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REPORT FROM THE COMMISSION

Interim Report of the Sector Inquiry on Capacity Mechanisms

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1. Introduction

On 29 April 2015 the Commission launched a sector inquiry into the financial support that EU Member States grant to electricity producers and consumers to safeguard security of electricity supply (capacity mechanisms). It has concerns that capacity mechanisms may unduly favour particular producers or technologies and that they may create obstacles to trade in electricity across borders.¹

To test these concerns, over the past year the Commission has collected a large amount of information on existing and planned capacity mechanisms in 11 Member States. It has investigated why Member States implement capacity mechanisms, how these mechanisms are designed and what their effects are on competition and trade in the internal electricity market.

The Commission will draw on the information collected in the inquiry when assessing whether capacity mechanisms comply with EU State aid rules.²

The inquiry will contribute to the Commission's Energy Union strategy, in particular by supporting the development of a legislative proposal for a new electricity market design in the EU. On 18 March 2016 the European Council recalled the importance of a fully-functioning and interconnected energy market.³ Lessons learned from the sector inquiry will support the development of more regional approaches to security of supply, as where capacity mechanisms are used they will increasingly need to be opened up to allow participation across national borders.

This **interim report** and the **annexed Staff Working Document** set out the Commission's preliminary findings and tentative conclusions from the inquiry.

The Commission invites the EU Member States, stakeholders in the electricity sector and the general public to **submit comments** on the interim report and the annexed staff working document within the next 12 weeks.

The Commission will publish a final report on the sector inquiry later this year.

¹ http://europa.eu/rapid/press-release_IP-15-4891_en.htm

² Guidelines on State aid for environmental protection and energy 2014-2020 ('EEAG') (OJ C 200 of 28.06.2014, p. 1)

³ European Council conclusions, 17-18 March 2016, <http://www.consilium.europa.eu/en/press/press-releases/2016/03/18-european-council-conclusions/>

2. The Commission's policy in the area of electricity market design

Europe's electricity sector is experiencing a period of unprecedented transition. Liberalisation and decarbonisation policies have profoundly changed the way electricity is generated, traded and consumed in the European Union. Renewable energy sources have grown rapidly. 26% of the EU's power is generated from renewables and 10% of total electricity is now sourced from intermittent sources, such as wind and solar.⁴

The large scale roll-out of renewables combined with the overall decline in demand and the decreasing cost of fossil fuels have curbed the profitability of conventional generators and reduced incentives to maintain existing power plants or invest in new ones. In many Member States, these developments have been accompanied by increased concerns about security of supply. Member States are concerned that the electricity market will not produce the investment signals needed to ensure an electricity generation mix that is able to meet demand at all times.

Some Member States have reacted by taking measures designed to support investment in the additional capacity that they deem necessary to ensure an acceptable level of security of supply. These capacity mechanisms pay providers of existing and/or new capacity for making it available.

When introduced prematurely, without proper problem identification or in an uncoordinated manner, and without taking into account the contribution of cross-border resources, there is a risk that capacity mechanisms distort cross-border electricity trade and competition. For example, they may reward new investments only in certain types of generation or exclude demand response. They may also encourage investment within national borders when it would be more efficient to reinforce interconnection and import electricity when needed.

The Commission has voiced its concerns about the security of electricity supply in the framework of the Energy Union,⁵ and it announced plans to propose legislation on electricity market design and security of electricity supply. The legislative proposal would establish a range of acceptable risk levels for supply interruptions and an objective, EU-wide, fact-based security of supply assessment addressing the situation in Member States. To obtain stakeholders' views on these ideas, the Commission has launched two public consultations.⁶ The sector inquiry into capacity mechanisms is a part of this wider initiative.

⁴ European Commission 'Renewable energy progress report,' 15 June 2015, COM(2015)293

⁵ Communication from the Commission, 'A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy', 25 February 2015, COM(2015) 80

⁶ COM(2015)340 final

https://ec.europa.eu/energy/sites/ener/files/documents/DG%20ENER_ConsultationPaperSoSelectricity14July.pdf

3. The sector inquiry into capacity mechanisms

The Commission can carry out inquiries into particular sectors if it suspects that competition is affected by action taken by private undertakings or public authorities. This sector inquiry is the first ever in the area of State aid.⁷

The Commission launched the inquiry due to concerns that existing or planned support schemes for electricity capacity risk distorting competition and undermining the internal energy market.

The information gathered in the sector inquiry will enable the Commission to understand better:

- whether, and to what extent, it is necessary that Member States grant State aid to ensure security of electricity supply;
- what types of capacity mechanisms are most suitable to ensure security of electricity supply, and under which conditions capacity mechanisms risk distorting competition between capacity providers⁸ and cross-border trade;
- how capacity mechanisms can complement the internal energy market rather than undermine its functioning;
- how capacity mechanisms for security of supply interact with decarbonisation objectives; and
- how compliance with State aid rules can be ensured when Member States design and implement capacity mechanisms.

To this end, the Commission has, as a first step, examined the reasons behind the introduction of capacity mechanisms and their design features. It has examined a number of existing mechanisms as well as a number of mechanisms that Member States plan to put in place. It has looked at those mechanisms in the wider market context considering in particular the growing share of renewable energy.

In this interim report, the Commission presents its preliminary findings and tentative conclusions from the information collected. It invites comments on the findings and conclusions, and will use these as a basis for a final report to be published later this year.

⁷ Since the revision of the State Aid Procedural Regulation in 2013 the Commission can conduct sector inquiries where State aid measures may distort competition in several Member States or where existing state aid measures are no longer compatible with the internal energy market.

⁸ For instance between power generators and demand response operators

This interim report does not provide an assessment of whether the existing or planned capacity mechanisms in the Member States comply with EU State aid rules. The Guidelines on State aid for environmental protection and energy 2014-2020 ('EEAG') include specific rules for assessing capacity mechanisms. The Commission has already applied these rules to capacity mechanisms notified by the United Kingdom and France.⁹ As it did in these cases, the Commission will assess the compatibility of capacity mechanisms with State aid rules in the context of State aid procedures.

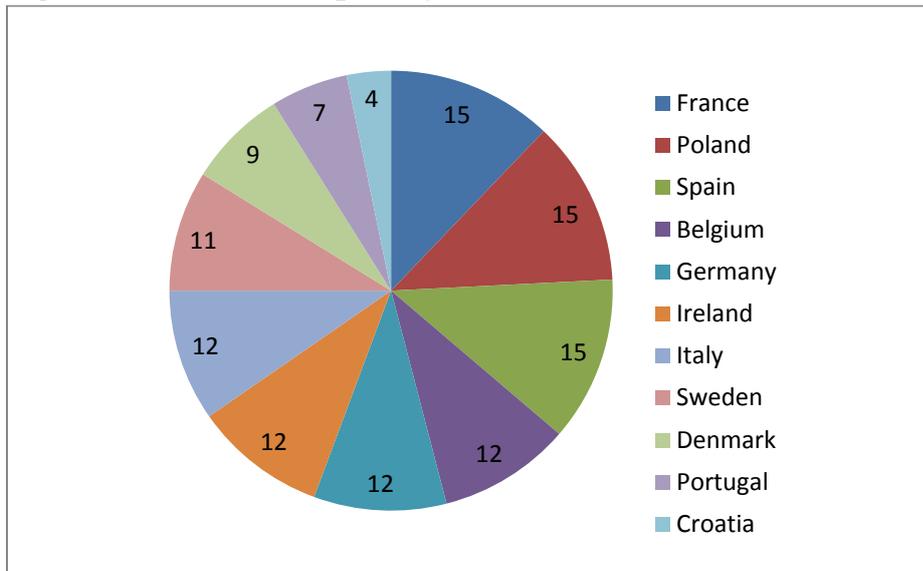
4. Process

The inquiry covers eleven Member States: Belgium, Croatia, Denmark, France, Germany, Ireland, Italy, Poland, Portugal, Spain and Sweden. The Commission selected these Member States based on three considerations: (i) the existence of a capacity mechanism or plans to introduce a mechanism, (ii) the need to cover different models of capacity mechanisms existing or planned in the EU; and (iii) the likely impact of the existing or planned capacity mechanism on competition and cross-border trade.

To prepare this interim report the Commission sent detailed questionnaires to over 200 public bodies, energy regulators, network operators and market participants commercially active in the eleven Member States covered by the inquiry. It received 124 replies.

⁹ For the British capacity market decision see Commission decision C (2014) 5083 final of 23.7.2014 in Case SA.35980 (2014/N-2) – United Kingdom – Electricity market reform – Capacity market. The public version of the decision is available at: http://ec.europa.eu/competition/state_aid/cases/253240/253240_1579271_165_2.pdf. The Commission opened formal investigations into the French country-wide capacity mechanism (SA.39621) and the tender for a gas-fired power plant in Brittany (SA.40454) on 13 November 2015. See: http://europa.eu/rapid/press-release_IP-15-6077_en.htm. For the country-wide capacity mechanism the public versions of these decisions (in French) are available at: http://ec.europa.eu/competition/state_aid/cases/261326/261326_1711140_20_2.pdf and for the tender for a gas-fired power plant in Brittany at: http://ec.europa.eu/competition/state_aid/cases/261325/261325_1711139_35_3.pdf.

Figure 1: overview of replies by Member State



Source: European Commission

The Commission also organised three workshops with Member States on questions related to capacity mechanisms, for instance on adequacy assessments, design features and cross-border participation in capacity mechanisms.¹⁰ Bilateral meetings were held with European bodies and associations, including the Agency for the Cooperation of Energy Regulators (ACER), the European Network of Transmission System Operators for Electricity (ENTSO-E), the International Energy Agency (IEA) and associations of electricity producers, consumers, storage operators and demand-response providers. In addition, the Commission has also made use of public sources of information as well as specialist literature and publications on the topic.

5. Structure of the annexed staff working document

The annexed Staff Working Document presents in more detail the inquiry's findings on the current practice of Member States when contemplating, adopting and operating a capacity mechanism. A number of tentative conclusions are drawn from this information.

The first two chapters of the Staff Working Document define the scope of the work and describe the context in which the issue of capacity mechanisms has arisen. Chapter 2 presents an overview of the state of the European electricity market, with an emphasis on the eleven Member States covered by the inquiry. It explains why many Member States are concerned about the continued capability of their electricity system to meet demand at all times and are therefore using or considering introducing capacity mechanisms. It then assesses what drives investments in generation capacity and describes the market and regulatory failures that

¹⁰ http://ec.europa.eu/competition/sectors/energy/state_aid_to_secure_electricity_supply_en.html

impact investment decisions in the electricity market. The chapter also identifies a number of market and regulatory reforms that can help improve the functioning of the internal electricity market and therewith reduce or remove the need for capacity mechanisms. Finally, it recognises that there are residual market and regulatory failures which may persist well into future.

Subsequent chapters examine the ability of capacity mechanisms to address these residual market and regulatory failures. Chapter 3 divides capacity mechanisms into different types and, based on that taxonomy, categorises the capacity mechanisms covered by the sector inquiry. Chapter 4 explains how Member States assess their generation adequacy¹¹ and the role of reliability standards¹² in that assessment. Chapter 5 presents the design features of the capacity mechanisms covered by the inquiry, looking into questions such as: who can participate in the scheme, how does the selection take place and what are the rights and obligations of scheme participants. Based on these findings, Chapter 6 draws tentative conclusions regarding the suitability of each type of capacity mechanism to ensure security of electricity supply as well as their impacts on the market.

6. Preliminary findings and tentative conclusions

6.1. The context in which generation adequacy concerns arise

Capacity mechanisms are not a recent invention. Between 1990 and 2001 the electricity market in England and Wales included a capacity payment as a separate element to the electricity price. Ireland, Italy and Spain have made capacity payments to electricity generators for many years and in Sweden strategic reserves have existed since 2003. Nevertheless, in recent years an increased interest in capacity mechanisms has led to the planning and introduction of a large number of new schemes.

The reasons for Member States' renewed interest in capacity mechanisms can be found in the development of the electricity sector. As shown in Chapter 2 of the Staff Working Document, generation capacity in the EU has increased over the past years. This increase is mainly due to the growth of electricity generation from renewable energy sources. At the same time, electricity demand has decreased. The decrease is partly due to the economic crisis in the EU since 2008, and partly due to energy savings resulting from energy efficiency measures.

Increasing generation capacity and decreasing demand have led to increasing gaps between peak demand and generation capacity, which points to overcapacity. This has in turn led to

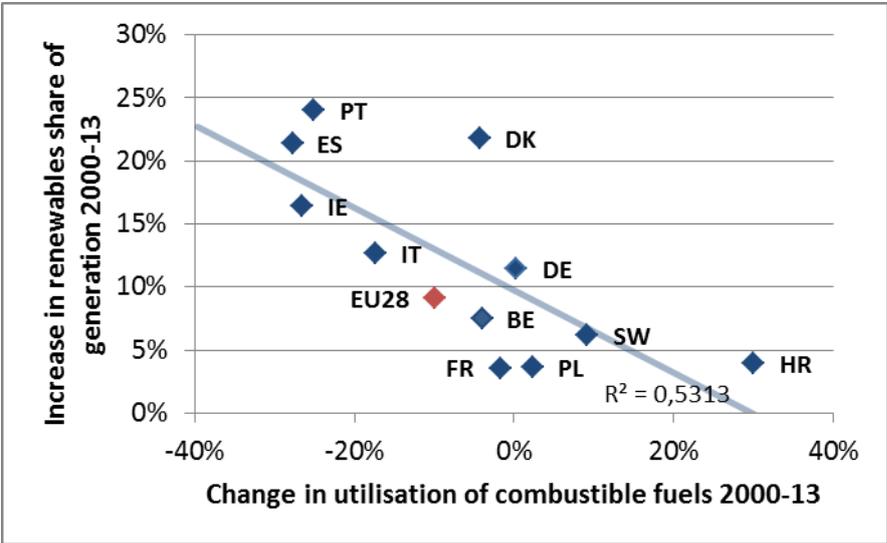
¹¹ 'Generation adequacy' means a level of generated capacity which is deemed to be adequate to meet demand levels in the Member State in any given period (based on the use of a conventional statistical indicator).

¹² The term 'reliability standard' in the context of the sector inquiry refers to a level of generation adequacy that is deemed acceptable and which may form the basis for interventions.

decreasing electricity wholesale prices since 2011. In Germany for instance year-ahead wholesale prices are currently at a 14-year low.

The generation capacity of new renewable energy usually has lower running costs than conventional coal- or gas-fired power plants. As a result the conventional power plants do not produce as often as they did in the past, especially in markets with a high proportion of renewable energy. The intermittent character of renewable sources of electricity creates uncertainty regarding the frequency of price spikes that help conventional technologies to recoup their investment costs. Figure 2 shows a correlation between the renewable energy share in the market and the extent to which fossil fuel generation is used: the more renewable energy, the lower the running hours of conventional power plants.

Figure 2: Renewables impact utilisation rates of conventional power plants



Source: European Commission based on Eurostat data

Whilst the current situation in EU electricity markets is characterised by a high level of security of supply, also compared to other parts of the world, many Member States are concerned that these developments will impact the adequacy of their electricity mix in the future. Many unprofitable power plants plan to mothball or to close. In recent years this has become an issue especially for flexible gas-fired power plants that have generally become more expensive to run compared to less flexible lignite or coal. Moreover, some Member States such as the UK, Poland and Croatia have an ageing fleet of coal-fired power plants, many of which they expect will close in the coming years. The trend to more generation from renewables constitutes an economic challenge for the business model of many established energy companies with a fossil fuel-based generation fleet. While the shift towards more renewable energy production is an intended development, it poses a challenge to security of supply if the result is the closure of, or lack of incentives to invest in, flexible power plants which are still needed to back up intermittent wind and solar renewable generation.

There is also a mismatch between the location of new renewable energy installations and centres of consumption. One example is Germany where most renewable energy is generated in the North, while many of the conventional and nuclear power plants that may close in the short- or medium term are in the South where important demand centres are located. The development of the grid does not keep pace with these changing supply/demand patterns. Even more important, electricity prices do not send the right signals for matching local supply and demand, because Germany, together with Austria and Luxembourg, forms a single bidding zone with means that the price of electricity on the wholesale market is the same across this entire area.

In principle, wholesale electricity markets (the 'energy-only' market) should be able to provide the price signals necessary to trigger the necessary investments provided wholesale prices allow fixed costs to be recovered. The ability of the 'energy-only' market model to do so in practice is currently debated because today's electricity markets are characterised by uncertainties as well as a number of market and regulatory failures which affect wholesale market price signals. These include: low price caps (which can be seen as a tool to prevent abuse of market power but which can also constrain the ability of electricity prices to rise and reflect scarcity and consumer's valuation of reliability), renewables support schemes that distort price signals, unpredictable scarcity periods, the lack of short term markets that allow for broad participation and the lack of active participation of demand response operators.

In this context, Member States may choose to implement capacity mechanisms instead of tackling market design failures. It is fundamental that Member States improve the functioning of their markets as far as they possibly can and address the underlying causes that created their adequacy concerns in the first place. This is likely to require Member States to ensure appropriate price signals – particularly at times of scarcity – since these prices provide the incentives for demand response, flexible generation capacity, and for imports and exports within the internal electricity market.

There are however some residual market and regulatory failures which are difficult to remedy or require time to be addressed properly. For example, demand participation requires that consumers have the equipment (e.g. smart meters), the real-time information and the contracts that allow them to react to price increases and to adapt their electricity consumption accordingly. In addition, liquid and competitive short term markets that can better contribute to security of supply cannot be developed across Europe overnight. Finally, it can take years to build the transmission lines necessary to remove network constraints.

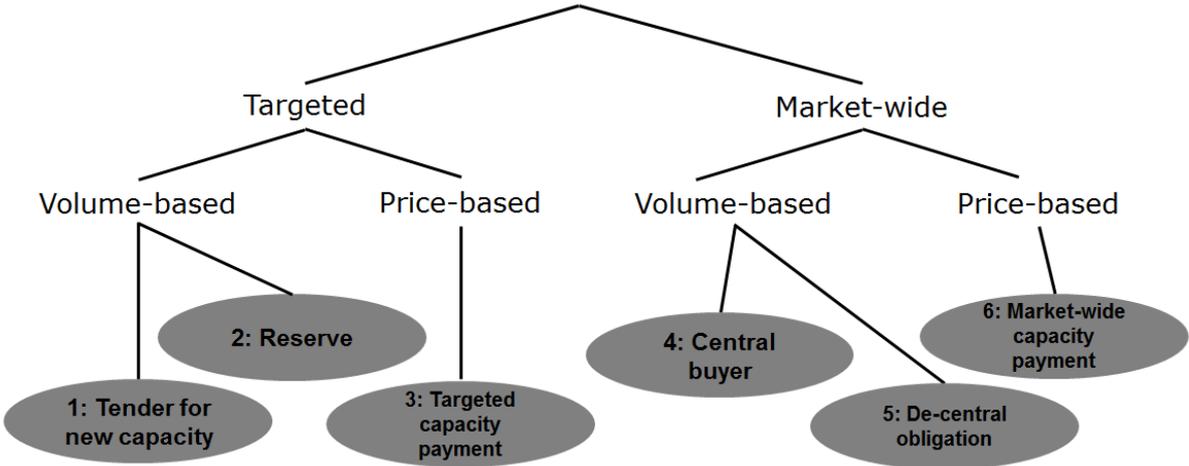
For these reasons, many Member States have introduced or are planning to introduce capacity mechanisms. These mechanisms fundamentally change electricity markets because generators and other capacity providers are no longer paid only for the electricity they generated but also for their availability.

Capacity mechanisms may cause a number of competition concerns. A patchwork of mechanisms across the EU risks affecting cross border trade and distorting investment signals in favour of countries with more ‘generous’ capacity mechanisms. Nationally determined generation adequacy targets risk resulting in the over-procurement of capacities unless imports are fully taken into account. Capacity mechanisms may strengthen market power if they, for instance, do not allow new or alternative providers to enter the market. Capacity mechanisms are also likely to lead to over-compensation of the capacity providers – often to the benefit of incumbents – if they are badly designed and non-competitive. All of these issues can undermine the functioning of the internal energy market and increase energy costs for consumers.

6.2. Capacity mechanisms encountered in the eleven Member States

The Member States covered by the inquiry apply a wide array of capacity mechanisms. The Staff Working Document in annex to this interim report categorises them into six types: (i) tenders for new capacity; (ii) strategic reserves; (iii) targeted capacity payments; (iv) central buyer models; (v) decentralised obligations; and (vi) market-wide capacity payments.¹³ These types of capacity mechanisms can be grouped into two broad categories: targeted mechanisms, which foresee payments to selected categories of capacity providers only, and market-wide mechanisms, which are in principle open to participation from all categories of capacity providers. Within these two categories, it is possible to distinguish volume-based mechanisms and price-based mechanisms.

Figure 3: A taxonomy of capacity mechanisms



Source: European Commission

¹³ See the Staff Working Document, Chapter 3.1 for a more detailed explanation of the taxonomy.

In total, the inquiry identified 28 existing or planned capacity mechanisms in the 11 Member States (see Table 1). The most common form of capacity mechanism is a strategic reserve. Strategic reserves include power plants and other capacity that do not participate on the wholesale market, but that are kept apart only to be called upon by the network operator in emergency situations.

So-called ‘interruptibility schemes’ in which industrial customers can be asked by the network operator to reduce their demand in scarcity situations are included in this definition as they also provide capacity that is only activated at the network operator’s request. Strategic reserves exist in eight Member States, with Germany and Poland operating both an interruptibility scheme and another form of strategic reserve. Spain currently has the highest number of capacity mechanisms (four).

Table 1: Capacity mechanisms in the sector inquiry

Tender for new capacity	Strategic reserve	Targeted capacity payment
Belgium **	Belgium	Italy
France	Denmark **	Poland
Ireland **	Germany ***	Portugal ***
	Poland	Spain ***
	Sweden	
	Germany (Interruptibility Scheme)	
	Ireland (Interruptibility Scheme)	
	Italy (Interruptibility Scheme) ***	
	Poland (Interruptibility Scheme)	
	Portugal (Interruptibility Scheme)	
	Spain (Interruptibility Scheme)	
Central buyer	De-central obligation	Market-wide cap. payment
Ireland *	France *	Ireland
Italy *		

* Planned Mechanism (or being implemented)
 ** Past Mechanism (or never implemented)
 *** Multiple capacity mechanisms of the same type

Source: European Commission based on replies to sector inquiry

6.3. Adequacy assessments and reliability standards

The sector inquiry has shown that a clear majority of public authorities expect reliability problems in the future even though today such problems occur only very rarely.

To determine whether these concerns require the introduction of a capacity mechanism, Member States first need to carry out an assessment of the adequacy situation. The inquiry demonstrates that Member States carry out such assessments with an increasing degree of sophistication. The methodologies are however rarely comparable across Member States. Methods vary significantly, for instance when it comes to the question whether to take into account generation from other countries, but also regarding the scenarios and underlying

assumptions. This reinforces the national focus of most mechanisms and prevents a common view on the adequacy situation which shows a possible need for (common) action at EU or regional level.

To determine the desired level of security of supply, Member States can define 'reliability standards' which enable them to make a trade-off between the benefits of reliability and the cost of providing it. However, the inquiry found that practices to define reliability standards differ significantly. Not all Member States define reliability standards and without reliability standard there is no objective benchmark against which to measure whether a capacity mechanism is required. The interim findings moreover suggest that even where a reliability standard exists, it is rarely based on the actual willingness of consumers to tolerate power cuts ('value of lost load' or 'VOLL'). There is also little evidence to suggest that Member States who have a capacity mechanism in place properly link the amount of capacity they need to the desired level of reliability as expressed by their reliability standard.

The absence of common methods to define generation adequacy and reliability standards makes it difficult to assess the necessity of the existing and planned capacity mechanisms and makes cross-border coordination difficult as Member States have a different perception of the actual problem. This in turn makes it difficult to assess the possibility of interconnectors filling in the identified capacity need. In addition, the contribution of renewables and demand response to system adequacy is not always properly considered.

There therefore appears to be a strong case a better alignment of the methods used to define generation adequacy and reliability standards. This is likely to be an essential element in the Commission's forthcoming market design initiative.¹⁴ As regional and EU-wide methodologies mature and become more reliable, they should also increasingly be used as a basis for assessing the need for introducing capacity mechanisms, notably under EU State aid rules.

6.4. Design features of capacity mechanisms

Once Member States have assessed their generation adequacy situation and concluded that there is a need to support generation capacity, they have a range of choices to design a suitable capacity mechanism to address the problem identified. The Staff Working Document presents the most important of those design choices in three categories:

- a) *Eligibility*: who can participate in the capacity mechanism? Is the mechanism open to different types of capacity providers, new capacities, demand response, electricity storage and/or capacity providers located in other Member States?

¹⁴ COM 2015 (340).

- b) *Allocation*: how does the process of selecting the supported capacity providers work, and how is the level of capacity remuneration determined?
- c) *Product design*: what is required from capacity providers supported by the mechanism, and what happens if they do not meet their obligations?

6.4.1. Eligibility

Well-designed eligibility criteria are important to ensure an optimal selection of capacity providers to address the identified security of supply problem. However, the preliminary findings indicate that most existing capacity mechanisms are open only to a limited number of capacity providers. In some cases certain capacity providers are explicitly excluded from participating or the group of potential participants is explicitly limited to certain providers. In other cases, Member States set requirements that have the same effect, implicitly reducing the type or number of eligible capacity providers. Examples are size requirements, environmental standards, technical performance requirements, availability requirements (de-rating), the lead time of the mechanism, i.e. the time between the award of the capacity contract and the start of the availability obligation, and the contract length offered to capacity providers. In a substantial number of capacity mechanisms the lead time is less than one year, which makes it difficult for capacity providers to develop capacity offers requiring a longer planning and implementation time, in particular to build new power plants. Short lead times therefore tend to implicitly exclude new generation capacity and, to a lesser extent, new demand response providers.

The sector inquiry specifically looked at the eligibility conditions of different types of generation technologies, demand response operators, storage providers and new and existing capacities. Locational eligibility requirements were also investigated. A clear majority of the existing and planned capacity mechanisms exclude certain generation technologies. While almost all Member States support demand response by means of some form of capacity remuneration, it does not always compete on equal footing with other capacity providers.

With respect to the inclusion of new and existing capacities, the sector inquiry has shown that Member States often focus either entirely on attracting new capacity or on avoiding the closure of existing capacity, rather than on both. The capacity mechanisms covered by the inquiry are in general open to capacity irrespective of their location within the Member State although separate rules often apply to islands.

The sector inquiry has shown that selective mechanisms may lead to the development of additional mechanisms so as to compensate capacity sources that were initially left out. A good example of this ‘snowball effect’ is the fragmented landscape of capacity payment mechanisms in Spain. In 1997, Spanish power plants started receiving targeted capacity remuneration. This, however, was not sufficient to address the generation adequacy problems,

since in 2007 the scheme was complemented by an interruptibility scheme and later still, in 2010, by a preferential dispatch scheme for indigenous sources (coal).

The inquiry has also shown that overly selective capacity mechanisms risk over-compensating their participants because the competitive pressure is weaker when the allocation process has only limited participation. The capacity providers therefore have an incentive to bid at a higher level than the funding they actually require to provide the availability service. This is illustrated by the results of the British capacity auction, which show that excluding any of the eligible types of capacity providers from the auction would have resulted in a higher capacity price.

At the same time, the sector inquiry has shown a growing tendency towards mechanisms that are open to a wider group of potential capacity providers. In 2014, the United Kingdom for example introduced Great Britain's market-wide central buyer mechanism and in 2015 France proposed a market-wide de-central capacity mechanism. The participation of various capacity providers is more likely helps to avoid over-compensation and to prevent distortions between different capacity providers within a Member State and in cross-border trade.

6.4.2. Cross-border participation in capacity mechanisms

The inquiry revealed that although some countries take into account the contribution that imports from other countries make to their security in stress situations, very few of the eleven Member States covered by the inquiry allow capacity providers in other Member States (foreign capacity) to participate in their capacity mechanisms. This situation is changing, however, since an increasing number of Member States are working towards allowing such participation. For example, the UK included interconnectors (cross-border transmission lines) in the 2015 capacity auction, and France and Ireland are developing plans to allow cross-border participation in their mechanisms. The inclusion of cross-border participation is also in line with the Energy Union objective to ensure a fully-functioning and interconnected energy market.

Taking imports into account when operating capacity mechanisms is essential as it prevents the costly over-procurement of capacities that would arise if each Member State used a capacity mechanism to ensure self-sufficiency. Allowing foreign capacity to take part in a capacity mechanism also removes investment signal distortions that would favour countries with more generous capacity mechanisms and benefit incumbents. It also creates incentives for continued investment in interconnection.

It is technically challenging to include foreign capacity in capacity mechanisms. A working group with Member States convened in June 2015 to examine the issue of cross-border participation in capacity mechanisms. The outcome of the working group is attached as Annex 2 to the Staff Working Document accompanying the Sector Inquiry Report in the form

of an input paper to stimulate discussion on this topic. The material presented in that annex is not a formal position of the Commission and is not an outcome of this sector inquiry, but respondents to the public consultation are welcome to comment on its contents.

6.4.3. Allocation process

If well-designed, an allocation process selects the most cost-effective option from the eligible capacity providers and sets a capacity price that avoids overcompensation. The inquiry has identified a wide variety of approaches to allocation. The most important distinction is between administrative and competitive allocation processes. In an administrative allocation process all eligible capacity providers are selected without competition and the remuneration of capacity is set in advance by the Member State authorities or negotiated bilaterally between the Member State and the capacity provider. Conversely, in a competitive allocation process, eligible capacity providers participate in a bidding process and the capacity remuneration is the result of this process. Administrative and competitive processes are equally common in the 11 Member States covered by the inquiry, but competitive bidding processes feature increasingly in mechanisms introduced in recent years. The UK has been holding capacity auctions since 2014. France is in the process of creating a market for the trading of capacity certificates. Ireland and Italy are moving away from using the administrative allocation process, and plan to allocate capacity products via auctions.

The sector inquiry has demonstrated that administrative allocation processes are unlikely to reveal the true capacity value and are therefore unlikely to be cost-effective. In Spain, for example, the price for an interruptibility service almost halved after a competitive auction was introduced. In contrast, competitive allocation processes are in principle better at revealing the real capacity value, but experience shows that this only holds true if the design of the allocation process and the market structure make real competition possible. An allocation process that does not reveal the real capacity value is also unlikely to send the proper investment signals. If the capacity remuneration is too high, the capacity mechanism keeps unnecessary capacity in the market or even brings forward new capacity in situations of overcapacity. On the other hand, if the remuneration is too low, existing plants will leave the market or there will be no investment in new capacity.

The design of the allocation process in a capacity mechanism can also affect competition in the electricity market. For instance, the inquiry found that in concentrated markets, capacity mechanisms which are de-centralised (i.e. where the individual suppliers are responsible for estimating and procuring the required capacity), such as the mechanism being developed in France, may act as a barrier to market entry. This is because new entrants are less able to estimate their future capacity needs than established companies with a large and stable customer base are.

6.4.4. Capacity product

All capacity mechanisms include certain obligations that capacity providers must fulfil in return for receiving remuneration. These range from a relatively basic obligation to build and operate a power station, through obligations linked to fulfilling instructions from the network operator (e.g. turn on and generate electricity), to obligations that are more complex (e.g. reliability options requiring financial paybacks when a strike price is exceeded by a reference price).

There are also many different answers to the question of what happens if capacity providers fail to meet their obligations (penalties). Some mechanisms simply exclude capacity providers from receiving future payments, but most require them to return the payments earned or to pay an additional penalty.

The inquiry found that, where obligations are limited and penalties for non-compliance are low, there is insufficient incentive for plants to be reliable. The inquiry also revealed a tension between an effective penalty regime in a capacity mechanism and undesirable impacts on market functioning. Policy makers could consider capacity mechanism penalties as a replacement for electricity scarcity prices. Both provide signals for generation or demand reduction in scarcity situations. However, only electricity prices — not capacity mechanism penalties — provide a signal for imports within the internal market. Therefore, Member States should take care to ensure that electricity price signals are not replaced by capacity mechanisms.

A further finding is that mechanisms which include demand response usually include different obligations for demand response providers than for generators. Some differentiation in obligations and penalties between generation and demand response may be justifiable, at least in the short term, to enable the development of demand response.

6.5. Tentative conclusions on the assessment of the various types of capacity mechanisms

Based on the above findings, the Commission draws the following tentative conclusions on whether capacity mechanisms can ensure the security of electricity supply and on how capacity mechanisms impact the functioning of the EU internal energy market.

- Harmonised and more transparent ways of determining generation adequacy levels and reliability standards would contribute to objectivising the need for different intervention levels and improve cross-border comparability.
- The six different types of capacity mechanisms (see the taxonomy above) are not equally well suited to address capacity problems. The optimal choice depends on the nature of the generation adequacy problem it is meant to address (market-wide or local; long-term or

transitional) and on the structure of the Member State's electricity market (degree of concentration).

- Of the six types of capacity mechanisms, two (i.e. price-based mechanisms offering market-wide or targeted capacity payments) risk over-compensating capacity providers because they rely on administrative price setting rather than competitive allocation procedures.
- The risk for overcompensation is lower with the four remaining types of capacity mechanisms, which may address specific generation adequacy concerns. The choice of the most suitable model depends on the precise adequacy problem to be solved:
 - Tenders for new capacity and strategic reserves may be appropriate to address a transitional capacity problem. A tender allows new investment, while a strategic reserve is typically used to prevent existing plants from closing. Neither of these two models solves underlying market failures, but they can both bridge a capacity gap until market reforms are carried out to enable the electricity market to provide sufficient investment incentives, or until a more appropriate longer-term capacity mechanism is introduced. These models should therefore be accompanied by a credible plan for the future.
 - Central buyer mechanisms and de-centralised obligation mechanisms could be appropriate options to address a longer-term and more general adequacy problem, depending on the level of competition in the underlying market. These two types of capacity mechanisms are better able to attract new capacities and allow direct competition between generation and demand response, thus creating stronger competition for the capacity remuneration and revealing the real economic value of capacity.
- In all cases, capacity mechanisms must be carefully designed with specific attention to transparent and open rules of participation and a capacity product that does not undermine the functioning of the electricity market. In particular, electricity prices should continue providing a signal of scarcity so that electricity is imported from other Member States at the right times.

These tentative conclusions focus primarily on the ability of various capacity mechanisms to address problems of security of electricity supply in the most cost effective and least market distortive way. Capacity mechanisms can however affect the generation mix and therefore interact with policy instruments aimed at fostering decarbonisation. As recognised by the

Energy and Environmental Aid Guidelines¹⁵, the design of capacity mechanisms should take into account these impacts in order to contribute to the overall coherence of EU energy policy in electricity markets.

In the context of the public consultation, the Commission invites comments on these tentative conclusions. It will draw firmer conclusions in its final report, which will give Member States and market participants greater clarity on how it will apply EU State aid rules when assessing capacity mechanisms in the future.

7. Next steps

With this interim report and the annexed Staff Working Document, the Commission presents its preliminary findings and tentative conclusions on the sector inquiry into capacity mechanisms to the sector and to Member States for consultation. It will actively engage with stakeholders in the months to come with a view to presenting a final report later this year. The Commission will use the final report to assess capacity mechanisms notified in relation to State aid and to develop legislative proposals on a revised electricity market design.

¹⁵ See par 233(e) EEAG: "The measure should [...] give preference to low-carbon generators in case of equivalent technical and economic parameters" and para. (220) "Aid for generation adequacy may contradict the objective of phasing out environmentally harmful subsidies including for fossil fuels. Member States should therefore primarily consider alternative ways of achieving generation adequacy which do not have a negative impact on the objective of phasing out environmentally or economically harmful subsidies, such as facilitating demand side management and increasing interconnection capacity."