UK response to European Commission Consultation on Generation adequacy, capacity mechanisms and the internal market in electricity

Key points

- The UK Government is committed to the development of the single energy market.
- As with other EU Member States, the UK faces a security of electricity supply challenge which requires the introduction of a capacity mechanism. Waiting for security of supply problems to emerge before acting would mean that the solution arrives too late.
- Therefore, national capacity mechanisms may be needed, at least in the short to medium term. Considering the diverse nature of EU Member State energy markets, flexibility is needed to implement the most appropriate solution for national circumstances.
- While we would support non-binding guidelines on capacity mechanisms, we are not in favour of stringent rules as a "one-size fits all" approach cannot address individual concerns.
- Capacity mechanisms should be designed with the intention to be transitional. However, Member States should have the flexibility to decide on duration as it will be impossible to assess *a priori* when the single market will be sufficiently developed to no longer need capacity mechanisms. Momentum to build the EU single market should be maintained.
- Greater regional cooperation may be needed to ensure System Operators across Europe have the best possible information for designing capacity mechanisms and assessing impacts on neighbouring markets.

Questions relating to Section 2: Investing in the Internal Energy Market

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

1. The UK's view is that there is a range of factors, including current and projected energy prices and more fundamental market failures, which are creating a difficult climate for investment in generation capacity, and which could prevent the required level of investment.

2. While the electricity market should in theory provide the signals to incentivise adequate investment in reliable capacity, there are a number of market failures which the UK (and to varying degrees other European markets) face which mean that we cannot be confident that sufficient capacity will be in place to ensure security of supply. These market failures are significantly exacerbated by the rapid closure of existing capacity, in particular to meet European Union environmental requirements, and the increase in intermittent and inflexible capacity on the system to achieve our ambitious renewables and decarbonisation objectives.

3. The first market failure is that reliability is a public good. Customers cannot choose their desired level of reliability, since the System Operator cannot selectively disconnect customers and they do not respond to real-time changes in the wholesale price. This may also lead to high costs to society as a result of having an unreliable electricity supply, and if they aren't charged to generators, they would be external costs.

4. The second market failure is the "missing money problem". In theory the inability of consumers to select their desired level of reliability could be addressed in an energy-only market by allowing prices to rise to a level reflecting the average Value of Lost Load (i.e. the price at which consumers would no longer be willing to pay for energy) and allowing generators to receive scarcity rents.

5. However, in practice energy market revenues alone may fail to bring forward sufficient investment in capacity due to 'missing money.' This may be due to two reasons as follows:

   - Inability of price to reflect scarcity**.** Current wholesale energy prices cannot rise high enough to reflect the value of additional capacity at times of scarcity. This is due to the charges to generators who are out of balance in the Balancing Mechanism ("cash out") not reflecting the full costs of balancing actions taken by the System Operator (such as voltage reduction).
   - Lack of certainty that prices will rise even if they can. At times when the wholesale energy market prices should peak to high levels, investors are concerned that the Government or the regulator will see any rise in prices as an abuse of market power on the part of the generator. Investors are worried that either the Government or the regulator could respond to price rises by, for example, introducing a cap on energy prices. They are also concerned that prices simply won't rise – for example, if wind capacity performs better than expected, it may reduce the opportunities for more expensive despatchable capacity to run.

6. This is not a theoretical problem. The evidence from recent scarcity situations in the GB market is that prices have not risen to the levels that would have been expected. And there are examples of regulatory intervention following periods of high prices (for example, most US markets have a price cap).

7. The third market failure is that the electricity market has significant barriers to entry. The regulatory risk, lack of forward liquidity, and the challenge of "missing money" mean that there are real barriers for new market entrants to overcome if they are to invest – particularly if they need to secure project or debt finance.

8. These market failures exist to some extent in all electricity markets. But they are very significantly exacerbated by the specific nature of the GB market in the coming years. The UK's generation fuel mix is in the process of changing radically. Gas is displacing coal, nuclear in the short term is reducing, and oil

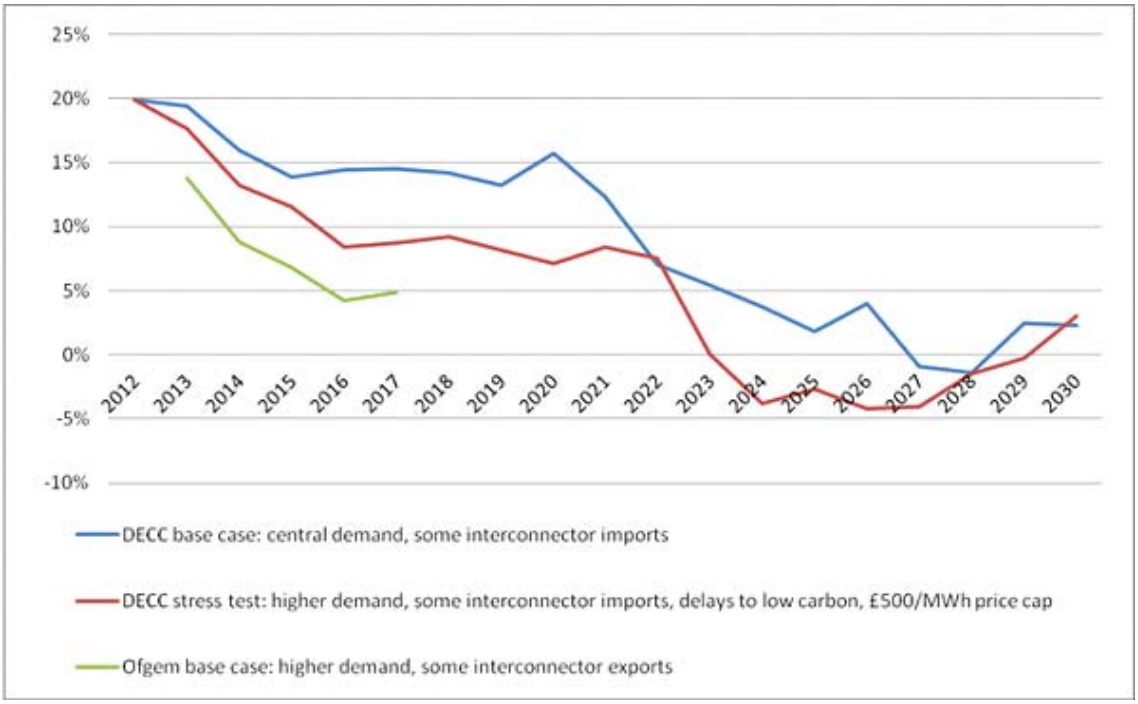
and coal plant is closing down. This change in fuel mix threatens the UK's ability to meet its energy needs by having secure supply of electricity, while at the same time furthering UK decarbonisation and contributing to the EU's carbon emission reduction objectives.

9. DECC and Ofgem (the regulatory authority) have both carried out assessments of the likely future capacity margins in the GB market. There is agreement between the models that capacity margins will tighten to levels which significantly increase the risk of capacity shortfalls.

10. Ofgem's Electricity Capacity Assessment[1] (which was developed using analysis from the UK's System Operator, National Grid) suggests that the current capacity excess is likely to reduce sharply between now and the middle of the decade. The key driver for declining capacity margins is the retirement of coal and oil plant under the EU's Large Combustion Plant Directive (LCPD) as well as low levels of new investment in conventional generation. According to the Base Case presented in Ofgem's report, de-rated capacity margins are expected to fall from their current level of around 14% this coming winter to around 4% in 2015/16.

11. DECC has also modelled the security of supply outlook. This includes a central case and a plausible stress test which includes, among other things, higher levels of demand. The de-rated capacity margins from these scenarios are shown in Figure 1 along with the Ofgem Base Case.

Figure 1: Ofgem and DECC estimates of de-rated capacity margins



[1] http://www.ofgem.gov.uk/Markets/WhlMkts/monitoring-energy-security/elec-capacity-assessment/Documents1/Electricity%20Capacity%20Assessment%202012.pdf

12. Finally, we would note that this is not simply an issue for generating capacity. The UK is keen to incentivise the most efficient form of reliable capacity – this includes not just generation but also demand side response and electricity storage.

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?

13. The UK's view is that targeted support for some technologies can be the most cost-effective way to deliver electricity system objectives. For example, our view is that increasing the proportion of renewables and nuclear generation is essential not just to meet renewables and decarbonisation targets, but also as it provides wider security of supply benefits. Firstly, it reduces our dependence on the fast diminishing reserves of fossil fuels, and exposure to fossil fuel price shocks. Secondly, such targeted support is essential to the achievement of our national decarbonisation target, delivery of the UK's 2020 renewables target and contributing to the European decarbonisation objectives.

14. However, increasing the amount of intermittent and inflexible plant, with low short-run marginal costs, on the system can undermine the business case for conventional generation whose opportunities to secure revenues will be more limited and less certain. This, along with the other market failures discussed in the response to question (1), can result in insufficient investment in reliable capacity.

15. This means that, to enable the transition to a low carbon electricity system without compromising security of electricity supply, Member States may need to introduce capacity mechanisms.

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

16. Yes. Interconnectors have the potential to enhance security of supply by permitting areas where there is a surplus of generation in Europe to supply those where there is a scarcity of it at any given time, subject to there being sufficient capacity on the interconnectors to allow this.

17. Ensuring security of supply through the use of interconnectors is critically dependent on the interconnected markets being efficiently coupled and for both national markets to properly reflect scarcity on an equitable basis (i.e. it will be futile if one market has consistently higher prices than the other, irrespective of levels of scarcity). Coupled intra-day and balancing markets will contribute further as they are implemented.

18. Current plans to extend the market coupling arrangements operating on BritNed to the interconnector with France (IFA) this year and Ofgem's expected

cash-out reform[2] should facilitate significant improvement in the intra-day and balancing markets by 2014. Until these reforms are operational, interconnectors exporting from GB during periods of scarcity will remain possible.

19. The efficient operation of interconnection, once balancing arrangements are harmonised, can certainly contribute to security of supply, but fundamentally EU level security of supply will only be achieved through a combination of sufficient generation (or demand side response) capacity at an EU level.

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?

20. The steps described above in our response to question (2), particularly harmonising balancing arrangements across the internal energy market, are the most important.

21. We also see possible benefit in the Commission providing non-binding guidelines for Member States introducing capacity mechanisms. This would help to ensure that the mechanisms introduced support the development of the single energy market through harmonisation while at the same time addressing the needs of individual markets. It is essential that any guidelines recognise that different solutions may be appropriate for different markets. This is reflected in the fact that a number of Member States have different designs of capacity mechanism already in place and with more proposed.

22. Our preference is that state aid guidelines should cross-refer to capacity mechanism guidelines. This would provide recognition of the careful balancing act that Member States are undertaking in seeking to ensure security of supply whilst decarbonising our energy markets. The UK has fed into the State Aid Modernisation process and has included a recent paper it provided to DG Competition setting out its proposed state aid principles for capacity mechanisms in the Annex of this response.

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

23. Our view is that two additional steps could be taken. Firstly, the use of real-time tariffs to drive generalised demand-side response. Secondly, to ensure System Operators across Europe have the best possible information for designing and operating capacity mechanisms and assessing their impacts on neighbouring markets, we see value in the development of EU-wide capacity adequacy assessments and greater regional cooperation.

24. The Electricity Coordination Group could provide a formal framework, possibly by setting up an expert group to consider such issues.

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[2] Ofgem is currently consulting on the need for reform of "cash-out" http://www.ofgem.gov.uk/Europe/Documents1/EU%20Target%20Model%20open%20letter.pdf

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?*

25. All consumers value security of electricity supply. Ideally they would be able to respond to real time price signals and set their own level of reliability.

26. Over the medium to long term, the UK will be enabling a more price responsive demand side to the electricity market through smarter networks[3], the rollout of smart meters (expected to be completed by end of 2019), and through the use of real-time tariffs. This will enable consumers to make their own decisions to shift their energy consumption to periods where prices are lower.

27. Given the barriers to consumers responding dynamically to prices in this way, and the increasing risks to security of supply, it may be necessary for public authorities to set a level of reliability on behalf of all consumers. This can be achieved by balancing the benefits of security of supply with the costs. The benefits of security of supply can be quantitatively assessed by reference to a Value of Lost Load while the costs are determined by the cost of additional capacity.

Questions relating to Section 3: Assessing Generation Adequacy

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*

28. Yes. As referred to in our response to question (4), our view is that the Electricity Coordination group (or, rather, a sub-group thereof) should be used for discussion of capacity adequacy assessments at EU level and similar discussions should take place on a more informal basis at regional level.

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

a) *Is there a need for a regional or European assessment of the availability of flexible capacity?*
b) *Are there other areas where this generation adequacy assessment should be made more detailed?*

29. Our view is that there may be a case for a regional or European assessment of the availability of capacity. In principle, our view is that this ought to make use of dynamic despatch modelling of the electricity system across Member States

[3] The expansion of smarter networks will be an incremental process. Roll out has already begun in the UK, this will increase as more low carbon technology (such as heat pumps, electric vehicles and renewable distributed generation) is connected to the network.

including the likely operation of European interconnectors. However, care must be taken to ensure that this modelling is robust and that realistic assumptions can be used. One problem is that there are many subsidies, contracts etc that distort the cost and operation of stations that are either unknown (commercially confidential) or are too complex to model across Europe. Therefore there is a role for the Commission to try to ensure that this can be overcome. Care should be taken that analysis is not duplicated by co-ordinating with other institutions which might carry out such analysis such as ENTSO-E.

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

30. The Electricity Security of Supply Directive provides a useful framework for action by Member States to safeguard their security of supply and the principles enshrined in it are still valid. We do not think there is a compelling case for a revision.

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?

31. It would help countries to understand the security of supply risks and benefits of interconnectors if they could understand the capacity adequacy and risk assessment in other countries. There may be a role for some harmonisation of outputs so that assessments can be understood together and compared across countries. However, it is also important that there is sufficient scope for individual Member States to tailor their assessment in a way that is most useful for them and reflects any individual requirements.

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?

32. Capacity adequacy standards reflect a Member State's trade-off between cost and reliability. Ultimately this is a policy decision which needs to take into account the individual circumstances in a Member State and is not appropriate or desirable to be harmonised at European level.

33. While it is important that countries creating national capacity adequacy standards consider those in other neighbouring countries (particularly those with which they are interconnected), the UK considers that this decision is more appropriately taken at Member State level.

34. It is also the UK's view that irrespective of whether it is the Member States' choice to decide capacity adequacy standards, until there is a fully functioning internal market, it is practically impossible to go beyond Member State standards, because of the security of supply issues that have been described earlier in our response.

Questions relating to Section 4: Mechanisms to address generation adequacy concerns

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

35. Capacity mechanisms should be introduced if there is strong evidence (both qualitative and quantitative) that market failures are likely to lead to a capacity shortfall. Member States must think carefully and undertake thorough analysis before introducing a capacity mechanism. However unless Member States wait until it is too late, it will not be possible to *prove* definitively market functioning is 'clearly insufficient' and therefore that a capacity mechanism is required. Judgements need to be taken by Member States on a prudent, risk-based basis, with supporting evidence.

36. Before intervening, Member States should ensure the impact of any intervention on the underlying market (including the developing internal energy market) is carefully considered, and that any intervention can be withdrawn if the market develops to the point where it is no longer required.

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?

37. It is critical to remember that no liberalised market provides security of supply. There is always a need for central intervention, which is why European Transmission System Operators still use systems such as the Short Term Operating Reserve (STOR)[4], Fast Start[5] and other forms of reserve, to maintain an adequate level of security of supply close to real-time where the energy market is not best placed to do so. The introduction by Member States of capacity mechanisms is an extension of this requirement, rather than a sudden move to intervene in the energy market.

38. Our view is that from an overall adequacy perspective sufficient flexible capacity is something that can be monitored. Indicators of insufficient flexible capacity could be increased balancing costs, the System Operator issuing notices of insufficient margin or incidences of loss of supply outside traditional peak times.

39. Overall adequacy would hopefully be identified through EU and Member State level capacity adequacy analysis. Indicators of insufficient overall capacity could be the System Operator issuing notices of insufficient margin or incidences of loss of supply at traditional peak times. One limitation of these

[4] Short Term Operating Reserve (STOR) is a service for the provision of additional active power from generation and/or demand reduction. Further detail can be found at http://www.nationalgrid.com/uk/Electricity/Balancing/services/balanceserv/reserve_serv/stor

[5] Fast Start is the ability of generation to start rapidly from a standstill condition and to deliver its rated output in MW in the event of emergency. Further detail can be found at http://www.nationalgrid.com/uk/Electricity/Balancing/services/balanceserv/reserve_serv/faststart

indicators are that they are all lagging and by the time problems are signalled, timely corrective action is impossible.

14) In relation to strategic reserves:

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

40. Yes – Strategic Reserves may be appropriate under certain circumstances.

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?

41. Any risks to effective competition and the functioning of the internal market may be manageable if the Strategic Reserve is carefully designed and is suitable to addressing the problem in an individual Member State.

42. Our analysis indicates that this approach can be at risk of significant market impacts, in particular if the "slippery slope"[6] effect materialises - where the targeted support becomes broader and broader because of the impact of the Strategic Reserve on market certainty. This is a significant risk because, once Government intervenes to contract directly for capacity (either to keep capacity open or to bring forward new investment), there is increased market uncertainty resulting from the potential for the Strategic Reserve to be despatched at a lower price or more frequently than initially envisaged, reducing revenue certainty.

43. This issue increases uncertainty for market participants, and therefore could impact on the behaviour of (a) existing plant, particularly those at the end of the merit order, who may bring forward closures and/or seek to form part of the Reserve to mitigate their increased risk; and (b) those considering new investment, who may be disincentivised because of increased risk to future revenues.

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?

44. There are a number of different options for addressing security of supply concerns, there cannot be a "one size fits all" approach. Member States will need to introduce the capacity mechanism best suited to their national circumstances and energy market.

[6] The "slippery slope" effect refers to a situation in which more and more generating capacity forms part of the reserve, meaning that the mechanism becomes unworkable and, if unable to respond rapidly enough, fails to deliver the required standard of security of supply.

45. Our view is that no model is automatically more distortionary than another. Capacity mechanisms need to be assessed on a case by case basis. In order to consider whether a model is distortionary or anti-competitive it is necessary to consider issues such as:

- whether the model restricts electricity undertakings in the national market from selling their electricity to customers elsewhere in the internal market;
- whether electricity undertakings located elsewhere in the internal market are able to participate in the capacity mechanism;
- and, in the event that foreign undertakings cannot participate in the capacity mechanism, whether the full contribution of interconnected markets is taken into account in determining how much capacity to put in place.

46. The UK Government is committed to achieving the single market in energy. We have considered the above in our approach and have ensured that our model does not restrict GB undertakings from selling their electricity elsewhere in the internal market. We are also exploring how electricity undertakings sited outside the UK could participate in the UK Capacity Market, and if this does not prove possible we propose to ensure that the contribution of interconnected capacity will be taken into account in our capacity auction to minimise market distortion.

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?

47. As set out above, the UK's view is that there cannot be a "one size fits all" approach to capacity mechanisms. Member States need the flexibility to introduce solutions for their own energy market and national circumstances. In doing so, it is important that the Member States ensure that the capacity mechanism and energy market provides efficient incentives for an appropriate capacity mix.

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

48. No. It is all dependent on the design of the mechanism. The UK's view that capacity mechanisms should be designed to allow an exit from the mechanism in order to transition back to an energy only market, or a change in its design if that is appropriate.

49. As part of the design of the GB Capacity Market, we are legislating for a statutory requirement for the Capacity Market to be reviewed every five years following implementation. This review could analyse whether it is appropriate to consider a change to, or exit from the capacity mechanism, through considering changes to cash out or developments in demand side response.

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

50. It is our view that no one model of capacity mechanism has the least cost to consumers compared to any other. Capacity mechanisms need to be assessed on a case by case basis and adapted to the individual circumstances of Member States, while taking account of the wider market context.

51. The UK's conclusion is that the Capacity Market is, for the GB market, the most cost-effective way of ensuring security of supply as it addresses the underlying market failures, and due to the cost of capacity payments, should be largely offset by reductions in the wholesale price.

52. Our most recent modelling indicates that the Capacity Market will have a modest impact on costs for final consumers. The most recent Impact Assessment on the impact of Electricity Market Reform (EMR)[7] forecasts an increase in bills of around £16 per annum for average domestic consumers after the Capacity Market is in place – effectively an insurance premium to reduce the risk of blackouts.

53. Previous modelling had indicated a small reduction, as the Capacity Market helps to reduce the high electricity prices that can occur in periods of scarcity[8].

54. However it should be noted that the bill impacts are uncertain given the difficulties predicting future capacity margins and bills without a Capacity Market. The Capacity Market could have a lower impact on bills, or even reduce bills, depending on the degree to which it reduces the financing costs for investment in new capacity and dampens wholesale electricity prices.

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

55. An extension of the balancing services is already in place in liberalised markets. This extension is a Strategic Reserve or a direct tender for reserve capacity. Both of these arrangements, in the long-term, have the potential to be more distorting to the market than a market wide solution designed to put in place a framework that fixes market failures and allows the market to deliver the right mix of capacity and flexibility.

56. Balancing market arrangements that accurately reflect marginal costs of balancing and the value of scarcity are most helpful in encouraging flexibility of demand, generation and storage. Capacity mechanisms need to be designed to complement such balancing markets and incentivise required new capacity while causing minimal distortion to balancing prices.

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

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[7] http://www.decc.gov.uk/assets/decc/11/policy-legislation/energy%20bill%202012/7468-contracts-for-difference-energy-bill-2012.pdf.

[8] EMR Impact Assessment: http://www.decc.gov.uk/en/content/cms/legislation/white_papers/emr_wp_2011/emr_wp_2011.aspx

57. No. The needs of different electricity systems in the EU mean that designing a capacity mechanism blueprint that is suitable for all these different cases would be unlikely to succeed. Issues such as market structure, geographic barriers, level of interconnection, degree of demand side responsiveness and generation mix must be taken into account as capacity mechanisms are designed.

58. The UK's view is that it would be difficult to co-ordinate an EU-wide blueprint across 27 Member States and it would take a long time to get this in place. Our view is that this solution, even if it could eventually be agreed and implemented, would not address the UK's (and to varying degrees other Member States') security of supply concerns in the required timescale. Member States need the flexibility to introduce their own security of supply solutions to address national concerns.

59. We believe that the long-term solution to security of electricity supply concerns is a well functioning internal energy market, not a European capacity mechanism.

Questions relating to Section 5: Framework for assessing Capacity Mechanisms

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

60. The UK would support guidance proposed by the Commission as we would benefit from having more clarity on what key factors the Commission consider important to an assessment of compatibility, however we would not support the introduction of stringent rules for national capacity mechanisms because of our view that different national markets may need different solutions. Member States need to have the flexibility to implement whichever solution works best for their national circumstance. Our preference is that state aid guidelines should cross-refer to capacity mechanism guidelines.

61. The UK supports a robust EU state aid regime as being in Europe's best interests and we welcome the help the state aid framework provides in ensuring measures are designed to address real market failures, represent value for money, and are limited to the minimum necessary to have the required incentive effect.

62. It is our view that well designed capacity mechanisms may not involve state aid but where they do they can be regarded as compatible under Article 107(3) of the Treaty on the Functioning of the European Union (TFEU). The UK is currently involved in discussions on the State Aid Modernisation process and has made specific recommendations.

63. Capacity mechanisms may not be required in all markets, and where they are required, different designs may be appropriate for different market conditions (e.g. because of the generating mix, wider market structure, level of interconnection, and local transmission constraints).

64. Member States need the flexibility to implement the most appropriate solution to address their market failures and situation. Member States need to be able to act if necessary to manage risk. It will never be 100% certain that intervention is required until it is too late.

20) Should any criteria be added to this list?

65. The UK does not propose any additional criteria.

21) Which, if any, criteria should be given most weight?

66. We believe that all criteria should receive equal weighting.

Potential detailed criteria to apply to capacity mechanisms

1) The necessity for capacity mechanisms should be clearly established in the context of:

a) The potential of the identified needs being met in the normal operation of the internal energy market, in particular:
- increased interconnection and in particular the completion of identified projects of Common interest.

67. The UK's view is that capacity mechanisms should be considered appropriate measures to address concerns about security of supply if Member States can demonstrate they can address the market failures or policy challenges identified and provide an incentive effect on participants, with minimal distortion to the single market.

68. Our view is that Member States should be encouraged to consider the contribution of interconnection when determining the amount of capacity needed to be procured in order to achieve security of supply objectives. This could be achieved either by considering previous contributions of interconnected capacity to the national energy markets and by procuring less capacity in their national capacity mechanism, or ideally by allowing interconnected capacity to participate in the capacity mechanism.

69. The UK wishes to increase its levels of interconnection with Europe and is pursuing opportunities, for example with Ireland, Norway, Iceland, France and Belgium. Some of these projects are applying for Project of Common Interest status. However, the contribution of interconnection to security of supply depends on compatible balancing arrangements. Even with current planned and existing interconnection projects our analysis indicates that there is a significant risk that we will not have sufficient capacity to address the security of supply challenge that we face. This is because we currently have low interconnection levels (5% of generation), there are issues with the Balancing Mechanism and imbalance settlement (absence of cash out reform) and we have a less developed demand side which may exacerbate our security of supply challenge. There is also a more general political issue regarding interconnection which is that at times of system stress within two

interconnected markets, electricity will flow to the market with the highest price. This may cause political difficulties for the Member States with unresolved system stress.

70. These problems are not unique to the GB market, which is why many European energy markets have historically included capacity mechanisms, and why many Member States consider they may be necessary as a temporary measure to ensure security of supply as we transition to a higher proportion of low carbon generation and a better integrated single market.

- steps to encourage effective competition by addressing the position of dominant undertakings.

71. The UK Government is committed to achieving a more competitive energy market whilst moving towards the single market. Large vertically integrated companies can play a vital role in electricity markets. But we also need to make sure that markets are open to independent generators and suppliers on a fair and competitive basis. Wider participation and more diversity are key to a competitive market and securing the investment we need.

72. Our view is that wholesale market liquidity is an important feature of a competitive market, and is critical to the success of our EMR programme. A liquid market facilitates market entry and competition by offering a reliable route to market, allowing participants to manage their risks effectively and providing robust reference prices to base operational and investment decisions on. Low liquidity in the forward markets is currently acting as a barrier to entry for some independent players.

73. However, due to the importance of liquidity to competition and the success of EMR, the Government considers it important to have the flexibility to act should it prove necessary. This is why we are taking backstop powers in the Energy Bill[9] to provide Government with the flexibility to act if industry and Ofgem cannot deliver sufficient improvements to meet the objectives and timelines of the EMR programme.

b) Alternative, less distortionary measures which could be taken, for example steps to improve energy efficiency or reduce electricity demand.

c) Removing barriers to the effective participation of demand in the electricity market.

74. The UK's view is that Member States should take action to improve energy efficiency and reduce electricity demand. Both of these measures offer long-term solutions to addressing security of supply concerns. However Member States need to be able to act to introduce capacity mechanisms if necessary to manage the risk that these long-term solutions will not address our short and medium term security of supply concerns.

[9] Further details on the introduction to the Houses of Parliament of the UK Government's Energy Bill can be found at http://www.decc.gov.uk/en/content/cms/legislation/energybill2012/energybill2012.aspx

75. The UK is taking steps to reduce the level of future peak electricity demand both by reducing overall electricity requirements through widespread encouragement for energy efficiency, for example, through the Green Deal and Energy Company Obligation, and by enabling a more price responsive demand side to the electricity market through smarter networks and smart meters.

2) The effectiveness of the capacity mechanism addressing the identified market failure should be demonstrated and that it is additional to what would have occurred under normal market rules.

76. Waiting for definitive proof that a security of supply challenge will emerge is very likely to mean that the solution arrives too late or is very costly. Further, demonstrating a market failure being addressed can be modelled but not observed.

77. For this reason it will be difficult to prove definitively that the effectiveness of the capacity mechanism is additional to what would have occurred under normal market rules. We also think that this would not be a practicable concept in this situation. The use of competitive capacity auctions which are transparent and open to new entry should be sufficient.

3) The duration of the application of the capacity mechanism should be clearly limited and clearly specified,

a) the impact on the market of the introduction of capacity mechanisms should not make it difficult to reverse that decision in the future.

78. As outlined in response to question (14c), the UK's view is that capacity mechanisms should be designed with the intention to be transitional and allow an exit from the mechanism in order to transition back to an energy only market, or a change in its design if that is appropriate.

79. Our intervention is based on a competitive auction which can be designed to allow the price of capacity to fall to zero as market failures are addressed, potentially allowing an exit from the capacity mechanism. Ministers will also have the option from withdrawing from the mechanism if it is appropriate.

80. However, it is important that Member States are not forced to commit to exiting a capacity mechanism prematurely before they are confident their concerns about security of supply have been addressed, and without giving due consideration to the potential impacts on investor certainty.

b) the necessity of retaining/reinstating a capacity mechanism should be subject to review.

81. The UK proposes to legislate for a statutory review of the Capacity Market.

4) Any capacity mechanism should be open to electricity undertakings operating in other Member States, to the extent they are able to make the electricity available in markets to which the capacity mechanism is established.

82. The UK's view is that, in principle, electricity undertakings in other Member States should be able to participate in national capacity mechanisms so long as they are able to meet the same requirements, and be subject to the same incentives, as domestic capacity. If this is not possible, the capacity provided by interconnected capacity should be taken into account when setting the volume of capacity sought.

5) Any capacity mechanism should not act as a barrier to cross border trade or competition in the internal market by,

a) artificially altering trade flows or the location of production, in particular by:
restricting the ability of electricity undertakings in the Member State to sell their electricity to customers elsewhere in the internal market, (i.e. capacity physically located in a Member State should not be reserved for that Member State).

83. The UK's view is that, in principle, undertakings in other Members States should be able to participate in national capacity mechanisms, subject to exceptions set out in our response to the previous question.

84. We also believe that undertakings within that Member State should continue to be able to sell their electricity through the interconnector to customers elsewhere in the internal market.

85. The GB Capacity Market will not restrict electricity undertakings in the GB market from selling their electricity to customers elsewhere. Capacity physically located in GB is not reserved for GB.

- distorting the commercial behaviour of generators in the day ahead and intraday markets.

86. It is the UK view that one of the objectives of capacity mechanisms is to change behaviour in the day ahead and intraday markets, as generators need to be available to operate at times of systems stress.

- distorting investment signals in the internal market leading to inefficient locational choices.
- distorting investment signals in the internal market leading to the displacement of new investment from one Member State to another.

87. In principle the introduction of a capacity mechanism should not distort investment signals in the internal market and Member States should aim to design capacity mechanisms to avoid this. Member States should ensure that any distortion to investment signals is limited and outweighed by the benefits of introducing the capacity mechanism.

88. It is important to note though that whilst one Member State may have sufficient capacity, a connected Member State can suffer a loss of load. Capacity is local if interconnection is constrained or unavailable. Furthermore, because temperature, wind speed and hours of darkness are somewhat correlated

across Europe, there is a real possibility of system stress occurring across multiple Member States simultaneously.

b) distorting dynamic incentives/crowding out;

89. In principle the introduction of a capacity mechanism should not distort dynamic incentives in the internal market and Member States should aim to design capacity mechanisms to avoid this. Member States should ensure that any distortion is limited and outweighed by the benefits of introducing the capacity mechanism.

- The incentive on consumers or generators to respond to high prices at periods of scarce capacity should not be diminished.

90. We are supportive of moves to increase the responsiveness of the demand side, including by making it more responsive to price signals.

- The mechanism should not undermine incentives on the electricity market to deploy new techniques for demand reduction or electricity storage and generation.

91. As set out in our response to question 1b and c of the proposed criteria, the UK agrees that Member States should support the energy market in deploying demand reduction and electricity storage. The UK's view is that these can play a major role in providing a long-term solution to our security of supply concerns and moves towards completing the single market in energy.

c) creating market power or exclusionary practices;

- The mechanism should not strengthen or maintain the market power of incumbent firms.

92. The UK's view is that capacity mechanisms introduced by Member States should enable the competitive participation of both incumbents and new entrants.

93. As is the case in most or all electricity markets, there are significant barriers to the entry of new firms in the GB electricity market. Investments are large so if a company already has a large portfolio it can mitigate the risk associated with the new plant not being profitable and potentially failing. Enabling competitive new entry is essential to allowing the energy markets and capacity mechanisms to function competitively, and ensure they are cost effective.

94. The UK Capacity Market is designed to be pro-competitive and should reduce the ability of incumbents to exert market power. It will be designed to facilitate competitive new entry in a number of ways:

- Auctions four years ahead of delivery mean new entrants can participate in the capacity auction before they have built their capacity, knowing that if

successful in the auction they have four years to get their capacity operational before delivery is required.

- We are considering longer term contracts for those building a new plant, which will help new entrants secure financing for their projects at competitive rates.
- We have more work to do to finalise the design of the capacity auction, but expect a clearing price auction to contribute to ensuring smaller market players are not disadvantaged (because bigger incumbent market players could be expected to be better able to exploit a pay as bid auction).
- We are considering facilitating a secondary market for capacity obligations so that providers can trade out of their position if unavailable.
- Supporting the development of demand side response by procuring some demand through a year ahead auction. This will allow demand side response to compete against conventional generating capacity and so increase competition in both the energy and capacity markets.
- The mechanism should not act to maintain inefficient market structures or undertakings, acting to deter new entry.
- Long-term capacity contracts procured through a central auction ensure that new entry has a route to market and encourages price discovery about the returns to building new plant (reducing the asymmetric information in the market).
- Sharper incentives for providers to be available at times of system stress will reduce incentives for gaming in the energy market as providers who withhold capacity to drive up the energy price will face a significant reduction in their capacity payment.

- The mechanism should not act to maintain inefficient market structures or undertakings, acting to deter new entry.

95. As set out in our response to the previous question, the UK supports the competitive participation of incumbents and new entrants in the energy market and the capacity mechanism. However, the UK does not think that there can be a “one size fits all” approach to capacity mechanisms. Member States need the flexibility to introduce solutions for their own energy market and national circumstances.

96. The UK considers that caution should be exercised when defining undertakings owning older plant as inefficient, as such plant might be the most efficient standby capacity. For example, in a situation where an older coal power station is the only asset of an undertaking and is at risk of closure without a capacity contract, issuing a contract to the generator could be viewed as a decision to efficiently ensure an adequate capacity margin, rather than a decision to maintain an inefficient undertaking.

6) To be non-discriminatory a capacity mechanism should

a) be allocated after an open competitive bidding process.

97. Our view is that capacity mechanisms should be procured on an open competitive basis. However, a Member State may find that this is not the most

appropriate solution for their circumstances, for example if analysis indicates that its capacity shortage could be best addressed by a direct tender with a particular capacity provider. Any proposed guidelines should provide Member States with the flexibility to procure capacity in a manner appropriate to its specific circumstances.

b) allow demand response and energy efficiency solutions to bid into capacity markets on an equal basis to generation.

98. The UK supports the participation of demand side response in capacity mechanisms on an equivalent rather than equal basis to generation as they have different characteristics to generation.

99. Demand side response has the potential to offer reliable capacity that can make a valuable contribution to security of supply. Increased development of the demand side is also an important step towards a better functioning market where participants respond to price signals appropriately by reducing demand when electricity is scarce and prices high.

100. Storage also contributes to a better functioning market by allowing energy to be stored for use at times when generation exceeds demand (e.g. high wind output at times of low demand), and used when energy generation is scarce. In a system with a higher proportion of intermittent generation, this role will be increasingly important.

101. The UK Government set out its transitional arrangements for supporting the development of demand side response and storage through its Capacity Market as part of its recent update on Electricity Market Reform[10].

7) Not be confined to any particular generation technology, i.e. being technology neutral (insofar as the mechanism is directed towards security of supply concerns – this may not apply if other objectives are also being pursued).

102. We agree that Member States should seek to ensure that capacity mechanisms are procured on a technology neutral basis to the extent that they are principally directed towards security of supply and do not lead to over-compensation of plant.

103. The UK considered this issue as part of its design of the GB Capacity Market. We took the decision to open our scheme to the whole energy market (including demand side response) unless we had evidence that particular capacity was already being sufficiently incentivised to bring forward capacity or build new plant.

104. In the case of our own capacity mechanism we took the decision that we were minded to exclude plants receiving the Contract for Difference (CfD) (aimed at

[10] http://www.decc.gov.uk/assets/decc/11/policy-legislation/EMR/7104-emr-annex-c-capacity-market-design-and-implementat.pdf page 21

incentivising decarbonisation) from also receiving a capacity payment while technology-specific CfD strike prices are set administratively[11].

8) Capacity mechanism should be at least cost:

a) The direct costs imposed on suppliers or others electricity undertakings must be kept to the minimum necessary.

105. The UK agrees that the costs of capacity mechanisms to suppliers and consumers must be kept to the minimum. Further detail on the impact of the GB Capacity Market is provided in our response to question (15).

b) Persons providing capacity under the obligation must not be overcompensated.

106. The UK believes that mechanisms should be designed to provide the most efficient outcome for the whole market and minimise costs for consumers.

c) Any selection process in the mechanism should be conducted in a transparent, open and non-discriminatory way which is market based.

107. The UK has strong competition credentials and our view is that ideally the selection process used by Member States should be transparent, competitive, open and non-discriminatory. However this may not always be possible, for example, if a Member State believes that its capacity shortage could be best addressed by a direct tender with a particular capacity provider its selection process may be less transparent and competitive than a market-wide capacity auction.

108. In situations where this is the case, we believe that Member States should demonstrate the need for their proposed arrangement. As part of this, Member States should demonstrate that any proposal is appropriate for the circumstances they are experiencing, this should include obtaining value for money throughout the selection process.

d) The duration of any compensation to generators under the mechanism should be clearly justified.

109. We agree. Longer-term contracts should only be used if they will provide a more efficient outcome for consumers.

9) Costs associated with capacity mechanisms should be allocated to the beneficiaries of secure energy supply with different classes of consumers being treated in a non-discriminatory way.

110. In principle we are in agreement, however Member States must have the flexibility to recover costs from beneficiaries in a manner best suited to their national circumstances. We believe that the important issue is that Member

[11] Further detail on the possible exclusion of plant from the UK Capacity Market can be found at http://www.decc.gov.uk/assets/decc/11/policy-legislation/EMR/7104-emr-annex-c-capacity-market-design-and-implementat.pdf page 19

States must be able to provide the necessary quantitative and/or qualitative evidence to justify their arrangements.

Annex A

UK position on possible principles for European Capacity Markets: Input into DG Competition's review of the Environmental Aid Guidelines

1. A robust EU state aid regime is in the UK's long term best interests and we welcome the help it provides to design measures which address real market failures, ensure that state interventions represent value for money, and are limited to the minimum necessary.

Security of supply is an objective of common interest

2. The UK welcomes the opportunity to provide views on the Commission's review of the Environmental Aid Guidelines. Security of electricity supply is of fundamental importance to all European economies.

3. Articles 194(1) and 194(2) of the Treaty on the Functioning of the European Union recognise the importance of measures to ensure security of supply in the Union. Directive 2005/89 concerning measures to safeguard electricity supply and infrastructure investment requires Member States to ensure 'a high level of security of supply by taking measures to facilitate a stable investment climate' (Article 3(1)).

Security of supply concerns are legitimate

4. The Commission's recent consultation on generation adequacy[12] recognised that ensuring security of supply has become a matter of increasing discussion across Europe.

5. We believe that a capacity margin of 10%[13] provides a reasonable level of security of electricity supply for our citizens. Modelling of the GB market suggests a possibility of blackouts as soon as winter 2015/16.[14] We consider that without a Capacity Market we could face unacceptable security of supply risks.

6. However, we are not the only Member State facing tight capacity margins. We understand that the French electricity market faces a potential capacity shortfall from 2016[15].

The security of supply challenge

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[12] http://ec.europa.eu/energy/gas_electricity/consultations/20130207_generation_adequacy_en.htm

[13] A capacity margin of 10% is an illustrative example based on historical precedent rather than an official UK reliability standard. The UK intends to set a reliability standard as part of the design of its Capacity Market.

[14] See for example the recent capacity assessment produced by Ofgem, the British regulator, available here: http://www.ofgem.gov.uk/Markets/WhlMkts/monitoring-energy-security/elec-capacity-assessment/Pages/index.aspx. DECC modelling, and analysis produced by the energy and financial sector also shows tightening GB capacity margins over the next decade.

[15] http://clients.rte-france.com/htm/an/mediatheque/telecharge/generation_adequacy_report_2011.pdf

7. There are a number of market failures in the UK and other EU electricity markets which could mean the market may not deliver sufficient capacity to deliver security of supply. Modelling of the GB market suggests a possibility of blackouts as soon as winter 2015.[16]

8. The fundamental problem is that security of supply is a public good, and consumers cannot readily indicate their own individual preference for a reliable electricity supply (e.g. by offering to pay a higher price for higher security of supply). In other words, the market lacks a true demand side. A further related problem is that electricity prices may not rise sufficiently high at times of system stress to justify sufficient investment in new capacity.

9. This is a particular concern over the coming years because European electricity markets are facing unprecedented challenges. Member States are rapidly decarbonising their electricity markets, which means moving to a system with a far higher proportion of intermittent (wind) and inflexible (nuclear) generation sources. This exacerbates existing market failures by:

   i. increasing the need for flexible back up capacity; and
   ii. making the investment case for this back-up and peaking plant more risky as it will run less often with a high proportion of low carbon plant with low marginal costs on the system.

10. We need to guarantee an economic level of security of supply during the transition to a low carbon economy.

Tight capacity margins

11. Both DECC and Ofgem[17] projections imply an increased likelihood of controlled load shedding and voltage reductions in GB in the future, with higher risks associated with Ofgem's projections. These risks are set out in Table 1 for 2015/16.

Table 1: Probability of load shedding under different scenarios

	De-rated capacity margin in winter 2015/16 (%)	Likelihood of customer disconnections[18]
DECC base case	14.4	~>1 in 3000 years (0%)
DECC stress test	8.4	~1 in 50 years (2%)
Ofgem base case	4.2	1 in 12 years (8%)

[16] See for example the recent capacity assessment produced by Ofgem, the British regulator, available here: http://www.ofgem.gov.uk/Markets/WhlMkts/monitoring-energy-security/elec-capacity-assessment/Pages/index.aspx. DECC modelling, and analysis produced by the energy and financial sectors also shows tightening GB capacity margins over the next decade.

[17] Note: Ofgem explicitly estimated the probability of some customer disconnections in its scenarios. The estimates of customer disconnections in the DECC scenarios were not directly modelled and were instead inferred from the Ofgem analysis

[18] The likelihood of some customer disconnections gives the probability of some customers facing disconnection after the System Operator has made full use of the mitigating measures available to it, including some use of voltage reduction. Industrial customers would be disconnected before households.

Ofgem high demand	0.3	1 in 2 years (50%)

12. These disconnections are likely to affect a large number of industrial and domestic customers at the same time and have the potential to damage the UK economy and growth. The UK, as with the rest of Europe, relies on secure energy supplies in order to function effectively and to attract private investment.

13. We believe that there are also underlying issues within the energy market such as low interconnection levels (5% of generation), issues with the Balancing Mechanism and imbalance settlement and a less developed demand side which may exacerbate the security of supply challenge. These problems are not unique to the GB market, which is why many European energy markets have historically included capacity mechanisms, and why many Member States consider they may be necessary as a temporary measure to ensure security of supply as we transition to a higher proportion of low carbon generation and a better integrated single market.

14. The UK wishes to increase levels of interconnection across Europe and investors are proposing new interconnectors with Belgium, France, Norway, Ireland and Iceland to supplement the existing connections to France, Ireland and Netherlands. However, the contribution of interconnection to security of supply depends on compatible balancing arrangements. Even with current planned and existing interconnection projects we believe that we will not have sufficient capacity to address the security of supply challenge that we face.

15. The UK could potentially build 9GW of new interconnection by 2020, however this is dependent on private firms securing the necessary investment to build the interconnectors. Even in the event that the interconnectors are built, electricity may not flow to the UK at times of system stress unless the Balancing Mechanism and imbalance settlement is reformed to price demand reduction and the use of reserve (Ofgem is currently consulting on the need for reform of “cash-out”). Furthermore, given that projected capacity margins are projected to tighten in the middle of the decade the proposed interconnection may not be built in time to address our short to mid-term security of supply challenge.

16. The UK is also taking steps to reduce the level of future peak electricity demand both by reducing overall electricity requirements, for example through the Green Deal and Energy Company Obligation, and by enabling a more price responsive demand side to the electricity market through smarter networks and smart meters, which could incentivise electricity use to be shifted to periods where prices are lower. Further action on permanent demand reduction is also being considered through the Electricity Demand Reduction Project. A public consultation was launched last Autumn to consider potential policy approaches to unlocking the potential for demand reduction[19].

[19] http://www.decc.gov.uk/en/content/cms/consultations/edr_cons/edr_cons.aspx

17. In addition we are taking steps to increase the responsiveness of consumer demand, including by rolling out smart meters. We are continuing to work to make completion of the single market a reality. Full implementation of the EU Market and Network codes will enable more efficient functioning of interconnectors.

Member States face challenges in seeking to deliver EU climate change targets whilst ensuring security of supply

18. Engagement with other Member States reveals that fossil plant closures taking place across Europe (including those due to the Large Combustion Plant Directive and Industrial Emissions Directive constraints), and their replacement by more intermittent low carbon generation, has created concerns that security of supply may be at risk. This is also clear from the number of Member States with capacity mechanisms (such as Ireland, Spain, Italy and Sweden) and the other Member States who are considering implementing capacity mechanisms (such as UK, France and Germany).

19. We consider it is essential that the new Guidelines recognise the careful balancing act Member States face in seeking to deliver against binding EU climate change objectives whilst also trying to keep the lights on for their citizens.

20. We recognise however that decarbonisation is not the only reason Member States are considering introducing national capacity mechanisms. Investors in the energy industry have expressed concerns about the ability of wholesale electricity prices to incentivise capacity (generation and demand side) at times of system stress. Investors have identified two issues. Firstly, there is a concern that in the event of periods of high electricity prices the Government, or regulator, may perceive an abuse of market power and introduce a price cap. Secondly, even in the event that prices are allowed to spike, investors have concerns that capacity will be unable to obtain the necessary finance on the basis of uncertain, sporadic high prices. These are wider issues which European governments and regulators will need to address in order to further support security of supply.

If the Commission determines a capacity mechanism to be aid, the capacity mechanism can be deemed an appropriate measure if it is complementary to the development of the single energy market

21. As noted above, Member States are introducing capacity mechanisms to address specific challenges they face in delivering environmental objectives whilst ensuring secure and reliable electricity supply. We believe that capacity mechanisms should be considered appropriate measures if Member States can demonstrate how they address the market failures or policy challenges identified and provide an incentive effect on participants, with minimal distortion to the single market.

22. We suggest that the revised Environmental Aid Guidelines should encourage Member States to engage directly with countries most likely to be impacted by the introduction of a national capacity mechanism. The Commission may also wish to suggest that Member States provide the Commission with their analysis

of the likely impact of any proposed national capacity mechanism on investment signals in neighbouring countries or on the likely impact of its capacity mechanism on flows of electricity between countries as part of its assessment of a scheme. Member States should be encouraged to take steps to mitigate any negative impacts identified as part of the design of their measure, where possible.

The Commission should continue to have the discretion to take a market-wide assessment of proportionality, rather than being restricted to making assessments on a plant by plant basis.

23. As noted in the Commission's consultation paper, there are a number of different kinds of capacity mechanisms in place, and under consideration, across Europe. Given the range of capacity mechanisms and the significant differences in the make-up and functioning of electricity markets in different Member States, it is important that the new state aid rules allow Member States to compensate on a market-wide basis so long as the payment is the minimum level necessary to incentivise behaviour (i.e. payments are at the minimum necessary for new plant to receive sufficient investment signals to build *and* for existing plant to be incentivised to make their capacity available at times of system stress).

24. The new Guidelines should offer some flexibility to Member States. We suggest the following principles.

    - Member States should choose the most appropriate capacity mechanism to suit their particular circumstance, but if a market-wide capacity mechanism is introduced it should be open to the whole market, including demand side response, unless Member States can prove that particular capacity or specific sectors of the market are already sufficiently incentivised to bring forward capacity or build new plant. In those cases inclusion in the measure would risk overcompensating this capacity;
    - Member States should be encouraged to take the potential contribution of interconnection into account in the determination of the amount of additional capacity needed to be procured in order to achieve security of supply objectives. This means either by taking into account previous contributions of interconnected capacity to the national energy markets or by procuring less in a national capacity mechanism, or ideally by allowing interconnected capacity to participate in the capacity mechanism.
    - Competitive capacity auctions, open to new entry, are a proportionate basis for awarding payments to participants. These arrangements allow the market to set the price of capacity and avoid the need for a central administrative decision on the appropriate payment for capacity. Another advantage is that competitive auctions can be designed to allow the price of capacity to fall to zero as market failures are addressed, potentially allowing an exit from the capacity mechanism.
    - To ensure minimal distortions to competition and prevent national over-procurement of capacity, the decision by a Member State to procure capacity should be taken in reference to an objective reliability standard.
    - Member States should look to work co-operatively with their neighbours both on the design of capacity mechanisms and operational aspects. For

example, it may be helpful for Member States to collaborate on issues such as capacity adequacy assumptions.