

European Commission
DG Energy - ENER.B.2
'Internal Market II: Wholesale markets; electricity & gas'
Rue De Mot 24-26
B-1049 Bruxelles
Belgium

7 February 2013

Dear Sirs

Generation adequacy, capacity mechanisms and the internal market in electricity

EDF Energy is one of the UK's largest energy companies with activities throughout the energy chain. Our interests include nuclear, coal and gas-fired electricity generation, renewables, and energy supply to end users. We have over five million electricity and gas customer accounts in the UK, including residential and business users. Our comments focus on our licensed activities in the UK only.

EDF Energy considers that the current electricity market arrangements in the UK will not be able to secure the investment required to ensure there is adequate capacity to meet future electricity needs and that these arrangements will also fail to decarbonise the electricity sector by the 2030s in an efficient manner at least cost to consumers. Although the existing electricity market framework has served consumers well up to now by delivering high levels of reliability, it is being stretched in an attempt to deliver outcomes that were not envisaged when it was originally established. There are a number of reasons why the current market arrangements are unlikely to be fit for purpose over the next decade, including:

- the inability of the EU Emission Trading System (ETS) to provide a strong, long-term carbon price signal for investment in low carbon generation;
- the significant increase in the proportion of the market that is sustained by subsidy and the consequential distortions in wholesale electricity prices which compromise the effective operation of the competitive market;
- the large increase in the proportion of high capital, low marginal cost plant required on the system to deliver the country's decarbonisation objectives, and the need to deliver stable and adequate returns to investors in these plants; and
- the significant projected increase in the level of intermittent generation on the system, and the need to ensure that there is adequate capacity of short term response and standby plant to provide back up for variations in wind output.

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EDF Energy believes that well designed capacity mechanisms have a key role in ensuring security of supply. We believe that continuing with an energy only market will progressively reduce plant margins and will fail to ensure security of supply.

In designing any capacity mechanism, it is important to be clear on the objective that it is trying to achieve. It is our view that security of supply can be split into two broad components; resource adequacy (namely the provision of sufficient reliable capacity to meet demand) and operational security (i.e. ensuring that supply and demand is in balance at all times). While the current market arrangements are delivering the latter, we do not believe that this is the case in future for the former. Therefore, a capacity mechanism is purely needed to deliver resource adequacy. We are concerned that conflating objectives will lead to poor design and increase the potential for distortions.

We also believe it is necessary to be equally clear about the difference between demand response and general demand reduction driven by energy efficiency initiatives. There is evidence from the implementation of capacity mechanisms internationally where conflating these objectives has meant that the design of the capacity mechanism has been compromised leading to considerable operational difficulties and potential or real market distortions. Demand response is despatchable whereas energy efficiency driven demand reduction is not. If energy efficiency driven demand reduction is included, then it will artificially suppress capacity values, because economic energy efficiency should, by definition, have a negative cost compared with despatchable demand response or generating capacity.


Applying the principle of valuing energy efficiency on a par with generation capacity or demand side response is fundamentally flawed and would create significant distortions in the capacity market. The correct way to incorporate energy efficiency into a capacity mechanism is to revise the requirement of the peak demand that must be met, and this should result in a lower capacity requirement. The benefit of implementing an energy efficiency measure is the value of energy saved and potentially lower energy prices if the new peak demand can be satisfied at lower cost.

EDF Energy believes that there is scope for the alignment of gas and electricity security of supply arrangements, i.e. the Electricity Security of Supply Directive and the Security of Gas Supply Regulation, regarding governance, in particular to tackle issues associated with the interaction between gas and electricity markets during a crisis. In addition, it seems sensible to align the reporting methodologies associated with generation adequacy, especially to avoid the problem of double counting interconnector capacity by Member States for example. However, it does not seem appropriate to intervene in Member States' right to determine their own generation adequacy arrangements, which would be at risk if adequacy standards were harmonised.

Our detailed responses are set out in the attachment to this letter. Should you wish to discuss any of the issues raised in our response or have any queries, please contact Ravi Baga on 020 7752 2143, or myself.

I confirm that this letter and its attachment may be published on the European Commission's website.

Yours sincerely,

A handwritten signature in black ink, appearing to read "D. Linford", with a long horizontal stroke extending to the right.

Denis Linford
Corporate Policy and Regulation Director

Attachment

Generation adequacy, capacity mechanisms and the internal market in electricity

EDF Energy's response to your questions

QUESTIONS

INVESTING IN THE INTERNAL ENERGY MARKET

Q1. Do you consider that the current market prices prevent investments in needed generation capacity?

EDF Energy considers that the electricity market arrangements in the UK will not be able to secure the investment required to ensure there is adequate capacity to meet future electricity needs and that these arrangements will also fail to decarbonise the electricity sector by the 2030s in an efficient manner at least cost to consumers. Although the existing electricity market framework has served consumers well up to now by delivering high levels of reliability, it is being stretched in an attempt to deliver outcomes that were not envisaged when it was originally established. There are a number of reasons why the current market arrangements are unlikely to be fit for purpose over the next decade, including:

- the inability of the EU Emission Trading System (ETS) to provide a strong, long-term carbon price signal for investment in low carbon generation;
- the significant increase in the proportion of the market that is sustained by subsidy and the consequential distortions in wholesale electricity prices which compromise the effective operation of the competitive market;
- the large increase in the proportion of high capital, low marginal cost plant required on the system to deliver the country's decarbonisation objectives, and the need to deliver stable and adequate returns to investors in these plants; and
- the significant projected increase in the level of intermittent generation on the system, and the need to ensure that there is adequate capacity of short term response and standby plant to provide back up for variations in wind output.

EDF Energy believes that the existing market arrangements, where the market price is largely based on marginal energy costs, are insufficient to provide a credible market signal to bring forward adequate capacity to ensure security of supply. This problem is exacerbated by the projected scale of intermittency that the UK system will have to deal with by the end of this decade. The current arrangements also do not provide sufficient reassurance to underpin investment in capital intensive low carbon plant. There is a "missing money" problem, and this is exacerbated by a large portfolio of intermittent plant that makes generator revenue more volatile and uncertain.

It is for this reason that we believe that some form of capacity mechanism, as a complement to the energy only electricity market, is required to maintain the levels of supply security to which consumers are accustomed. A well designed capacity market should deliver a higher reliability standard in a sustainable and cost effective way as the capacity payment will adequately reimburse all capacity for the loss of the scarcity premium in the energy price. A capacity mechanism will help ensure investment in generation capacity by providing a stable income stream to incentivise investment in reliable capacity. However, it will still retain the appropriate incentives to generate and despatch electricity in the electricity market.

If there are no other changes, the current arrangements will not deliver investment in low carbon generation but will instead lead to increasing dependence on imported gas for electricity generation and this will mean that the UK is not able to meet its energy supply and climate change objectives.

Without capacity payments, the economics of new peaking plant will depend on very infrequent occasions of very high prices. The UK Government cites analysis that if no capacity mechanism is implemented then market prices could need to rise to £10,000/MWh for short periods to allow flexible plants to recover investment¹, and there are serious questions as to whether this would be politically acceptable. The uncertainties about the magnitude of these peak prices, their frequency, and their acceptability leads us to believe that if left to itself, the market may reach equilibrium with a lower standard of security of supply than we currently have.

In practical terms, a capacity mechanism may need to support both the continued operation of existing fossil plant until the early 2020s (if this is cheaper than new build) as well as the introduction of new peaking capacity to replace it. This approach has the advantage of preventing the 'lock in' of carbon emissions from new assets. Any mechanism should enable rational economic choices between peaking plant and other solutions such as demand side response, storage and interconnection. It should also ensure security of supply in a cost-effective manner, and in way that does not discourage participation by new market entrants.

Q2. 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?

EDF Energy believes that while there is some merit in supporting emerging low carbon technologies in the short-term through dedicated support mechanisms, we believe that in the long-term all low carbon generation (including renewables) should be driven by a strong carbon price, combined with transparent electricity markets. This combination will reveal the most cost-effective technologies for decarbonisation of Member State economies.

¹ DECC, Planning our electric future: technical update, p25, December 2011.

In particular, we endorse the UK Government's conclusion² that the UK's need for additional supplies of low carbon electricity should be based on a diverse mix, including nuclear, renewables, and other low carbon thermal generation (i.e. fossil generation with Carbon Capture and Storage (CCS)). Therefore, we believe that post-2020, there should not be any specific targets for renewables (or other specific forms of low carbon generation), and instead the focus should be on total carbon emissions reduction for electricity supply. It is important not to lose sight of the EU's long-term aspiration to deliver a 60%-80% reduction in greenhouse gas emissions by 2050 as Member States work towards the 2020 renewables target.

There is a risk that dedicated support mechanisms for different energy sources will undermine the EU ETS and create market distortions. EDF Energy continues to support the EU ETS as an essential measure to meet the EU's emissions reduction objectives. We recognise that the scheme has had problems in its implementation since inception but we believe that, if these shortcomings can be addressed, it still has a key role in the decarbonisation efforts of both the UK and EU.

However, although EDF Energy considers a robust carbon price as a fundamental part of a coherent and holistic package of electricity market reforms, at this stage we believe it is unlikely on its own to lead to the investment in low carbon generation required for the UK to make its transition to a low carbon economy. This is because the existing energy markets have been built around the dynamics of fossil fuel markets and associated technologies, and these will ultimately have to be replaced with arrangements appropriate and consistent with a low carbon electricity sector. We believe that it is important that steps are taken to secure arrangements that will provide investors with greater revenue certainty over the course of their proposed investment. We therefore welcome the UK Government's current proposals for electricity market reform (EMR) which we believe, when taken together with the forthcoming carbon price floor, can be developed into a robust market framework that is capable of underpinning the investment required in affordable low carbon electricity generation and help ensure generation adequacy.

As we move to longer term arrangements, and as markets converge and the carbon price increasingly drives investment decisions, the need for national support schemes should recede. EDF Energy believes that, consistent with a technology neutral approach to decarbonisation, transmission investment and interconnection policy and regulation should not be targeted towards particular technologies.

Q3. 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?

As we articulate in our response to Question 13, when discussing security of supply, it is important to distinguish between resource adequacy and operational security. We believe that the current market arrangements deliver the latter but are not adequate to deliver the

² DECC, Overarching National Policy Statement for Energy Infrastructure (EN-1), July 2011.

former. With this clarification in mind, we agree that the establishment of cross-border day ahead, intraday and balancing markets will contribute to ensuring security of supply.

This is because:

- Cross-border trades will efficiently move power to those Member States willing to pay for it.
- The day ahead market will attract the right power at the right time such that the trading market participants will be in balance by fine tuning their positions.
- Balancing markets, by definition, create an incentive to balance and hence reduce any residual balancing actions which might be required by the Transmission System Operator (TSO).
- An active power market, with correct pricing signals, will in the long run be attractive for further investment where necessary.

However, the markets mentioned above will only contribute to, as opposed to fully secure, a Member State's security of supply requirements as we have argued in our response to Question 1. The impact of these markets is to optimise what existing plant is available on the system in the short term (day ahead) and real time basis (balancing market). If, for example, there is little or no scope for trade with countries with similar supply and demand characteristics (i.e. if peak demand periods are simultaneous), then this will not take place and will not realise security of supply benefits.

In this context it is also important to note that interconnection and generation capacity are two distinct elements of the electricity supply chain, and interconnection does not in itself guarantee that there is sufficient generation capacity to meet demand. Interconnection is not a panacea and failure to allocate the costs of additional transmission and interconnection capacity to those technologies that will benefit from it represents a very large risk for consumers because it will;

- Lead to inefficient technology choices because it will unduly disguise the difference in value between firm and non-firm generation sources, and,
- Lead to inefficient decisions on locating generation assets.
- Subsidising or socialising interconnection costs will also artificially undermine the price signals for cost effective demand side response measures as well as electricity storage.

We believe that investment should take place where it makes economic sense and be guided by market price signals. Member States must retain the flexibility to meet security of supply through other mechanisms, such as capacity payments.

Q4. 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?

EDF Energy believes that the Third Package is comprehensive enough as it stands (i.e. Art. 8 of the EC Regulation n. 714/2009) and steps should be limited to ensuring timely implementation by all Member States of regulation as it comes into force, rather than extending the range of regulation.

Q5. What additional steps could Member States take to support the effectiveness of the internal market in delivering generation adequacy?

Ideally, we believe that Member State intervention artificially to suppress price spikes should be prevented, as these spikes reflect the economic reality of funding very low load factor plant. We agree that demand side management should be encouraged and steps should be taken to ensure that consumers at all levels are given the opportunity to participate.

However, we also believe that it is necessary to be very clear about the difference between demand response and general demand reduction driven by energy efficiency initiatives. There is evidence from the implementation of capacity mechanisms internationally that conflating these objectives has meant that the design of the capacity mechanism has been undermined leading to considerable operational difficulties and potential or real market distortions. Demand response is despatchable whereas energy efficiency driven demand reduction is not. If energy efficiency driven demand reduction is included then it will artificially suppress capacity values because economic energy efficiency should by definition have a negative cost compared with despatchable demand response or generating capacity.

Applying the principle of valuing energy efficiency on a par with generation capacity or demand side response is fundamentally flawed and would create significant distortions in the capacity market. The correct way to incorporate energy efficiency into a capacity mechanism is to revise the requirement of the peak demand that must be met, and this should result in a lower capacity requirement. The benefit of fitting an energy efficiency measure is the value of energy saved, and potentially lower energy prices if the new peak demand can be satisfied at lower cost.

Other steps that Member States could usefully take include:

- a. Concisely state their concept of security of supply for the purposes of European assessment.
- b. As a result of the above, understand what consumers are willing to pay for security of supply.
- c. Consider the design of force majeure arrangements so that they are fully integrated into security of supply policy.

Q6. 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?

Public authorities will inevitably have to make complex trade offs between different classes of consumer with different values of lost load and hence willingness to pay. Aggregating these choices is essentially a public policy issue. As we implied in our response to Question 5, we are not certain that all Member States have enough information about willingness to pay for security of supply. We note that in the UK some research has been conducted

for distribution price controls on the reliability of supply and so it seems logical to extend this work.

Different groups cannot be easily identified in terms of their physical connection by a supplier or network operator unless they are a large industrial customer. Therefore, it seems almost impossible to reflect the preferences of lower standards on the part of some customers at the moment. However, in the longer term we believe that the situation could potentially be reversed with smart metering and associated switching. This could be combined with the statutory opportunity for compulsory demand side participation as long as there are reasonable incentives to do so. In such instances, the public authorities would provide the framework for what are essentially market transactions between consumers and energy suppliers.

ASSESSING GENERATION ADEQUACY

- Q7. 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**

We support the proposed review, although we believe that confidence in the accuracy of the information in these reports will always be an issue. There is an element of uncertainty regarding the assessment of security of generation adequacy. This is because of the inherent uncertainties regarding commercial decisions about generating plants, electricity interconnection flows, and the level of demand. This requires the modeller to develop sensitivities to fully capture these known unknowns. It may therefore be difficult to use the existing bottom-up approach to data collection if these national judgements are simply collated - regardless of the quality of the data. With regard to each of the reporting levels, EDF Energy believes:

a. National level

There are three publications which taken together provide information on capacity adequacy in the UK:

- Transmission Entry Capacity (TEC) register - this shows the capacity of generators' connection with an indication of commissioning and closure depending on the plant.
- Ten year Network Development Plan which identifies future mixes for TSO planning.
- Ofgem's Electricity Capacity Assessment specifically designed for the issues identified in the report.

Despite the variations in power flows across the interconnectors, we feel that there is enough information to identify shortfalls in generation adequacy for our purposes.

b. Regional Level

We agree that there could be issues associated with aggregating national generation especially in the treatment of interconnection in its contribution to security of supply. We notice that the process and methodology of regional reporting by ENTSOE is not static and has been under revision. For example, the 2013-2014 report³ states "for the Winter Outlook 2012-2013 an extensive regional analysis was added to the well-known per-country analysis which has been performed in previous years." It seems sensible to integrate this work with the review.

c. European Level

There may well be a case for increased information at the European level over and above aggregating the regional data. However, the usefulness of the information may well be more suited to European policy makers than for energy companies operating within the Member States.

Q8. Looking forward, is the generation adequacy outlook produced by ENTSOE sufficiently detailed? In particular,

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

We would highlight that all plant is flexible and that there are many different responses available to deliver this. In this regard, we believe that the current market arrangements are working adequately. However, what is required is to consider how much firm and non-firm capacity is available, and then establish what the costs are of accommodating a large portfolio of non-firm generation capacity.

We believe that the evolution of the existing reports may be the most sensible way forward. At present the near-term Winter Outlook reports provide a good sense of system needs for the next winter and the Scenario Outlook and System Adequacy reports take a broader view to 2025.

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

We welcome initiatives to improve forecasting accuracy in the face of new challenges posed by intermittency. We note that, system adequacy is scenario-based and requires the forecasters to use their judgement, we believe that the increased level of detail may not

³ ENTSOE, An Overview of System Adequacy: Winter Outlook Report 2012/2013 and Summer Review 2012, p6, 30 November 2012

necessarily lead to a more accurate forecast. This is especially true given the complex interactions between different national energy systems.

Q9. Do you consider the Electricity Security of Supply Directive to be adequate? If it should be revised, on which points?

We believe that the Directive is adequate. However the Directive's focus could be aligned with the Gas Security of Supply Regulations where possible. This would include the requirement to submit a national emergency plan. This will allow strategic decisions to be made during an emergency across both gas and electricity.

Q10. 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?

No. The burden of implementing mandatory risk assessments has to be set against the policy tools available to remedy any problems identified by it. The application of the risk assessment for gas in the UK has been a useful exercise. However, we would note that during the national debate on security of supply, it was argued that the gas system operator may not be in any better of a position to source extra gas for delivery into the UK than shippers. In the equivalent scenario for electricity, we believe that the existing market incentives will be enough to bring as much generation as is available, to the market.

However, we are sympathetic to the existing aims defined in the Gas Directive and believe that it should be adopted for electricity, with in particular:

- Economic production from indigenous resources being maximised.
- A well-functioning commodity market that delivers a high quality, reliable and competitive service to consumers.
- A well-functioning capital market working with the Government to provide necessary levels of investment in energy infrastructure.
- An enabling regulatory framework set by the Government, in areas where the market acting alone might not achieve adequate levels of security.
- Strong and diverse markets promoted both within the EU and internationally.

Q11. 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?

No. It would be difficult to harmonise the existing generation adequacy standards given their diversity. For example, a country in a subarctic climate that relies strongly on electrical supply for heating may want a higher standard than one in a Mediterranean climate that, in any case, relies more on biomass for heat. Alternatively, the Mediterranean

country may be more worried by air conditioning load which, however, may be strongly correlated to output of photovoltaic generation.

We do not believe that there is a problem per se in different security standards producing different values for capacity across the EU. Any difference in prices will help underpin the price signal for interconnection. However, EDF Energy believes that it would make sense to harmonise the reporting methodologies in an increasingly regional market driven by market coupling. If these reporting methodologies were to be harmonised, then the differences between Member States choices should become transparent.

MECHANISMS TO ADDRESS GENERATION ADEQUACY CONCERNS

Q12. Do you consider that capacity mechanisms should be introduced only if and when steps to improve market functioning are clearly insufficient?

EDF Energy believes that we have already reached this stage in the UK. It is crucial that the introduction of any initiative or reform (e.g. capacity mechanism) is considered by Member States in a holistic manner by considering the interaction with their other energy policy mechanisms (i.e. low carbon feed-in tariffs). There should be clarity as to what each individual mechanism is designed to achieve.

Although there is some uncertainty about exactly when Member States, such as the UK, may face a capacity shortage, we are concerned about the risks related to the closure dates of fossil plants (some of which are unprofitable or only marginally profitable) and which could provide a cost effective solution to ensuring security of supply in the short to medium term. In any case, we believe it is important to address this issue now to remove an uncertainty that will increase the risk associated with investment decisions in all forms of generation.

Q13. 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?**

As stated above, EDF Energy believes that it is imperative that market participants are clear about the role of the different mechanisms within the electricity market. With respect to the purpose of the capacity mechanism, we believe that the distinction has to be made between diversification of supply, operational security and resource adequacy.

It is our view that the purpose of the capacity mechanism should be to address resource adequacy (namely the provision of sufficient reliable capacity to meet demand) and that it should not discriminate between different sources of capacity that contribute to security of supply. This role is different from mechanisms that help achieve operational security of

the electricity system, by ensuring that supply and demand are in balance at all times. If this distinction, and interaction, is not managed correctly, then market participants may not have confidence in either mechanism and this may discourage investment, leaving the system with an insufficient level of resource adequacy.

In effect, it is important to keep capacity, energy and flexibility products separate:

- The capacity market must signal for adequate reliable capacity to be on system to ensure demand can be met on a long term basis.
- The energy market (or the System Operator) must signal for efficient despatch of that capacity.
- Balancing and other ancillary services must be the mechanism for the System Operator to procure sufficient flexibility to ensure demand is met on a minute to minute basis.

We believe that the current market arrangements are delivering the last two points but are not fit to address future resource adequacy.

Q14. 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?**

EDF Energy does not support a Strategic Reserve, or a similar targeted capacity mechanism model, because we believe its successful operation would be heavily dependent on effective governance, and the perception of a high risk associated with further potential intervention may undermine the mechanism.

Unless it is designed and implemented correctly, a strategic reserve could depress wholesale prices, which could lead plant outside the mechanism to become unprofitable and risk a 'slippery slope' problem (i.e. that the infra-marginal plant without a capacity payment becomes unviable). Such a market distortion could undermine the mechanism's ability to ensure security of supply as the revenues for plant outside the Strategic Reserve would remain uncertain, and such plant would be adversely affected by the operation of the Strategic Reserve. These revenues will be contingent on the combination of the number of hours a year that the Strategic Reserve will operate and the despatch price of the reserve. A clear methodology is therefore necessary to set the despatch price, and the impact on the cash out price should be well understood by market participants

In addition, we are also concerned that this may lead to the development of a sub-optimal capacity mix, with the construction of low capital cost plants that can offer capacity into the Strategic Reserve precluding the development of more capital intensive but more efficient plant. We believe that these problems can be minimised if the key parameters are correctly calibrated. These key parameters are the volume of reserve capacity, the despatch criteria for reserve capacity, and the impact on balancing prices when the reserve

is activated. However, we believe that these parameters will evolve over time as the level of intermittent capacity increases over time. This will make it extremely difficult always to set these parameters correctly and in a manner which ensures that sufficient plant is contracted in the Strategic Reserve to provide a reliable and predictable impact on wholesale prices that all market participants can rely on.

We believe that consideration will also be given as to how the reliability of Strategic Reserve can be assured. If the plant is called only very infrequently, there may be a high risk of failure when it is called. A regime of periodic test operation may be required to manage this risk, which should be done in a manner designed to have minimal impact on the normal operation of the market.

A Strategic Reserve would have to be designed to procure capacity from the most cost-effective sources, irrespective of whether they are generation assets, Demand Side Response (DSR), storage or other solutions. However, a critical requirement for the participation of DSR in a targeted capacity mechanism is that the DSR is actively provided in response to the requirements of the Strategic Reserve Operator in such a manner that it can be properly evidenced, quantified and verified.

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?

We believe that making the necessary changes over a period of time to ensure that the Strategic Reserve continues to operate effectively and provides a predictable and stable revenue stream for all plant will prove to be quite challenging. These could create the perception of a high associated risk of further intervention, which is likely to undermine the mechanism. The difficulty in determining the required level of reliability, and estimating the proportion that is likely to be delivered by the market, should also not be underestimated. This will not only have consequences for the Member States' security of supply (if the required capacity is underestimated), but also for the Member States' other energy policy objectives such as affordability and decarbonisation, if there is too much capacity, or if the mechanism distorts the capacity mix.

As noted above, we note that the risk identified with the Strategic Reserve is that it may fail to ensure sufficient revenue for plant outside the Strategic Reserve. It will therefore be necessary to assess the expected capacity balance over a much longer timescale (perhaps 7-10 years ahead). In the absence of clear signs that the market is likely to provide adequate capacity as a result of investment in a mix of generation assets, this would be a warning that the Strategic Reserve is failing to support the right investment climate.

We would also question the assertion in the consultation document that the strategic reserve mechanism "effectively acts as a price cap" for two reasons:

- Firstly, this does not take into account any possible effect on interconnector flows during a Europe-wide scarcity event. Member States' markets must retain the capability to increase market prices above the despatch price, so that they can retain

indigenous power supplies and/or import additional power supplies up to the point where it is no longer willing to pay a higher price than neighbouring markets. If this is not allowed then this will simply mean that Member States' would have paid for Strategic Reserve without benefiting from the additional security of supply.

- Secondly, in the absence of any specific capacity-related remuneration for plants outside the Strategic Reserve, these plants are rewarded for providing capacity by high prices in the energy market at times of system stress. The operation of the Strategic Reserve will be a major factor in setting the energy prices at such times; therefore, it effectively becomes the mechanism that provides the right incentives for investment in capacity outside the Strategic Reserve. The precise impact of the Strategic Reserve on energy prices will depend on the detailed rules of the balancing market regime. If it sets prices too high, it will lead to excessive costs to customers but, if it sets prices too low, it will discourage necessary investment in "market" capacity.

For both of these reasons, we believe that, although the operation of the Strategic Reserve will clearly affect market prices at times of system stress, the idea that it would set a cap on prices underplays the importance of high market prices at these times in ensuring security of supply. At times, it might effectively set a floor, rather than a cap, on market prices.

Q15. 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?**

EDF Energy favours a capacity auction model that we believe will be more compatible with the existing market arrangements and proposed reforms. We believe that all plant that provides reliable capacity should be able to participate in the capacity market to ensure demand can be met on a long term basis. Excluding any plant from the capacity market would be a targeted capacity mechanism through the back door and would result in missing money for those plants and a "slippery slope" of capacity on the system.

Our preferred mechanism would consist of a centrally co-ordinated approach, where the total need for capacity would be set centrally on a national level, looking at a single year in the future (say four years in advance). A centralised auction would be held to satisfy the demand for the required capacity. Both generators and providers of demand side response would be able to sell capacity certificates through a competitive process and the clearing price of the auction would set the value of capacity for that year.

The auction clearing price would be paid to all participants. All providers of capacity that contribute to system security would be eligible to participate, and this capacity would be audited. The certification would reflect different levels of availability; e.g. wind would need to have its capacity credit assessed. Availability would need to be checked over a defined number of hours reflecting highest demand, e.g. the forecast top 200 hours. Capacity owners would face a penalty if not available when called upon. It is important

that this penalty should be set at a level that incentivises availability but, at the same time, should not be set too high, to prevent capacity owners withdrawing capacity in fear of the penalty.

The Central Agency would be responsible for recovering the costs through a levy on suppliers as a function of their share of demand over the forecast 200 hours of highest demand. The suppliers would in turn recover this amount from customers. We believe that this time duration represents a compromise. If the number of hours is too long, then it will not promote enough peak demand reduction and will reduce the incentive to be available when most likely to be needed. Conversely, if the number of hours is too short then this will make it too difficult for capacity providers to predict the peak hours, and will place too great a risk on them if they are not available during this period. This unpredictability of payments will also represent a risk to suppliers and, ultimately, to consumers. The benefit of this mechanism is that the capacity market and the energy market would remain separate to avoid distorting each other.

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?

EDF Energy believes that the model we have outlined in our response to Question 15a would be compatible with ensuring flexibility in the electricity system. For example, potentially flexible non-generation technologies, such as DSR, would be able to participate in capacity auctions to the extent that they are able provide the quantity of reliable capacity that they offer in a given year. However, this capacity must be properly evidenced and quantified, either by direct measurement or by reliable estimation. Ensuring that the price signal is robust and reliable will encourage DSR. If given a sufficient lead time, it may be possible for suppliers or aggregators to sell a DSR product to the central body, and then subsequently contract with customers to provide this service.

c. Are there any models of capacity mechanism the introduction of which would be irreversible, or reversible only with great difficulty?

As stated above, EDF Energy does not favour a Strategic Reserve mechanism due to the potential distortions that may arise as a result of the indirect interaction between the Strategic Reserve and energy market. Therefore, any steps to remove the capacity mechanism at a later stage could have unintended consequences.

However, we are deeply concerned that the withdrawal, or threat of withdrawal, of any model of capacity mechanism adopted, without adequate notice and appropriate industry consultation, would introduce a high degree of investor uncertainty. This would then put at risk investment in adequate levels of reliable generation capacity and so threaten security of supply.

Q16. Which models of capacity mechanisms do you consider to have the least impact on costs for final consumers?

EDF Energy believes that any well designed capacity mechanism is in the direct interests of consumers as it should help ensure that adequate capacity is provided efficiently, and will allow an effective trade-off between supply side and demand side actions. In the long-run, prices should, on average, be little different as a result of introducing a capacity mechanism. However, the upside is that the capacity mechanism should reduce the risk of periods of high prices because of capacity shortages.

Our preferred option for a capacity auction model is likely to be more open and transparent than other models and, subject to the right detailed operational framework, will avoid excessive cost for consumers by allowing transparent price discovery.

However, we recognise the need to limit consumers' costs by considering the trade-off between system reliability and overall cost. In retaining the ability to procure different amounts of capacity depending on the costs and system reliability trade-off, it is important that the rules are transparent and consistent from year to year to prevent uncertainties from causing untimely investments in capacity.

Q17. To what extent do you consider capacity mechanisms could build on balancing market regimes to encourage flexibility in all its forms?

EDF Energy believes that balancing mechanisms and capacity mechanisms exist for very different reasons but are also complementary in their objectives. As stated above, it is our view that security of supply should be considered in two broad components; resource adequacy (namely the provision of sufficient reliable capacity to meet demand) and operational security (i.e. ensuring that supply and demand is in balance at all times). While the current market arrangements are delivering the latter, we do not believe that this is the case going forward for the former. Therefore, a capacity mechanism is purely needed to deliver resource adequacy. We are concerned that conflating objectives will lead to poor design and increase the potential for distortions.

Balancing markets, by definition, creates an incentive to balance and hence reduce any residual balancing actions which might be required by the TSO. However, as we have argued above, the existing market arrangements, where the market price is largely based on marginal energy costs, are insufficient to provide a credible market signal to bring forward investment in adequate capacity to ensure an appropriate level of security of supply.

Q18. Should the Commission set out to provide the blueprint for an EU-wide capacity mechanism?

The EU should consider a market design that will provide robust revenue streams for low carbon plant as well as ensuring security of supply. This will help reduce the need for subsidies and will restore market signals.

The development of capacity mechanisms is likely to reflect national willingness to pay, and this will depend on the cost structure of the plant within the generation portfolio, as well as the respective endowments of the Member State. In this case, national authorities should be in a position to make their own judgements regarding what is required. This is important as an EU-wide blueprint would inevitably have to accommodate a number of different approaches to capacity mechanism design, and this may ultimately distort the internal energy market. For this reason, we see that there is more value in developing a framework for assessing European generation adequacy assessments as opposed to a prescriptive blueprint.

FRAMEWORK FOR ASSESSING CAPACITY MECHANISMS

Q19. Do you consider that the European Commission should develop detailed criteria to assess the compatibility of capacity mechanisms with the internal energy market?

Yes. Capacity mechanisms must be free from distorting the internal energy market but must also allow Member States to develop their own schemes that are consistent with their own energy policy objectives. The criteria to assess the compatibility of capacity mechanisms with the internal energy market identified by the Commission in the consultation is a good starting point for their development.

Potential detailed criteria	Comment
1 (a-c) establishing the context of the mechanism	<i>Qualified agreement. What constitutes "context" is highly discretionary. At present this could create some confusion in its interpretation of the draft as it currently stands. Member states are required to consider other alternatives such as demand side response, before a capacity mechanism is developed. It is likely that Member states will already have these arrangements in some form so it is likely that it will be the incremental value of extending existing arrangements that will be the issue. Given the intent of the criteria the emphasis should be on the economics of the capacity mechanism and its alternatives. We do not believe that energy efficiency measures cited in the text would necessarily solve the challenge of providing peak power, and believe that the concept of valuing energy efficiency on a par with generation capacity or demand side response is fundamentally flawed.</i>
2 Effectiveness of the capacity mechanism in addressing market failure	<i>Agree. It would be useful for more clarity as it requires an assessment of the counterfactual and comparing comparative costs.</i>
3. Duration of the capacity mechanism	<i>Disagree. This could potentially introduce investor uncertainty. If there is adequate capacity in the system then this will simply reveal itself through a low capacity payment.</i>

4. Capacity mechanism open to electricity undertakings operating in other Member states	<i>Disagree. It will be very difficult to design the mechanism with other Member States over and above their existing contribution to security of supply through trade. For example, such issues as free riding and liability chains are not easily resolved.</i>
5. Should not act as a barrier to trade	<i>Qualified agreement. Competition law and financial regulations already effectively prevents an abuse of a dominant position. It is therefore difficult to justify a regulation that duplicates these existing powers and creates what amounts to double jeopardy for generators. The concept of "distortion" may be difficult to define in the context of a capacity mechanism.</i>
6. Non discrimination	<i>Agree. Need to make a distinction between energy efficiency and demand side response which have inherently different characteristics.</i>
7. Non technology specific	<i>Agree.</i>
8. Least cost	<i>Agree. May be hard to demonstrate and it is not in the interests of consumers to have a gold plated scheme.</i>
9. Non discrimination of costs allocated to consumers	<i>Agree.</i>

Q20 Do you consider the detailed criteria set out above to be appropriate?

a. Should any criteria be added to this list?

We have suggested that national methodologies for determining generation adequacy could profitably be aligned. This would have the advantage of creating coherence of adequacy assessment and allow freedom of choice for the member states to determine their own security of supply standards. We do not see how the detailed criteria identified in on pages 12-14, would work effectively without this alignment.

The list provided is comprehensive in terms of the topics covered. However, it is worth providing more detail on the discretionary elements of the criteria. For example, the definition of "artificially distorting" may be difficult to draft legally but is central to the text.

b. Which, if any, criteria should be given most weight?

EDF Energy would argue that point 5 of the text, which prevents the distortion of cross-border trade or competition in the internal market, is the most important assessment criteria. This is because the impact of incorrectly formed market prices pose the largest risk to wholesale prices and hence consumer welfare.

EDF Energy
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