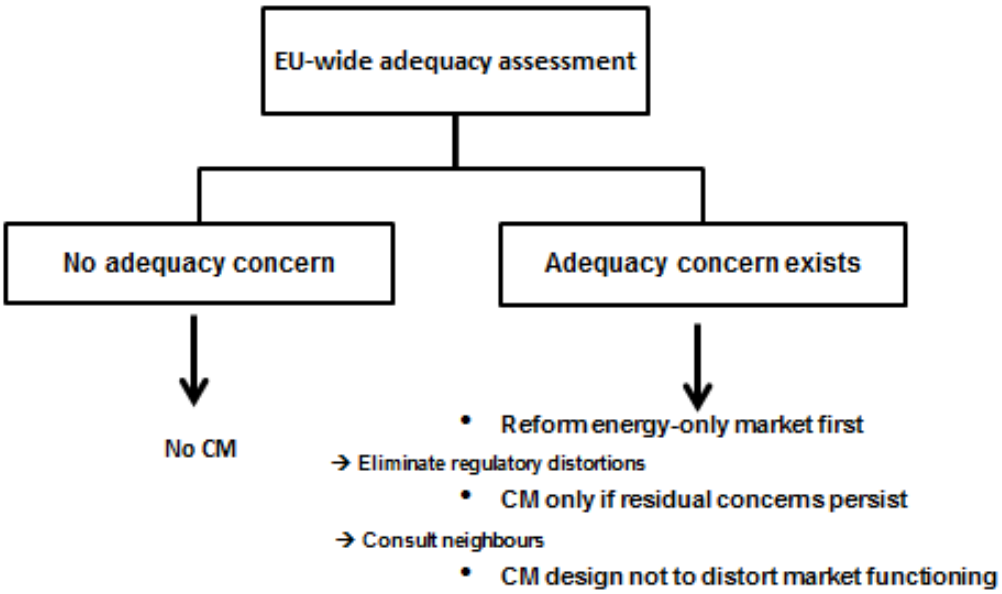

Figure 8: New framework for Capacity Mechanisms, based on (EC, 2017a)

1.4.4. Limiting discrimination: existing versus new solutions in capacity mechanisms

Demand response providers still face important barriers for participating in capacity mechanisms across Europe (EC, 2016g). The report of the sector inquiry on capacity mechanisms concluded that capacity mechanisms should be open to all types of potential capacity providers, except for the mechanisms specific for demand response[24], and strategic reserves[25].

The Commission proposal for the E-Directive and E-Regulation does not contain precise rules for participating in capacity mechanisms, while the Council position, brings more clarification, inter alia, for the participation of storage, energy efficiency and demand response. **Article 23(3c)** states that '*capacity mechanisms shall*:
(a) not create unnecessary market distortions and not limit cross zonal trade;
(b) be market-based;

[24] Given their particular ability to address market failures.
[25] According to EC, (2016g) '*market distortions can be kept at a minimum if the reserve is kept as small as possible'.* Strategic reserve is designed not to promote new generation capacity.

(C) be open to participation of all resources that are capable of providing the required technical performance in a technology neutral manner and through fair and transparent rules, including but not limited to participation of storage, energy efficiency and demand response;
(d) be temporary, but are permitted, in accordance with state aid rules, as long as the relevant resource adequacy assessment identifies a resource adequacy concern;
(e) not go beyond what is necessary to address the resource adequacy concern.'

1.4.5. Limiting the impacts on climate goals

According to **article 23(4),** the Commission proposes that a generation capacity emitting more than 550gr CO2/kWh, and for which the final investment decision has been made be made after the entry into force of the Regulation, shall not be eligible to participate in a CM. It adds, for existing capacities emitting 550 gr CO2/kWh or more, that they *'shall not be committed in capacity mechanisms 5 years after the entry into force of this Regulation.'* Such proposal will limit the most climate-damaging capacity payments.

The Council position provides an extra emission threshold, expressed in kg CO2 on average per year per installed kW, and indicates a fixed deadline for the payments. This means that the plants have to commit to one of the requirements. **Article 23(4)** states that new plants will only be eligible to receive payments in a capacity market from 31 December 2025 if

- Their emissions are below 550 gr CO2/KWh, or
- Their emissions are less than 700 kg CO2 on average per year per installed KW.

For existing plants, and with the same threshold of emission, the Council proposes the deadline to '*be 31 December 2030, except for contracts with a remaining duration of not more than 5 years concluded before 31 December 2030. Between 31 December 2025 and 31 December 2030, the capacity receiving remuneration for this participation should be reduced by 5% per year.'*

This emission limitation will impact the participation of coal-fired power plants, as well as gas peaking plants, in CMs as they emit, in most cases, more than the stated threshold of 550 gr CO2/KWh (IEA, 2013). The Council's additional limit, based on yearly emissions, may enable highly emitting plants to continue to receive payments from a CM as long as they are dispatched occasionally (a few hours per year).

1.4.6. Limiting cross-border concerns

Regarding the cross border effects of capacity mechanisms, the findings of the EC, (2016g) report highlight the necessity of taking into account cross-border participation in CMs to ensure efficient signals and avoid internal market failure such as distorting cross-border trade, leading to suboptimal investments and creating shifts of generation capacity towards the country with a capacity mechanism.

Article 21 of the Commission E-Regulation states in point 1 that '*mechanisms other than strategic reserves*[26] *shall be open to direct participation of capacity providers located in another Member State (…).*' Indeed, CMs must be open to explicit cross-border participation to limit distortions to cross-border trade and competition as well as providing incentives for interconnection investment to ensure the EU security of electricity supply at least costs. **Point 12** adds that '*national regulatory authorities shall ensure that cross-border participation in capacity mechanisms is organised in an effective and non-discriminatory manner. (…).'*

[26] The Council position adds that where technically feasible, strategic reserves, shall be open to direct cross-border participation.

Regional Operational Centres (ROCs)[27], national TSOs, the ENTSO for electricity and NRAs via ACER will be involved in the development of technical parameters for the participation of foreign capacities as well as the operational rules for their participation. For instance, according to **article 21(6)** of the E-Regulation, the maximum entry capacity available for the participation of foreign capacity shall be annually calculated by ROCs, established under **article 32** of the Regulation. The calculation, required for each bidding zone border, should take into account '*the expected availability of interconnection and the likely concurrence of system stress between the system where the mechanism is applied and the system in which the foreign capacity is located.*'

The Council position assigns the calculation of the capacity available for the participation of foreign capacity to TSOs. **Article 21(6) states** that *'Transmission System Operators shall annually calculate the maximum entry capacity available for the participation of foreign capacity based on the methodology referred in point (a) of paragraph 10 and taking into account the recommended values calculated by the Regional Security Coordinators[28] pursuant to Article 34(q), 38 and 39, the level of physical interconnection between Member States, expected availability of interconnection and the likely concurrence of system stress between the system where the mechanism is applied and the system in which the foreign capacity is located. A calculation is required for each bidding zone border.*'

Finally, on *'design principles for capacity mechanisms'*, **article 23 (2)**, aiming to reduce cross-border effects, states that when a MS plans to introduce a CM, it shall consult with the connected neighbouring states. It adds in point (3) that *'capacity mechanisms shall not create unnecessary market distortions and not limit cross-border trade. (…).*'

Commission proposal

-Proposal for a European resource adequacy assessment.

-Proposal for common methodologies for reliability standards.

-Limitation of the most damaging capacity payments, by introducing emission threshold.

-Existing Generation plants not respecting emission requirements cannot participate in CMs 5 years after entry into force of the Regulation.

- CMs (except SR) shall be open to direct cross-border participation of capacity providers.

-The maximum entry capacity available for the participation of foreign capacity shall be annually calculated by Regional Operational Centres.

Council Position

-A national resource adequacy assessment, may be performed by MS in addition to the European assessment.

-An extra emission threshold expressed in Kg CO2 on average per year per installed KW

-The deadline for future payments of under a capacity mechanism is 31 December 2025.

-TSOs shall annually calculate this maximum entry capacity available for cross-border participation.

[27] The creation of new Regional Operational Centres (ROCs), that will build on the framework established by the Regional Security Coordinators in the CEP, aims to ensure a more co-ordinated regional approach to transmission system operations. For more information, please see 1.5.2.

[28] The Council position removed the introduction of ROCs and kept the Regional Security Coordinators, also discussed in 1.5.2.

1.4.7. Stakeholders' positions

The EURELECTRIC (2017a) position on the E-Regulation disagrees with the binding aspects of the European resource adequacy assessment. It states that *'a move towards a European/regional approach to security of supply is welcome as it will allow developing a common forecast of reliable and firm capacity provided by all assets (generation, demand response and storage) as well as potential cross-border contribution. The European mid-term adequacy assessment performed by ENTSO-E shall be factored in but shall however not be considered as a binding factor for MS to introduce security of supply measures (e.g. capacity mechanisms). On the contrary, several adequacy assessments with different geographical scope (European, regional, national) and granularity in the underlying assumptions should be taken into account by MS.*'

Regarding the provisions on reliability standards, EURELECTRIC added that '*all MS should define and publicly disclose their desired level of SoS target based on harmonised metrics – and not only the MS that apply for CM. While the choice of adequacy metrics should be harmonised, each country should be free to set its desired level of adequacy. We would also welcome more clarity on how the provisions of the electricity regulation on adequacy assessment and reliability standards on one side, and the provisions of the Risk Preparedness Regulation on the other side are interlinked.*'

EURELECTRIC also disagrees with the proposed emission limitation in capacity mechanisms and states that '*the most cost-efficient way to deliver this transition*[29] *and the needed investments is through a market-based approach. Command and control tools, such as an emission performance standard, should be avoided.*' EURELECTRIC partially agrees with the provisions on cross-border participation in capacity mechanisms and states that '*cross-border participation should apply to all types of mechanisms aimed at ensuring security of supply, including strategic reserves.*'

CEER '*broadly welcomes the system adequacy and CRM-related proposals in the Clean Energy package.*' It *stresses the benefits of an EU-wide methodology, implemented at regional level, with a strong coordinating role for ENTSO-E in order to ensure consistency.* Also, CEER believes that *'at least in the short term, this assessment may be complemented by national adequacy studies'* (CEER, 2017d). On the compliance of existing mechanisms with the future regulatory framework, CEER states that the Commission proposal '*does not provide a clear framework to ensure compliance of existing mechanisms with the future regulatory framework'.* It adds that the process needs to consider the 'State Aid inquiry framework' and decisions taken within that.

According to ENTSO-E a '*European Resource Adequacy is welcome, but it needs to respect subsidiarity*'. ENTSO-E supports the Commission proposal for harmonising resource adequacy methodologies across Europe (ENTSO-E, 2017b). It adds that '*whilst resource adequacy assessments need one common methodological basis, ENTSO-E recommends not to replace national assessments by the MAF, because national assessments will continue having better granularity. The European and regional assessments should complement national analyses and challenge them. Any national disagreement or divergence has to be justified.*' On cross-border participation, ENTSO-E adds that '*the decision on the amount of cross-border capacity for the participation of foreign capacity should be left to TSOs rather than assigned to Regional Operation Centres.*'

[29] Refers to low-carbon transition to achieve a carbon-neutral electricity supply by 2050.

Several other EU organisations among them SEDC[30], Solar Power Europe, and Wind Europe agree, in SEDC et al., (2017), with the CEP proposals for implementing capacity mechanisms only as a last resort, when proven strictly necessary by a European adequacy assessment. They also support the proposal for ensuring all resources participation in capacity mechanisms and the regular review of these mechanisms.

BEUC, (2017a) policy paper on 'Energy Markets Of The Future' states that *'security of supply should be ensured at the lowest costs for consumers and reasons to introduce capacity mechanisms should be properly scrutinised. Costs of capacity mechanisms and their impact on consumers' bills should be carefully assessed. If they are deemed necessary, capacity mechanisms should be non-discriminatory and should include not only generation capacities but all kinds of flexibility mechanisms such as interconnection capacities, demand-side response, storage and energy efficiency. Capacity mechanisms should only be a temporary measure of last resort, limited in time and accompanied by a clear exit strategy.'* It adds in the letter addressed to the Permanent Representation of the EU (BEUC, 2017b), *'in view of the Council discussions on the revision of the Electricity Directive and the Electricity Regulation and the latest texts prepared by the Estonian Presidency'* that *'at the same time, the need for capacity mechanisms should be coordinated at the EU level and based on an accurate regional resource adequacy assessment. Therefore, current discussion on the national resource adequacy assessments and its role risks undermining the importance of the European adequacy assessment.'*

Wind Europe supports, in its response to EC proposals (Wind Europe, 2017), '*an Emission Performance Standard (EPS) of 550 gr CO2/kWh in the frame of a CRM*.' It states *that* '*whilst a robust Emission Trading System (ETS) might encourage a switch of fuel use, an EPS would provide an ultimate backstop limit to investments in polluting technologies that are built now on the promise of emission reduction technologies which may never be commercially viable.'*

The position paper on the CEP, REScoop, (2017b) states that *'the introduction of capacity mechanisms by Member States should be tightly regulated and overseen at EU level to ensure they do not raise costs for consumers, discriminate against renewables, discourage flexible consumption, or disincentivise energy efficiency.'* It adds in REScoop, (2017c) that the *'newly proposed EU rules on capacity mechanisms could allow fossil fuel generators to hoodwink consumers out of their money for at least another decade. With a market that is already saturated with energy production, this will lock in dirty energy and continue to distort markets, preventing signals being sent to businesses and consumers that they should pursue energy savings and become active.'*

The CO2 cap proposal was also backed by 22 signatories from energy majors, renewable energy groups and utilities including Eni, Shell, Siemens, Iberdrola and Statoil (ENI et al., 2017). They stated that *'electricity bills should not support the operation of the most polluting power plants, given that cleaner supply options are available. This would clearly contradict EU climate and energy policy objectives and would go against the best interest of European consumers.'*

1.5. Interlinkage with Network codes

In what follows, we first discuss the interlinkages between topics that are covered in the first generation of network codes, which are addressed in the CEP proposals, i.e. balancing responsibilities, the regional governance of system operation, bidding zones, and the calculation of interconnection capacities. Then,

[30] Smart Energy Demand Coalition, the European business association focusing on digital, decentralised energy solutions. It changed its name to smarten in December 2017.

we also introduce the scope of the second generation of network codes that has been foreseen in the CEP proposals.

The first generation of network codes includes:

- The market codes:
  - Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a **guideline on capacity allocation and congestion management (CACM)**
  - Commission Regulation (EU) 2016/1719 26 September 2016 establishing a **guideline on forward capacity allocation (FCA)**
  - Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a **guideline on electricity balancing (EBGL)**
- The connection codes:
  - Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a **network code on requirements for grid connection of generators (RfG NC)**
  - Commission Regulation (EU) 2016/1388 of 17 August 2016 establishing **a network code on demand connection (DCC)**
  - Commission Regulation (EU) 2016/1447 of 26 August 2016 establishing **a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules (HVDC NC)**
- The operation codes:
  - Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a **guideline on electricity transmission system operation (SOGL)**
  - Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a **network code on electricity emergency and restoration (ER)**

For a more complete introduction to the first generation of network codes, see Meeus and Schittekatte (2018).

1.5.1. Balancing responsibilities

Balancing in network codes

The Balancing Guideline (EBGL) has been adopted as Electricity Regulation and entered into force in 18/12/2017. Balancing responsibilities are not explicitly mentioned in the electricity network codes. However, the EBGL **article 18(1)** states that no later than six months after its entry into force and for all scheduling areas of a MS, a proposal regarding the terms and conditions for BSPs and BRPs should be submitted by the TSOs of this MS. This proposal shall contain the definition of balance responsibility for each connection (in a way that avoids any gaps or overlaps in the balance responsibility of different market participants providing services to that connection). It is also important to add that **article 18(4d**) of the EBGL states that it is required that each balancing energy bid from a BSP is assigned to one or more BRPs to enable the calculation of an imbalance adjustment.

CEP proposals on balancing responsibilities

Article 2(2) of the E-Regulation defines a BRP as *'a market participant or its chosen representative responsible for its imbalances in the electricity market'*. The balance responsibility is passed on to the) BRP before the actual delivery. A BRP can represent one or more electricity generators, suppliers and/or large consumers.

On Balancing responsibility, **article 4** of the CEP E-Regulation indicates in the first paragraph that *'all market participants shall aim for system balance and shall be financially responsible for imbalances they cause in the system. They shall either be balance responsible parties or delegate their responsibility to a balance responsible party of their choice.'*

Derogations from balance responsibilities

The derogation from balance responsibility is possible for projects with the following characteristics, **article 4(2)** of the regulation:

'(a) demonstration projects[31];
(b) generating installations using renewable energy sources or high-efficiency cogeneration with an installed electricity capacity of less than 500 kW[32];
(c) installations benefitting from support approved by the Commission under Union State aid rules pursuant to Articles 107 to 109 TFEU[33], and commissioned prior to [OP: entry into force]. Member States may, subject to Union state aid rules, incentivise market participants which are fully or partly exempted from balancing responsibility to accept full balancing responsibility against appropriate compensation.'

From 1 January 2026, point (b) of paragraph 2 shall apply only '*to generating installations using renewable energy sources or high-efficiency cogeneration with an installed electricity capacity of less than 250 kW[34]'* (**article 4(3)**).

The Council, in its position, adds that when a MS chooses to provide a derogation according to **article 4 (2)**, it needs to ensure that the financial responsibilities of imbalances are fulfilled by another party. It also reduces the capacity threshold from 500 kW to 250 KW in the point (2b) regarding the derogation capacity of the generating installations and from 250 kW to 150 kW for the point (3), for the capacity limit beyond 2026, as explained in the footnotes.

1.5.2. System operation regional governance

RSCs in network codes

The system operation guideline (SOGL) introduced the establishment of Regional Security Coordinators (RSCs). RSCs are owned or controlled by TSOs and perform tasks related to TSO regional coordination. The SOGL states that each control area shall be covered by at least one RSC. A control area is defined as a coherent part of the interconnected system, operated by a single system operator. RSCs combine the tasks outlined in the SOGL and the capacity calculation stated in the CACM. Regional cooperation in SO allows TSOs to have a regional vision on threats to SO coming from regional power flows. The TSOs remain in charge of security of supply and consequently of the final operational decision-making. RSCs are intended to provide five core services which are presented in Figure 9.

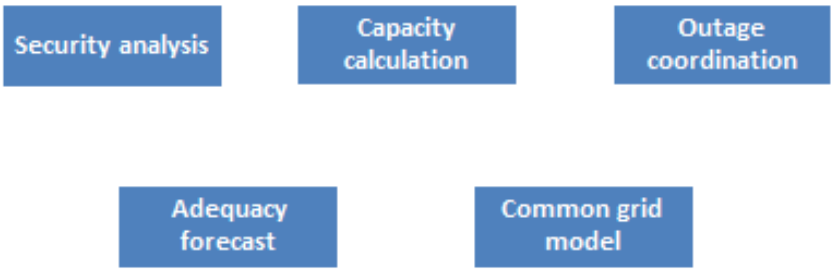

Figure 9: Services provided by RSCs to TSOs, source: (ENTSO-E, 2016)

[31] A *'demonstration project' means a project demonstrating a technology as a first of its kind in the Union and representing a significant innovation that goes well beyond the state of the art* (**article2 (2x)** of the E-Regulation).
[32] Set to 250 kW in the council proposal.
[33] Treaty on the Functioning of the European Union.
[34] Set to 150 kW in the council proposal.

CEP proposal for the implementation of ROCs

The proposal for the E-Regulation has introduced the implementation of ROCs. ENTSO-E should develop, in consultation with ACER for the guidelines, the execution framework of ROCs tasks and ensure overall alignment between ROCs and national TSOs. The ROCs implementation aims for a centralisation of SO in larger geographic areas prior to real-time while keeping a national TSO focus for the real-time operations (EC, 2015b). CEP proposals on ROCs functions complements the RSCIs[35] voluntary TSOs approach and the RSCs Network Codes ones as shown in Figure 10. The proposal excludes the real-time operation of the system which is left for national TSOs. The full list of ROCs functions is available in **article 34** and in ANNEX I of the E-Regulation.

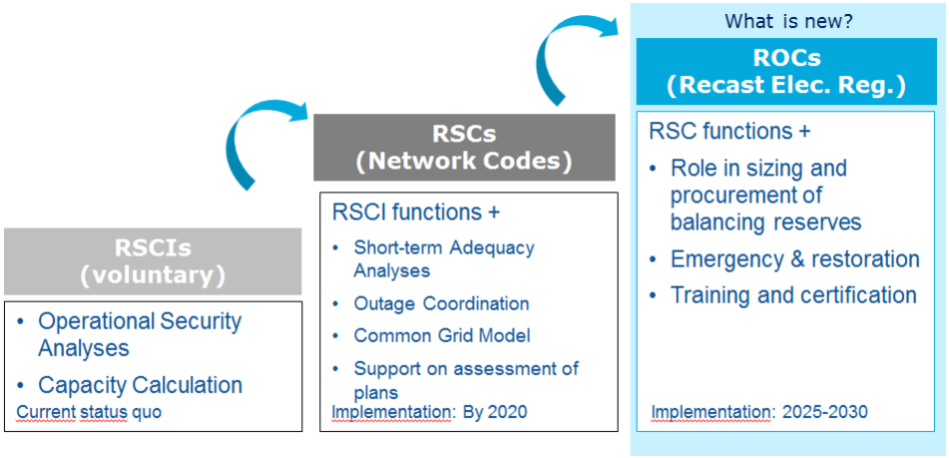

Figure 10 Sequence of ROCs functions, source: (EC, 2017b)

The removal of ROCs in the Council proposal

The Council position for the E-Regulation removes the naming of the ROCs and proposes to keep the RSCs. **Article 32** of the E-Regulation changes the requirement to establish ROCs within 12 months as stated in the Commission proposal, to the submission of a proposal by TSOs to NRAs for the enhancement of RSCs. They shall take up their new tasks by 1 January 2025. The tasks of the RSCs can be found in **article 34** of the Council position for the E-Regulation. For instance, compared to the Commission proposal, the point (d) of **article 34(1)** was changed from '*consistency assessment of transmission system operators' defence plans and restoration plans'* to *'support the consistency assessment of transmission system operators' defence plans and restoration plans.'* Also, the system adequacy forecasts were limited from week ahead to day ahead instead of intraday. *The 'coordination and optimisation of regional restoration'* in point (e) was changed into *'support the coordination and optimisation of regional restoration as requested by transmission system operators.'*

Moreover, the Council proposed to give the right to introduce additional RSCs functions to NRAs instead of the Commission.

[35] The Regional Security Coordination Initiatives (RSCIs) were launched voluntarily by TSOs since 2009. They aim to improve TSOs cooperation by covering a greater part of the European interconnected networks. CORESO and TSC are the pioneers in this respect in continental Europe (ENTSO-E, 2015).

1.5.3. Bidding zones and capacity calculation between zones

Bidding zones in Europe

Europe is divided into different bidding zones as shown in Figure 11. Their delimitations are defined mainly by national borders (France or Spain). Other bidding zones can be smaller within the same countries (Italy or Sweden) or grouping more than one country (Austria, Germany[36], and Luxembourg).

Within a bidding zone, electricity wholesale prices are the same. Market participants who wish to trade electricity in another bidding zone have to consider bidding zone interconnection constraints. As long as electricity can flow freely through the interconnector (no congestion), there will be a single price across the markets. The markets are then called fully coupled. However, when the cross-zonal interconnector is congested between bidding zones, prices can diverge between those zones. The markets of the two bidding zones are in this case split. The price differential between the two interconnected bidding zones in case of congestion is called the congestion rent, and this is a revenue for the TSOs owning the interconnection.[37]

Figure 11: Bidding zones in Europe, source: (Ofgem, 2014)

A review process to be undertaken by TSOs has been formalised in legislation as part of the CACM Guideline on the existing and possible alternative configurations. In November 2017, ENTSO-E developed the first edition of the bidding zone review (ENTSO-E, 2017c). The review was based on three categories of criteria: network security, market efficiency and stability and robustness of bidding zones, as prescribed in CACM regulation. However, the evaluation presented in this report did not provide sufficient evidence

[36] In October 2018, the Germany and Austria common bidding zone will be separated into two bidding zones, according to the joint statement published by the German and Austrian authorities. Italy is also undergoing a bidding zone review. A decision by Italian Regulator is due by the end of June 2018 (ARERA, 2018).

[37] For example, imagine, that during a certain hour the interconnectors between two bidding zones are congested. The price in one bidding zone equals 30 €/MWh and 40 €/MWh in the other. The interconnection capacity between the two bidding zones is 500 MW. This means that the congestion rent for this hour is 5,000 €.

for maintaining or for a modification of the current bidding zone configuration. The participating TSOs recommended to maintain the current bidding zone delimitation. This was actually quite a lengthy process. Early studies began in 2012, where ACER invited ENTSO-E to initiate a pilot project on bidding zone configuration assessment and review. ENTSO-E published a technical report in January 2014, followed by the ACER Market Report in March 2014. Based on those early findings, in the spring of 2015 ENTSO-E began its investigation on the technical and economic efficiency of the current European bidding zones, including the possibility of splitting the German-Austrian bidding zone (Rossetto, 2017).

CEP proposals on bidding zones

The European Commission and Council have different positions in their respective proposals for the E-Regulation. Indeed, the Commission proposed in **article 13** that more powers would be given to EU institutions to decide on price zone configuration following the bidding zone review. ACER shall approve and may request amendments to the methodology and assumptions of the review methodology instead of NRAs. Moreover, according to **article 13(4)** of the E-Regulation, TSOs '*participating in the bidding zone review shall submit a proposal to the Commission regarding whether to amend or maintain the bidding zone configuration.'* **Article 13(4)** adds that *'based on that proposal, the Commission shall adopt a decision whether to amend or maintain the bidding zone configuration, [no later than 6 months after entry into force of this Regulation, specific date to be inserted by OP] or by six months after the conclusion of the bidding zone configuration.'*

The Council proposal for the E-Regulation foresees a more national decision-making power for bidding zones. ACER is tasked to decide on the methodology of the review if the relevant NRAs do not come to a unanimous decision within three months, (**article 13(3)** of the Council position). The bidding zone review shall be submitted in a joint proposal by the participating TSOs to the relevant Member States or designated NRAs. Then, according to **article 13(4a)**, '*where structural congestion has been identified, by one or more transmission system operator, or where the bidding zone review recommends a bidding zone change of one or more Member States, the concerned Member States in cooperation with their transmission system operators have the possibility, within 6 months, to define action plans, national or multinational.'* This action plan contains measures[38] to reduce the structural congestions identified '*within the period of [no later than [4] years after entry into force of this Regulation, specific date to be inserted by OJ[39]].'*

At the end of the action plan implementation, MS should decide whether to opt for a split of bidding zones or for remedial actions (for which they will bear the costs) to solve remaining congestions, according to **article 13(4c)**. If MSs fail to find a consensus, the EC shall be informed and it may make further proposals for a balanced solution and as a measure of last resort, the *'Commission shall adopt a decision whether to amend or maintain the bidding zone configuration in and between those Member States that are subject to the decision',*(**article 13 (4e)**).

CEP proposal for interconnector capacity calculation

The rules on capacity allocation as stated in the Commission's proposal for E-Regulation require the allocation of maximum capacity to market participants on the bidding zone border. According to **article 14(3)***, 'the maximum capacity of the interconnections and/or the transmission networks affecting cross-border flows shall be made available to market participants, complying with safety standards of secure*

[38] For example: the acceleration of network development, more efficient use of existing infrastructure, a review of current system operation practices, increased coordination of system operation with relevant neighboring transmission system operators.

[39] Official Journal of the European Union.

network operation.' It adds that '*countertrading and redispatch, including cross-border redispatch, shall be used to maximise available capacities, unless it is demonstrated that it is not beneficial to economic efficiency at Union level.'*

TSOs, according to **article 14(7)**, shall not limit the volume of interconnection capacity to be made available to market participants in order to solve congestion inside their control area or as a means of managing flows on a border between two control areas observed even without any transaction[40]. **Article 14(10)** adds that *'financial penalties for failure to honour obligations associated with the allocation of capacity shall be attributed to those who are responsible for such a failure*, according to the same article.'

In the Council text, a benchmark level of the maximum capacity established on the border is established and must be respected, as stated in **recital (12)** and **(14a)**. MSs that fall below the benchmark level will need to start undertaking remedial actions or reconfiguring the bidding zones.

The **minimum level of capacity** that should be used in capacity calculation has been set depending on the capacity calculation method as stated in article 14(7) of the Council position;

*(i) 'For borders using a coordinated net transmission capacity approach, **75% of the net transfer capacity** pursuant to capacity allocation and congestion management guideline adopted on the basis of Article 18 of the Regulation 714/2009;*
(ii) For borders using a flow-based approach[41]*, **75% of the remaining available margin** on internal and cross border critical network elements made available for cross border flows pursuant to capacity allocation and congestion management guideline adopted on the basis of Article 18 of the Regulation 714/2009**.'***

Derogations can be given to TSOs for a limited period, according to article 14 (7a) & (7b).

Note that the Council-proposed threshold differentiates between the capacity calculation methods; net transfer capacity (NTC) and flow-based capacity calculation (FBCC) and does not involve a direct link to thermal capacity. To find out more about the relationship between the thermal capacity, NTC and FBCC, please see (ACER and CEER, 2017a)

1.5.4. Scope of the second generation of NC

Electricity Regulation 714/2009 identified twelve focus areas for network codes. From these twelve areas, only half are covered by the first generation of network codes that has been developed since the introduction of the third package. For the following six areas, network codes have not yet been developed.

-third-party access rules;
-data exchange and settlement rule;
-interoperability rules;
-transparency rules;
-rules regarding harmonised transmission tariff structures incl. locational signals and inter-transmission system operator compensation rules;
-energy efficiency regarding electricity networks;

[40] That is, it flows over control areas caused by having the origin and destination within one control area.
[41] The CACM stipulates in recital (7) that the *flow-based method should be used as a primary approach for day-ahead and intraday capacity calculation where cross-zonal capacity between bidding zones is highly interdependent and may only be introduced after market participants have been consulted and given sufficient preparation time to allow for a smooth transition.*

The Commission proposal for E-Regulation has added four additional focus areas to be covered by NC in **article 55.** They concern:
-rules for non-discriminatory, transparent provision of non-frequency ancillary services, including steady state voltage control, inertia, fast reactive current injection, black-start capability;
-demand response, including aggregation[42], energy storage, and demand curtailment rules;
-cyber security rules; and
-rules concerning regional operational centres.

Moreover, the E-Regulation proposal adds the harmonisation of distribution tariffs next to the transmission ones, as discussed in 1.3.2.

The Council position has brought some changes in the proposed focus areas. The addition of the harmonisation of distribution tariffs has been removed in the Council position. Moreover, two new proposed areas were removed: 'demand response, including aggregation, energy storage, and demand curtailment rules' and 'rules concerning regional operational centres'.

Commission proposal
-All market participants shall aim for system balance and shall be financially responsible for imbalances they cause in the system. Derogations are possible for projects with certain characteristics.

-ROCs are established for a centralisation of the System Operations through regional cooperation. They gradually build on RSCs.

-ROCs complement TSOs roles to ensure secure and reliable operation of the interconnected transmission system.

- More powers to be given to EU institutions (Commission and ACER) to decide on price zone configuration following the review.

- Addition of four focus areas to be covered by NC.

Council position

- A lower threshold for derogations from balancing responsibilities.

- Removing the proposal for the introduction of ROCs and keeping the RSCs.

- A more national decision power for bidding zones.

-The addition of the harmonisation of distribution tariffs, in the NC focus areas, has been removed as well as two new proposed areas.

[42] An aggregator, according to article 2(14) of the E-Directive is *'a market participant that combines multiple customer loads or generated electricity for sale, for purchase or auction in any organised energy market.'*

2. Adapting to the decentralisation of the power system

In this section, we set the scene by introducing the DSO landscape in Europe. We then focus on key measures included in the CEP proposals to adapt the DSOs' roles and responsibilities to the ongoing decentralisation of the power system. This includes increased expectations in their traditional roles of network planning and network management. It also covers the limitations that have been introduced for DSO ownership of EV charging infrastructures, storage facilities, and for data management by DSOs. To conclude, we will discuss the establishment of an EU DSO entity, and the interlinkages between DSO topics and network codes.

2.1. Setting the scene: The DSO landscape

There are around 2,600 DSOs (Figure 12) that own and operate around 10 million km of power lines in Europe. They employ around 240,000 people and service 260 million customers. About 90 % of these customers are residential and small businesses (Meeus and Glachant, 2018).

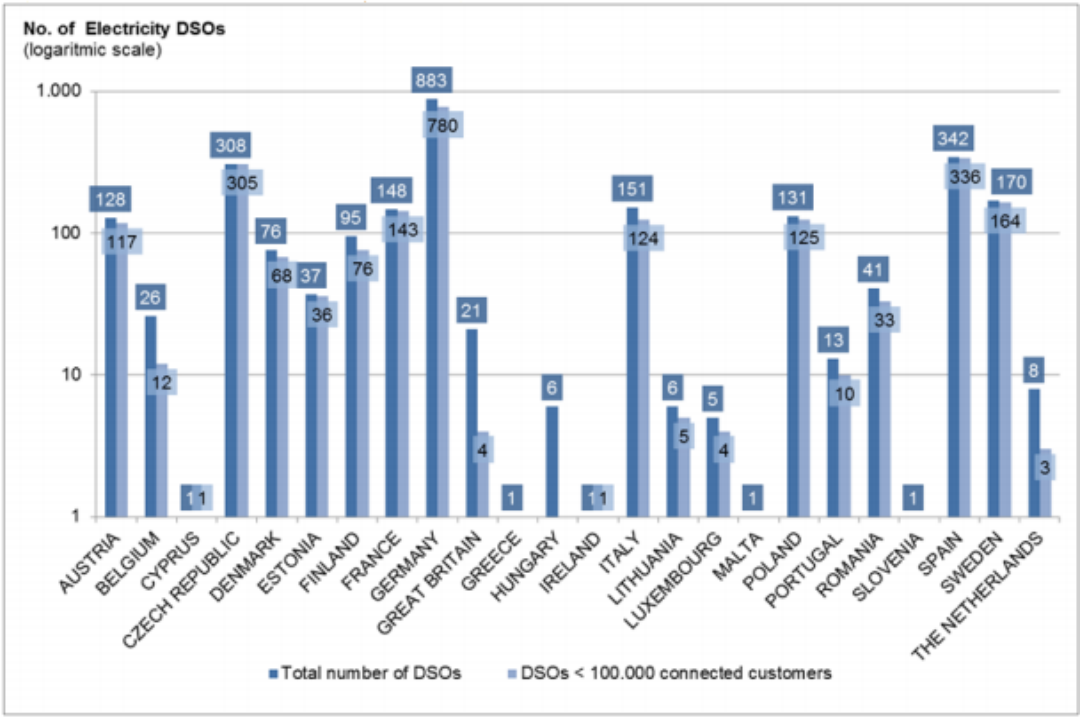

Figure 12: Number of electricity DSOs per Member State, source: (EC, 2016e)

Despite the large number of DSOs in Europe, the distribution industry sector is rather concentrated. In countries such as Ireland, Slovenia and Lithuania, there is only one DSO. In France (148 DSOs) and Italy (151 DSOs), there is one dominant DSO and many small players sharing small market shares. In other MSs we find a significantly lower concentration. For instance, in Austria (128 DSOs), Belgium (26 DSOs), Sweden (170 DSOs), and Germany (883 DSOs), the three largest DSOs represent less than half of the industry (Meeus and Glachant, 2018). Today, according to data from EC, (2016e), only 13% of the European DSOs have more than 100,000 connected customers.

DSOs are represented in five different industry associations based in Brussels: EURELECTRIC, GEODE, CEDEC, EDSO for Smart Grids and REScoop. The larger DSOs in Europe work together within the association

EDSO for smart grids. This association has about 30 members that represent more than 70 per cent of the industry. EURELECTRIC gathers electricity industry companies (generators and retailers, most of them are not ownership-unbundled). CEDEC and GEODE represent smaller 'local' and 'regional' energy distributors. REScoop is the federation of energy cooperatives which undertake distribution activities in some cases.

Different organisations representing DSOs at EU level

- EDSO for Smart Grids, founded in 2010, gathers leading European distribution system operators for electricity, like Innogy in Germany, Enedis in France and Vattenfall in Sweden, cooperating for the development of smart grids with a focus on EU RD&D, policy, and Member State regulation.
- EURELECTRIC, the Union of the Electricity Industry founded in 1989, gathers the large power generators and retailers of the electricity sector. It represents the common interests of the electricity industry at the pan-European level and also their affiliates on other continents. It currently has over 34 full members, representing the electricity industry in 32 European countries. EURELECTRIC works on behalf of European DSOs and their customers for a secure and reliable supply of electricity.
- CEDEC, from the french name Confédération Européenne des Distributeurs d'Énergie publics Communaux, is the European Federation of Local Energy Companies founded in 1992. It represents the interests of more than 1,500 local and regional energy companies – mostly in public hands – serving electricity and natural gas customers & connections in ten European countries: Austria, Belgium, Bulgaria, France, Germany, Italy, the Netherlands, Norway, Sweden, and Switzerland.
- GEODE, founded in 1991, is made up of independent European gas and electricity distribution companies. The association represents more than 1,200 companies in 15 countries, both private & public owned.
- REScoop, short for renewable energy cooperative, is the European federation for renewable energy cooperatives. It is a network of 1,500 European cooperatives and their 1,000,000 members who co-operate in the field of RES or energy efficiency production as well as distribution supply and services.

2.2. Current practices

According to CEER, (2015), the DSOs activities can be separated into three categories. This categorisation regards the nature and the different businesses at the distribution network:

- Core activities, such as planning, developing, operating and maintaining the network, connecting users to the grid, managing technical data and managing network losses;
- Prohibited activities such as electricity generation;
- Non-core activities or grey areas where there are concerns about DSOs activities, such as infrastructure for EVs, flexibility services such as the ownership of flexibility assets, managing metering data for customers.

Their logical framework for categorising DSOs activities is described in Figure 13.

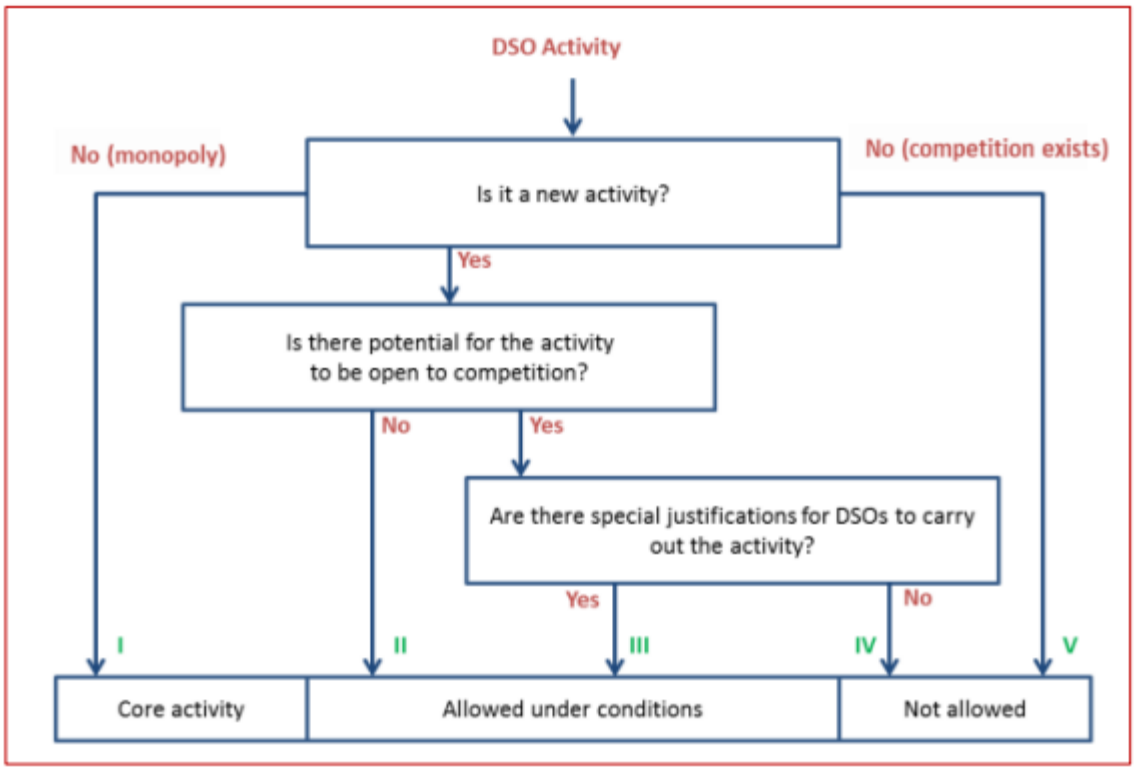

Figure 13: Logical Framework for DSO Activities, source: (CEER, 2014)

For the grey areas, there is no single model defining how they should be regulated. The DSO involvement in areas such as the ownership of storage and EV charging infrastructure is allowed in some Member States under certain conditions. In such cases the aim is to help the development of this sector on a provisional mandate until the market develops to actual competition.

2.2.1. Traditional Roles

From a regulatory point of view, network planning and network maintenance are core DSO-activities, while the active network management (i.e., procurement of flexibility services) can be considered as a regulatory grey area.

Network planning

The EC, (2015c) study on tariff design for distribution systems presents the main features of the DSOs network development process. It considers whether the distribution network development plan is published in different MSs and whether the investments are subject to approval by the NRAs or the government.

Across Europe, only DSOs in Italy, Portugal, Hungary, the Netherlands, Poland, UK, and Germany (for network assets at HV distribution level) publish distribution network development plans. In six MSs (Spain, Greece, Poland Portugal, Romania and Slovenia) distribution network development plans are approved by regulators. In France, Germany and Lithuania the regulator approves only selected investments (EC, 2015c). Figure 14 gives an overview of the situation in various MSs.

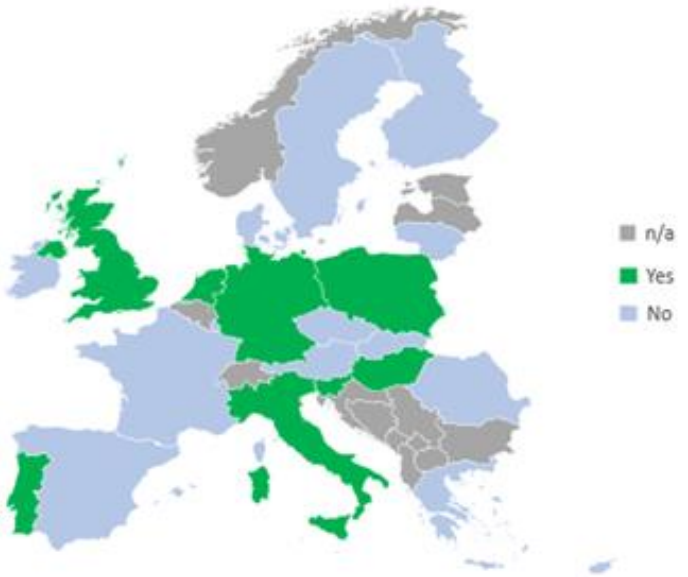

Figure 14: Published distribution network development plans (DNDP), based on (EC, 2015c)

The Commission report adds that the decision-making process of distribution network development appears less structured and transparent than for transmission network development in most MSs. However, the importance of the process has increased with the recent trends in the sector. Distribution and transmission system operators may need to take a coordinated approach to network planning and development with transparent data exchange processes for an increased overall efficiency and quality of the electricity network. For instance, planned reinforcements on the transmission network may offset the need for reinforcements on the distribution system.

Network management

Today, some DSOs have already started to consider procuring flexibility services to re-dispatch the system at the level of distribution grids. However, in most countries, there are no rules in place that allow DSOs to do that. Figure 15 shows the different regulatory approach to flexibility services procurement in some MSs.

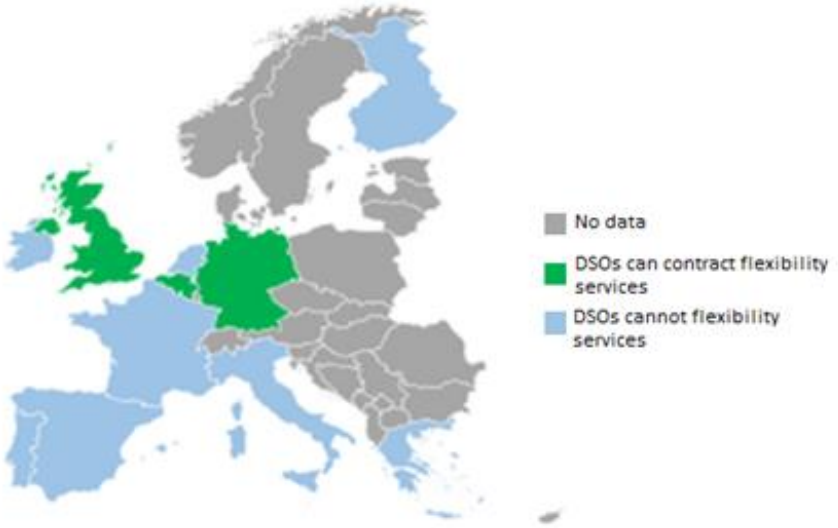

Figure 15: DSOs incentives to procure flexibility services in Europe, source: (EC, 2016e)

According to the EvolvDSO[43] project survey, in countries like France, Ireland, Italy or Portugal, DSOs are not able to contract flexibility for congestion management. Discussions on the topic are ongoing in these countries. In others, like Belgium and Germany[44], DSOs can obtain system flexibility services via connection and distribution access contracts. These contracts provide a reduced network fee in exchange for the unit control by the DSO.

2.2.2. Emerging Roles

Storage facilities

Electricity storage is one way of providing flexibility to the system. It can be defined as any device that can store electrical energy and make it available when required. Several types of storage technologies have been proposed, tested and are currently being implemented. Storage systems can be chemical, electrochemical, electrical, mechanical and thermal. Currently, pumped hydro, which is classified as mechanical storage, accounts for most of the storage capacity. This can be considered as a traditional storage technology as it has been around for a long time.

However, due to rapid innovation, large-scale batteries (also referred to as electrochemical storage devices) are recently becoming economically viable (Obi et al., 2017). Batteries have some unique characteristics that set them apart from the traditional storage resources. These devices are modular and can be installed quickly, and they are not constrained by location. Not only can batteries be installed at any location, but they can also be moved to other locations as and when required cost-effectively. This makes them an invaluable resource for providing location-specific services such as voltage control for distribution grids.

There is currently no common EU regulatory framework incorporating storage in distribution grids. In the UK, DSOs that have invested in batteries, are exempted from generation licence for capacities below 50 MW and possibly up to 100 MW in individual cases. In Spain, the DSO and the TSO can own batteries and are also exempted from requiring authorisation if the generation output is less than 50MW[45]. Several other regulators across the EU have approved battery pilots in motivated cases, such as in Germany, Italy and Finland (Meeus and Bhagwat, 2018).

EV charging infrastructure

According to Meeus and Hadush (2018), 70,000 public charging points were in place in Europe by the end of 2016, representing one public charging point for every nine EVs. 27% of them are installed in the Netherlands. 90% of the public charging points in the EU are normal charging points (AC, <22 kW), meaning that full charging times is a matter of hours. The remaining 10% are considered fast (AC, >22 kW or DC, >25 kW) where the charging time is lower than an hour[46]. Also, there were 390,000 private charging points in Europe in 2016, bringing the total charging points to 460,000. During the year (2015-2016), the amount of public charging stations installed had a higher increase than the number of sold EVs (71% versus 53%).

[43] EvolvDSO ('Development of methodologies and tools for new and evolving DSO roles for efficient DRES integration in distribution networks') is an FP7 collaborative project funded by the European Commission

[44] This is particularly relevant for DSOs in Germany where the distribution grid can be up to 110 kV and therefore hosts large amounts of DG.

[45] Ley 24/2013, de 26 de diciembre, del Sector Eléctrico.

[46] As a reference, it would take approximately 30 minutes for an 80 % charge or 120 km of extra range with a 60 kW DC charger on a Nissan Leaf.

Several actors may play a role in the provision of EV charging infrastructures, such as DSOs, suppliers or third parties who can use the charging points to sell electricity. DSOs involvement in EV charging is different across MS as there is no common EU regulatory framework. In the Spanish model, most DSOs deploy the charging infrastructure while the commercial operation is open to retailers. In Ireland, the DSO is involved, but the assets have not yet been included in the regulated asset base. Costs have been recovered via the distribution tariffs but are kept in a separate company and account. In the Czech Republic EV public charging infrastructure is built, owned and managed through competitive tenders mostly pushed by the three biggest energy utilities while DSOs are only in charge for the connection (EDSO, 2018). For more information on EV charging infrastructure regulation, see Meeus and Schittekatte (2018b).

Data management

Data management comprises *'the processes by which data is sourced, validated, stored, protected and processed and by which it can be accessed by suppliers or customers',* according to the EC impact assessment (EC, 2016e).

Data access and management is a key enabler for the operation of electricity markets. There are currently different data management models across EU MS, as presented in CEER, (2016); decentralised, partially centralised or fully centralised. Categories of the data management models are described as follows:

- A fully centralised model comprises a centralisation of all key aspects related to data management. A typical centralised model is a data hub, where all data is retrieved, validated, stored, protected, processed, distributed and accessed. In this model DSOs, market actors and all consumers relate to the data hub.

- A partially centralised model involves centralisation of one of the key aspects of data management, typically distribution and access to data. It is rather a communications hub that provides a common access point for data that could be stored in several databases, at DSOs or metering points.

- A decentralised model, or DSO model, typically means that all the key aspects of data management are decentralised, meaning that they are the responsibility of the DSO. A typical decentralised model would be a standardised message exchange system or another cruder way of connecting market actors with DSOs.

In Europe, Denmark currently operates a centralised data hub with storage. The Netherlands has a partially centralised model, with centralised communications with multiple databases. Spain, and Italy have decentralised models with DSO-centred data storage and access models.

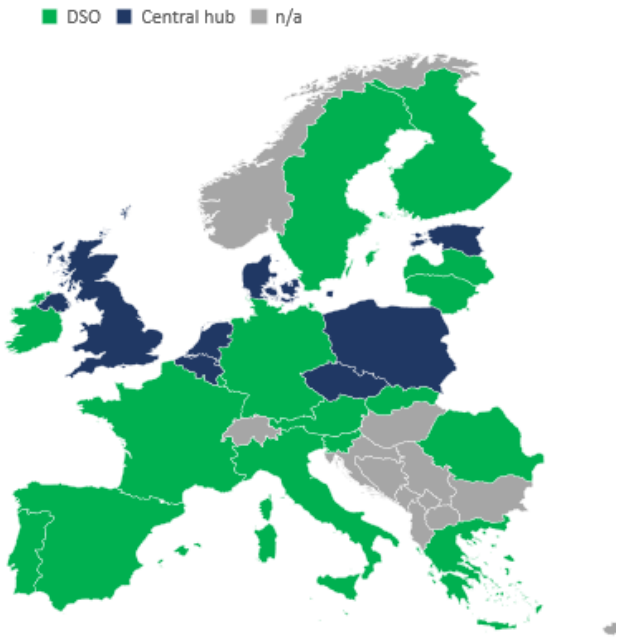

Figure 16: Responsible parties for access to metering data, based on (EC, 2018b)

Figure 16 gives an overview of the different data management models in Europe. Germany, which has a combination of models, is considered as a decentralised (DSO) model in the figure. In fact, a metering point operator, which can be a DSO, is responsible for third-party access to metering data in Germany.

2.3. Increased expectations for DSOs in their traditional roles

In this subsection, we will present three new responsibilities that the CEP assigns for the DSOs.

2.3.1. Proposal for DSOs network planning

On the introduction of distribution network planning, the newly added **recital (42)** of the Commission E-Directive states that '*(..) Member States should also introduce network development plans for distribution systems in order to support the integration of generating installations using renewable energy sources, facilitate the development of storage facilities and the electrification of the transport sector, and provide to system users adequate information regarding the foreseen expansions or upgrades of the network, as currently such procedure does not exist in the majority of Member States.'*

The Commission proposal for the E-Directive requires that DSOs prepare and implement multi-annual development plans and to coordinate with TSOs on such multi-annual development plans. It adds in **article 32(2**) that *'the development of a distribution system shall be based on a transparent network development plan that distribution system operators shall submit every two years to the regulatory authority.'* Moreover *'the network development plan shall contain the planned investments for the next five to ten years, with particular emphasis on the main distribution infrastructure which is required in order to connect new generation capacity and new loads including re-charging points for electric vehicles.'* The development plan *'shall also demonstrate the use of demand response, energy efficiency, energy storage facilities or other resources that a distribution system operator is using as an alternative to system expansion.'*[sic] It adds that *'the regulatory authority shall consult all current or potential system users on the network development plan. The regulatory authority shall publish the result of the consultation process on the proposed investments.'* For DSOs serving less than 100,000 connected consumers, or serving isolated systems, MSs may decide not to apply these obligations.

The Commission and Council proposals for the introduction of DSO network planning agree on its necessity, but there is some disagreement over the details regarding the submission and publication of network plans by the DSOs as well as for public consultation process on the network development plan and on the proposed investments.

The Council position ensures the greater involvement of NRAs and TSOs in the network development. It adds in **article 32(2)** that the DSOs should submit and publish the network development plan, to both NRAs and TSOs every two years. It also tasks the DSOs with conducting the public consultation with relevant system users on the network development plan instead of NRAs as stated in article **32(2a)**.

Commission proposal
- A requirement for DSOs to prepare and implement multi-annual development plans and coordinate with TSOs on their development.
- The network development plan shall be submitted every two years by DSOs to the regulatory authority.
- The network development plan shall contain the planned investments for the next five to ten years.
- For DSOs serving less than 100,000 connected consumers, or serving isolated systems, MSs may decide not to apply these obligations.
- NRAs should undertake a public consultation on the proposed investment in the network plans.

Council position
- A higher involvement of NRAs and TSOs in the network development plans.
- DSOs should conduct the public consultation instead of NRAs.

Stakeholders' positions

EURELECTRIC, (2017b) welcomes '*the initiative to describe the grid needs and how DSOs will address them, including through flexibility solutions when they are available and economically efficient.'* However, it does not agree with the two-year cycle for the submission of such a plan and considers that it is up to *'Members States to decide on the review cycle of the network development plan considering the situation of the already deployed distribution network infrastructure.'* For the consultation process, EURELECTRIC states that *'it is inappropriate to define a harmonised consultation process for DSOs' development plan at EU level given the large number of national specificities. The consultation should be defined by Member States and should not be mandatory.'*

ACER and CEER, (2017b) also welcome '*the proposal for DSO network plans'.* However, they add that the E-Directive and E-Regulation '*should require DSOs and TSOs, instead of NRAs, to consult stakeholders on their network plans and take responsibility for their quality. This reflects the fact that DSOs should engage with and respond to the reasonable needs of their stakeholders.'*

On distribution network planning, SEDC, Solar Power Europe, Wind Europe and other signatories of the joint position paper SEDC et al., (2017) have stated that rules must be established for ensuring market access for consumers and third parties, through creating *'a comprehensive framework for grid monitoring, so as to increase the visibility of flexibility, including demand-side flexibility. It should be based on information that TSOs and DSOs would publish regularly as regards to the performance of their networks, in particular the volumes and sources of curtailed energy. Comprehensive reporting on grid evolution, together with appropriate tariff structure, will be an essential basis for cost-effective network management and enable the targeted acquisition of flexibility services from the market by system operators instead of CAPEX only investments.'*

They also believe that *'there should not be an exemption in Article 32 of the Electricity Directive for integrated utility DSOs developing a network plan. Likewise, small DSOs should not be exempt in Article 32(2) - instead there should be an approach that gives the National Regulatory Authority discretion in defining the requirements for a small DSO.'*

REScoop, (2017b) states that the federation relies '*on transparency from, and the ability to have constructive dialogue with, DSOs in order to assess opportunities for rolling out different activities and investment.'* It welcomes the *'proposed requirements for DSOs to develop network development plans. However, all DSOs – even small ones – should have this requirement. Provisions on distribution network planning should also be strengthened to ensure REScoops and other stakeholders have sufficient opportunity to input into the DSO's plan as it develops. Such engagement will better enable DSOs to identify new opportunities to achieve savings and other system benefits through cooperation with REScoops.'*

On the other hand, EDSO for Smart Grid states, in its amendments proposed for the E-Directive (EDSO, 2017b), that *'network development plans for all voltage levels are unnecessary and would result in onerous costs and administrative burden of little additional value, overlapping with current regulations ensuring quality of supply. Therefore, the obligation for network development plans should be limited to high-voltage networks only, where grid planning timeframes match development plans and their costs might be appropriate in relation to the benefits.'*

2.3.2. Proposal for DSOs flexibility services procurement

The CEP aims to define the conditions under which DSOs may acquire flexibility services [47] without distorting the markets for such services. It includes clear provisions that will enable DSOs to manage local grid issues and enhance the security of supply (SoS) through flexibility procurement.

DSOs flexibility services procurement process

Regarding the regulatory framework of the distribution system operators for the procurement of flexibility, **article 32(1)** of the E-Directive requires MSs to define the exact regulatory framework including incentives for DSOs and adequate remuneration. It states that *'Member States shall provide the necessary regulatory framework to allow and incentivise distribution system operators to procure services in order to improve efficiencies in the operation and development of the distribution system, including local congestion management'.* It adds that *'distribution system operators shall be adequately remunerated for the procurement of such services in order to recover at least the corresponding expenses.'*

Article 32(2) of the Commission E-Directive on *'tasks of distribution system operators in the use of flexibility'* states that DSOs shall define standardised market products[48] for the services procured while ensuring effective participation of all market participants including renewable energy sources, demand response, and aggregators. Distribution system operators shall exchange all necessary information and coordinate with TSOs. The same article also requires DSOs to consider flexibility services in grid planning: '*the network development plan shall also demonstrate the use of demand response, energy efficiency, energy storage facilities or other resources that distribution system operator is using as an alternative to system expansion*.'

[47] Regarding the DSO role in balancing the system, the EU CEP has not foreseen the procurement of frequency ancillary services (Frequency Containment Reserves (FCR), Frequency Restoration Reserves (FRR) and Replacement Reserves (RR)) by DSOs. The flexibility services, that DSOs may procure, have been limited to non-frequency ones and congestion management services.

[48] For balancing, standardised products, according to the EBGL, mean harmonised balancing products defined by all TSOs for the exchange of balancing services and can be easily shared between them.

To ensure a smooth introduction of DSOs' procurement of flexibility services, the CEP proposes a market-based approach[49] while ensuring a TSO/DSO coordination. Indeed, **article 32(1)** says that *'distribution system operators shall procure these services according to transparent, non-discriminatory and market-based procedures.*'

The Council proposal for E-Directive adds, in **article 32(1a)**, a higher NRAs oversight in the definition of market products specifications for the flexibility services procured. The Council proposal removed the obligation of a market-based procurement of flexibility service.

Coordination with TSOs in the procurement of flexibility services

Using system flexibility services will require extensive cooperation and clear boundaries between TSOs and DSOs. This aims to ensure an efficient data exchange on the activated flexibility resources and to avoid a double activation from a DSO and a TSO of the same flexibility source. According to **article 32(1)** of the E-Directive, '*distribution system operators shall exchange all necessary information and coordinate with transmission system operators in order to ensure the optimal utilisation of resources, ensure the secure and efficient operation of the system and facilitate market development.'*

In addition, for the access flexibility resources, **article 53(2)** of the E-Regulation states that '*transmission and distribution system operators shall cooperate in order to achieve coordinated access to resources such as distributed generation, energy storage or demand response that may support particular needs of both the distribution system and the transmission system.'*

shows the new system approach for flexibility provision.

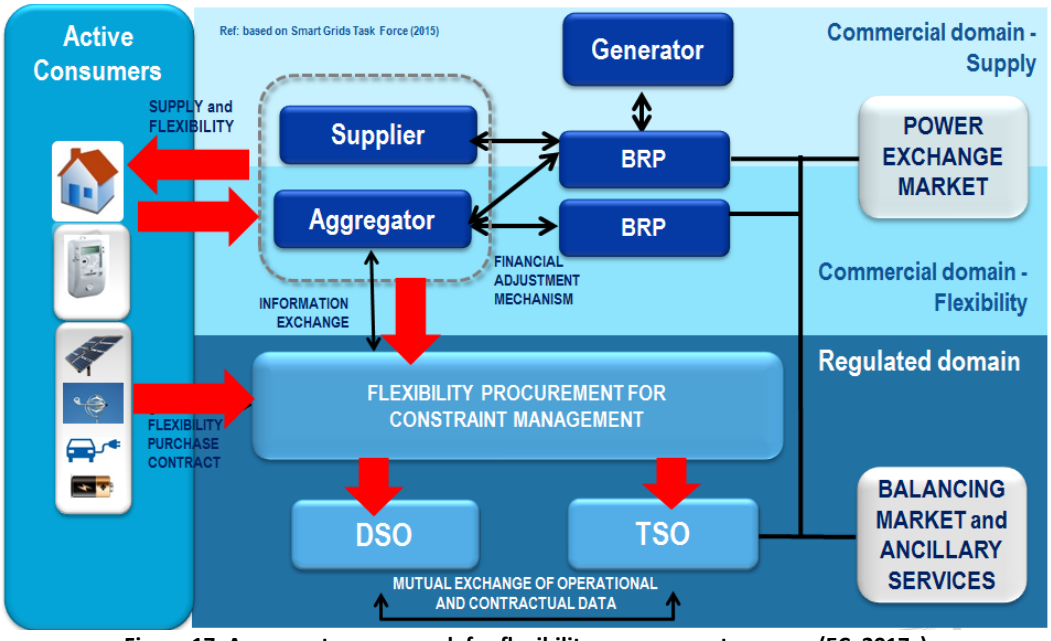

Figure 17: A one system approach for flexibility procurement, source: (EC, 2017c)

[49] Market-based flexibility is a process whereby flexibility is obtained and priced through a (separate) market mechanism from all stakeholders that are a source of flexibility, benefit from it, or have a controlling role, i.e. consumers, producers, BRP, system operators and regulators.

Commission proposal
-MSs shall provide the necessary regulatory framework to allow and incentivise DSOs to procure flexibility services.
-DSOs shall define standardised market products.
-DSOs to consider flexibility services in grid planning.
-The procurement of flexibility services shall be market-based while ensuring the TSO/DSO coordination.
Council position
-A higher NRAs oversight in the definition of market products specifications.
-Removal of the market-based procurement proposal of flexibility service.

Stakeholders' positions

Regarding DSOs procurement of flexibility services, EURELECTRIC, (2017b) states that it welcomes the initiative to propose a regulatory framework that *'allows and incentivises DSOs to procure flexibility services which may complement or obviate the need to upgrade or replace electricity capacity and which supports both the efficiency and secure operation of the distribution system.'* Also, EURELECTRIC welcomes *'the definition of standardised products by DSOs for the services procured. These services should be defined in such a way that electric vehicles can offer their flexibility services in this flexibility market – which also means that infrastructure able to modulate the charging process has to become the standard.'* It also agrees *'with the provision to foresee the adequate remuneration to DSOs for the procurement of flexibility services.'*

CEER and ACER, (2017g) support the proposals for the use of flexibility by DSOs to manage the distribution system. They state that DSOs *'should be required to act in a non-discriminatory manner when procuring and using flexibility, and, in this context, adequate unbundling is essential.'* Additionally, '*the use of flexibility by DSOs should not be exclusive, and should allow the provider of flexibility to take advantage of other arrangements for valuing flexibility e.g. through participation in the balancing market.'*

EDSO, (2017b) states that '*DSOs should not be limited to procuring flexibility on the market but instead need to have the choice to do it themselves to account for those situations when the market service cannot be immediately available or it is more expensive. In those situations where DSOs procure flexibility on the market, then transparent, non-discriminatory and market-based procedures should be applied.'* On the standardised products, it adds that the *'standardisation of market products does not stand in the way of innovation and dynamic product development. As flexibility markets do not exist yet for DSOs, it is important at this early stage to define standardised definitions (common language, terms, and definitions) regarding flexibility products. Once these definitions are put in place and before harmonising these products at national level, we believe that market parties should find out the best possible solution in order to allow for the development of innovative solutions.'*

ENTSO-E is, however, concerned about a possible market fragmentation due to the DSO definition of standard flexibility products (ENTSO-E, 2017c). It states that *'this task cannot be considered as the exclusive DSO area, given the growing need for coordinated use of flexibility in more and more interdependent transmission-distribution system and integrated retail market-wholesale market*.' It adds that '*flexibility products and associated market rules should be designed with DSOs, TSOs and market parties, in an integrated manner with balancing. Limiting it to DSOs will result in market fragmentation and loss of value for consumers.'*

Wind Europe, (2017) states that *'DSOs should be incentivised to make use of smart grid equipment that can improve their visibility on the flexibility resources connected to their network, instead of relying on costly and time-consuming grid expansion. Their deployment should be considered as part of TSOs and DSOs long-term network development plan, and encouraged through performance-based tariff (cf. UK RIIO model).'*

For REScoop, the requirements for national regulation enabling DSOs to procure flexibility services *'could provide REScoops with new local market opportunities. However, the provisions need to be clarified to ensure that standardisation of flexibility products does not result in the exclusion of LECs'* (REScoop, 2017c).

2.4. Limiting the role of DSOs in emerging businesses

EV charging and storage facilities are emerging businesses in the electricity sector. The CEP aims to establish a regulatory framework for limiting the DSOs' roles in these businesses when their involvement is not necessary.

2.4.1. Limiting DSOs' ownership of EV charging facilities

DSOs, according to **recital 42** of the E-Directive, have to cost-efficiently integrate electric vehicles. The distribution network development plans, submitted every two years to NRAs, should include the planned investments for the next five to ten years covering, inter alia, re-charging points for electric vehicles.

MSs are in charge of providing the necessary regulatory framework facilitating the connection of public and private EV charging facilities to the distribution networks. According to **article 33(1)** of the E-Directive, each MS shall ensure that DSOs *'cooperate on a non-discriminatory basis with any undertaking that owns, develops, operates or manages recharging points for electric vehicles, including with regard to connection to the grid.'*

Derogation for EV charging facilities ownership by DSOs

Both the Commission and Council proposals introduce limitations for DSOs ownership of EV charging facilities while, at the same time, they both include derogations that may be given. The EC promotes a market-based solution for the ownership of EV charging infrastructure and provides a derogation for DSOs ownership as a last resort and under certain conditions. **Article 33(2)** of The Commission E-Directive states that:

'(2) Member States may allow distribution system operators to own, develop, manage or operate recharging points for electric vehicles only if the following conditions are fulfilled:
(a) other parties, following an open and transparent tendering procedure, have not expressed their interest[50] *to own, develop, manage or operate recharging points for electric vehicles;*
(b) the regulatory authority has granted its approval.
(3) Articles 35[51] *and 56*[52] *shall apply to distribution system operators engaged in ownership, development, operation or management of recharging points.*[53]
(4) Member States[54] *shall perform at regular intervals or at least every five years a public consultation in order to re-assess the potential interest of market parties to own, develop, operate or manage recharging points for electric vehicles. In case the public consultation indicates that third parties are able to own,*

[50] The words 'have not expressed their interest' were changed into 'could not be awarded with a right' in the Council position.
[51] Article 35 on *unbundling of distribution system operators.*
[52] Article 56 on *unbundling of accounts.*
[53] This unbundling provision was removed in the Council position.
[54] The Council position states that *'Member States or their designated competent authorities'* shall perform the public consultation.

develop, operate or manage such points, Member States shall ensure that distribution system operators' activities in this regard are phased-out.'

Commission proposal

-Promoting market-based incentives for the ownership of EV charging infrastructure.

-Continuous market monitoring to enhance market functioning and increase competition.

-MSs may allow DSOs ownership of EV charging infrastructure under certain condition.

Council position

-The unbundling provision, among the conditions for obtaining a derogation for DSOs, was removed.

-MSs or NRAs shall perform a public consultation in order to re-assess the potential interest of market parties.

Stakeholders' positions

The EURELECTRIC, (2017b) position paper on the E-Directive welcomes '*the European Commission's quest for opening up the EV charging market'.* However, it states that *'in cases where DSOs are engaged in the roll-out of the necessary charging infrastructure, it should be guaranteed that they can recover the costs incurred, also and notably if the activity of the DSO on this field is phased out. This is especially of importance for DSOs in those countries that currently have opted for a roll-out of charging infrastructure with the help of DSOs. It should be made clear that DSOs in any case are only owning and technically operating the charging infrastructure as an extension of their regulated role. The commercial operation of the charging stations should always be done by market participants.'*

ACER and CEER, (2017b) state, regarding DSOs ownership of both EV and storage infrastructure, that the rule on *'network operators not owning and operating storage or electric vehicles in Articles 33, 36 and 54 of the Electricity Directive is welcome. However, the derogation process should be clarified to provide more certainty to market investors – to the benefit of consumers and businesses – and to deliver a more efficient use of regulatory resources in assessing exemption applications.'*

EDSO, (2017c) proposal for amendments of the E-Directive states that '*DSOs should be involved in the planning of EV infrastructure since public recharging stations will impact the operation of the distribution system.'* It adds that *'DSOs need to have regulatory certainty that they can recover any costs incurred (avoided stranded costs and stranded investments), should these activities be handed to a free commercial market party at a later point in time.'*

2.4.2. Limiting DSOs ownership of storage facilities

Article 36 of the E-Directive sets the Commission provisions with regards to DSOs ownership of storage facilities. It states that DSOs shall not be allowed to own, develop, manage or operate energy storage facilities. However, derogations may be granted.

Derogation for storage facilities ownership by DSOs

Derogation can be granted, according to **article 36(2)** by a MSs only if the following conditions are fulfilled;

'(a) other parties, following an open and transparent tendering procedure, have not expressed their interest to own, develop, manage or operate storage facilities;

(b) such facilities are necessary for the distribution system operators to fulfil its obligations under this regulation for the efficient, reliable and secure operation of the distribution system; and
(c) the regulatory authority has assessed the necessity of such derogation taking into account the conditions under points (a) and (b) of this paragraph and has granted its approval.'

The Council position adds an extra derogation for DSOs to own storage facilities in **article 36**. It states that '*Member States may allow distribution system operators to own, develop, manage or operate energy storage facilities which are fully integrated network components[55] and the regulatory authority has granted its approval* ***OR*** *if all of the following conditions are fulfilled:*

(-a) such facilities are necessary for the distribution system operators to fulfil their obligations under this Directive for the efficient, reliable and secure operation of the distribution system and they are not used to buy or sell electricity to the wholesale market, including balancing markets;
(a) other parties, following an open, transparent and non-discriminatory tendering procedure, subject to review and approval by the regulatory authority have not been awarded with a right to own, develop, manage or operate such facilities. Regulatory authorities may draw up guidelines or procurement clauses to help distribution system operators ensure a fair tendering procedure; and
(c) the regulatory authority has assessed the necessity of such derogation and has carried out an assessment of the tendering procedure, including the conditions, and has granted its approval.'

Public consultation and third parties access

'Regulatory authorities[56] *shall perform at regular intervals or at least every five years a public consultation in order to re-assess the potential interest of market parties to invest, develop, operate or manage energy storage facilities'*, according to **article 36(4).** In case the public consultation indicates that third parties can own, develop, operate or manage such facilities, Member States shall ensure that distribution system operators' activities in this regard are phased-out.

The Council proposal adds to the same article that the phase-out shall be done within 24 months. Also, 'NRAs *may allow the distribution system operators to receive reasonable compensation, in particular to recover the residual value of the investment they made into energy storage facilities.'*

Commission proposal
-DSOs may invest in storage when no market party expresses interest to own, develop, manage or operate storage facilities in a competitive tendering process.
-Public consultation to be done by NRAs regarding market parties' interest in the ownership of storage facilities.

Council position
-Addition of an extra derogation for DSOs to own storage facilities.
-Public consultation to be done by NRAs or DSOs regarding market parties availability and interest in the ownership of storage facilities.

[55] Here, 'fully integrated network components' means static network components that are integrated in the transmission or distribution system, including storage facilities, and are used for the sole purpose of ensuring a secure and reliable operation of the transmission or distribution system but not for balancing nor congestion management, **article 2(39a)** of the Council position of the E-Directive.
[56] According to the Council position, the monitoring can be done by the distribution system operators or the regulatory authority.

Stakeholders' positions

EURELECTRIC partly supports the Commission proposals in EURELECTRIC, (2017b). It favours *'a tendering procedure to assess whether DSOs should be allowed to own, develop, manage or operate energy storage facilities because in principle energy storage facilities shall be owned, developed, managed or operated by market participants'*. However, it states that a mandatory tendering procedure *'could be both costly and time consuming and not appropriate for every situation.'* Therefore, EURELECTRIC proposes an amendment under which *'DSOs should be allowed to own, develop, manage or operate energy storage facilities if 1) following an assessment of the market the NRA concludes that no tendering procedure is needed and gives its approval or 2) if following a tender/market test performed in an open and transparent manner under NRAs' supervision, no parties have expressed interest to own, develop, manage or operate the storage facilities.'*

CEER & ACER took the same position, for storage facilities ownership as for EV charging infrastructure, requiring further clarification of the derogation process. They welcome '*the requirements in Article 36 for National Regulatory Authorities to carry out a public consultation on the derogation process, and the requirement for the Member State to require network companies to phase out activities in owning and operating storage'* (ACER and CEER, 2017b).

EDSO, (2017c) proposal for amendments of the E-Directive states, with regards to the ownership of storage facilities, that *'article 36 should not exclude DSOs' right to storage ownership and operation for ensuring network security and secure operations. Whereas storage services should remain a market activity, there are some particular situations that require technical solutions without the need of the DSOs of having to go to the market to ask for such services. These technical situations include voltage control, reactive power control, emergency situations, maintenance, voltage limits and reactive power control.'*

The signatories of SEDC et al., (2017), including SEDC, Solar Power Europe, and Wind Europe, have emphasised the need to *'establish a constructive framework for energy storage which takes into account the specificity of the energy storage technologies, and recognises that TSOs and DSOs should not own, develop, manage or operate storage assets, unless a market-based procurement based on an open and transparent tendering procedure is proven of not being possible and is regularly reviewed.'*

The BEUC, (2017a) policy paper indicates that *'*when operating outside of their natural monopoly role, e.g. in energy storage, the DSOs need to be strongly regulated in order not to limit competition in the energy market.'

2.4.3. Neutral DSOs role in data management

Article 34 of the E-Directive on 'tasks of distribution system operators in data management' states that MSs shall ensure that data eligible parties[57] have non-discriminatory, clear and equal access to data. Indeed, in MSs where smart meters are implemented according to **article 19** and DSOs are involved in data management, compliance programmes, ensuring that discriminatory conduct is excluded, shall include specific measures to exclude discriminatory access to data from eligible parties as provided for in article 23. The same article adds that where DSOs are not subject to article 35(1), (2) and (3), on unbundling of DSOs*, 'Member States shall take all necessary measures to ensure that the vertically integrated undertaking do not have privileged access to data for the conduct of its supply activity.'*

[57] According to **article 23** of the E-Directive, *'eligible parties shall include at least customers, suppliers, transmission and distribution system operators, aggregators, energy service companies, and other parties which provide energy or other services to customers'.*

Stakeholders' positions

On DSOs' access to data, EURELECTRIC states that '*regardless of the data management model adopted, DSOs and suppliers should have unrestricted access to customers' data needed to fulfil their legal and regulatory liabilities (security of supply, billing, switching etc.), as per their contractual obligations. For any other additional service, access to metering and consumption data should be possible only after the explicit consent of the customer. The General Data Protection Regulation (EU 2016/679)*[58] *introduces very precise rules and obligations about consumer consent and we think the Electricity Directive should be aligned'* (EURELECTRIC, 2017b).

EDSO, (2017c) indicates that *'the provisions in Article 23 should not prevent the DSOs from accessing all necessary data from the customers, including metering and consumption data, not only for a safe grid operation, but also for continuing to promote real market facilitation. DSOs' access to customers should comply with EU data protection regulation which already provides exemptions regarding customers' consent in some cases. Moreover, customers' consent should be arranged in standardised contracts, and any delivery of information to third parties will only be carried out based on explicit customers' consent.'*

2.5. EU DSO entity

In this subsection, we will present the proposed procedures for the establishment of the EU DSO entity and its expected tasks. They are currently represented by different organisations as introduced at the beginning of this chapter in 2.1.

2.5.1. Establishment of the EU DSO entity

The CEP E-Regulation defines the EU DSO entity establishment procedure. The Commission stresses that the DSOs that are to form part of the DSO entity should be 'unbundled', a requirement that has been removed in the Council position. Indeed, **article 49** of the Commission E-Regulation states that DSOs '*which are not part of a vertically integrated undertaking or which are unbundled according to the provisions of Article 35 [recast of Directive 2009/72/EC as proposed by COM(2016) 864/2], shall cooperate at Union level through a European Entity for Distribution system operators ('EU DSO entity'), in order to promote the completion and functioning of the internal market in electricity, (…).'* Moreover, *'distribution system operators who wish to participate in the EU DSO entity shall become registered members of the entity.'*

Article 50 of the Commission E-Regulation on *Establishment of the EU DSO entity for electricity* sets the different establishment steps:

'1.By [OP: twelve months after entry into force], the distribution system operators, with the administrative support of the Agency, shall submit to the Commission and to the Agency the draft statutes, a list of registered members, the draft rules of procedure, including the rules of procedures on the consultation with ENTSO for Electricity and other stakeholders and the financing rules, of the EU DSO entity to be established.
2.Within two months of receipt, the Agency, after formally consulting the organisations representing all stakeholders, in particular distribution system users, shall provide an opinion to the Commission on the draft statutes, the list of members and the draft rules of procedure.

[58] It is a regulation on *the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).*

3.The Commission shall deliver an opinion on the draft statutes, the list of members and the draft rules of procedure taking into account the opinion of the Agency provided for in paragraph 2, within three months of receipt of the opinion of the Agency.
4.Within three months of the day of receipt of the Commission's positive opinion, the distribution system operators shall establish the EU DSO entity and adopt and publish its statutes and rules of procedure.
5.The documents referred to in paragraph 1 shall be submitted to the Commission and to the Agency in case of changes thereof or upon their reasoned request. The Agency and the Commission shall deliver an opinion in line with the process set out in paragraphs 2 to 4.
6.The costs related to the activities of the EU DSO entity shall be borne by distribution system operators who are registered members and shall be taken into account in the calculation of tariffs. Regulatory authorities shall approve those costs only if they are reasonable and proportionate.'

The Council position proposes a 9/9/9 composition of the EU DSO entity Board of Directors of which:
- 9 are representatives of members with more than 1 million grid users;
- 9 are representatives of members with more than 100,000 and less than 1 million grid users;
- 9 are representatives of members with less than 100,000 grid users.

The Council adds further provisions on the establishment of the EU DSO entity. Its composition shall consist of, at least, a General Assembly, Board of Directors, Strategic Advisor Group, Expert Groups and a Secretary-General, according to **article 50(0).**

Article (50a) of the Council position of the E-Regulation, on the rules and procedures for the EU DSO entity, adds rules for the decision-making process of the entity. Among the principles that the statutes of the entity should safeguard, we find:

- The General Assembly adopts strategic decisions for the Board of Directors
- Voting criteria for the entity decisions
- Four years maximum duration of the Board of Directors elected by the General Assembly
- The nomination of the President and the three Vice-Presidents by the Board of Directors
- Decisions of the Board of Directors are adopted by simple majority of 15 votes
- The Board of Directors may not consist of more than 3 representatives of members based in the same Member State or the same industrial group

2.5.2. Tasks of the EU DSO Entity

In this subsection, we will present the proposed aggregated tasks for the DSO entity, its cooperation with ENTSO-E and its role in drafting network codes.

New aggregated tasks

Article 51(1) of the Commission proposal for E-Regulation lists the tasks of the new EU DSO entity;

'(a) coordinated operation and planning of transmission and distribution networks;

(b) integration of renewable energy resources, distributed generation and other resources embedded in the distribution network such as energy storage;

(c) development of demand response;

(d) digitalisation of distribution networks including deployment of smart grids and intelligent metering systems;

(e) data management, cyber security and data protection;

(f) participation in the elaboration of network codes pursuant to Article 55.'

Article 51(2) of the E-Regulation also brings the following additional tasks:
'(a) cooperate with ENTSO for electricity on the monitoring of implementation of the network codes and guidelines which are relevant to the operation and planning of distribution grids and the coordinated operation of the transmission and distribution networks and which are adopted pursuant to this Regulation;
(b) cooperate with ENTSO for electricity and adopt best practices on the coordinated operation and planning of transmission and distribution systems including issues such as exchange of data between operators and coordination of distributed energy resources;
(c) work on identifying best practices on the areas identified in paragraph 1 and for the introduction of energy efficiency improvements in the distribution network;[59]
(d) adopt an annual work programme and an annual report;
(e) operate in full compliance with competition rules.'

The Council position in **article 51(1)** foresees the involvement the EU DSO entity in the proposed tasks, but with more precautions with regards to explicitly stating direct responsibilities for this new entity. Indeed, the proposed roles in the Council position have rather a facilitating nature, such as promoting the operation and planning of distribution networks[60] and facilitating demand-side flexibility and response.

Cooperation with ENTSO-E

At the European level, the newly proposed DSO Entity '*should closely cooperate with ENTSO for Electricity on the preparation and implementation of the network codes where applicable i.e. areas related to distribution networks'* as stated in **recital 38** of the Commission proposal for E-Regulation. Moreover, the EU DSO entity shall cooperate with ENTSO-E on the coordinated operation and planning of transmission and distribution systems.

Article 51(2) states that the EU DSO entity shall:
'(a)cooperate with ENTSO for electricity on the monitoring of implementation of the network codes and guidelines which are relevant to the operation and planning of distribution grids and the coordinated operation of the transmission and distribution networks and which are adopted pursuant to this Regulation;
(b)cooperate with ENTSO for electricity and adopt best practices on the coordinated operation and planning of transmission and distribution systems including issues such as exchange of data between operators and coordination of distributed energy resources;''

Network codes drafting

Regarding the drafting of network codes, the Commission may require the EU DSO entity for electricity instead of the ENTSO-E to convene a drafting committee and submit a proposal for a network code to ACER if the matter is directly related to the operation of the distribution system and less relevant for the transmission system, as stated in **article 55(2)**.

The Council position changed the possible replacement of ENTSO-E by the DSO entity for network codes drafting into cooperation with ENTSO-E involving both entities.

[59] The work on identifying best practices on the areas of the EU DSO entity tasks and for the introduction of energy efficiency improvements in the distribution network was removed in the Council position.
[60] The operation and planning of transmission networks was removed in the Council position.

Also, the EU DSO entity shall conduct a consultation in the development process of network codes, according to **article 52** of the E-Regulation. This consultation process should be extensive, at an early stage of the development and done in a transparent and open manner for the relevant stakeholders, '*in particular, the organisations representing all stakeholders*[61]*.'* This process *'shall aim at identifying the views and proposals of all relevant parties during the decision-making process.'*

In addition to that, *'the EU DSO entity shall indicate how the observations received during the consultation have been taken into consideration. It shall provide reasons where observations have not been taken into account',* according to **article 52(3).**

Commission proposal

- The DSO entity will reinforce the DSOs representation at the European level.
- The DSO entity will be involved in the development of EU rules such as network codes.
- The DSO entity will cooperate with ENTSO-E on issues of mutual concern, such as data management, balancing, planning, congestion, etc.
- The DSO entity will work on areas such as DSO/TSO cooperation, integration of RES, deployment of smart grids, demand response, digitalisation and cybersecurity.

Council position

- More detailed provisions on the establishment of the EU DSO entity, its board members and the decision-making process.
- Supportive and facilitating nature of the DSO entity tasks, such as promoting the operation and planning of distribution networks and facilitating demand-side flexibility and response.
- Changing the possible replacement of ENTSO-E by the DSO entity for network codes drafting into cooperation with ENTSO-E.
- A 9/9/9 composition of the board of the DSO entity

Stakeholders' positions

EURELECTRIC welcomes *'the acknowledgement of the prominence of DSOs in the energy transition and the establishment of a EU DSO entity'* (EURELECTRIC, 2017c). It adds that *'the scope of responsibilities of the DSO entity has to be carefully defined'* and that *'MS must retain final responsibility for DSO activities within their national borders and markets. The DSO entity should be an expert organisation and should not engage in lobbying.'* Moreover, on the composition of the DSO entity, EURELECTRIC, (2017a) adds that '*since the decisions of the DSO entity apply to all DSOs (also smaller ones) EURELECTRIC suggests to ensure inclusivity of all DSOs in Europe, it therefore recommends that the membership criteria is widened to include all type of DSOs in Europe.'* Also, it states that *'the ways in which the members of the DSO entity come to a decision (voting right) also have to be defined carefully. EURELECTRIC believes that a proportional representation of all participants in the EU DSO entity is most appropriate.'*

CEER and ACER welcome the proposal for an EU-wide DSO entity, and for DSOs to produce network plans which feed into TSO plans. This will help deliver a holistic system approach. It adds that *'ENTSO-E and the proposed EU DSO entity should have an obligation to co-ordinate with one another in Article 53 of the*

[61] '*That consultation shall also involve national regulatory authorities and other national authorities, supply and generation undertakings, system users including customers, distribution system operators, including relevant industry associations, technical bodies and stakeholder platforms',* according to **article 52(1)**.

Electricity Regulation, and this mutual obligation should also be reflected in Article 27' (ACER and CEER, 2017b).

EDSO (2017a), also supports the setting up of a DSO entity and states that *'the setting-up of a dedicated body for electricity DSOs is welcome. DSOs remain strongly committed to proactively contribute to the future developments with regards to the new entity's governance, structure and functioning. However, it must be ensured that the costs related to the activities of the EU DSO entity are taken into account within the regulatory framework. We suggest to include a separate article concerning the costs of the EU DSO entity, in line with the relevant TSO rules for the establishment of ENTSO-E (Article 30).'*

ENTSO-E welcomes this EU DSO entity *'as a way to enhance EU-level TSO-DSO cooperation, based on the achievements of the current TSO-DSO platform. However, the topics listed in the regulation should not be the sole responsibility of the EU DSO entity, since close cooperation with TSOs and market parties should be a priority from the beginning of the process. The TSO-DSO platform should be used as an important cooperation place.'* It adds that '*digitalisation of the grid and development of smart grids cannot be limited to distribution, and should be addressed for the whole system. We need to bear in mind that digitalisation provides solutions to both DSOs and TSOs'* (ENTSO-E, 2017d).

Wind Europe also welcomes the proposal *'to form an EU DSO body with a legal role. As such, the DSOs should be further involved in network planning and network operation, to ensure an optimised operation of the system.'* It adds that *'it is important that this new entity remains a technical body and does not engage in advocacy activities. There should be a formal, transparent and inclusive cooperation with those associations representing system users. ACER should oversee its formation and task.'* (Wind Europe, 2017).

2.6. Interlinkage with Network Codes

We will present in this part the increasing stakeholders' involvement in network codes development and the newly proposed adoption process.

2.6.1. Stakeholders' roles in network codes

In Table 3, we introduce the changes in different stakeholders' roles according to the CEP with regards to the different interaction levels:

Table 3: Changes in NC development process and stakeholders' involvement, combined from (EC, 2016e) and (Groebel, 2017)

Interaction level	Current ACER Reg. 713/2009	What will change in the EU CEP
Network Code development process	Based on ACER's framework guideline, ENTSO-E drafts network code (strong ENTSO-E role and influence). ACER provides opinion and recommendation to the Commission.	Based on ACER's framework guideline, ENTSO-E drafts a network code guided by a standing stakeholder body and broad general stakeholder involvement. ACER consolidates the network code and submits the final document to the Commission.
Oversight of ENTSO-E	Limited ACER oversight of ENTSO-E	Strengthened ACER oversight of ENTSO-E[62]

[62] This entails strengthening ACER's role in the development of NC, particularly giving it more responsibility in elaborating and submitting the final draft of the network code to the Commission, while maintaining ENTSO-E's relevant role as a technical expert.

Oversight of new entities	None or limited regulatory oversight (limited rules in network codes and guidelines)	Strengthened regulatory oversight by NRAs and ACER[63]
ENTSO-E's mission and transparency	Lack of clear European mission and voluntary transparency rules	Codified clear European mission and transparency obligations on its decision-making[64]
DSO	European DSOs collaborate through the existing DSO associations but without any legal status at EU institutional level. There is no formal participation in drafting or amending of network codes and guidelines	Establishment of an EU DSO entity for electricity with an efficient working structure; European DSOs will provide experts based on calls for proposals issued by the EU-DSO.
Adoption and amendments of NC and Guidelines	Adoption/amendments by implementing acts	Adoption/amendments by delegated acts: The Commission shall consult national experts before adopting/amending a network code.

2.6.2. The new adoption process for network codes

The exercise of delegation in network codes and guidelines in the EU CEP

The EU CEP provides the adoption of network codes by the European Commission as delegated acts instead of the current implementing acts.

The EC exercise of delegation conditions in the CEP are stated in **article 63**[65] of the E-Regulation for the establishment of network codes. The E-Regulation refers to the power to adopt delegated acts for network codes and guidelines adoption in **article 55(1)** for the establishment of network codes and in **article 56(1&4)** for the amendment of network codes.

According to EC, (2017c), the Commission's power to adopt delegated acts is subject to strict limits:

- *'the delegated act cannot change the essential elements of the law*
- *the legislative act[66] must define the objectives, content, scope, and duration of the delegation of power*
- *Parliament and Council may revoke the delegation or express objections to the delegated act'*

[63] ACER would receive additional competence to oversee new entities and functions which are not currently subject to regulatory oversight at EU level. NRAs cooperate with one another in ACER's board of regulators, which is the locus of cooperation.

[64] Aiming to distinguish ENTSO-E's statutory mandate from defending its member companies' interests by setting out a clear European mandate in the legislation and ensuring more transparency in its decision-making processes.

[65] The E-Regulation refers also to the empowerment of the EC to adopt delegated in other areas; **article 31(3)** concerning the geographical area covered by each ROC, **article 46(4)** on Inter-transmission system operator compensation mechanism and **article 59(11)** on the adoption of guidelines for the application of the exemption of new DC interconnectors revenues uses.

[66] Regulation, directive or decision.

The Commission prepares and adopts delegated acts after consulting expert groups[67], composed of MSs representatives, which meet on a regular or occasional basis. Citizens and other stakeholders can provide feedback on the draft text of a delegated act during a four-week period. Once the Commission has adopted the act, the Parliament and the Council have two months to formulate any objections. If they do not, the delegated act enters into force. According to EC (2009), the Commission carries out the necessary preparatory steps from a political and institutional point of view to ensure that no objections will be made by Parliament or the Council. In case of an objection raised by one of these European institutions, the delegated act is revoked and cannot enter into force. Then the Commission can either adopt a new delegated act or amend where necessary while taking into account the expressed objections. If the objections are based on the fact that the Commission has overstepped the powers delegated to it, the EC can also present a legislative proposal under the terms of the Treaties (EC, 2009). Another possibility, in case of objection, is that the Commission will decide not to do anything at all.

Amendments of network codes

The newly added **article 56(1)** on 'a*mendments of network codes'* states that: *'the Commission is empowered to adopt delegated acts in accordance with Article 63 concerning the amendment of network codes following the procedure under Article 55. Amendments can also be proposed by the Agency under the procedure set out in paragraphs 2 to 4 of this Article.'*

Draft amendments to network codes may be proposed to ACER by the different concerned stakeholders[68]. **Article 56(2)** defines them as an entity or persons including '*ENTSO-E, the EU DSO entity, TSOs, system users and consumers'*. It also mentions that '*ACER may also propose amendments on its own initiative'*, as is stated in the same article of the E-Regulation. According to **article 56(3)**, '*the Commission is empowered to adopt, taking account of the Agency's proposals, amendments to any network code adopted under Article 55 as delegated acts in accordance with article 63.'*

Council position on the adoption and amendment of network codes

The Council position has removed the proposal for the Commission empowerment to adopt delegated acts for network codes and guidelines in **article 63** of the E-Regulation. **Article 55(1)** of the Council E-Regulation states that '*the Commission is empowered to adopt implementing acts in accordance with Article 62(2) in order to ensure uniform conditions for the implementation.'*

It has also removed the Commission empowerment to adopt delegated amendment of network codes and guidelines in **article 63** of the E-Regulation and also adds a deadline for the Commission amendments. Indeed, **article 56** of the Council E-Regulation states that '*until 31 December 2025 the Commission is empowered to adopt implementing acts in accordance with Article 62(2) concerning the amendment of network codes within the areas listed in Article 55(1).'* According to the general approach adopted by the Council, by 2025 the Commission will develop a report evaluating the elements of existing network codes that could be included in EU acts concerning the internal electricity market.

[67] EC requests specialist advice from outside experts as a basis for sound policymaking. This may be provided by groups of experts or external consultants, or take the form of studies. For more information, see EC (2016j).

[68] For more details on the development and amendment process of network codes as proposed in CEP, please consult a recording of the FSR online debate on this topic: www.youtube.com/watch?v=rjtX0RXc83Y&t=2533s and see also Lavrijssen and Kohlbacher (2018).

Commission proposal

-Increased responsibilities for ACER in the stakeholders' consultation of network codes for elaborating and submitting the final proposals to the Commission.

-Maintaining ENTSO-E's role as a technical expert.

-EC is empowered to adopt delegated acts on NC adoption and amendment.

Council Position

-Removing the EC empowerment to adopt delegated acts for network codes and guidelines adoption

-Introduction of a deadline, 31 December 2025, for the Commission to adopt implementing acts, concerning the amendment of network codes within the areas listed in article 55(1).

Stakeholders positions

EURELECTRIC (2017a) welcomes the fact that *'the EU DSO entity will be able to co-develop new NCs with ENTSO-E and ACER, where there is a clear and justified reason for NCs that have a DSO impact.'* It also emphasises the fact that the DSO entity should be involved in *'developing the priority list for the NCs together with ACER and ENTSO-E*.''

Additionally, EURELECTRIC welcomes *'the improvement of transparency and the will to involve stakeholders during the development phase of the NCs and guidelines.'* However, it believes that *'the obligation to involve stakeholders in the drafting teams for NCs should be strengthened (the proposed Regulation only mentions "a limited number of affected stakeholders"). This is essential to ensure importance and efficiency of the provisions as well as an overall support for these texts for their adoption.'*

On the adoption of network codes, EURELECTRIC supports the EC *'to adopt or amend new NCs and guidelines through delegated acts. However, EURELECTRIC emphasises the importance of involving stakeholders in the Expert Groups as part of a balanced comitology process with the aim to duly take into account the potential impact of the proposed delegated acts on the functioning of electricity markets and systems. The opinion of the Expert Groups should be highly considered by the Commission when adopting NCs and guidelines.'*

EDSO, (2017a) agrees with the proposal for adopting network codes as delegated acts. On the focus areas of network codes, it also agrees with the EC empowerment to adopt delegated acts and adds that the Commission should take into account existing network codes, necessity and opportunity to lay down new network codes, and, if appropriate, geographical specificities.

EDSO, however, disagrees with the adoption of guidelines at the EU level as delegated acts. It states that the *'technical expertise necessary to the development of guidelines lies with stakeholder experts, which are involved in the process presented in Article 55. A secondary process involving delegated acts does not seem suitable, especially as the Commission itself does not possess sufficient technical expertise to develop guidelines. Guidelines should not be decided at the EU level via delegated acts.'* It adds that *'as the network code development process is a lengthy and heavy one, the decision to start it anew should first consider existing provisions, real necessity for new codes and subsidiarity. Network codes are not the right tool to address the topics of cyber-security (implementation of the NIS Directive[69]) and distribution tariffs (related*

[69] The Directive on security of network and information systems.

to local conditions[70]). In addition to European network codes, more detailed rules should be fleshed out at national/local level.'

Wind Europe suggests that the proposed list of future network codes *'should not lead to "a code per technology" approach. Both a regular and transparent process of maintenance of the network codes is needed in order to adequately reflect technical and regulatory progress in all aspects of the power system. The transformation of network codes into delegated acts should not jeopardise stakeholders' participation. And relevant system users should be invited to participate in the drafting committees of future network codes at the earliest stage possible'* (Wind Europe, 2017).

[70] Due to the diversity of distribution tariffs across member states.

3. Empowering customers and citizens

In this section, we set the scene by describing customer and citizen empowerment from demand response to energy communities. We then focus on key measures included in the CEP proposals to enable these kinds of initiatives. This includes new rights for active customers regarding self-consumption, smart metering, data access and management, and dynamic pricing. We also cover new rules to facilitate the market entry of new customer intermediaries, aggregators and (local) energy communities.

3.1. Setting the scene: From Demand Response to energy communities

According to EC, (2016e), the theoretical European potential of DR in 2016 adds up to about 100 GW and is expected to reach 160 GW in 2030. In almost all EU countries, the highest share of DR potential is in the residential sector. The potential increase will depend on the roll-out of flexible technologies integration such as electric vehicles and heat pumps. Figure 18 shows its potential per Member State and share per sector.

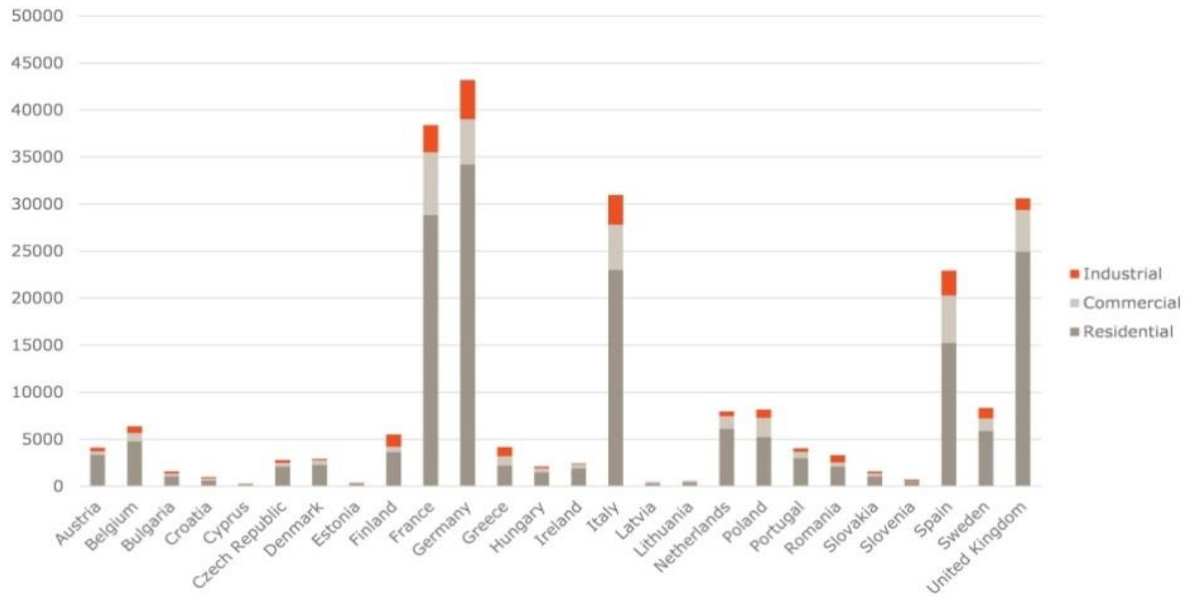

Figure 18: Theoretical demand response potential 2030 (in MW), source: (EC, 2016b)

In the same EC report, it is stated that the viable potential of demand response is limited to approximately 30-40% of the theoretical one. This is due to the fact that not all facilities and devices can be technically controlled by the existing ICT and infrastructure (technical barrier) and due to the fact that only a proportion of the technically feasible potential can be used in a cost-efficient way (economical barrier). Also, there can be timing issues as the associated loads are unlikely to be available all at the same time. In 2016, around 21 GW (out of the 100 GW potential) of DR participated in the market; 15 GW come from large industrial customers through direct market participation, while approximately 6 GW come from residential customers who are on dynamic pricing contracts.

Demand response is actually a broad concept, ACER and CEER (2017) provides guidance on how to categorise DR. They divide DR into implicit or explicit:

- Implicit DR is to be understood as end-consumers adapting their electricity consumption patterns to price without explicitly buying or selling in a market. An example is a dynamic electricity contract which

reflects the real or expected cost of electricity provision to the consumer (energy and/or network) in different time periods. Consumers are rewarded for their flexibility services by reducing their electricity bill. Implicit DR potential should be measured through an estimation of the capacity (MW) and volumes (MWh) available through it. This requires:

-Monitoring the percentage of customers equipped with smart meters
-The percentage of them with dynamic pricing contracts (hourly or shorter-term); and
-Assessing customers' reaction to price signals

- Explicit DR means that demand response is explicitly sold by consumers, directly (for large industrial ones) or through demand response service providers/aggregators (supplier or a third party) to the market or to grid operators. They are rewarded for their willingness to change their demand for electricity at a given point in time, usually in response to a specific system operator's request. Explicit DR should be monitored, through the capacity (MW) contracted and volumes (MWh) sold into the different markets, in order to assess the flexibility share in each segment of the electricity market.

Enabling both types of DR is necessary to address different consumer preferences. Some consumers, especially large ones, may engage in both types of DR for different applications and time-scales (SEDC, 2017). Figure 19 give an overview of the sequence of the Demand-Side engagement.

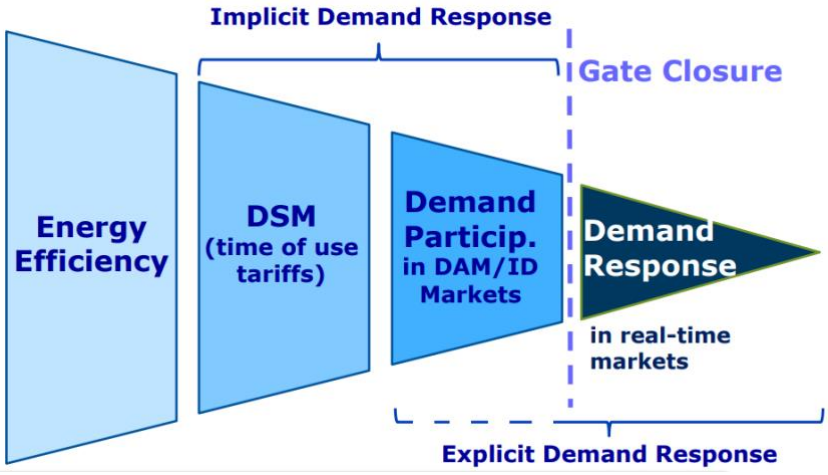

Figure 19: Demand-Side Engagement, source : (ACER, 2017)

Next to DR, another important concept introduced in this section is energy communities. Energy communities are not a new concept. People tend to pull together in times of crisis, as it is possible to accomplish more in a group than alone. Through energy communities or cooperatives, they may engage in generation, distribution, aggregation, supply or storage services. REScoop, (2015), stated that after the economic crisis of 1929, private investors were very cautious about undertaking new investments, and this applied to the electricity sector as well. In the first decades of the last century, local governments and cooperatives of citizens filled in the electricity supply gaps throughout Europe, as private and public undertakings were slow in delivering electrification, especially for rural and isolated areas. Germany, for instance, was hit by a tidal wave of 'electricity cooperatives'. Between 1895 and 1932, about 6,000 electricity cooperatives were created in Germany. For many reasons, explained in the REScoop (2015), only about 50 are still in existence. After the 1973 oil crisis, the anti-nuclear and pro-environmental movements emerged. Enthusiastic 'do it yourself' builders constructed their first wind turbines in

Germany, Denmark, Belgium, the Netherlands and kept on collectively financing and exploiting them. As for their new regulatory framework, proposed in the CEP, several questions are worthy of discussion such as the local dimension of energy communities, being profit or value driven, and the provisions regarding grid management.

3.2. New rights for active customers

3.2.1. Self-consumption

Current practices

A very simple definition of active customers[71], who are often referred to as prosumers, is that they are electricity customers that are engaged in the consumption and production of electricity. Other roles can be added to this definition, such as storage, demand response, and energy efficiency. Active consumers can be both household customers and non-household customers. However, with reference to the 3rd Energy Package, only a final customer can be an active customer, and wholesale customers do not qualify as active customers (Butenko, 2017a). Self-generation customers emerged in Europe more than two decades ago, and the number of electricity consumers has been slowly increasing. More recently, with the ongoing technological innovation (DER, batteries, smart metering...), prosumer roles have been expanding and prosumer numbers increasing rapidly. According to FSR (2017), in 2050 the European electricity system is expected to have millions of prosumers as well as electric vehicles and storage systems willing to provide energy and flexibility.

The EC (2017e) study on residential prosumers in the European Energy Union states three main indicators against which national regulation for residential prosumers can be assessed: the legal basis or definition in the national regulation, generation/consumption elements and the power capacity cap reference.

First, while most countries covered in the study define and regulate prosumers under different types of legislation, few of them do not have any legally binding definition. Belgium Flemish Region, Ireland, and Romania only have definitions developed by the energy distributor or system operator in private codes, which do not have any legally binding character.

Second, there is the concept definition of prosumers or active customers with reference to consumption or production. Some MSs (Portugal, The Netherlands, France, Austria, Bulgaria, Denmark, Spain, and Lithuania) refer to self-consumption or auto-consumption. In Greece prosumers are characterised as self-producers, instead of self-consumers. In Portugal, self-consumers are defined in relation to renewable energy as the persons who produce energy through renewable sources for self-consumption. In the Netherlands, the self-consumer definition is also related to renewable energy, while in France the production does not necessarily need to be from renewable energy sources. In Spain, self-consumption is defined as the *'consumption of electric energy from generation installations that belong to the consumer or from installations that are connected to the consumer through a direct line of electric energy connected to the grid'*, which form an interesting definition combining consumption, production, and connection to the grid. (EC, 2017d)EC (2017e) also indicates that this assessment indicator does not have any consequences for the quality of the support system to the corresponding prosumers.

Third, MSs may also define residential prosumers in relation to the capacity of the installation by stating that it has to be below a certain threshold. For example, Ireland defines micro-generation as a source of

[71] Note that three terms are used in the European Commission official documents with the same meaning, which are active customers, active consumers and prosumers. 20 to 30 years ago, the term prosumer was mainly used to refer to large industrial units with DG.

electrical energy that operates in parallel to the energy distributor and is rated up to 6kW at low voltage with single phase connection (230 Volt) and 11kW at low voltage with the three-phase connection. Some other MSs use the 10kW capacity as a threshold, such as Lithuania, Slovakia, Czech Republic and the Flemish system operator. A third group of MSs use a capacity cap of 100kW for defining residential prosumers such as Spain, Norway, and Romania.

The CEP proposal for active customers

The CEP aims to create a regulatory framework that copes with the new technological developments and puts consumers at the heart of the energy market. This will enable active consumer participation and ensure that they are protected and at the same time benefit from progress in energy technologies.

The E-Directive recognises that *'although consumers can generate and store electricity as well as manage their energy consumption more easily than ever, the current design of the retail market prevents them from being able to fully benefit from such opportunities and extends the level playing field in generation to the prosumers'*. The E-Directive defines an 'active customer' as *a 'customer or a group of jointly acting customers who consume, store or sell electricity generated on their premises, including through aggregators, or participate in demand response or energy efficiency schemes provided that these activities do not constitute their primary commercial or professional activity*.'

The active customer participation in the wholesale market is restricted to the sale of self-generated electricity and purchasing electricity for own use while not constituting a primary commercial activity. The situation is similar for ancillary services provision by active customers. They can place bids, *'alone or through aggregation, to sell demand reduction or increase at a price in organized markets.'* The contract of a final customer with an aggregator, according to **article 13** of the E-Directive, should be done directly, and without the prior consent of the energy supplier.

Article 15(1) of the E-Directive ensures that active customers are entitled to access wholesale markets directly or through the aggregators *'without being subject to disproportionately burdensome procedures and charges that are not cost reflective.'* Indeed, they shall be *'subject to cost reflective, transparent and non-discriminatory network charges, accounting separately for the electricity fed into the grid and the electricity consumed from the grid, in line with Article 59(8)*[72]*',* (**article 15(2)**)**.** Moreover, their installations *'may be managed by a third party for installation, operation, including metering and maintenance.'* **Article 17(1)** requires NRAs to encourage consumers, including those offering demand response, through aggregators or not, to participate alongside generators in a non-discriminatory manner in all organised markets.

The direct access to retail market for active customers is still not allowed in the CEP. Active customers cannot, according to the definition in **article 2(6)** supply their self-generated electricity to other end users. However, this is possible through aggregators, according to the definition in **article 2(14)**. Table 4 describes the changes in market access for active customers in the CEP. It should be noted that the wholesale market for commodity refers to the trading of electricity, organised by Power exchanges. The wholesale market for services refers to flexibility services used for balancing or congestion management (i.e. reaction to the conditions on the market). It is a single buyer market, where TSOs (and in the future DSOs) contract these services.

[72] Article 59(8): '*With a view to increasing transparency in the market and provide to all interested parties all necessary information, decisions or proposals for a decision concerning transmission and distribution tariffs as referred in Article 60(3), regulatory authorities shall make available to market parties the detailed methodology and underlying costs used for the calculation of the relevant network tariffs.'*

Table 4: EU CEP impact on prosumers' Market Access, adapted from (Butenko, 2017b)

	PRODUCTION	WHOLESALE MARKET COMMODITY		WHOLESALE MARKET SERVICES		RETAIL MARKET	
		DIRECT	INDIRECT (AGGREGATOR)	DIRECT	INDIRECT (AGGREGATOR)	DIRECT	INDIRECT (AGGREGATOR)
3RD ENERGY PACKAGE	✓	✗	✗	✗	✗	✗	✗
EU CEP	✓	✓	✓	✓	✓	✗	✓

The Council position is in line with the Commission regarding active customers, while grouping its different provisions from other articles of the E-Directive and E-Regulation regarding active customers rights and duties under **article 15**. It adds that MSs, with existing national schemes *'not accounting separately for the electricity fed into the grid and the electricity consumed from the grid, shall grant no new rights under these schemes beyond the end of the year 2025',* as stated in **article 15(1c)** of the Council E-Directive.

Commission proposal

-Active customers can be both household and non-household final customers.

-Network tariffs should reflect the cost and value of the system infrastructure, including for active customers.

-Market access of active customers is restricted to the sale of self-generated electricity, and the purchase of own usage electricity and shouldn't constitute their primary commercial or professional activity.

-Active customers can only access retail market through aggregator, which have the same requirements as energy suppliers.

Council position

-No new rights should be given to existing national schemes not accounting separately for the electricity fed into the grid and the electricity consumed from the grid, beyond the end of the year 2025.

Stakeholders' positions

EURELECTRIC, (2017b) states that '*the definition of active customers (as well as that of "renewable self-consumer" in art. 2(a) of the Renewables Directive) should be clarified. "Their premises" could be interpreted as to mean that the provisions apply to different assets owned by the same consumer in different locations and result in a positive discrimination. Instead, the definition should clearly refer to generation and consumption of electricity behind the grid connection point.'*

EURELECTRIC agrees with '*the requirement to charge network tariffs separately for the offtake from the grid and injection to the grid (art. 15) separately and the reference to cost-reflectiveness of such network tariffs'.* However, it thinks that *'the provisions should be made clearer, so as to explicitly prevent net metering on any longer period than the settlement time, and not only for network charges but also for the*

remaining elements of the customers' bill, i.e., system costs & levies (policy support costs).' Finally, EURELECTRIC agrees that *'energy installation for the activity of active customers (beyond the meter) could be managed by third parties provided that it is clarified that metering activity should still be performed by the party that in each Member State is responsible for metering.'*

ACER and CEER, (2017d) ask for more clarification concerning '*cost reflective, transparent and non-discriminatory network charges, accounting separately for the electricity fed into the grid and the electricity consumed from the grid'* to exclude the possibility of net metering. CEER & ACER propose that the definition of an 'active customer' should be further specified as a type of 'final customer'.

EDSO welcomes the customers' right to self-consumption in the E-Directive. It stated in EDSO, (2017c), that *'customers' right to self-consumption is a positive development. Prosumers should contribute in a fair manner to network charges and other system costs to ensure that cross-subsidisation[73] of costs, and net metering, is avoided. Article 15 paragraph 1 should be further amended to ensure that net metering is excluded by the provisions of this directive.'*

REScoop adds that *'active customers should benefit from oversight from national regulatory authorities to prevent discrimination and ensure regulatory barriers are removed'* (REScoop, 2017c).

3.2.2. Smart metering systems

Current levels of smart meter deployment

The 3rd Energy Package set a target of 80% of total consumers being equipped with a smart metering system by 2020. Smart metering systems aim to support retail markets to fully deliver benefits to consumers and the electricity system through enabling demand response, dynamic pricing competition, and other energy services to evolve.

The decision to roll-out smart metering systems at MS levels is subject to national cost-benefit analysis, resulting in different coverage choices, technical characteristics, and implementation roadmaps. Italy (95%), Finland (97%) and Sweden (100%) are the EU frontrunners in smart meter coverage. On the other hand, Belgium, the Czech Republic, Portugal and Lithuania have decided not to invest at all in smart meter deployment. These significant variations among the Member States are due to the uncertain cost/benefit of the deployment, as well as concerns about security and data protection. EC (2016i) evaluation of the EU Framework for metering and billing of energy consumption, a report accompanying the CEP, points out the relatively low penetration rate of smart meters across most MSs. It adds that this indicates the limited effectiveness of the provisions in the 3rd Energy Package. Note that in the majority of MSs, the DSOs are in charge of the procurement of smart meters except in the UK where the suppliers are in charge of the implementation. In Germany, the DSOs are responsible for the roll-out, as long as the respective consumer does not choose a third party as meter operator.

According to EC, (2016e), it is projected that 72% of European consumers will be equipped with smart meters for electricity by 2020:

-16 Member States: Sweden, Italy, Finland, Malta, Spain, Austria, Poland, the UK, Estonia, Romania, Greece, France, the Netherlands, Denmark, Luxembourg, Ireland, and lately Latvia are targeting a nation-

[73] Cross-subsidisation refers to the fact that non-active customers subsidise network costs that active customers or PV-owners avoided paying. For more details, see chapter 4 of Pérez-Arriaga et al. (2013).

wide roll-out to at least 80% of customers by 2020 (with 13 of them going much beyond the target of the E-Directive).

-2 Member States, Germany and Slovakia, are moving to a deployment in a selected segment of consumers (to max. 23% by 2020).

-The remaining ones (Belgium, Bulgaria, Czech Republic, Cyprus, Lithuania and Portugal) have either decided against, at least under current conditions, or have not made a firm commitment yet for a mass-scale or even a selective roll-out.

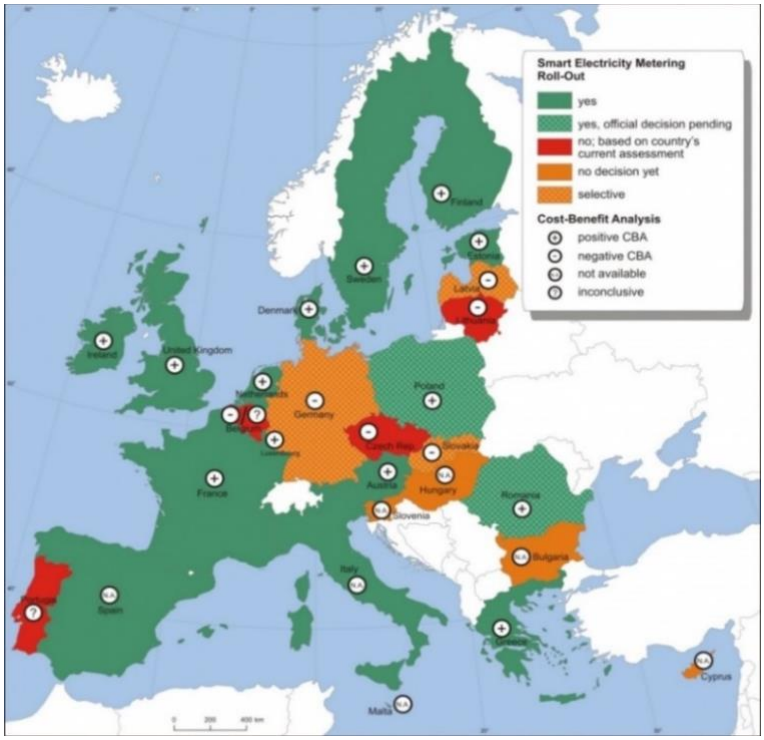

Figure 20: Smart electricity metering systems roll-out status in the EU countries and Norway until 2016, source: (EC, 2018b)

The CEP proposal for smart meter integration

A 'smart metering system' according to the E-Directive is '*an electronic system that can measure energy consumption, providing more information than a conventional meter, and can transmit and receive data for information, monitoring and control purposes, using a form of electronic communication.'*

Incentives for Smart metering systems

Smart metering is a key technology that allows consumers to engage in the electricity markets (**recital 33** of the E-Directive). It adds that: '*smart metering systems empower consumers as they allow them to receive accurate and near-real time*[74] *feedback on their energy consumption or generation allowing them to manage it better, participate in and reap benefits from demand side response programmes and other services, and lower their electricity bill.'* Also, with regards to DSOs, smart metering enables them to have better visibility of their networks. It reduces operation and maintenance costs. It could be considered as a sensor, which can open the 'door' to new services.

[74] Near-real time is defined in the E-Directive in the context of smart metering, as *'the time, usually down to seconds, that elapses between data recording and their automated processing and transmission for use or information purposes'.*

The deployed smart meters by MSs, according to **recital 36** of the E-Directive, should be *'interoperable, not represent a barrier to switching of supplier, and should be equipped with fit-for-purpose functionalities that allow consumers to have near-real time access to their consumption data, modulate their energy consumption and, to the extent that the supporting infrastructure permits, offer their flexibility to the network and to energy services companies, be rewarded for it, and achieve savings in their electricity bill.'*

The roll-out of smart metering systems in a MS may be subject to a cost-benefit analysis (CBA), as indicated in **article 19(2)**. Where smart metering is positively assessed or systematically rolled out, the MS shall implement smart metering systems in accordance with European standards and in line with the provisions of Annex III on 'Smart meters' as well as **article 20** of the E-Directive. If it is negatively assessed (negative CBA) and not systematically rolled out, the MS shall ensure that final customers are '*entitled to have installed or, where applicable, to have upgraded, on request and under fair and reasonable conditions, a smart meter',* according to **article 21**.

Positive CBA- Minimum Smart meters functionalities

*'Member States that proceed with deployment shall adopt and publish the minimum functional and technical requirements for the smart metering systems to be rolled out in their territories in line with the provisions laid down in **Article 20** and **Annex III** (…)',* as stated in **article 19(3)** of the E-Directive. These minimum functionalities should correspond, inter alia, to the ones listed in EC (2012) recommendations 2012/148/EU based on best practice from CBAs for smart metering of electricity carried out in 11 MSs. These minimum functionalities cover:

- Accurate, direct and near-real-time reading for the customer and third parties designated by the consumer, at no additional cost;
- Provide secure system, privacy and ensure data communications protection, in compliance with relevant Union security legislation ensuring the highest level of cybersecurity protection;
- Accounting for electricity injected into the grid and remote reading of meters by the operator;
- Appropriate advice and information shall be given to final customers;
- Enabling final customers to be metered and settled at the same time resolution as the imbalance period in the national market;
- Two-way communication between the smart metering system and external networks for maintenance and control of the metering system;
- Support advanced tariff systems;

Note that **article 7(4)** of the E-Regulation states that imbalance settlement shall be 15 minutes in all control areas[75] at wholesale and retail level by 1 January 2025.

Also, flexibility and interoperability[76] play a large role in the Commission's proposals for promoting smart meter implementation. **Article 19(3)** adds that '*(…) Member States shall ensure the interoperability of these smart metering systems as well as their connectivity with consumer energy management platforms. To this respect, Member States shall have due regard to the use of relevant available standards including those enabling interoperability, best practices and the importance of the development of the internal market in electricity.'*

[75] On the balance settlement period, the Council adds a derogation or an exemption possible from the 15-min period that can be given by NRAs *'in accordance with the balancing guideline adopted on the basis of Article 18 of the Regulation 714/2009.'*

[76] *'Interoperability*', is defined in of the E-Directives in the context of smart metering, as '*the ability of two or more energy or communication networks, systems, devices, applications or components to interwork, to exchange and use information in order to perform required functions.'*

Customer contributions to smart metering systems costs

The Commission proposes that final customers contribute to the costs of smart meters in a transparent and non-discriminatory manner. **Article 19(4)** states that '*Member States that proceed with smart metering deployment shall ensure that final customers contribute to the associated costs of the roll-out in a transparent and non-discriminatory manner. Member States shall regularly monitor this deployment in their territories to track the evolution of costs and benefits for the whole value chain, including the delivery of net benefits to consumers.'*

Negative CBA – Consumers' right to a smart meter

When the smart metering systems deployment is negatively assessed through the CBA, a MS shall ensure a periodical revision of this assessment is carried-out with regard to the changes in the underlying assumptions and market and technology developments. The MS updated economic assessment should be notified to the Commission services according to **article 19(5).**

In the case of a negative national CBA, final consumers are still entitled to have a smart meter installed, although they have to pay for the full costs themselves as stated in **article 21 (2a)**. It should have functionalities referred to in **article 20**, or with a set of minimum functionalities to be defined and published by MSs at the national level in line with the provisions in Annex III. In this framework, the MS or the designated competent authority shall ensure that smart metering systems are installed *'no later than three months* [77]*after the customer's request.'* They shall also regularly, and '*at least every two years, review and make publicly available the associated costs, and trace their evolution as a result of technology developments and potential metering system upgrades.'*

The Council position on smart metering did not bring major changes. The Council E-Directive added in article 19(5a) that the smart metering systems' provisions proposed in the E-Directive shall apply to future installations and installations replacing older smart meters. The already-installed smart metering systems, or for which the 'start of work'[78] has started before the date of entry into force of this Directive, may remain in operation over their lifetime.

Commission proposal

-Smart meter roll-out may be subject to CBA analysis

-Introducing the entitlement to a smart meter, in case of negative CBA, within 3 months of asking for one, while bearing the costs

-Setting more concrete functionalities for smart meters

-The imbalance settlement period to be harmonised at 15 min across Europe by 2025

Council Position

-For the already-installed smart metering systems, it is not mandatory to comply with the new functionalities and they may remain in operation over their lifetime

-A derogation could be given by NRAs regarding the imbalance settlement period in accordance with the EBGL

[77] This is changed to four months in the Council position.

[78] Start of works, according to Commission Communication 2014/C 200/01 1.3. 19 (44), means either the start of construction works on the investment or the first firm commitment to order equipment or another commitment that makes the investment irreversible, whichever is the first in time. Buying of land and preparatory works such as obtaining permits and conducting preliminary feasibility studies are not considered as start of works.

Stakeholders' positions

EURELECTRIC, (2017b), welcomes the proposal for the smart metering systems roll-out where the national CBA is positive. However, it adds that *'the proposal implies that Member States having rolled-out smart meters that do not comply with the outlined functionalities (defined in art. 20 and Annex III) by the time the legislation comes into force will need to upgrade them.'* EURELECTRIC believes however that *'as long as the meters deployed corresponded to the rules in application at the time of their deployment, no stranded costs should arise.'* This is especially related to the functionality stating that '*smart meters shall enable customers to be metered and settled at the same time as the resolution of the imbalance period in the national market takes place.'* (**article 20(g)**).

The CEER (2017d) white paper recommends maintaining *'a flexible approach to smart meter roll-out'* . It focuses especially on the case of negative CBA and states that *'smart meter roll-out is a national (not individual customer level) decision typically taken on the basis of a cost-benefit analysis. If a Member State's smart meter cost-benefit analysis is negative, an individual customer should not be entitled 'on-request' to a smart meter as this is neither practical nor cost efficient.'*

EDSO, (2017c) takes a similar position to EURELECTRIC with regard to the non-cost-efficient upgrade of the already rolled-out smart meters. It states that *'smart meters deployment will be completed in some Member States by the time the Electricity Directive enters into force. Therefore, if already deployed smart meters were obliged to comply with all the minimum functionalities, this could result in stranded assets and costs may outweigh the benefits. In some member states, the switch is assessed as a device with a high security of supply risk at societal level, and therefore contradictory with the requirement of highest level of security from sub-art b.'*

Wind Europe, SEDC, Solar Power Europe and other EU organisations welcome the roll-out decision of smart meters in the E-Directive. They state, in SEDC et al., (2017) that *'smart metering is a pre-requisite as the certified basis for billing consumers using multiple tariffs for market-based pricing. It also forms the foundation for the development of additional consumer services'.*

BEUC has stated that the E-Directive should be amended to indicate that *'where implementation of smart meter roll-out is assessed positively, consumers should have easy and timely access to the information on their consumption (i.e., near real time data defined down to seconds) so they can use this information and make informed decisions.'* Also *'the roll out of smart meters should be supported by a tailored advice programme that ensures consumers know how to make savings from their smart meter and how far this is supported by their own housing type.'* It adds that *'consumers should always have a choice to opt out and have their meter operated in a "dumb mode"'* (BEUC, 2017a).

3.2.3. Data access and management

Current practices

With the increased roll-out of smart meters across Europe, the experience from leading MSs in this process shows that robust and clear rules are necessary to ensure that the full benefits of smart metering data are realised, and that data privacy is respected (EC, 2016e). Such rules are not fully developed in the existing EU legislation, and national regulations may differ from one MS to another. This may harm the interests of market actors involved in data handling, meaning that they are unlikely to emerge without regulatory intervention. For example, studies from NRAs, according to EC (2016e) indicate that discriminatory access to information on potential customers represents a key barrier for new entrants to retail electricity markets in Europe. Indeed, as most DSOs are also electricity retailers, safeguards, and market monitoring

are necessary to prevent them from adopting discriminatory access and management of consumer data (i.e., smart metering data) and gaining a competitive advantage through information asymmetry between them (the incumbents) and the potential new entrants.

The CEP proposal for data access and management

According to the EC (2016e) impact assessment, consumer data management rules should be put in place in Europe, and standardised national data formats – to facilitate data access – should also be implemented. The CEP aims to define responsibilities in data handling as well as criteria and principles to ensure the impartiality and non-discriminatory behaviour of entities involved in data handling. It also includes proposals to implement a standardised data format at the national level. Principles ensuring the impartiality and non-discriminatory behaviour of entities involved in data handling as well as timely and transparent access to data, independently from the data management model, should be applied in each MS. These measures aim to increase transparency, provide non-discriminatory access and enhance competition, while at the same time ensuring data protection.

'Member States or, where a Member State has so provided the designated competent authorities, shall specify the eligible parties which may have access to data of the final customer with their explicit consent', according to **article 23(1)** of the E-Directive. '*Data shall include metering and consumption data as well as data required for consumer switching. Eligible parties shall include at least*[79] *customers, suppliers, transmission and distribution system operators, aggregators, energy service companies, and other parties which provide energy or other services to customers*.'

Article 23(2) adds that '*Member States shall organise the management of data in order to ensure efficient data access and exchange. Independently of the data management model applied in each Member State, the party or parties responsible for data management shall provide to any eligible party with the explicit consent of the final customer, access to the data of the final customer.*' MSs or the designated competent authorities shall also authorise and certify the parties that are managing data in order to ensure that they comply with the requirements of the E-Directive, according to **article 23(3)**. **Article 23(4)** states, regarding data access, that *'no additional costs shall be charged to final customers for access to their data. Member States shall be responsible for setting the relevant costs for access to data by eligible parties. Regulated entities which provide data services shall not profit from that activity*[80]*.'*

In addition to non-discriminatory data access, the Commission proposed nationally harmonised data formats that will also help new suppliers and service providers to enter the market and develop innovative new products. According to **article 24** of the E-Directive, MSs shall define a common national data format and a transparent procedure to promote competition in the retail market and avoid excessive administrative costs for the eligible parties[81]. Later, the Commission, by means of implementing acts, shall determine a common European data format that will replace those national data formats. MSs shall ensure then that market participants apply the common European data format.

In the Council position, **article 24(2)**, the common data format, to be determined by the Commission, was changed into interoperability requirements and non-discriminatory procedures for accessing the data that will build upon existing national practices adopted by Member States.

[79] The list of minimum eligible parties was removed in the Council position.
[80] The non-profit criteria of the data access of regulated entity has been removed in the Council position.
[81] This was removed in the Council position.

Commission proposal

-Setting principles ensuring the impartiality and non-discriminatory behaviour of entities involved in data handling and data access.

-Consumers' data can be shared among eligible parties with consumer consent.

-MSs shall specify the eligible parties for access to data while respecting the minimum eligible entities.

-MSs shall define a common national data format. Later, the Commission shall determine a common European data format that will replace those national data formats.

Council Position

-The list of minimum eligible parties was removed in the Council position.

-The common data format, to be determined by the Commission, was changed into interoperability requirements and non-discriminatory procedures for data access.

Stakeholders' positions

EURELECTRIC agrees with the Commission proposal regarding data access and management. It states in EURELECTRIC, (2017b) that '*there is no "one size fits all" data management model applicable in all European countries, it is however fundamental to set common principles at EU level to ensure that data access and exchange is done in a secure, transparent, neutral, non-discriminatory, and cost-efficient way.'* However as stated in their position regarding DSOs' role in data management, EURELECTRIC claims for a DSO and supplier' unrestricted access to their customers' metering and consumption data as indicated in EURELECTRIC position of section 2.4.3.

CEER welcomes the Commission's proposals for a transparent procedure for eligible parties to access data and the final customers free of charge data access (CEER, 2017e). On data format, CEER sees a scope for change. It states that *'a common European data format may generate high costs in the transition period from national standards to an EU standard, although it may bring long-term benefits. Before deciding on a common data format, energy regulators recommend a final analysis on the implications for innovation and retrospective compatibility. If a common European format is not required, interoperability should be allowed as a more cost-effective approach to facilitating retail competition between suppliers from different Member States.''*

EDSO also promotes a non-restricted DSOs access for all necessary data from the customers, as stated in its position regarding DSOs roles in data management in 2.4.3. It also states that *'the setting-up of a common European data format would be very costly to implement given the heterogeneous national frameworks, standards, and market processes, and therefore its costs should be compared against its benefits. In addition, evaluate whether the common data format should be limited to a "minimum content" to ensure easier implementation'* (EDSO, 2017c).

On data protection, BEUC has stated that the *'compliance with the data protection framework and effective enforcement must be ensured. The consumer must have the right to access and control all the data generated by the smart meter and other smart devices at home. Each party requesting the data has to provide justification of why the data is needed and should access data only after the explicit consent of the consumer. The consumer must be able to revoke this approval at any time'* (BEUC, 2017a).

3.2.4. Dynamic pricing

Dynamic pricing methods in Europe

Several dynamic pricing (DP) methods with different penetration levels among customers exist in Europe. The different methods depend on two main factors (ACER and CEER, 2015):

(i) the granularity of the period during which consumption is metered separately, and
(ii) the dynamics/statics of ToU prices.

The impact on consumers depends on the combination of these two factors. They can be rewarded for positively reacting to price signals or penalised if not. There are three main methods applied in the EU. Their implementation depends on the provided enabling framework.

- Static Time of Use (ToU): the end-user electricity price is set in advance for each fixed time band. It reflects the average wholesale price in the time band (low granularity-low dynamics). It can vary by time of day, day of week and/or season of year. Another form of 'static ToU', less common, that has high granularity-low dynamics, is where hourly consumption is priced at monthly average prices.
- Critical peak pricing (CCP): a higher end-user electricity price is charged in designated and limited periods corresponding to consumption peak at the system level (low granularity-high dynamics)
- Real-time pricing: the end-user electricity price is posted in real time (typically at least hourly) and communicated automatically to the consumer as it changes (high granularity-high dynamics).

Figure 21 gives a classification of the DP methods in function of the two factors.

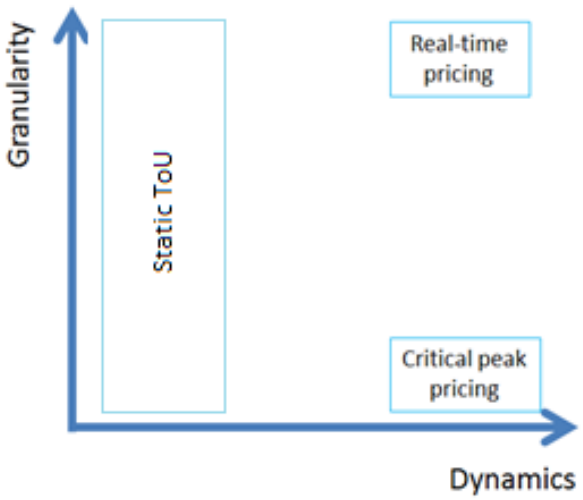

Figure 21: Methods of dynamic pricing for electricity

Dynamic Pricing in electricity supply

Figure 22 shows the different DP methods across MSs; countries are coloured according to the main dynamic pricing method used, as stated in the questionnaire presented in ACER and CEER, (2015).

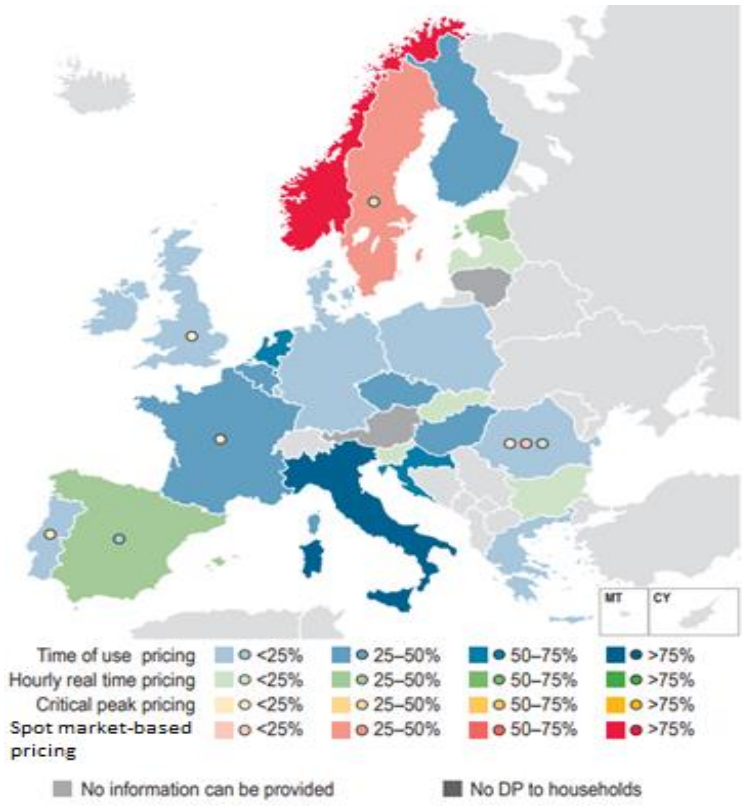

Figure 22: Share of standard household consumers supplied under dynamic pricing (DP), adapted from (ACER and CEER, 2015)

ToU pricing is applied in 17 out of 22 countries whose NRAs participated in the questionnaire. The most commonly applied type of ToU is a day/night differentiation. However, in some countries, like Italy, the number of time periods of ToU tariffs can be higher (e.g., in Italy, three-time bands are set based on the weekdays/weekends and peak/ off-peak differentiation). Spot market-based pricing applies to a large share of electricity household customers in three countries (Denmark, Norway, and Sweden) through monthly spot-exchange prices. The hourly real-time pricing method is only used in five European countries: Sweden, the UK, Romania, Estonia and Spain with different penetration levels among households. For the latter two, between 25% and 50% of all households have access to supply tariffs based on hourly pricing. Critical peak pricing (CCP) applies to a smaller proportion of households in France, Romania, Lithuania, Portugal and the UK.

In some MSs, there are multiple DP methods in use. The additional dynamic pricing methods are represented by the coloured dots in Figure 22. As for Spain, between 25% and 50% of households incur hourly real-time pricing and ToU also applies in supply to less than 25% of the households.

The CEP proposal for dynamic contracting

The CEP envisions the expansion of dynamic price contracts in Europe to enhance consumer empowerment and participation in competitive retail markets. We will present here the new provisions of the CEP in two parts, first, the entitlement to dynamic contracts and second the provision for dynamic pricing of networks.

Customer's entitlement and implementation monitoring

The E-Directive defines a dynamic electricity contract as *'an electricity supply contract between a supplier and a final customer that reflects the price at the spot market, including at the day ahead market at intervals at least equal to the market settlement frequency.'* This definition restricts dynamic pricing

contracts to the most granular and the most dynamic type of dynamic pricing. Thus, it excludes the static Time-of-Use Tariff (ToU) and the critical peak pricing (CCP).

Article 11 of the E-Directive on *'entitlement to a dynamic price contract'* states that MSs shall ensure that every final customer should be entitled, on request, to a dynamic electricity price contract[82]. Also, *'final customers shall be fully informed by the suppliers of the opportunities and risks of such dynamic electricity price contract.*[83]*'* Moreover, MSs through their NRAs *'shall monitor and report annually, for at least a ten-year period after such contracts become available, on the main developments of such contracts including market offers, the impact on consumers' bills and specifically the level of price volatility, and on consumers' sensitivity to the level of financial risk*.'

The Council position has changed the ten-year period for monitoring and reporting dynamic electricity price contracts. It proposes that it should be done where dynamic electricity price contract accounts for less than 80% of the electricity consumed by households instead.

Dynamic pricing for network charges in the EU CEP

Article 16(7) on *'charges for access to networks',* focuses on distribution tariffs which shall reflect the cost of use of the distribution grid by system users including active customers. They can be differentiated based on system user characteristics and generation/consumption profiles. It adds that: *'(…) where the EU Member States have implemented the deployment of smart metering systems, regulatory authorities may introduce "time differentiated network tariffs, reflecting the use of the network", in a transparent and foreseeable way for the consumer.'*

Commission proposal

- A new definition of dynamic pricing that excludes less granular pricing methods
- Mandatory dynamic pricing offerings from electricity suppliers
- Annual monitoring of DP contracts by NRAs for at least ten years is required
- Incentivising the introduction of dynamic time differentiated network tariffs

Council position

- Annual DP monitoring to be done where dynamic electricity price contract accounts for less than 80% of the electricity consumed by households.

Stakeholders' positions

EURELECTRIC agrees with customer entitlement to dynamic contracts in its position paper (EURELECTRIC, (2017b) but disagrees that the supplier is obliged to offer them. It states that '*offering dynamic electricity prices is also interesting for retailers as it provides them with the opportunity to reduce their hedging costs. There should not be any legal barriers to offer every final customer a dynamic electricity price contract if a customer chooses so, neither any obligation on all suppliers to offer such a product. (..) Any such obligation should be avoided to ensure coherence with the broader framework that advocates for complete market liberalisation [sic].'*

[82] The Council position restricts this right to customers who have a smart meter installed.

[83] The Council adds that *'regulatory authorities shall monitor the market developments and assess the risks that the new products and services may entail and modify safeguards in case of abusive practices.'*

EURELECTRIC adds that '*the proposed annual NRA report should also analyse the combined impact on consumers' bills of dynamic pricing and sales and purchases from an aggregation contract that customers may sign in parallel.'*

CEER also states that *'Member States should ensure that suppliers do not face any undue barriers if they choose to offer dynamic price contracts to customers. However, suppliers should not be obliged through EU legislation to offer dynamic price contracts as this could hinder retail competition, ultimately harming consumers. Furthermore, the definition of a dynamic price contract should be reassessed.'*

CEDEC also supports the idea not to oblige suppliers to offer dynamic contracts in (CEDEC, 2017). It states that *'given the cost for a supplier to develop such an offer, the right should be optional. Also, the right should not be explicitly limited to his current supplier, in order to let the market function most efficiently and to stimulate market development in this field.'*

BEUC adds that *'in case of dynamic price contracts, the contract as well as the summary of key contractual conditions should contain clear guidance and warnings explaining the financial risk of such contracts'* (BEUC, 2017a).

3.3. Market entry for new customer intermediaries

Two customer market intermediaries, aggregators and local energy communities, are defined in the CEP with provisions on their regulatory framework, roles, and duties aiming to group the energy generation or consumption of several consumers.

3.3.1. Aggregators

The landscape of electricity aggregators

An aggregator is an energy service provider which can change the electricity consumption of a group of electricity consumers and provide demand-side flexibility to the grid. Aggregation can be carried out by traditional energy service providers such as suppliers, or by new entrants such as independent aggregators. In practice, when consumers engage with an independent aggregator, they have one contract with the supplier and a separate one with the aggregator.

In European markets, there are few examples of independent electricity aggregators engaging with residential consumers. The existing aggregators mainly work with large industrial or commercial customers. However, with the emergence of consumer empowering new technologies and the adequate regulatory framework, residential flexible electricity consumption will become more commercially attractive for aggregators and vice-versa, (BEUC, 2018b). Figure 23 illustrates the access of independent aggregators to markets in Europe.

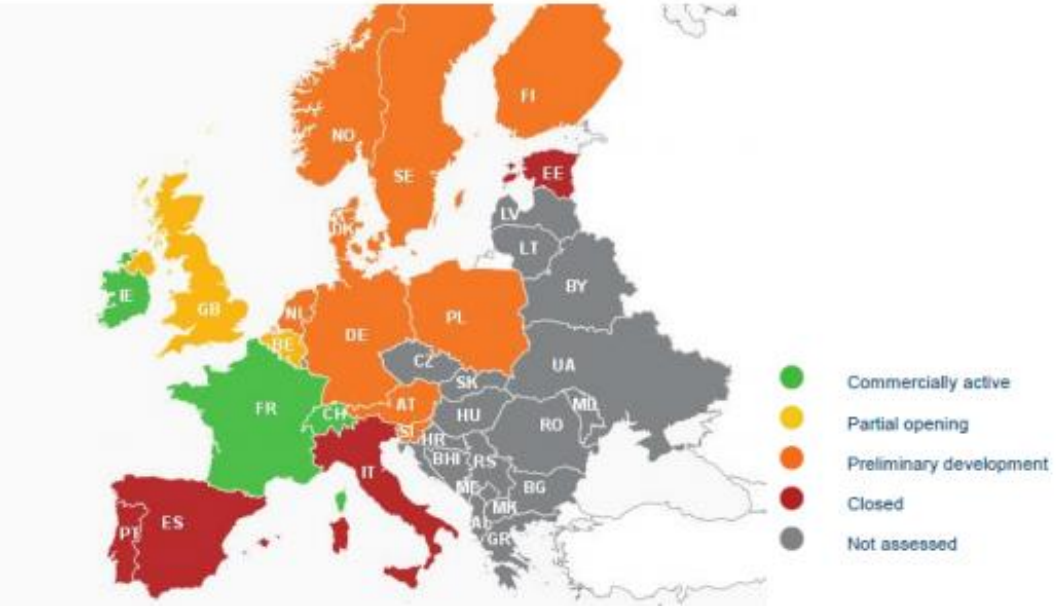

Figure 23: Aggregators' access to markets, source: (SEDC, 2017)

According to SEDC, (2017), the MSs that currently provide the most supportive framework for the development of demand response and aggregation are Switzerland, France, Belgium, Finland, the UK, and Ireland. Nevertheless, there are still regulatory issues that exist in these well-performing MSs.

Switzerland[84] and France[85] have put in place detailed frameworks for independent aggregation, including the standardised roles and duties of market participants. In Belgium, an upcoming legislation addressing the role of the aggregator and independent aggregation will soon be put in place. Spain, Portugal and Estonia are in red in Figure 23, because aggregated demand-side flexibility is either not accepted as a resource in any of the electricity markets or it is not yet regulatory viable. Italy is also in red, however, a partial opening of balancing markets to aggregators is occurring in 2018 (Bertoldi et al., 2017).

Independent aggregators and electricity suppliers can have opposing interests due to their type of activity; the former sell flexibility while the latter sell electricity. In most MSs, but not all, an aggregator needs permission from the supplier to access the supplier's consumers and therefore may prevent the aggregator from contracting with their customers.

The CEP proposal for aggregators

The CEP aims to establish a regulatory framework clarifying the roles and responsibilities of aggregators and lifting the barriers impeding independent aggregators from entering the market.

Article 2(14) of the E-Directive defines an 'aggregator' as *'a market participant that combines multiple customers loads or generated electricity for sale, for purchase or auction in any organised energy market'*. It can be considered as an independent aggregator, according to **article 2(15)**, if it '*is not affiliated to a supplier or any other market participant'.*

[84] Switzerland opened its market to aggregated Demand Response after certain regulatory changes in 2013 (SEDC, 2017).

[85] In France, large industrial customers have been participating in balancing mechanisms since 2003. The provision of FCR by industrial customers started in 2014. Furthermore, demand was allowed to participate in automatic FRR since July 2014, and in the day ahead and intraday markets from January 2017 (SEDC, 2017).

Consumers' right for aggregator contracting

Article 13 of the E-Directive on *'contract with an aggregator'* gives the right for aggregators to enter the market without consent from other market participants. It also sets contracting rules between final customers and aggregators. For instance, MS shall ensure that final customers' engagement with an aggregator '*shall not require the consent of the final customer's supplier.'*

Also, final customers contract termination with aggregators, while respecting contractual conditions, should be done within three weeks. If a fixed contract termination by final customers happens before its maturity, they should not be charged any termination fee that *'exceeds the direct economic loss to the aggregator, including the cost of any bundled investments or services already provided to the final customer as part of the contract.*[86]*'* **Article 13(4)** adds that *'Member States shall ensure that final customers are entitled to receive all relevant demand response data or data on supplied and sold electricity at least once per year.'* These rights regarding aggregators' contracts shall be granted to final customers in a non-discriminatory manner with regards to cost, effort or time.

The Council position states on suppliers' consent in **article 13(1)**, that MSs may allow suppliers to require such consent only in cases where the customer's supplier neither receives a regulated compensation payment, in line with **article 17(3)(db)** of the Council E-Directive, nor a compensation for positive imbalances[87] and the need for the supplier's consent is clearly specified in the contract between the customer and his supplier.

Rules for aggregators market participation

Article 17 of the E-Directive requires MSs to ensure demand response participation, from active customers directly, or through aggregation, in all organised electricity markets. It states that all MSs shall introduce a conducive legal framework for demand response aggregators to foster market participation of DR, including through independent aggregators while defining the relevant roles and responsibilities. Moreover, it adds that MSs shall ensure that TSOs and DSOs, when procuring ancillary services, treat demand response providers, including independent aggregators, in a non-discriminatory manner, on the basis of their technical capabilities.

To encourage aggregators' participation, **article 17(3)** states that MS national regulatory framework should provide to the aggregators the right to enter the market without consent from other market participants. Also, it should ensure that '*aggregators shall not be required to pay compensation to suppliers or generators.'* In paragraph **(4)**, the article indicates that Member States may exceptionally determine a compensation by the aggregator to BRPs. This happens exceptionally in *'situations where one market participant induces imbalances to another market participant resulting in a financial cost. Such exceptional compensation payments shall be subject to approval by the national regulatory authorities and monitored by the Agency.'*

The Council position states, on aggregators' financial responsibilities in **article 17(3)(da),** that '*market participants engaged in aggregation shall be financially responsible for the imbalances they cause in the electricity system. To this extent they shall be balance responsible parties or shall delegate their balance responsibility in accordance with Art 4 of the electricity Regulation.'* It adds that MS may require independent aggregators to pay compensation to other market participants or their BRPs if they directly induce imbalances to these market participants.

[86] This statement was removed in the Council position.

[87] Meaning a higher production or lower consumption than scheduled.

Commission proposal

-Introducing a conducive legal framework for DR aggregators to foster market participation.

-Aggregators can participate in the market without consent from other market participants i.e., customers' supplier.

-Final customers contract termination with aggregators should be done within three weeks.

Council Position

-MSs may allow suppliers to require their consent in some cases.

-Market participants engaged in aggregation shall be financially responsible for the imbalances they cause in the electricity system.

Stakeholders' positions

EURELECTRIC, (2017b) fully supports *'the objective that generation, storage and demand response should compete on a level-playing field, including non-discriminatory participation of aggregators in the market.'* However, it adds that *'the newly introduced definitions in Art. 2 for "independent aggregator"/"aggregators" need clarification as the intention of this distinction and its consequences are unclear. (…) "aggregators" and "independent aggregators" should not be exempted from rules applicable to other market participants, including balance responsibility.'*

CEER & ACER recognise '*the benefits of introducing independent aggregation and propose that MSs enable independent aggregation unless a national implementation assessment suggests an alternative that better serves system efficiency and can be implemented effectively. Such an assessment might be supported by an analysis of the state of competition in MSs' retail markets. This reflects a focus on the facilitation of aggregation (the activity), rather than aggregator type (the agent)',* (ACER and CEER, 2017c).

ENTSO-E welcomes the Commission proposal on aggregators. However, it believes that *'the absence of financial compensation between aggregators and suppliers or generators will create balancing market inefficiencies and could result in undue distortion of market incentives and competition. As a consequence, the overall development of implicit and explicit demand response would be put at stake.'* It adds that 'e*ach market party should be financially compensated for the energy it has sourced and which has been transferred to another market party's balancing perimeter'* (ENTSO-E, 2017d).

SEDC, (2017) also calls for a clarification of the relationship between retailers, BRPs, and independent aggregators to allow for a fair competition between market parties. It adds that *'standardised frameworks and processes should be put in place to enable the smooth functioning of the market'.*

3.3.2. Local Energy Communities

Landscape of local energy communities

The past decade or so has seen the emergence of increasing numbers of local energy cooperatives, through citizen initiatives, which produce and supply themselves with clean, renewable energy, and this trend is likely to continue in the future. They may be gathering a number of household consumers on a small scale or may be much more structured in larger local energy communities. Figure 24 gives an overview of the energy communities in Europe.

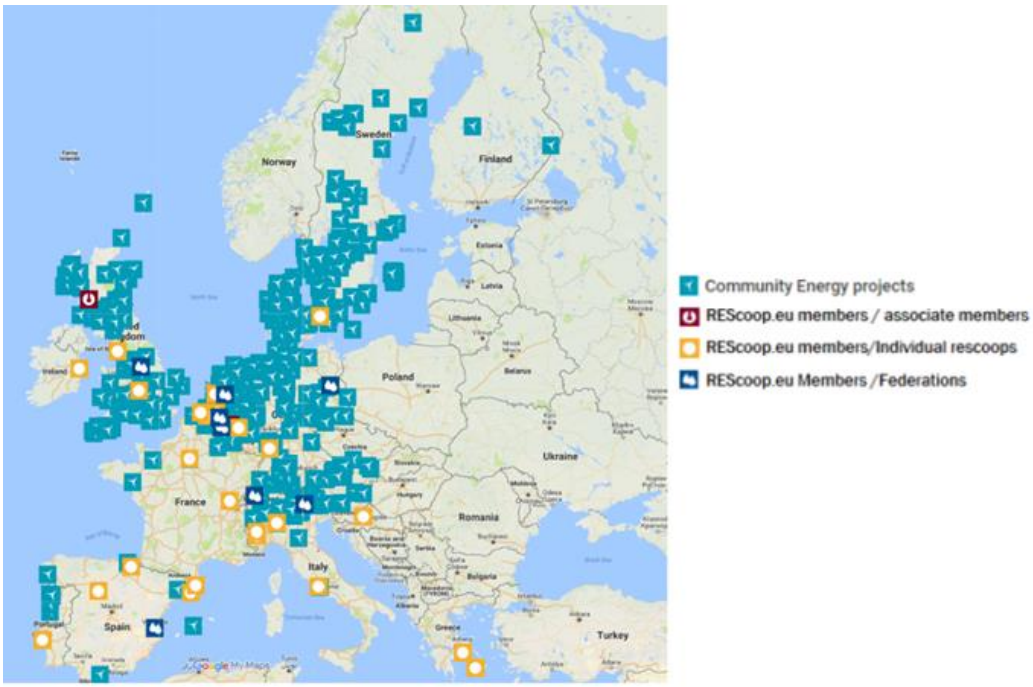

Figure 24: European groups or cooperatives of citizens working on renewable energy, energy efficiency, and e-mobility, source: (REScoop, 2018)

Recently citizen cooperatives have started looking at taking back the electricity grids as well. The most known example is the one of Hamburg, where citizens voted to buy back the distribution grid from Vattenfall in early 2014. A similar campaign had failed in Berlin, however, the question of buying back the grid there has not yet been completely resolved (EC, 2015d).

The drivers for energy communities are not just the benefits from competitive energy prices and investment returns. Energy communities are also driven by citizens' willingness to work against monopolies by cooperating with their neighbours and their desire to fight climate change with a social and renewable focus.

EU citizens have started investing in local energy communities and especially renewable energy cooperatives in countries like Spain, Croatia, France and Greece. However, different legal frameworks and lack of effective support mechanisms have prevented those countries from keeping up with the more developed energy community countries of the north, such as the Netherlands, Sweden, Denmark, Germany and Belgium (EC, 2015d).

The CEP proposal for Local Energy Communities

According to the E-Directive, a 'local energy community' means: '*an association, a cooperative, a partnership, a non-profit organisation or other legal entity which is effectively controlled by local shareholders or members, generally value rather than profit-driven, involved in distributed generation and performing activities of a distribution system operator, supplier or aggregator at local level, including across borders.*' The CEP recognises local energy communities as a critical enabler for encouraging the involvement of the individual in the development of the electricity sector and requires from member states to ensure implementation of enabling legal frameworks.

Recital 30 of the E-Directive, states that '(…) *Local energy communities should be allowed to operate on the market on a level-playing field without distorting competition. Household consumers should be allowed to voluntarily participate in a community energy initiative as well as to leave it, without losing access to the network operated by the community energy initiative or their rights as consumers. Access to a local energy community's network should be granted on fair and cost-reflective terms.'*

MSs adopt a legal framework for the establishment of local energy communities (**article 16** of the E-Directive). They should ensure that LECs are entitled '*to own, establish, or lease community networks and to autonomously manage them.'* They shall also access all organised electricity markets either directly or indirectly (through aggregators or suppliers) in a non-discriminatory manner, as shown in **Error! Reference source not found.**, (Butenko, 2017b). LECs should additionally be '*subject to fair, proportionate and transparent procedures and cost-reflective charges.'*

The LECs enabling regulatory framework should provide voluntary participation in these communities and guarantee individual rights for their shareholders or members. On grid operation, when LECs perform distribution network activities, they are subject to the same provisions as the DSOs, included in chapter IV of the E-Directive. They may also, where relevant, conclude an agreement with a DSO, to which their network is connected, for the operation of the LEC's network, subject to cost-reflective network charges.

According to **article 16(2)(g),** if an LEC consumes electricity from an external network, it will be subject to 'appropriate network charges', which must account separately for the electricity fed and taken from the grid. Given that these measures will be contained in a Directive, this may leave further space for MSs for adopting national measures for LECs. Indeed, there are some areas that are still not clear, such as LECs licencing procedure, possible concentration or size requirements with regards to LECs diverse roles (Butenko, 2017b).

Table 5: EU CEP impact on LECs' Market Access, adapted from (Butenko, 2017b)

	PRODUCTION	WHOLESALE MARKET COMMODITY		WHOLESALE MARKET SERVICES		RETAIL MARKET	
		DIRECT	INDIRECT (AGGREGATOR)	DIRECT	INDIRECT (AGGREGATOR)	DIRECT	INDIRECT (AGGREGATOR)
3RD ENERGY PACKAGE	✓	✓	✗	✓	✗	✓	✗
EU CEP	✓	✓	✓	✓	✓	✓	✓

The Council position divides the framework of LECs to be established by MSs into two parts: a mandatory one as stated in **article 16(1)** concerning the enabling regulatory framework to be provided by MSs for the open and voluntary participation in LECs, its members rights as well as DSOs relation with energy communities' compensation and procedures regarding the overall cost sharing of the system.

The second part regards cross-border participation, distribution network management and the community sharing of self-generated electricity. **Article 16(2)** of the Council position states that MSs may provide in the enabling regulatory framework that LECs are open to cross-border participation as well as

the right to own, manage, establish, purchase or lease the distribution network in their area of operation according to the E-Directive provisions on DSOs rules**.**

Commission proposal

-A definition of Local Energy Communities having access to different electricity markets

-Ensuring the possibility for LECs to establish, own, and autonomously manage networks as well as to purchase and sell electricity directly or through aggregators.

-LECs should be subject to appropriate network charges for the electricity consumed from an external network

Council position

- The Council has given freedom to MSs to allow or not energy communities' openness for cross border participation as well as for the right to own, manage, establish, purchase or lease the distribution network in their area of operation

Stakeholders'positions

EURELECTRIC, (2017b) states regarding the provisions on LECs, that *'any kind of positive discrimination of energy communities at the expense of other consumers and actors in the energy system must be avoided*''. It adds that LECs *'should not be exempted from market obligations such as balancing responsibility and from paying cost-reflective network charges.'*

CEER, (2017e) has indicated that the definition of LECs should be refined. It states that the *'participation in local energy communities should be strictly voluntary; shareholders/members of local energy communities must not lose their rights as household or active customers, including the right to leave the local energy community and thereby switch suppliers quickly; and legal responsibility must remain with such communities even when management is delegated to a third party.'*

CEER strongly supports the fact that LECs *'are subject to appropriate network charges at the connection points between the community network and the distribution network outside the energy community.'* It adds that *'such network charges shall account separately for the electricity fed into the distribution network and the electricity consumed from the distribution network outside the local energy community in line with Article 59 (8).'*

EDSO, (2017d) suggests that some rights and obligations of LECs could be potentially contradictory. It states that *'the entire electricity system is built on the strict separation between regulated (network operators) and unregulated (supply). It is questionable that the Directive seems to allow LECs to be both at the same time.'* It proposes that '*if LECs are involved in (regulated) grid activities, conditions must apply in the same way to LECs as to the DSOs, which includes compliance with unbundling rules.*'

REScoop, (2017c) position paper on LECs states that the definition of a LEC *'should clearly specify the characteristics that distinguish a LEC from traditional public and commercial energy companies, and acknowledge equally all the activities that LECs engage in throughout the power sector'*. It should include open, or non-exclusive, economic participation of all potential local shareholders, direct democratic governance based on equal decision-making rights. REScoop also adds that LECs' definition should reduce the emphasis on the link to distribution system operation as the E-Directive definition might be interpreted as presenting LECs as DSOs. Moreover, REScoop states that the role of LECs in addressing energy poverty, particularly in national energy action plans, should be better acknowledged.

BEUC adds that *'local communities should be granted a simplified access to wholesale markets. Exemptions regarding market access for local renewable energy communities should be granted to facilitate consumers' engagement in energy markets'*. It also indicates that *'whenever communities act as aggregators, for instance by selling self-generated solar electricity to tenants, tenants should always be able to decide if they want to participate in this scheme and therefore, contractual relationships should be purely voluntary for tenants'* (BEUC, 2017a).

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