



SEDC response to the European Commission's

Consultation Paper on generation adequacy, capacity mechanisms and the internal market in electricity

1. Do you consider that the current market prices prevent investments in needed generation capacity?

In Western Europe, scarcity rents (provided by high market prices in resource scarcity situations) should pay for the fixed costs of some peaking generation (mostly existing thermal assets), but some regulatory constraints (e.g. price caps) and some market distortions (including subsidized generation) prevent those situations from taking place most of the time. Moreover, even with a global adequacy, network constraints may limit the actual activation of the required and available capacities even if the prices are high enough.

This creates a strong uncertainty that may prevent investment in new peaking capacities.

However, as mentioned in the document, resource adequacy may not be the only reason to invest in additional capacity: the question of flexibility (mostly because of the introduction of more and more RES on the network) should be discussed (e.g. need for backup capacities that have to be very flexible, etc.).

The position of the SEDC is that the markets currently lack relevant signals for investment, either in terms of volume (additional capacity) or quality (flexibility, peak vs base, etc.). To define the appropriate signals, the first question to ask is: What are the needs of the electric power system?

The rush in RES development together with the decrease of demand (linked to the economic crisis) has led to an oversupply in baseload/mid merit generation in some countries/markets.

Nevertheless, RES intermittency leads to specific needs – both peak and flexibility needs that could be met by Demand Response for instance. However, in practice, current market prices are not always providing an adequate signal for investment in appropriate peak/flexibility means.

So we consider that additional mechanisms can be needed to foster capacities that are used very scarcely or provide extra flexibility. These mechanisms should create a competitive market revealing the scarcity value of capacity and flexibility. Such value is not correctly provided by the energy market, usually based on the marginal cost of fungible blocks of energy.

Note that we used the term “capacity” instead of “generation”, because either new or even existing generation capacities might be replaced by Demand Response ones, as long as these are more competitive for a given expected level of service.

- 2. Do you consider that support (e.g. direct financial support, priority dispatch or special network fees) for specific energy sources (renewables, coal, nuclear) undermines investments needed to ensure generation adequacy? If yes, how and to what extent?**

If subsidies are not well motivated and based on carefully defined indicators, they may disturb the efficient functioning of the market and this in turn will eventually undermine investment needed to ensure generation adequacy. They can artificially lower energy prices and put at risk the ability of capacity resources to recover their costs through existing market structures. This places zero-carbon demand side solutions –such as demand response – at a competitive disadvantage.

- 3. Do you consider that work on the establishment of cross-border day ahead, intraday and balancing markets will contribute to ensuring security of supply? Within what timeframe do you see this happening?**

There are few examples of true energy only markets. They tend to provide insufficient investment security to support the full measure of capacity and flexibility required for security of supply. The SEDC does not calculate that cross border day ahead, intraday and balancing markets will be sufficient to provide long term system security throughout the EU.

*Cross border, **pay as cleared**, unified balancing products will, in our view, contribute to the establishment of new flexible resources¹. However, we see no evidence that these efforts will contribute to ensuring sufficient resources are available. In fact, we see the implementation of well-designed capacity markets as contributing to both sufficient resources (capacity is by definition a peak load resource) and flexible resources. Flexible resources are supported by capacity markets because capacity markets encourage consumers to install and use energy management systems. These systems are then available beyond capacity markets to be deployed in balancing, day-ahead and intraday markets.*

It is essential, though, to recognize the need for flexibility and the need for capacity as separate needs – which together ensure security of supply.

¹ We support pay as cleared for market efficiency and sustainability purposes, primarily for capacity and reserves markets. Pay as cleared in energy markets, particularly when many suppliers are subsidized, creates, in our view, some complex issues

4. What additional steps, if any, should be taken at European level to ensure that internal market rules fully contribute to ensuring generation adequacy and security of supply?

General mechanisms or general principles for capacity mechanisms, should be defined at the European level to ensure fair competition between Member States, however, the needs, characteristics and the plans for future development of demand response and generation are national and will differ from one region to the other.

In considering potential additional steps, it may be of interest to consider market rules in some other markets, including the effect of such rules. PJM and CAISO have rules requiring that electricity retailers demonstrate what capacity they have available – both owned generation and contracts, including demand response – to meet their monthly or annual peak demand plus a reserve margin. ERCOT has no such requirement. We do not endorse any of these specific market rules, but we believe they are worth studying. The SEDC can provide additional information if desired.

5. What additional steps could Member States take to support the effectiveness of the internal market in delivering generation adequacy?

Step by step, well designed capacity markets that accommodate the specific requirements of providers of demand response as well as flexible generation resources, have the potential to create a large and vibrant source of flexible demand and generation that enhances security of supply and lessens the need for additional generation capacity at periods of capacity constraints.

A well designed adequacy market must (because it is cost-effective and adds to reliability by dint of diversity of resources) welcome demand-side participation. The three key attributes of an adequacy market that welcomes demand-side response as a participant are:

- 1. A market that includes option payments for the **availability** of response during limited peak consumption hours*
- 2. A market that allows for demand response resources to be sold by any consumer, directly through the TSO or through an independent aggregation service provider and*
- 3. A market that does not penalize the retailer, if a consumer with demand response capability, chooses a retailer for electricity supply and a separate aggregation service provider to sell its demand response .*

6. How should public authorities reflect the preferences of consumers in relation to security of supply? How can they reflect preferences for lower standards on the part of some consumers?

Standards even within each consumer are different at different times of the day and for each individual piece of equipment. That's what makes demand response resources so effectively pin-point, not just for the grid with respect to locale and duration, but also for the individual with

respect to reservation price for each kWh. Overall standards are a dicey subject and will need to address not just the willingness of some to endure black-outs but the ability to pay for reliability and the impact on economic opportunity and social equity that unreliability will generate. This complexity and interaction between causation, long-term impact and willingness creates a social issue that, in our view, should be explored well in advance of assessing market design choices to address the issue. Market design is best applied to achieve resolved social goals, rather than to create social equity or inequity, by default.

A well designed demand response mechanism can facilitate customer options to self select alternative “standards” for resource adequacy. Such a program can, in effect, allow reduced costs for the customer in exchange for lower reliability when the system is in stress.

The key to successful demand response contribution to overall security of supply is the equal treatment of demand side resources within the markets. This means consumer participation in demand response should be voluntary and paid, and market access should be made a priority within regulatory structures. Security of supply should not be used as an excuse for mandating the use of consumer goods as an ‘emergency resource’.

- 7. Do you consider that there is a need for review of how generation adequacy assessments are carried out in the internal market? In particular, is there a need for more in depth generation adequacy reviews at:**
- a. National level**
 - b. Regional Level**
 - c. European Level**

Generation adequacy (supply; including demand-side resources) should be reviewed at every level, even beyond the regional and national levels to regions within a nation and at each transmission/distribution area. These reviews could also take into account adequate reserves for local issues (e.g. spare dynamic power must be available for unforeseen outages or consumption, potentially limiting the capacity that could be sold across regions) and long-term cost effectiveness (e.g. can we avoid transmission upgrades by requiring procurement of very substantial percentages of capacity locally and is that distribution of extra generation and demand side resources more or less expensive and more or less reliable than more centralized solutions).

The need for local, national, and regional depends on the physical realities of the infrastructure. Markets should reflect these physical realities. Regional adequacy reviews might be relevant for some specific zones where the network topology and/or the structure of the generation mix may create recurring network constraints (e.g. Brittany that lacks generation in France ; Geographical distribution of wind and loads in Germany). As a regional network collapse may endanger the overall stability of the European network, ENTSO-E may be allowed to initiate directed adequacy reviews at regional or national level, triggered by :

- *identification of geographical network topology constraints*
- *concentration of capacity increasing risks of failure*

Depending on the needs, these reviews might be conducted on a regular basis for a given period of time (e.g. 3 years).

8. Looking forward, is the generation adequacy outlook produced by ENTSO-E sufficiently detailed? In particular,

- a. **Is there a need for a regional or European assessment of the availability of flexible capacity?**

Yes there is a need for more detailed information on flexible capacity – especially that of the Demand Side, which has been ignored so far.

- b. **Are there other areas where this generation adequacy assessment should be made more detailed?**

As stated in the Energy Efficiency Directive, both generation and demand side resources should be included in adequacy assessments. Demand Side resources have been largely ignored by ENTSO-E in their market assessments.

We very strongly believe that regional and national assessments of the availability, and potential availability, of flexible capacity is an essential need. What's critically lacking, in our view, is an assessment of the demand response potential in each nation and region by particular industrial and commercial consumer segments and by electricity market product by consumer type. For example, even the most sophisticated reports produced to-date lack the granularity to determine how much of the demand side resources could be available on two-second call, one-minute call, ten-minute call, half hour call, and for what duration or for how many total hours, before eroding from over-utilization. This information would be extremely valuable in assessing the most cost-effective market structures going forward.

Additional Comments on ENTSO-E outlooks:

- *Those reports are based on heterogeneous data coming from the different TSO reports by Control Area. The definitions of adequacy can vary widely from TSO to TSO and therefore the findings are not comparable. Those reports should be harmonized, so that the variables and KPIs might be complementary and/or comparable. ENTSO-E may then sum up the data to get a clear view on Europe's situation.*
- *The ENTSO-E reports focus on the availability of enough capacity (generation or transmission) to manage peaks, but does not consider the situations when there is an excess of power: this should be assessed in more detail with an assessment of the available storage or Demand Response (increase the load) potential.*

9. Do you consider the Electricity Security of Supply Directive to be adequate? If it should be revised, on which points?

10. Would you support the introduction of mandatory risk assessments or generation adequacy plans at national and regional level similar to those required under the Gas Security of Supply Regulation?

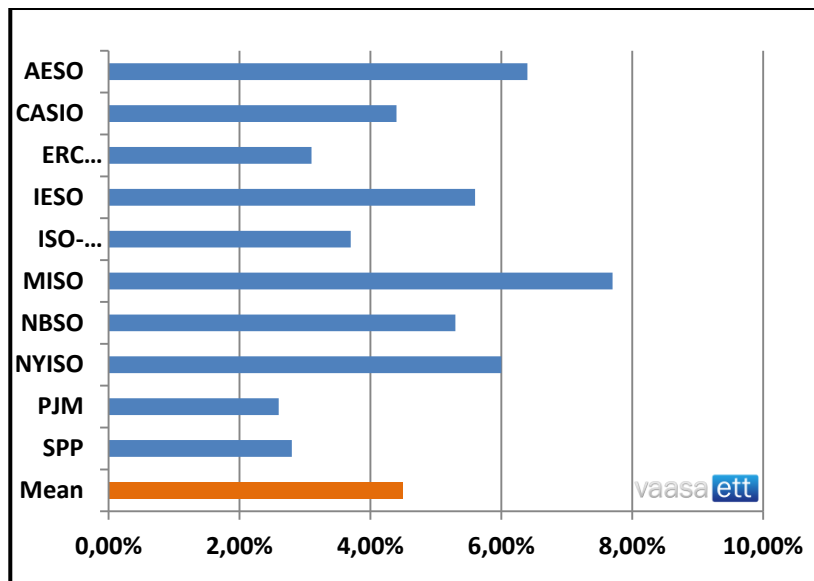
11. Should generation adequacy standards be harmonised across the EU? What should be that standard or how could it be developed taking into account potentially diverging preference regarding security of supply?

There is a benefit to harmonization to the extent that processes and products could be standardized, but these standards could be oriented toward achieving tradeable products and cost-effective and diverse resources. Standards with respect to reliability and resource adequacy could be a minimum, ensuring against free-ridership and the economic impacts of grid collapse. However, movement to entirely harmonize standards could freeze efforts of some nations to introduce markets that would advantage those countries by building demand side capacity resources available for export, to the ultimate economic advantage of that nation (more in the response to the next question). Harmonized standards could incorporate the step-by-step procedures with general freedom to incorporate capacity markets based on minimal standards and ultimate freedom to structure within them.

Also, the studies that are lead by ENTSO-E (summer and winter outlook) should be harmonized so that the results are comparable

12. Do you consider that capacity mechanisms should be introduced only if and when steps to improve market functioning are clearly insufficient?

We do not. Capacity mechanisms can be part of an optimal market design even when resources are sufficient. They can prevent the need to build additional transmission, they can inspire a demand-side industry (see U.S. markets) and they can ensure longer term sufficient and flexible resources. Well designed capacity markets can also ensure a variety of resource source fuels. Such variability will make the market clearing prices more responsive to shifts in demand, creating cost containment opportunities. Diversifying to include non-fossil sources of supply will also act as a price hedge in the face of price volatility in one or in a family of fuel sources (e.g. fossil).



Actual Peak Clipping USA 2010, C&I + Residential Demand Response.

Source: FERC

For example, in 2005, Capacity Markets were opened to Demand Response in the USA. The availability payments these provided to demand side resources, enabled a steep increase in consumer participation across all market types. The figure *above* describes the percentage of peak clipped in 2010 through demand response. By 2012, **29.5 GW² of demand was involved while a total of 66 GW³ was under some form of control, making up 9% of total national capacity**, significantly increasing the amount of flexible, CO2-free capacity resources within the country and providing over two billion dollars a year in direct payments to local businesses and homes. **This would not have been possible without access to capacity markets.**

NB. Capacity markets should be put in place in anticipation of the market's needs in order to ensure sufficient development of demand response. In practice, while a CCGT takes about four years to be built with first delivery at the commissioning date, ramping up DR capacity might take a couple of years with delivery from day one. Making the right investment decisions require forward capacity markets with a timing that matches with all the competing technologies. A three-year forward capacity market has proved to be relevant in the US.

13. Under what circumstances would you consider market functioning to be insufficient:

- a. to ensure that new flexible resources are delivered?
- b. to ensure sufficient capacity is available to meet demand on the system at times of highest system stress?

² Joule Assets. 2013

³ FERC. 2012

The use of demand response in Europe is a good indication of what is the current situation in Europe. Almost all markets in Europe could address their capacity issues through shifting only 40 hours of consumption a year. However, demand side resources are underused in several countries: these resources will require a secure investment atmosphere to be able to grow and provide a robust resource. Capacity markets can provide this investment security if well constructed.

The value of flexibility is currently not sufficiently reflected in European energy markets, in particular with respect to the future needs for flexibility. This issue becomes acute in markets with high levels of intermittent renewables, where energy prices drop and the spikes in price do not provide sufficient investment security for flexible resources used only a few hours a year.

Currently, this is as much of a problem for legacy natural gas plants as it is for demand side resources. Ultimately, availability payments that reflect the insurance nature of capacity markets, an open structure that welcomes demand side participation, and the separation of demand side resources from the balancing party that provides power to the demand side resource, will allow most, if not all flexibility (at peak) resources to come from demand response and storage.

The low, unstable value of flexibility is particularly difficult for demand side resources whose main contribution is fast-acting, dependable, short duration, flexibility. The current market structures lack the mechanisms to provide sufficient and long-term investment stability.

Market structures require flexible resources to be available. However, flexible resources available at any time and resources available at peak should be different products. The same resource may be able to provide in both markets but, if the markets require all resources to perform in both markets, two outcomes will ensue: Firstly, we believe it will cost the system more over even the short-term and, secondly, resources will be less diverse (see response to Q12) and fewer demand side resources will be able to participate.

As technology matures related to the cost and precision of dynamic control and proper timing of consumption, demand resources will find more value at lower cost than today, through participating in energy markets. Given the limited automation in place today, and the limited ability to apply this automation, the development of energy market demand resources will be a small subset of its potential in the absence of capacity market payments to defray the capital costs of enabling resources for energy markets.

14. In relation to strategic reserves:

- a. Do you consider that the introduction of a strategic reserve can support the transition from a fossil fuel based electricity system or during a nuclear phase out?**

Strategic reserves often mean that system security of supply during a nuclear phase out is ensured through keeping old thermal units in the system. Therefore it might not achieve security of supply and decarbonisation at the same time.

- b. What risks, if any, to effective competition and the functioning of the internal market do you consider being associated with the introduction of strategic reserves?**

*Strategic reserves markets will require availability payments. These are, in general, quite helpful for demand-side resources. However, **we do not support flat subsidies for availability payments.** Instead, longer-term auctions and local requirements for adequate reserves that mirror transmission and/or distribution constraints, will suffice to keep prices adequately high to ensure resource sufficiency, as well as to ensure diverse and flexible resources. Demand side resources can be quickly “built” as well, meaning that they are particularly valuable in transitioning from a fossil-fuel based electricity system. A reserve market can also prove valuable for existing gas resources that would otherwise be challenged by the influx of coal from abroad.*

Reserves markets are always valuable for the demand side resource that are capable of providing reserves resources, though requirements (primarily short notification lead times) are, and ought to be, rigorous. The development of a reserves market for demand resources will be a small sub-set of its potential in the absence of capacity market payments to defray the capital costs of enabling resources for reserves markets.

15. In relation to capacity markets and/or payments:

- a. Which models of capacity market and /or payments do you consider to be most and least distortionary and most compatible with the effective competition and the functioning of the internal market, and why**

An auction capacity system with an independent clearing agent will guarantee the procurement of capacity while providing a favourable context for new actors.

It should be remembered that the current market price signals reflect only the capacity requirements of today and the historical investment signals. They do not reflect future capacity needs. Investment in new capacity requires an advance quantity signal (global amount of capacity required to satisfy the security of supply criteria) and a price signal (payment for reserve capacity). A first auction (at least three years in advanced as in PJM) would aim to buy the missing capacities to ensure the overall target. The acquisition by the regional transmission operator of these capacities would allow the transparent formation of an equilibrium price.

Bilaterals (reported to the TSO) and balancing markets that settle after a forward auction will allow for new entrepreneurial entry into the market. We support these market structures, though they will also require strong oversight to prevent market manipulation.

Constructing a market which minimizes market distortion:

Critical components of the decision relate to who the capacity market rewards. For example, a market that requires a 20% total reserve, could require capacity resources that total 20 – 30% of

that market's peak consumption (akin to a balancing reserve), or it could require capacity resources that total 120% of that market's peak consumption.

Most power plants will support a market that requires more resources than are likely to be operating at peak hours. Demand response providers will, as well. However, with a "pay as cleared" TSO purchase of capacity resources from power plants and demand response providers, this approach will create more distortionary impact on the market, in our view, than would a more conservative approach.

A capacity market that requires only incremental "reserves-type balancing" resources (20 – 30%) will gather less political support from power plants. Yet it creates substantially less market distortion. In our view, we question whether such a market is more or less distorted than an energy-only market, which does not take into account the insurance value of adequate supply available at all times.

Design challenges: *Should a capacity resource also be allowed to sell into energy markets? If the answer is "yes" we believe that, in order to minimize distortion, energy markets should not be price capped, and capacity resources should buy their way out of performance obligations in the energy market by paying the energy market price, plus a substantial premium.*

Another option: At least in the early years of market development, if capacity resources are only a portion of the market (20 – 30%), capacity resources should not be allowed in the energy market. This will ensure that capacity resources are truly incremental to those resources participating in the everyday electricity markets.

b. Which models of capacity market and /or payments do you consider to be most compatible with ensuring flexibility in a low carbon electricity system?

We have outlined three principals throughout the paper. These include:

- 1. Either a capacity market that purchases "strategic reserves" (e.g. 20% - 30% in toto) and that strictly controls the terms under which resources can sell into energy markets, or one that purchases 120% - 130% and allows all resources to sell into all markets*
- 2. A market that creates a separate "certificate" that allows resources to sell their demand responsiveness as capacity, directly to the TSO and holds harmless the retailer who represents that consumer, by spreading the cost of that demand response resource "like butter" across all consumers and*
- 3. Availability payments that reflect the attribute of capacity as an insurance resource that must remain in place from year-to-year because it will be used extensively in some periods and barely, in others.*

We also support "pay as cleared" capacity market structures, with market monitoring to ensure the integrity of these markets. In pay as cleared markets the lowest cost resources are advantaged with higher margins and as a result, over the long-term you get to the most efficient solution because of "survival of the fittest."

We do recognize that pay as cleared markets can be more expensive over the short term, however, and that such markets, exactly like energy markets, require some oversight, particularly when market participants with great power can submit bi-lateral contracts. Even a large (e.g. 120%) capacity market won't have nuclear as the marginal resource that sets the clearing price so while large capacity markets will have some free-ridership, they will still encourage the most cost-effective new resources and will be most efficient for consumers, over the long run.

The SEDC believes that well designed capacity mechanisms provide the best prospect for demand response and should therefore be treated as the most compatible with ensuring flexibility in a low carbon electricity system.

- a. Long term contracts are preferable due fact that they provide security for investors in additional capacity. The current market reflects only the current market excesses and shortages, not the long term needs.*
- b. Pay as Bid vs Pay as Cleared : pay as bid can be cheaper for consumers in the short term, however in the longer pay as cleared is more cost effective because*
 - i. provides a better incentive for capacity owners to participate and bid at their marginal price*
 - ii. The least expensive capacity resources make most the most profits in a pay as cleared markets thereby providing insentives to invest in more low cost resources – loweing prices for consumers longterm*
- b) In answer to 15b, the SEDC believes capacity mechanisms designed provide the best prospect for demand response and should therefore be treated as the most compatible with ensuring flexibility in a low carbon electricity system.*
- c) Are there any models of capacity mechanism the introduction of which would be irreversible, or reversible only with great difficulty?**

Capacity markets will prove to be efficient if most of the generation capacities get a significant revenue from this market. If the capacity mechanism provides significant payments, then capacity owners will need it and it may be difficult to go back to the initial situation. In the end, capacity markets HAVE to be irreversible, otherwise they are not efficient.

16. Which models of capacity mechanisms do you consider to have the have the least impact on costs for final consumers?

Though a market wide capacity mechanism can be preferable, in our view, a 20% - 30% market, akin to a strategic reserves product with high value because it has significant locational requirements and limited participation (buy out other market positions, particularly energy market positions with no price cap), build a reliable capacity resource that does not include free-ridership and is therefore most cost-effective.

17. To what extent do you consider capacity mechanisms could build on balancing market regimes to encourage flexibility in all its forms?

If designed correctly, capacity mechanisms can spur the growth of a large and vibrant demand response market – a wide array of demand side products will therefore be available for the balancing markets.

The best way to accomplish both synergy between markets and to ensure that all markets provide real and reliable dynamic response, is to require resources to buy out positions in the reserves markets, when they are called for a capacity event. This avoids double counting of resources and efficiently adds revenue for those who can participate only in reserves markets and for those who can participate in both capacity and reserves markets.

18. Should the Commission set out to provide the blueprint for an EU-wide capacity mechanism?

19. Do you consider that the European Commission should develop detailed criteria to assess the compatibility of capacity mechanisms with the internal energy market?

This definitely is an important challenge to deal with. Of course an EU-wide capacity mechanism could be a solution, but we do not believe that it could happen in the short/mid term. Furthermore it might not be adapted to the needs/requirements of each region (which have different degrees of flexibility, RES, interconnection). In this context, we recommend that EU encourages member states to develop ad-hoc mechanisms.

20. Do you consider the detailed criteria set out above to be appropriate?

- a. Should any criteria be added to this list?**
- b. Which, if any, criteria should be given most weight?**

We believe the criteria set out above provides a solid framework for developing capacity markets that do not discriminate against demand side solutions. In weighting the criteria, the SEDC urges the Commission to put added emphasis on the specific requirements of the demand response providers.

If the capacity market is not a strategic reserve, then the introduction of the capacity market is a fundamental change in market design and should be introduced with a long term view. A well design capacity market should have the ability to reduced boom and bust of the electricity market

