



[REDACTED]  
Director of Energy Strategy and Futures  
Department of Energy and Climate Change  
3 Whitehall Place  
London SW1A 2AW  
United Kingdom

4<sup>th</sup> October 2011

Dear [REDACTED]

On behalf of Wärtsilä Corporation, I welcome the opportunity to participate in the Capacity Mechanism consultation process launched by the Department of Energy and Climate Change. As providers of smart power generation technologies on a global basis, we are keen to engage directly on the issues on which we feel most strongly, in particular the demand for and provision of efficient flexibility on all timescales.

The EMR proposals will lead to a greatly increased need for flexible capacity in line with low carbon deployment. However, much of the dispatchable plant in the UK will be retiring, and the true economic cost of providing flexibility from the current fleet of thermal plant under more demanding operating regimes is not well proven. Whilst this will create opportunities for new flexible technologies, we believe that ensuring an appropriate investment environment for such capacity is a critical part of EMR considerations, and in particular should be a key consideration in any Capacity Mechanism design.

We have further developed our thinking in this area since our response to the December consultation based on the analysis presented in the White Paper, and we would welcome the opportunity to meet and discuss these issues in more detail.

Yours sincerely,

[REDACTED]  
Group Vice President, Power Plants  
Wärtsilä



## **Electricity Market Reform: Consultation on possible models for a Capacity Mechanism**

### **A response to the consultation questions**

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October 2011

## Consultation on Possible Models for a Capacity Mechanism

### Response form

Responses are welcome by email or post. You may find this document helpful for structuring your response, but can reply in a separate document if you prefer. If replying in a separate document please make clear which questions you are answering.

Respondent Details	
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Tick this box if you are requesting non-disclosure of your response.

Please return by 4 October 2011 to:
Department of Energy & Climate Change, Electricity Market Design – Security of Supply 4th Floor, Area D 3 Whitehall Place, London, SW1A 2AW  You can also submit this form by email to: <a href="mailto:DECC.capacity.mechanism@decc.gsi.gov.uk">DECC.capacity.mechanism@decc.gsi.gov.uk</a>

## Consultation questions

Note: the references in square brackets refer to page and figure numbers in the consultation document where more information can be found, and the questions are set out in context. The consultation document is Annex C of the Electricity Market Reform White Paper, and is available here:

[http://www.decc.gov.uk/en/content/cms/consultations/cap\\_mech/cap\\_mech.aspx](http://www.decc.gov.uk/en/content/cms/consultations/cap_mech/cap_mech.aspx)

### Targeted mechanism

Consultation question		[page 167]
<b>1</b>	<b>Does this table [see Figure C3] capture all of your major concerns with a targeted Capacity Mechanism? Do you think the mitigation approach described will be effective?</b>	
<b>Response</b>	<p>Yes, we agree that the major concerns are captured by Figure C3.</p> <p>We note that the table makes the point that the targeted approach may not recognise the value of flexibility but this is far less of a risk in our view than with a universal mechanism. Indeed, we believe this is a benefit of the targeted approach.</p> <p>We also note that in this context the targeted Capacity Mechanism has close interactions with STOR and day ahead and within day balancing by the market which need to be explicitly recognised and “designed in”. Our responses to other consultation questions suggest some ideas for solutions in this area as part of an overall design for a targeted capacity mechanism which builds on Government thinking to date but addresses some potential gaps.</p> <p>Finally, the criteria in any tenders need to be carefully crafted in order to ensure that a balanced generation mix within the Strategic Reserve can be achieved and the link to the STOR market explicitly recognised.</p>	

Consultation question		[page 168]
<b>2</b>	<b>How long should the lead time for Strategic Reserve capacity procurement be and why?</b>	
<b>Response</b>	<p>The Energy Bill 2010-11, currently making its way through Parliament, would obligate Ofgem to assess future capacity need. This could clearly be the basis for defining requirements for procurement. However, we believe that this process needs to be modified in two ways. First, the ‘lookahead’ period for the assessment should be extended to cover the full horizon of potential procurement for the Capacity Mechanism. This could be up to 15-20 years.</p> <p>Clearly the level of uncertainty through the horizon will become increasingly greater (which should be reflected in the way capacity is procured, as discussed below), but nevertheless this will provide important context for evaluating overall requirements. Overall, a range of lead times could be considered in light of the capacity assessment undertaken and confidence which is attached to it. For example, a tranche of capacity could be</p>	

purchased on a long lead time where this represents a small portion of the overall volume in the capacity assessment, whereas capacity could be auctioned with a shorter lead time to cover requirements in the nearer term horizon.

It is likely that some technologies may require a long lead time, up to 4 years, to reflect construction time. It could be a lot shorter, however, for the right type of plant and DSR. Indeed, it may well need to be shorter to accommodate a potentially rapid increase in renewables penetration to 2020. For example, in Italy 5GW of PV was brought on line in 6 months in the first half of 2011 with further deployment to 10 GW planned by the end of this year. The TSO now needs to respond in terms of both flexible generation (both ramping up and particularly ramping down as PV generation comes on line) and backup for times with little or no PV output.

This suggests that shorter lead times will be required under some circumstances, with the appropriate reward for providers able to deliver to match this. Some technologies can be delivered faster, including our technology, as a result of modular capabilities and design. Therefore, if an urgent requirement emerged, the lead time could be reduced to 2 years or less for some tranches of the overall requirement. In this situation, the procurement function would need to adopt some form of "fast track" but competitive selection process. Further thought would also need to be given to responsibility for planning, consenting and licencing for a short lead time project.

We note also that a shorter period means that there will be less forecast uncertainty with regard to the required level of capacity. This reduced forecast risk has an inherent value and plants and developers who can respond on shorter timelines, including Wärtsilä, should be appropriately rewarded for the optionality that they provide to the procurement function. This enables the postponement of procurement decisions pending a more accurate forecast of the capacity requirement. One way of formalising that optionality might be, for example, to auction for the option to develop (and thus receive a contribution towards the costs of consents, permits and licences). As a result, the lead time for commission of the plant can be significantly reduced from the point a firm requirement is established.

### Consultation question

[page 168]

3

**Should the length and nature of contracts procured by the Strategic Reserve procurement function be constrained in any way?**

#### Response

Overall, we believe the procurement function, informed by further analysis based on the Capacity Assessment, should take a view on the appropriate portfolio of contract durations and types of capacity, taking account of key considerations including:

- Extensions of existing plant and DSR would require a shorter lead time but to avoid foreclosure of the market to new entrants it may be prudent to require existing plant to either rebid at regular intervals or offer shorter duration contracts for existing plant to ensure the value versus new build

	<p>is regularly tested</p> <ul style="list-style-type: none"> <li>• Encouraging new entry through ensuring a balanced set of assessment criteria which amongst others includes long term value delivered and flexibility</li> <li>• The time frame over which capacity is required versus generator financeability need to be balanced</li> <li>• The framework needs to ensure interactions with STOR, energy markets and any future day ahead reserve market are clear, specifically in terms of how the capacity will be utilised and how it is different from other services, and</li> <li>• The treatment of interconnectors requires further consideration.</li> </ul>
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Consultation question		[page 169]
<b>4</b>	<b>Which criteria should providers of Strategic Reserve be required to meet?</b>	
<b>Response</b>	<p>If the goal of a Capacity Mechanism is only to secure capacity adequacy, flexibility is not a priority, and this can be reflected in the criteria for providers. However, it is our firm view that, failing other changes to market arrangements to provide appropriate price signals for flexibility, any Capacity Mechanism should be aiming to ensure that the right “type” of capacity is brought forward, to ensure that the system is sufficiently robust. Aside from the importance in regard to security of supply, this will have benefit in enabling the system to ramp more cost-effectively and with lower carbon emissions, as well as from efficiencies in the provision of reserve. We think that the criteria should reflect this.</p> <p>We agree that the criteria listed, namely, ramping rates, costs, availability period and length of sustained running are relevant. However, we believe that the selection process should seek to procure offers meeting different technical thresholds or criteria, based on analysis extended from capacity assessment, and aiming for an appropriate balance between low cost and the value of flexibility.</p> <p>Based on this, we suggest the following criteria which also enable alternative technologies to be differentiated:</p> <ul style="list-style-type: none"> <li>- Availability/reliability/start reliability <ul style="list-style-type: none"> <li>○ Availability period including length of sustained running</li> <li>○ Overall reliability (including benefits of a modular approach)</li> <li>○ Reliability at peak</li> </ul> </li> <li>- Affordability with the tendering process to define this, covering: <ul style="list-style-type: none"> <li>○ Prices - availability or option fees and utilisation prices</li> <li>○ Costs</li> </ul> </li> <li>- Flexibility – to maximize benefits of capacity, at least part of it should be flexible in order to be able to respond to a variety of supply/demand conditions. Our view is that a small number of different products should be defined and providers allowed to offer</li> </ul>	

	<p>different costs for these products. The providers would internalise detailed characteristics that are relevant include:</p> <ul style="list-style-type: none"> <li>○ Startup time</li> <li>○ Shutdown time</li> <li>○ Min down time</li> <li>○ Ramp rate: both up and down</li> <li>○ Emissions</li> <li>○ Efficiency – full load and part load</li> <li>○ Time to synchronise</li> <li>○ Minimum stable generation levels (absolute and as a proportion of rated capacity)</li> </ul> <ul style="list-style-type: none"> <li>- Fuel capabilities eg single versus dual fuel capabilities</li> <li>- With respect to DSR would need to prove that it was beyond what the market would deliver anyway.</li> </ul>
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Consultation question		[page 169]
<b>5</b>	<b>How can a Strategic Reserve be designed to encourage the cost-effective participation of DSR, storage and other forms of non-generation technologies and approaches?</b>	
<b>Response</b>	<p>We believe that DSR has an important role to play in providing peak and flexibility services as the market develops, and we believe that focus should be put on ensuring that the overall market arrangements should promote DSR more generally. Studies indicate that, certainly for short duration response, DSR can have costs that are very competitive with peaking plant, and with volumes up to 5-10% of peak if all potential was fully realised<sup>1</sup>. We would hope that DSR would participate as fully as possible directly in the market, rather than being “held back” for a Strategic Reserve role. That said, any Strategic Reserve process should be technology agnostic, and as long as the technical criteria can be met there should be no barrier to DSR competing.</p> <p>It is harder to see how storage could participate since its key driver is price arbitrage and therefore it is unlikely to be economic as Strategic Reserve, nor necessarily available at the right times for the same products as other providers.</p> <p>Overall, if DSR and storage are to be encouraged we believe the market needs to provide appropriate price signals first and foremost, that barriers to participation be removed where they exist, and ensure that the Strategic Reserve does not overlap with other services (such as STOR).</p> <p>We believe a day ahead reserve market where flexibility can be bought and valued by the market is a mechanism which can enable the price signals to emerge.</p>	

<sup>1</sup> See for example *Load Participation of Energy Intensive Industry*, Dr Marian Klobasa, Fraunhofer Institute for Systems and Innovation, September 2011

	Finally, we need to ensure that the mechanism rewards long lasting delivery of flexible energy to complement fast acting but limited duration resources such as DSR or storage.
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Consultation question		[page 175]
<b>6</b>	<p><b>Government prefers the form of economic despatch described here. Which of the proposed despatch models do you prefer and why?</b></p>	
<b>Response</b>	<p>We think it is important in considering the question of how Strategic Reserve is dispatched to note that three key elements can be separated:</p> <ul style="list-style-type: none"> <li>• the price paid to the provider of capacity for utilisation</li> <li>• the decision to use Strategic Reserve by the System Operator</li> <li>• the level at which cash-out prices are set if Strategic Reserve is used.</li> </ul> <p>As a set of principles, we would propose:</p> <ul style="list-style-type: none"> <li>• avoiding market distortions that could lead to 'slippery slope' issues with regard to capacity investments, and</li> <li>• aiming to use Strategic Reserve capacity in a cost-effective manner once it is procured.</li> </ul> <p>Given the industry concerns over the first of these points, the 'slippery slope' problem, we think it is important to recognise that there is a simple solution that completely allays this concern. Under this model, Strategic Reserve capacity would only be used through the Balancing Mechanism when no other option was available, with cash-out prices subsequently being set at (or close to) VOLL. (Payment to the provider of the capacity would still be determined by the utilisation price from the auction process.) This is the 'last resort' approach set out in the Consultation Document.</p> <p>However, this is not our preferred option, as we consider that this does not meet the second of our principles around cost-effective use. It would be paradoxical, for example, to have a brand new gas engine paid for by consumers sitting idle while the System Operator is managing peak imbalances or reserve with old, inefficient oil plant and GTs. As a step towards this, two separate prices could be defined for Strategic Reserve. A (lower) price could be used to determine dispatch in meeting balancing actions, potentially ahead of alternative options available to the System Operator in the Balancing Mechanism. However, cash-out prices could be determined by an ex-post calculation of the price that would have been set had Strategic Reserve capacity been available only at the second (higher) price. The lower dispatch price could be closer to the SRMC of the capacity (or the utilisation fee), whereas the latter one would be "very high".</p> <p>To avoid any blunting of price signals, this "very high" price could still be set at (or close to) VOLL, leaving full incentives on market participants to manage their own balance position directly "as if" the Strategic Reserve had not been present, and accordingly offering unchanged opportunities for providers of capacity in the market (albeit having a modest impact on potential usage to be expected through a strategy of offering into the</p>	

Balancing Mechanism).

Alternatively, a price more reflective of the long run cost of the capacity, calculated given an expectation of (low) load factor, could be used. (Indeed, such a mechanism is currently used with STOR to enable efficient use whilst being priced in a way that should fully recover costs and avoid distorting price signals.) A premium could be added to retain an incentive on market participants to manage balance positions, particularly if market arrangements such as a day-ahead reserve market facilitated this.

Under this model, providers of flexible capacity could determine whether they preferred to offer into the Strategic Reserve auction or seek to offer flexibility directly in the market. This (like DECC's economic dispatch model) would reflect the fact that a certain portion of the peaking market would now be more directly managed, but this would be limited by the way in which the capacity was 'priced in'.

This approach could be extended further to make the Strategic Reserve capacity available to participants in the day-ahead reserve market (if introduced), and in the energy market prior to day-ahead, at a similar price (but potentially with a lower premium) to enable positions to be balanced prior to gate closure in situations where Strategic Reserve capacity is required. This could be implemented after gaining initial experience with the mechanism under more restricted utilisation processes to begin with.

Finally, we think it would be important (in line with the principle of cost-effective use) to recognise that Strategic Reserve capacity could play a useful role in providing short term operating reserve, alongside capacity procured through STOR auctions. The System Operator could be required to take this into account in determining volumes procured through auction.

In summary, we believe that there are approaches which would enable Strategic Reserve to be deployed at different times ahead of gate closure at administered prices set at levels to limit the impact on the rest of the market:

- Available in energy market prior to day-ahead
- Available in day-ahead reserve market (if introduced)
- Available to National Grid for energy balancing actions via Balancing Mechanism
- Available to meet National Grid Short Term Operating Reserve requirement

This way, Strategic Reserve capacity is used cost-effectively, whilst managing the impact on incentives and investment signals through the administered prices.

We note that reforms to cash-out would be required to reinforce this. We hope that this would be a consideration if Ofgem proceed with a Significant Code Review of electricity balancing arrangements.

Consultation question		[page 175]
7	<b>How would the Strategic Reserve methodology and despatch price best be kept independent from short-term pressures?</b>	
Response	<p>This would best be achieved through a governance process that builds in a substantial lead-time for any changes. The governance process itself can be protected through an appropriate definition in the original legislation. This would mean that any short term pressures, particularly political ones that may arise from price spikes in the market, could not immediately lead to an overruling of the use or pricing of the Strategic Reserve capacity.</p>	

Consultation question		[page 175]
8	<b>Do you agree that a Strategic Reserve should be periodically reviewed? If so, who would be best placed to carry out the review and how often should it be reviewed?</b>	
Response	<p>There are more than one scope options for such a review: the volume of the Strategic Reserve, whether the procurement function is procuring efficiently or its continuing existence.</p> <p>If it is in relation to the volume then that is already planned to happen annually through the capacity assessments.</p> <p>If it is efficiency then it should be reviewed annually by Ofgem supported by an expert group.</p> <p>If it is about continued existence, then we are not sure a review is required since by definition if the mechanism is not required the targeted volume can be reduced to zero at any time during the capacity assessment. If a periodic review is deemed necessary for any other reason it should be no more than every 3 years.</p> <p>Any review should be an open process, with market participants given an opportunity to take part and voice concerns and suggest ideas.</p>	

Consultation question		[page 176]
9	<b>Into which market should Strategic Reserve be sold and why?</b>	
Response	<p>Please see our response to Question 7. In summary, the simplest solution would see it be sold through the Balancing Mechanism, but we feel there are advantages to extending utilisation (perhaps at a later date) to include making it:</p> <ul style="list-style-type: none"> <li>– Available in energy market prior to day-ahead</li> <li>– Available in day-ahead reserve market (if introduced)</li> <li>– Available to National Grid for energy balancing actions via Balancing Mechanism</li> <li>– Available to meet National Grid Short Term Operating Reserve requirement</li> </ul>	

Consultation question		[page 178]
10	<b>Do you have any comments on the functional arrangements proposed for managing a Strategic Reserve?</b>	
Response	Overall, the functional arrangements seem reasonable. Further consideration needs to be given to how STOR and Strategic Reserve might work together from a functional perspective which our design suggestions begin to provide some initial thinking on.	

Consultation question		[page 179]
11	<b>Given the design proposed here and your answers to the above questions, do you think a Strategic Reserve is a workable model of Capacity Mechanism for the GB market?</b>	
Response	<ul style="list-style-type: none"> <li>• The UK government and other stakeholders believe that, over the next few years, there could be generation capacity shortfall in the GB market.</li> <li>• Combined with an increasing penetration of low carbon but intermittent renewable generation this could lead to substantial challenges in ensuring the electricity system can be balanced. Greater interconnection will not on its own solve these problems, given the correlation in wind output across Europe. For example, with high levels of intermittent generation the market will need to respond to the following events: <ul style="list-style-type: none"> <li>– Ramping from high/low wind situations</li> <li>– Meeting a high net derated demand requirement for short periods (in low wind output situations, for example)</li> <li>– Sustained energy shortfall events when high peak demand conditions are combined with sustained periods of low wind output</li> </ul> </li> <li>• Flexible gas capacity will be needed given the overall range of possible situations, in addition to DSR and other non-generation providers.</li> <li>• Our proposed design and response to the Capacity Mechanism has been developed with the following objectives: <ul style="list-style-type: none"> <li>– Work within the broad bounds of the consultation document</li> <li>– Enable maximum use of wind power (given the sunk investments made and low carbon emissions) by being able to adjust generation on the rest of the system cost-effectively and with low carbon impact, to avoid wind curtailment</li> <li>– Contribute to an efficient system with a portfolio of different technologies that can most effectively meet different potential situations, including rapid changes in intermittent output and long “low wind” periods</li> <li>– Recognise the need for capacity to be available to meet the worst case supply/demand scenarios (as suitably defined)</li> <li>– Balancing capacity should produce as little energy as possible in</li> </ul> </li> </ul>	

	<p style="text-align: center;">response to high wind situations</p> <p>Overall, we believe Strategic Reserve is workable if well designed and if it encourages the right type of capacity. Ideally, it would be combined with a day ahead reserve market and have clearly set out interactions with STOR and the Balancing Mechanism and priced correctly into cash-out (combined with other reforms to cash out), which protects against the “slippery slope” problem whilst encouraging new entry.</p> <p>It is worth stressing that Strategic Reserve is an insurance policy. It will only be procured if the market doesn’t deliver and hence is significantly less of a risk than universal mechanism – the risk of a hiatus associated with the implementation significantly greater than any slippery slope risk with Strategic Reserve.</p> <p>We also believe that a Strategic Reserve will have the least impact on the interaction between GB and interconnected markets, as unlike a Market-wide mechanism, it would not be expected to have a significant impact on energy prices, leaving GB consistent with its energy-only neighbouring markets on the continent. We recognise that Capacity Mechanisms are under discussion elsewhere in Europe, but observe that future changes could still be introduced if appropriate under harmonised markets.</p> <p>Most importantly, however, an appropriately designed Strategic Reserve mechanism enables the “right type” of capacity to be procured to ensure a robust, flexible system, which is not possible under a Market-wide approach.</p> <p>The attached appendix (<i>Wartsila capacity mechanism consultation response supplementary paper.pdf</i>) sets out a coherent, high level design for an overall Capacity Mechanism which meets DECC’s objectives whilst enabling the market to deliver as far as possible.</p>
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*Market-wide mechanism*

<b>Consultation question</b> <span style="float: right;">[page 182]</span>	
<b>12</b>	<b>How and by whom should capacity in a GB market be bought and why?</b>
<b>Response</b>	<p>Capacity could be bought by suppliers through an obligation or a central body. Our preference is for a central body given the relative simplicity and transparency of this approach.</p> <p>Any capacity mechanism must address two market failures:</p> <ul style="list-style-type: none"> <li>• “Missing money” – market price signals not perceived to be enough to reward the construction of sufficient capacity that may be used at low load factor / rarely</li> <li>• “Missing flexibility” – even if there is enough “money”, we may not build enough capacity of the right type, ie sufficiently flexible to meet increasing variations in demand/generation with intermittency</li> </ul> <p>The focus on the consultation document has been on addressing the missing money problem and there has been <u>insufficient</u> focus on the second</p>

	<p><u>failure</u> which is just as important in a world of intermittent generation.</p> <p>We believe there are market mechanisms (eg a day-ahead reserve market) which could be put in place to tackle the flexibility problem by creating appropriate price signals.</p> <p>If this does not happen, then the Capacity Mechanism should be designed to help address the flexibility issue, recognising the efficiencies in procuring capacity to meet the resource adequacy and flexibility issues together. This is not something that a Market-wide approach can achieve, given that by definition all capacity participates in the market on an equal footing.</p>
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Consultation question		[page 183]
<b>13</b>	<b>What contract durations would you recommend for a Capacity Market?</b>	
<b>Response</b>	<p>Our view is that this area is one of the greatest challenges for a universal capacity market. How the different auctions for the different contract lengths interact is far from clear. It is difficult to see it working unless there is a uniform contract length, else there is a risk that the long term contract undermines the value of the short term contract.</p> <p>It is difficult to see how a universal scheme can be designed to procure the precise types of service and flexibility which a capacity assessment should, in our view, identify. Hence, we believe the advantage of a targeted mechanism is that it is much easier to procure a portfolio of different types of contract.</p> <p>If a universal mechanism is the preferred way forward then there must be some differentiation between existing plant and new plant.</p> <ul style="list-style-type: none"> <li>• For existing plants, short period, eg, one year could be suitable</li> <li>• For new build, the long term nature of the scheme should provide sufficient certainty to investors in order to adequately incentivise investment.</li> <li>• Procurement on longer term contracts for new build could be implemented only if insufficient capacity is brought forward through a standard one year tender.</li> </ul>	

Consultation question		[page 184]
<b>14</b>	<b>How long should the lead time for capacity procurement be? Should there be special arrangements for plant with long construction times?</b>	
<b>Response</b>	<p>In general, the lead time would need to be the same for all contracts otherwise there is a significant risk (as noted above) that the different markets (long term versus short term) would be undermined.</p> <p>Please see our answer to Question 2 which included reference to our views on the interaction with Capacity Assessment. In general, principles should include a) allow sufficient time for new capacity to be built if economic versus existing capacity, b) ensure low regret choices under changing supply-demand forecast changes, and c) mitigate market power and/or</p>	

	gaming issues.
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Consultation question		[page 185]
15	<b>Should there be a secondary market for capacity? Should there be any restrictions on participants or products traded?</b>	
Response	<p>We see no reason to restrict secondary market trading but this must be consistent across markets and standardised as far as possible to promote liquidity.</p> <p>A related issue would be to determine how a secondary market could link into a day-ahead reserve market. Both could be an important way to encourage the development of DSR.</p>	

Consultation question		[page 186]
16	<b>What are the advantages and disadvantages of making a central, administrative determination of (i) the capacity that can be offered into the market by each generator; (ii) the criteria for being available; and (iii) the penalties for non-availability? In outline, how would you suggest making these determinations?</b>	
Response	<p>With purely financial Reliability Contracts (i), (ii) and (iii) are no longer relevant. If one were to implement "physical" capacity contracts then a much more proactive regulation regime would be required, and this is a strong disadvantage.</p> <p>Otherwise, we have no specific comments but have a general view that reliability and performance should be appropriately rewarded as well as non-performance being appropriately penalised and the same rules should apply to all participants.</p>	

Consultation question		[page 191]
17	<b>How should the reference market for reliability contracts be determined and what would be an appropriate reference market if it is set by the regulator? How could any adverse effects of choosing a particular option be mitigated?</b>	
Response	<p>We believe the reference market should be set based on spot markets or imbalance prices with the reforms discussed above (single, marginal cash out price). The appropriate choice here will be a function of the overall design of the mechanism, including consideration of whether the exposure faced by holders of reliability contracts is 'net' of any firm market-traded contract positions. This will impact on how the risk of holding the contracts is measured and managed.</p>	

Consultation question		[page 192]
18	<b>For a Reliability Market, how should the strike price be determined? If using an indexed strike price, which index should be used?</b>	
Response	<p>We agree that an independent body should be tasked with setting the strike price based on economic analysis of historic price behaviour, particularly at times of tight capacity margins, to establish the point at which the market is operating under “scarcity conditions”. It would appear logical to make this a part of the role of Ofgem in conjunction with its Capacity Assessment.</p> <p>Whilst we have no strong view on the indexation, if the approach is to have the strike linked to the SRMC of a particular plant type it might make sense to index it. However, if the intent is to create a market in standard products that may generate liquid secondary market trading, then indexation could be a disadvantage compared to a simpler definition.</p>	

Consultation question		[page 193]
19	<b>For a Reliability Market, what level of physical back up (if any) should be required for reliability contracts and how should it be monitored?</b>	
Response	<p>One of the main reasons for implementing a capacity mechanism is to “fix” the perceived “missing money” problem. Hence there is no reason that contracts should not be financial only (and thus avoid the complexities associated with physical contracts).</p> <p>If a more physical route is followed, the Reliability Market just looks like a traditional capacity auction but with penalties for non-delivery set to the market price.</p>	

Consultation question		[page 194]
20	<b>Do you agree that a vertically integrated market potentially raises issues for the effectiveness of a Reliability Market? If so, how should these issues be addressed?</b>	
Response	<p>Not necessarily but centrally procured capacity would at least be more transparent.</p> <p>It is possible that market testing through a day ahead reserve market operating in parallel with the reforms and arrangements to promote a general increase in liquidity proposed by Ofgem could provide a partial solution.</p>	

Consultation question		[page 195]
21	<b>What could we do to mitigate interactions between a Capacity Market (especially if a Reliability Market) and Feed-in Tariff with Contract for Difference without diluting the effectiveness of either?</b>	
Response	<p>We believe that FIT-CfD generation should be excluded from the capacity market for non-dispatchable plant since participating in the Reliability Market could introduce unnecessary complications.</p> <p>It would be much better if the contribution of wind to security of supply is determined centrally (as a part of the Capacity Assessment), and the requirement from rest of market determined accordingly. This is less clear cut for plant (nuclear, CCS) with year-ahead indices for CfDs and careful consideration need to be given to their treatment in the Capacity Assessment.</p> <p>Potentially the Reliability Market will cap out peak prices which might marginally dilute incentives to be available at peak. This might be a particular issue for CCS since this plant may have the option to generate with capture units bypassed to boost output at times of peak.</p>	

Consultation question		[page 196]
22	<b>How can a Capacity Market be designed to encourage the cost-effective participation of DSR, storage and other non-generation technologies and approaches?</b>	
Response	<p>We believe a day ahead reserve market operating alongside day ahead spot markets that would create prices for reserve (option to increment, option to decrement energy) which would encourage all forms of flexibility. Key features would include:</p> <ul style="list-style-type: none"> <li>• Buyer would purchase the right to exercise the option(s) prior to gate closure, allowing utilisation of flexibility prior up to an hour before real time</li> <li>• Day ahead market to allow time for generators to warm plant</li> <li>• Reserve would be purchased for defined commitment periods (minimum 1 half hour)</li> <li>• Buyers and sellers can subsequently trade contracts bilaterally to gate closure</li> <li>• At gate closure all contracts are either exercised or expire and any exercised contracts become committed and treated like any other position</li> </ul> <p>A functioning reserve market could reduce the requirement for STOR contracts as there will be greater opportunities for market participants to improve their balancing up to the point of gate closure, leaving a smaller residual role for the System Operator.</p> <p>It is worth highlighting the practical difficulties of policing DSR in a market wide mechanism. For example, it would be difficult to determine whether the</p>	

	<p>demand side response would have occurred in any case.</p> <p>In addition, there is a risk of a universal scheme that the market is foreclosed for new technologies because too much traditional capacity has been forward contracted.</p> <p>Getting prices that accurately reflect supply and demand on the system (including the possibility of prices spiking really high) is the best way of encouraging innovation on the demand side and into storage technologies.</p>
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Consultation question		[page 199]
23	<b>Do you have any comments on the functional arrangements proposed for managing a Capacity Market?</b>	
Response	No specific comments.	

Consultation question		[page 199]
24	<b>Do you think that a trigger should be set for the introduction of a Capacity Market? If so, how do you think the trigger should be established, and how should it be activated?</b>	
Response	<p>Our view is that a trigger makes no sense for a universal or market wide scheme since a decision must be made now if such a scheme is to be implemented.</p> <p>This is an area in which a targeted mechanism is advantageous since, once designed, you only need to proceed to auctions for the strategic reserve once the need is clearly established.</p>	

Consultation question		[page 199]
25	<b>What is the most appropriate design of Capacity Market for GB and why?</b>	
Response	<p>Two market failures which must be addressed:</p> <ul style="list-style-type: none"> <li>• “Missing money” – market price signals not perceived to be enough to reward the construction of sufficient capacity that may be used rarely</li> <li>• “Missing flexibility” – even if there is enough “money”, we may not build enough capacity of the right type, ie flexible capacity to meet increasing variations in demand/generation with intermittency</li> </ul> <p>DECC’s focus to date has been on the missing money problem and there has been insufficient focus on the second failure which is just as important in a world of intermittent generation. We believe there are market mechanisms (e.g. a day-ahead reserve market) which could be put in place to tackle the flexibility problem. With this in place, either Capacity Mechanism option, if well designed, could address the resource adequacy issue, but without it, then the Capacity Mechanism itself may need to address market flexibility as</p>	

	well as resource adequacy. A Market-wide mechanism that does not differentiate between different types of capacity would not address this, whereas a Strategic Reserve, suitably designed, could do so.
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### *Capacity mechanism Assessment*

Consultation question		[page 210]
<b>26</b>	<b>What are your views on the costs and benefits of a Capacity Mechanism to industry and consumers?</b>	
<b>Response</b>	<p>We believe the overall case for a Capacity Mechanism is unproved but, if well designed, may not materially affect costs to consumers. There are high degrees of risk, however, particularly with the more innovative (and hence untested) schemes laid out in White Paper and consultation.</p> <p>Thus, very careful consideration needs to be given to the design, including interactions with other reserve markets, which should not be rushed, and equal attention should be given to the creation of supporting markets such as a day ahead reserve market.</p>	

Consultation question		[page 211]
<b>27</b>	<b>Which Capacity Mechanism should the Government choose for the GB market and why?</b>	
<b>Response</b>	<p>We believe that the key issue is ensuring appropriate market signals for flexibility are provided and to this end we have proposed a day ahead reserve market. If these signals are in place, then we believe either a targeted or market wide mechanism could work. If not, then a Strategic Reserve is necessary to ensure that the right types of capacity are procured which can enable resource adequacy and adequate flexibility. Under a Market-wide approach, this would not be achievable, and hence there is a serious risk that the system as a whole will be "missing flexibility" as the penetration of intermittent generation increases.</p> <p>Please see our answer to Question 25.</p>	

Please select the category below which best describes who you are responding on behalf of.

- Business representative organisation/trade body
- Central Government
- Charity or social enterprise
- Individual
- Large business ( over 250 staff)
- Legal representative
- Local Government
- Medium business (50 to 250 staff)
- Small business (10 to 49 staff)
- Micro business (up to 9 staff)
- Trade union or staff association
- Other (please describe):

Thank you for taking the time to let us have your views.

The Government does not intend to acknowledge receipt of individual responses unless you tick this box.



**Electricity Market Reform: Consultation on possible  
models for a Capacity Mechanism**

**A supplementary paper to support our response to  
the Department of Energy and Climate Change**

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October 2011

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The contact for queries and questions on our response is:



General Manager

Liaison Office, Power Plants



## **1 INTRODUCTION**

- 1.1.1 This paper has been prepared as a part of Wärtsilä's response to the UK Department of Energy and Climate Change (DECC) Consultation on Possible Models for a Capacity Mechanism. It is intended to supplement our formal response to each of the Consultation questions, by providing a summary of our views, identifying the need for a more explicit focus on flexibility, and outlining a Capacity Mechanism design that we believe could address this.
- 1.1.2 We are keen to meet with interested parties to exchange views and further develop thinking in this critical area.

## **2 OBJECTIVES**

- 2.1.1 The UK government and other stakeholders believe that, over the next few years, there could be generation capacity shortfall in the GB market. Combined with an increasing penetration of low carbon but intermittent renewable generation this could lead to substantial challenges in ensuring the electricity system can be balanced. We support the rationale behind the current Electricity Market Reform, and believe that the process should be aimed at ensuring a future Great Britain electricity system with a mix of capacity that ensures security of supply as the level of intermittency on the system increases.
- 2.1.2 In particular, this requires the ability for the system to respond to rapidly changing intermittent output. Evidence increasingly suggests that wind output at high levels of penetration could swing rapidly. Other plant must be able to respond as wind levels drop, but also ramp down when wind output is high to avoid 'spill' in a cost effective way, minimising the associated carbon impact. Provision of flexibility through keeping conventional thermal plant part-loaded has a significant carbon cost, and curtailing wind at times of high output and low demand would limit the contribution to renewable targets. New market arrangements should ensure that appropriate investment is made in technologies that are most suitable to meet the new flexibility demands.

## **3 THE FLEXIBILITY PROBLEM**

- 3.1.1 DECC has identified a concern that the market may bring forward insufficient capacity under current market arrangements. There is a potential market failure associated with a perceived political risk to allowing prices to reach high levels at peak times. Such high prices would be required to remunerate plant running at lower load factors, such that they are able to recover fixed costs whilst operating for only a small number of hours per year, and at a higher rate of return than baseload plant, reflecting a higher price and load factor uncertainty. This issue has been termed the "missing money" problem.

- 3.1.2 However, we believe that there is another issue that must be addressed. It is not simply “capacity” that is required. Consideration must be given to delivering the “right types” of capacity, and in particular, that a sufficiently flexible mix is available. Without appropriate price signals, there is an equally important concern around “missing flexibility”. We think this has not received adequate attention during the current debate but is essential in meeting the overall objectives of EMR. Put another way, we think that, in addition to resource adequacy and operational security, DECC should explicitly consider “market flexibility” as a direct objective for the new arrangements. This may be defined as ensuring sufficient system responsiveness to track a profile of demand and non-controllable generation in a technically secure, low carbon, and cost-effective manner. We differentiate this from the “operational security” provided by STOR by considering what would be required given accurate demand and intermittent output forecasts at gate closure, compared to the need to adjust due to unplanned outages or deviations away from forecast on a minute-by-minute basis.
- 3.1.3 Our analysis, presented previously in our response to the December 2010 Electricity Market Reform Consultation, and re-presented here in Appendix 1, suggests that the net demand swing (taking into account both load and wind variations) could increase to 2020 by 2GW over a 2 hour period and over 3 GW over a 3 hour period. At the same time, retirements of existing plant could decrease available dispatchable thermal plant (without further investment) by 15 GW over a 3 hour response period. Whilst Demand Side Response and interconnectors can make a modest but important contribution to the provision of flexibility, this will not be sufficient to bridge the gap or to provide the portfolio of flexibility services required. Furthermore, of the remaining dispatchable thermal plant, the true economic cost of providing flexibility from the current fleet of gas fired plant in particular, with unit operating regimes increasingly diverging from design assumptions, is not proven.
- 3.1.4 The role of interconnectors will of course be dependent on the state of neighbouring markets and commercial arrangements between participants and system operators. In particular, understanding correlation in wind output across Europe will be the key. Recent evidence increasingly suggests that output may be highly correlated, as illustrated by the figure on next page, extracted from *Smart Power Generation*, J. Klimstra and M. Hotakainen, 2011, p.108.