DS3: System Services Review –

New Products & Contractual Arrangements Consultation

This questionnaire has been prepared to facilitate responses to the consultation. Respondents are not restricted to this template and can provide supplementary material if desired.

Please send responses in electronic format to DS3@eirgrid.com or DS3@soni.ltd.uk

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Note: it is the TSOs' intention to publish all responses. If your response is confidential, please indicate this by marking the following box with an "x".

Response confidential ☐

The closing date for responses is Friday 3rd August 2012.

Question	*Response*
New Products	
Synchronous Inertial Response Is the need for this product clear? If not, what additional information is required?	Yes.
Is the product description clear? If not, what aspects require clarification or further details?	Yes. However, it is not clear why it is proposed that the SIR ratio should refer to the *"lowest sustainable MW output at which the unit can operate at while providing <u>reactive</u> power control"*. As the SIR system service is essentially an active power service it would be more logical to define it in terms of the *"lowest sustainable MW output at which the unit can operate at while providing <u>active</u> power control"*. Perhaps this is a typographical error. If not, an explanation would be useful. Also, it is not clear why it is proposed that payments will be proportional to the product of kinetic energy and SIR ratio. Given that SIR ratio is defined as (kinetic energy)/(Min Gen), this means payment will be proportional to (kinetic energy)^2/(Min Gen). Is it intended to incentivise kinetic energy so strongly? Is not Min Gen as important as kinetic energy? The proposed formulation would disproportionately reward operators of large generators e.g. consider two 100MW generators and one 200MW generator, all with the same inertia constant and same % Min Gen. The 200MW generator would receive 4x greater SIR payments than a single 100MW generator and twice as much SIR payment as both 100MW generators combined yet the inertial effect and min gen capability of the 200MW generator is the same as the two 100MW generators. It will be important to specify how SIR delivery can be verified. It should not simply be a function of generator mechanical parameters and Min Gen because generator control systems may act to limit delivery of inertial energy. It is noted that at the DS3 System services Forum 4th July it was proposed that SIR Factor should be capped at 45 and this is not included in the consultation proposal. A cap is important to ensure that remuneration for synchronous condensers (Min Gen = 0) is not

Question	*Response*
	unreasonable. Are the proposed requirements for phasor measurement units an expression of the need for high speed metering of frequency events and generator SIR rather than a need to measure and compare phasors from generators with phasors at other locations? Is this the right equipment for the job? It is not made explicit whether payment will be for capability or for utilisation. Payment for verified capability would be reasonable.
What are your views on the proposed threshold value of 20s for the SIR ratio	No view. No information has been provided to illustrate how a SIR ratio of 20s (or any other value) would impact on overall system inertia and ROCOF for anticipated levels of SNSP. Nor is it clear what levels of SIR ratio are already achieved by existing generators. Some anonymous charts describing existing SIR ratio could help inform the industry of whether the proposed threshold value is challenging i.e. • Frequency distribution of SIR ratio • MW distribution of SIR ratio
Given the system need, what alternative product design should be considered?	The product should be redesigned so that payment is proportional to kinetic energy divided by Min Gen (i.e. payment proportional to SIR ratio). It is noted that the product is only available to generators. Should thought be given to SIR from demand customers with large machines or large numbers of machines?
Fast Frequency Response Is the need for this product clear? If not, what additional information is required?	Yes.
Is the product description clear? If not, what aspects require clarification or further details?	No. It is not clear how providers may provide both FFR and SIR as suggested in the consultation document. How would measurements distinguish between SIR and FFR in those

Question	*Response*
	circumstances? It is not clear how these products will be utilised. Should all contracted generators provide FFR continuously, or only when selected by the TSO or only when frequency or ROCOF deviations exceed a deadband threshold? It is not made explicit whether payment will be for capability or for utilisation. Payment for verified capability would be reasonable. Are the proposed requirements for phasor measurement units an expression of the need for high speed metering of frequency events and generator FFR rather than a need to measure and compare phasors from generators with phasors at other locations? Is this the right equipment for the job? Both product descriptions assume that FFR will result in extra energy being delivered i.e. they are responses to a low frequency or a negative ROCOF event. However with increased interconnection and export of power to other countries being envisaged, it may be that an interconnector trips resulting in a high frequency or positive ROCOF event. <u>Option 1</u> It is not clear whether payments will be proportional to the quantity of extra energy delivered or to the "constant ratio of this additional energy output to the integral of the frequency deviation in the same time period". Who will specify the minimum capability that can/should be provided at all MW output ranges in normal operation? Generator or TSOs?
Which product option do you favour and why?	because synthetic inertia energy from an uncurtailed wind farm must be borrowed from rotor inertia and must be paid back relatively quickly as it can affect aerodynamic efficiency. This would not allow wind farm FFR response to be sustained for 15 seconds.

Question	*Response*
	There is no reason to force a choice of either option 1 or option 2. Both could be provided depending on the circumstances or the capabilities of the generator / energy storage device. Option 1 is better suited to wind farms providing synthetic inertia, because synthetic inertia energy from an uncurtailed wind farm must be borrowed from rotor inertia and must be paid back relatively quickly as it can affect aerodynamic efficiency. This would not allow wind farm FFR response from an uncurtailed wind farm to be sustained for 15 seconds. Option 2 is better suited to a curtailed wind farm which could provide a significant increase in active power output in 2 seconds and maintain or build upon it. Some energy storage devices may be able to offer option 1 and option 2 and the TSO should incentivise which ever better suits the needs of the system.
Given the system need, what alternative product design should be considered?	
Fast Post-Fault Active Power Recovery Is the need for this product clear? If not, what additional information is required?	Yes
Is the product description clear? If not, what aspects require clarification or further details?	Are the proposed requirements for phasor measurement units an expression of the need for high speed measurement of FRT events and generator fast active power recovery rather than a need to measure and compare phasors from generators with phasors at other locations? Is this the right equipment for the job? It is not made explicit whether payment will be for capability or for utilisation. Payment for verified capability would be reasonable. The consultation document says *"Potential providers of these services include conventional generators, synchronous storage devices and full convertor windfarms with advanced voltage control"*. However non-synchronous energy storage devices may also have a part to play and it is the active power capabilities of windfarms which are important in this case and not their

Question	*Response*
	voltage control capabilities.
Given the system need, what alternative product design should be considered?	Consideration should be given to higher payments for faster delivery of active power.
Ramping Product Is the need for this product clear? If not, what additional information is required?	Yes. However, no information has been provided to quantitatively illustrate how provision of this service by different classes of generator would improve control of the system with expected levels of SNSP.
Is the product description clear? If not, what aspects require clarification or further details?	No. Option 1 concludes ambiguously *"...less the maximum increase in MW output during the horizon window"*. However *"increase in MW output"* could refer to the increase due to ramping. It should say *"...less the maximum increase in <u>dispatched</u> MW output during the horizon window"*. The illustrations of both options imply that there should be a monotonic increase in MW from the starting point to the horizon time (end point). At the System Services Forum 4th June it was explained that generators may take any path from the start point to the end point. This should be clarified in the product descriptions.
Which product option do you favour and why?	Option 2 is favoured. Option 1 penalises providers for uncertainty during the horizon time including any increase in MW dispatch. This is outside the generators control and should be the system operator's risk. While it is at the generator's risk this option is not favoured although the shorter risk periods of the ramping periods (1, 3 and 8 hours) are more attractive to a wind farm generator than the total of ramp and duration periods (3, 8 and 16 hours) specified in option 2 Option 2 penalises providers for failure to achieve or sustain the TSO requested ramp. this is more material to system operation than the Option 1 penalty for uncertainty during the horizon time and is therefore favoured.

Question	*Response*
Given the system need, what alternative product design should be considered?	Rewrite option 1 with no deduction for maximum increase in MW dispatch during the horizon window.
Steady State Reactive Power Is the need for this product clear? If not, what additional information is required?	Yes. However the need is not restricted to the need for reactive power to be provided by generators. The need for steady state reactive power is a generalised and sometimes localised need which can arise from reactive support for generation, transmission, distribution and demand customers.
Is the product description clear? If not, what aspects require clarification or further details?	No. The proposed wording is not clear in isolation from diagrams and could be improved. Colleagues did not immediately understand that the Prange and Qrange refer to the largest rectangle which can fit inside the MW/MVAr diagram between Pmax and Pmin. The definition of minimum generation from a wind farm needs careful consideration. The reactive power which may be delivered by a wind farm which is dispatched down to it lowest controllable MW output may differ from the reactive power capability which is delivered as wind speed rises and falls. This difference is due to the starting and stopping of wind turbines as the wind rises and falls which contrasts with the availability of all wind turbines when MW output is dispatched down. Reactive power testing is normally conducted when wind is sufficient to achieve a significant proportion of rated MW and this should be the condition for determining the plant capability of a wind farm for system services purposes.
Given the system need, what alternative product design should be considered?	The product should be rewritten to include other providers of reactive power in addition to generators.
Dynamic Reactive Power capability Is the need for this product clear?	Yes.

Question	*Response*
If not, what additional information is required?	
Is the product description clear? If not, what aspects require clarification or further details?	No. Settling time is not defined in the context of the proposed system service. It should be defined to take account of the reasonable needs of the system operator and the accuracy and controllability of generator equipment. Note that reactive power or reactive current overshoot by DFIG generators in response to a voltage dip cannot be controlled as this is a physical machine response governed by the generator parameters.
Given the system need, what alternative product design should be considered?	The delivery of specified quantities of reactive power is difficult during a voltage disturbance and many non-synchronous generators are current limited devices which may be unable to fulfil dynamic reactive power requirements during a low voltage disturbance. The system service should be rewritten in terms of reactive current. This would be consistent with the proposed ENTSO-E Network Code Requirements for Generators Article 15(2)(b). It would also be consistent with solutions already developed by many wind turbine manufacturers to comply with similar fast reactive current injection requirements in other countries' grid codes e.g. Germany and Turkey.
Revised Replacement Reserve Is the need for this product clear? If not, what additional information is required?	Yes
Is the product description clear? If not, what aspects require clarification or further details?	Yes
Given the system need, what alternative product design should be considered?	
Remuneration Approach	
General Approach What are your views on our proposed remuneration approach?	Yes, RES supports the proposed remuneration approach. Yes, RES supports the increased focus on performance reliability.

Question	*Response*
Do you support the increased focus on performance reliability?	
It is proposed that payment rates will be reduced where performance reliability is shown to be below a defined level (e.g. 90%) and reach zero at 50%. Do you believe this will be a more effective approach than applying charges for failures ?	Yes
Contractual Arrangements Bilateral contracts are proposed. What are your views on the proposed range of possible durations of 3 to 7 years?	Contract durations should reflect the period over which assets are normally financed. Seven years is too short and may not sufficiently incentivise investment in the services sought by the system operators, particularly those proposed new system services which are not mandatory requirements of the grid codes. RES would not invest to provide any discretionary system services based on a 3 year contract unless the system service rates were very high and this is unlikely to achieve regulator approval. Low cost system services need long term finance and the system operators and regulatory authorities need to assure the investor community that such investment is low risk.