European Commission Consultation Paper

On

Generation adequacy, capacity mechanisms and the internal market in electricity

Response from E3G[1]

Summary of key points

- There is a significant risk that there will be Member States in which electricity markets, left to their own devices, will produce outcomes that are inconsistent with a socially acceptable reliability standard. This means that the Internal Energy Market structure must allow market/system operators to administer a socially acceptable reliability standard through the introduction of national policy mechanisms.
- EU policy makers should view this as a temporary issue. Ultimately, sufficient numbers of customers will be able to define their own reliability standards by responding to real time price signals, thereby making the concept of a socially acceptable reliability standard redundant.
- To ensure that this ultimate vision emerges, and that this happens as quickly as possible, it is necessary to take action to develop a fully active demand side of the market. It is also important that rules to allow for temporary measures to administer a reliability standard are time-limited and expire when the demand side becomes fully active.
- Promoting a fully active demand side has three dimensions:

[1] **About E3G**
E3G is an independent, non-profit European organisation operating in the public interest to accelerate the global transition to sustainable development.
E3G builds cross-sectoral coalitions to achieve carefully defined outcomes, chosen for their capacity to leverage change.
E3G works closely with like-minded partners in government, politics, business, civil society, science, the media, public interest foundations and elsewhere.
More information is available at www.e3g.org
For enquiries about this document please contact simon.skillings@e3g.org.uk

    - There needs to be a new political narrative that under-pins the internal energy market. This narrative must highlight the need for dynamic, competitive and responsive demand side markets and how this will promote best value investments for consumers across the whole value chain.
    - Imbalance price calculations must be consistent, transparent and predictable such that they can be accurately predicted by market participants.
    - It is necessary to 'kick-start' development of the demand side of the market through placing strong incentives on System Operators to procure demand response.
- It will be necessary to introduce a requirement for Member States to demonstrate that they have measures in place that deliver a minimum reliability standard. This will remove the perverse incentives for Member States to 'hoard' capacity or 'free-ride' from capacity in neighbouring countries. The methodology to calculate reliability will need to be determined at EU level and highlight the value of interconnection in providing reliability.
- Common 'reliability products or services' must be defined such that they can be traded across borders. It is proposed that there should be three such products relating to demand response, flexibility services and firm capacity.
- A hierarchy of measures should be prescribed by which Member States can deliver their reliability standard:
    - Firstly, procure demand response through annual contracts up to the value of lost load consistent with the minimum reliability standard,
    - Secondly, procure sufficient 'flexibility services' to support the efficient integration of intermittent renewable generation,
    - Only in the event that these measures fail to deliver the required reliability standard will it be acceptable for Member States procure firm capacity.
- There is no need to prescribe how Member States value and procure these products and services provided the process is consistent with competition and state aid regulations.
- The demand response reliability product should be designed to stimulate and measure the capability of demand response providers to forecast and respond to imbalance settlement prices. This information should be gathered and reviewed by system operators and regulators as part of a process leading to a decision to rescind regulations relating to a centrally specified reliability standard.

Context

There is broad consensus that the most cost-effective route to economy-wide decarbonisation involves early action in the power sector and this will involve a dramatic increase in the proportion of electricity produced from intermittent sources of renewable energy. Attracting the necessary investment, and transforming the power system to accommodate renewables, presents a major challenge. The policy and regulatory framework must deliver affordable and secure energy supplies in addition to meeting the decarbonisation objective. Indeed, unless investors are confident that the framework will deliver all three objectives simultaneously, there is a risk that sufficient investment will not be forthcoming due to fears over future policy interventions.

One issue that has remained controversial since power market liberalisation was first introduced is the need, or otherwise, for a capacity mechanism. Although theoretical micro-economics suggests that energy only markets will efficiently deliver the optimum level of security for consumers, there are a series of problems that may prevent this from happening in reality. This is for two principle reasons:

- There is concern that regulators or politicians will intervene to prevent the high prices that naturally occur during periods of tight supply and that are necessary for investors to make a return. This might either happen directly through price capping, or indirectly through side-deals that encourage reserve capacity to be available and, thereby, suppress prices for all other participants.
- It is difficult to monetise the potential future value of periods of high prices. This is because the great majority of consumers lack the understanding to hedge their exposure and do not expect to have to do so, whilst the intermediaries on whom they rely (suppliers) have no obligation to provide such a hedge and face asymmetrical risks in choosing to do so as a commercial strategy.

These problems give rise to the so-called ‘missing money’ thesis which, in effect, says that the market left to its own devices may provide a lower level of security than customers have grown to expect. Whilst the ‘missing money’ thesis is taken seriously by many policy makers, the introduction of capacity mechanisms to remedy the concerns remains controversial. This is because experience of capacity mechanisms has given rise to a number of perceived problems, in particular:

- They create a significant policy risk for investors and the long term value of capacity payments can be largely discounted (in much the same way that investors discount the long-term value of carbon price),
- Poorly designed capacity mechanisms can distort markets and can be easy to exploit through the exercise of market power, and

- They can suppress short-term price signals and, thereby, remove incentives for efficient demand response to price.

Moreover, it is envisaged that the deployment of communication and control technologies will increasingly allow consumers to participate in short term wholesale markets and avoid taking power when prices exceed a certain level. Under these circumstances, the old concept of a socially acceptable reliability standard will become increasingly irrelevant.

As a result of the problems with capacity mechanisms, and the potential for a more active demand side to the market, many jurisdictions have opted to retain the energy-only market. Indeed, this represents the basis of the 'target market model' adopted by EU institutions. Nevertheless, it is possible (or even likely) that there will be electricity markets in Europe where the problems described above will lead to market outcomes that are inconsistent with a socially acceptable reliability standard and, therefore, Member States will want to introduce a corrective mechanism. This means that the Internal Energy Market structure must allow market/system operators to administer a socially acceptable national reliability standard.

There are two ways that EU policy makers might approach this problem:

1. Assume it is a temporary issue and that ultimately sufficient numbers of customers will be able to define their own reliability standards by responding to real time price signals, or
2. Adjust the target market model such that it might incorporate capacity mechanisms on an enduring basis.

The second option would represent a major change from the current policy direction and would require all Member States to buy into the need for capacity payments. However, the main difference between the approaches involves the underlying narrative and the need for a process to drive through the long term vision of a fully active demand side to the market. Also, the first option is more pragmatic and flexible to differing Member State approaches. This consultation response considers how it might be implemented.

Improving the energy only market

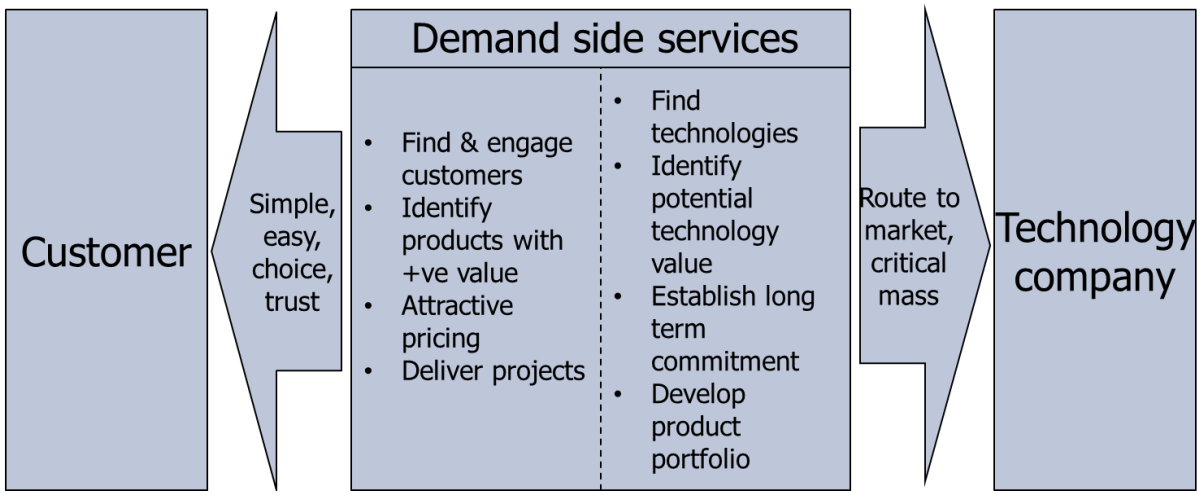
Assuming that the requirement to allow system/market operators to administer a reliability standard is a temporary problem allows the EU to retain the energy only status of the target model. However, this approach requires that action is taken on two fronts:

1. There is a strategy to develop a fully active demand side[2] of the market, and

[2] In this document the 'demand side' is assumed to include a range of services that include distributed generation and small scale storage.

2. Rules must be implemented that allow for temporary measures to administer a reliability standard until such time that the demand side becomes fully active.

This first of these can be considered as an initiative to improve the operation of the energy only market. Liberalisation has delivered many benefits, including significant improvements in generation efficiency and the attraction of private sector investment. However, the development of dynamic, customer-facing markets in electricity products and services has proved more elusive and, in consequence, a responsive and efficient demand side to the market has not materialised. Instead, customer facing markets tend to remain highly concentrated with little evidence of significant new entrants or the emergence of business models built around innovative new products and services.



The chart above illustrates a long term vision for the structure of the demand side of the market. A number of key changes are required to allow this vision to materialise:

1. It is essential to attract new businesses to the market that are experts in retailing to various consumer groupings since the ability to find and engage customers will be critical.
2. A key component of the value proposition (there should be others) will be the avoided cost of future electricity purchases – either average costs or, for demand response, costs at particular times. Very few organisations are competent to manage these risks for consumers. This deters those with the relevant retailing expertise from entering the market, thereby reducing competition. A fully liquid wholesale market (across all timescales) would address this issue but this is currently some way off and is particularly challenging for the types of balancing services provided by responsive demand.
3. Commercialisation of new technologies requires long term commitments that allow technology companies to develop their products to full potential. This, in turn, requires mature demand services companies that are confident in their ability to forecast consumer demand.

Addressing these deficiencies requires more than simple technical changes to market design. There needs to be a new focus for the political narrative that under-pins the internal energy market. This narrative must highlight the need for dynamic, competitive and responsive demand side markets and how this will promote best value investments for consumers across the whole value chain. This narrative will provide the confidence for businesses to explore and develop new operating models. Existing suppliers may take a leading role in this transformation but success must not depend on them 'playing ball'. Policy makers must consider these structural changes when introducing new policy measures and policy outcomes must not depend on the current structures continuing (e.g. supplier obligations must be deployed with extreme care).

The focus for the development of the trading arrangements must be to ensure that markets are sufficiently liquid. This is essential to attract new players that lack competence in managing wholesale price risk since they will not be forced to carry significant exposure to changes in wholesale prices. Within day markets are particularly important in relation to harnessing demand response potential. It is critically important that we move to a situation in which it is possible to forecast (and lock-in through liquid intra-day markets) imbalance settlement prices over timescales that are longer than the time needed to initiate a change in a significant proportion of overall demand. Achieving this objective has both market design and technological dimensions and it is unlikely that it will be achieved across Europe in the near term future. However, one early requirement is to ensure that imbalance price calculations are consistent, transparent and predictable such that market participants can develop the necessary forecasting expertise.

The ultimate goal of an active demand side to the market will not be achieved without the necessary development and deployment of information and communication technology. This will not happen whilst System Operators and regulators favour generation sources to provide the necessary balancing services. It is, therefore, appropriate to 'kick-start' development of the demand side of the market through placing strong incentives on System Operators to procure demand response – particularly where this avoids the need for new generation capacity (see rules proposed below) – and on regulators to ensure the necessary network infrastructure is in place. Also, it is important to ensure that the System Operator does not foreclose the balancing services market to new participants through signing long term contracts with generators.

Co-ordination of reliability standards

The internal energy market regulations are designed to leverage the principle of free trade to increase security of supply and reduce costs for electricity consumers across Europe. It is important that this principle is retained and that Member States do not use the opportunity to administer a national reliability standard as an excuse to 'hoard' capacity that cannot be exported for use elsewhere when required. Conversely, some Member States may be

tempted to ‘free-ride’ from neighbours who have implemented a capacity mechanism by accepting an increase in reliability without incurring any additional costs.

These drivers potentially undermine the principle of free trade and the benefits of the internal energy market and it is, therefore, necessary to avoid these perverse incentives on Member States. This, in turn, suggests that it is necessary for Member States to demonstrate that they have measures in place that deliver a minimum reliability standard. Member States can seek a higher standard if they wish although this would only be possible where transmission congestion imposes a physical constraint on trade between neighbours.

Establishing a minimum reliability standard would be technically (and politically) challenging since it would be necessary to define how it is calculated. However, it is an essential step if the Internal Energy Market is going to preserve the benefits of free trade whilst allowing Member States the freedom to define a reliability standard.

Of particular significance is the definition of the contribution that interconnectors make to the reliability of each Member State (including those interconnections with countries outside the EU). It would also be necessary to define the basis upon which providers of reliability products can sell services into neighbouring countries. This process would highlight the cost advantages of additional interconnections compared to building additional generation capacity.

Capacity mechanism rules

Reliability product

This transitional approach avoids the need to be overly prescriptive about capacity mechanism design. However, it is necessary to define common ‘reliability products or services’ such that they can be traded across borders. This definition involves four steps:

- What is the critical period or circumstance in which system reliability is under most stress?
- What is the service that will deliver reliability during this period?
- How much of this service do individual providers offer?
- How far in advance and for how long must providers deliver this service?

Traditional approaches to capacity mechanism design have assumed that all (or a sufficient proportion of) capacity is able to provide the range of operational flexibility that will enable the System Operator to balance supply and demand in real time. Therefore, it has been possible to separate the concepts of ‘resource adequacy’, which involves having enough total capacity available over planning time horizons, and ‘system quality’ which involves maintaining certain system parameters (e.g. frequency, voltage) within statutory limits during operational timescales. Given this assumption, the critical period in which system reliability is under most stress is the time of peak demand and the service that is required to

deliver reliability during this period is firm capacity. If there is enough firm capacity available to meet the winter peak demand then it is assumed that this capacity will have the inherent flexibility to maintain operational security throughout the year, provided the short term pricing signals ensure that this flexibility is made available when required.

However, an increasing proportion of intermittent generation will change this paradigm and the critical period or circumstance in which system reliability is under most stress will no longer simply be the time of peak gross demand. Instead, the most challenging threat to reliability will arise when consumer demand and the availability of intermittent renewables is changing in opposite directions, something that can happen any day, every day, at any time during the day, and even several times a day. It will occur to the greatest extent in situations where demand is either increasing towards system peak whilst the availability of variable renewables is reducing to a minimum, or falling to system minimum levels whilst the availability of variable renewables is increasing to a maximum. These circumstances highlight that the ability of resources to respond to a rapidly changing level of net demand is as important as the overall quantity of firm capacity. Therefore, the answer to the second design question - what is the service that will deliver reliability during the most challenging periods – will no longer be simply firm capacity. It is important that capacity mechanism designs do not inhibit the efficient integration of renewable energy by procuring inflexible firm capacity and, therefore, the procurement of flexibility must be prioritised.

It is likely to be extremely complicated to define one 'all encompassing' reliability product. Instead, it is proposed that three products are specified: demand response, flexibility and firm capacity.

Hierarchy of measures

It is proposed that the following hierarchy of measures is prescribed:

1. Procure demand response through annual contracts up to the value of lost load consistent with the minimum reliability standard[3]. This prioritisation will help to kick-start the development of the demand side of the market.
2. Procure sufficient 'flexibility services' to support the efficient integration of intermittent renewables. Demand response will, to some extent, meet this requirement. However, there may be the need for new generation capacity or large-scale storage that possesses the relevant dynamic capability.
3. Only in the event that measures 1 and 2 fail to deliver the required reliability standard should Member States be allowed to procure firm capacity.

There is no need to prescribe how Member States value and procure these products and services provided the process is consistent with competition and state aid regulations and there are a range of auction designs that could be deployed.

[3] A reliability standard is based on an assumption as to the highest price that consumers are prepared to pay for electricity.

Transitional process

This approach is based on the assumption that these measures are transitional and will lapse once the demand side of the market becomes sufficiently responsive. It is possible to use the demand response reliability product to stimulate and measure the capability of demand response providers to forecast and respond to imbalance settlement prices[4]. This might possibly involve an additional incentive payment associated with demonstrating the capability to self-dispatch and respond to balancing mechanism instructions.

This information could be gathered and reviewed by system operators and regulators leading to a decision to rescind regulations relating to a centrally specified reliability standard. However, it is important for investor confidence that any longer term commitments to procure reliability products are honoured until they expire.

[4] This opportunity also exits for the flexibility reliability product.