Renewable Energy Systems Limited
Beaufort Court, Egg Farm Lane, Kings Langley
Hertfordshire WD4 8LR, United Kingdom
T +44 (0)1923 299 200 F +44 (0)1923 299 299
E info@res-group.com www.res-group.com

Mr. Andrew McCorriston
Utility Regulator
Queens House
14 Queen Street
Belfast
BT1 6ED

Our Ref: EN01-004078

11 October 2013

Dear Mr. Andrew McCorriston,

Re: SEM-13-060 Consultation Response

Through its subsidiary RES UK & Ireland, RES has been developing wind projects on the island of Ireland since the early 1990s, having developed 14 operating wind farms in Northern Ireland and 4 operating wind farms in the Republic of Ireland, totalling 241MW. RES currently owns or operates 134MW of wind capacity across the island. In addition, RES has 62MW of wind capacity in development with planning consent in Northern Ireland and a further 55MW of new wind generation currently in the Northern Ireland planning system. RES has been an established presence at the forefront of the wind energy industry for over three decades. Our core activity is the development, design, construction, financing and operation of wind farm projects worldwide. With a portfolio of almost 7GW constructed and several gigawatts under construction and in development, RES continues to play a leading role in what is now the world's fastest growing energy sector.

RES has been an active participant in the DS3 process and has an active role in the SONI Grid Code Review Panel. We welcome the opportunity to respond to this consultation.

Here are RES' responses to the consultation paper's specific questions and comments on other matters described in the consultation paper.

5.1 Proposed Decision

Q1: Do you agree that enhanced system services are required?
A1: Yes, the proposed new services are necessary to simultaneously achieve governments' renewable energy targets and maintain the stability / controllability of the System. The new system services will also support greater interconnection of the System with other systems which has the potential to improve security of supply and bring economic benefits.

Q2: Do you agree with the proposed definition of the services?
A2: Yes, subject to the comments below.

5.2.1.1 Synchronous Inertial Response

Q1: Do you agree with the proposed service definition?
A1: Yes.

Q2: Do you agree with the proposed method of calculating the SIR volume?
A2: Yes, however the drafting should make explicit how the SIR *volume is used to generate system services payments.*

Q3: Do you agree with the proposed service definition of the additional variant of SIR?
A3: No opinion.

5.2.1.2 Fast Frequency Response

Q1: Do you agree with the proposed service definition?
A1: Yes.

Q2: Do you agree with the proposed method of calculating the FFR volume?

- *A2: Yes, however he drafting should make explicit how the* FFR *volume is used to generate system services payments.*

5.2.1.3 Fast Post-Fault Active Power Recovery

Q1: Do you agree with the proposed service definition?
A1: No.

- *The proposed service definition is imprecise with regard to voltage (it is similarly unclear in the proposed service definition of Dynamic Reactive Response). It is not clear whether "voltage" in this context refers to the positive phase sequence voltage or the lowest or highest or average value of the three phases or some other definition.*
- *The proposed definition requires service delivery within 250ms of "voltage recovering to 90% of its pre-fault value". As the pre-fault voltage could be at the lower end of the voltage range permitted by the relevant code, 90% of this value would be outside the operational envelope of many generators. The proposed service definition should be amended to require recovery of active power within a period after "voltage" recovers to statutory or code limits.*
- *The requirement to provide 90% of the pre-fault active power is unreasonable in all circumstances when up to 1150ms may have passed and the quantity of renewable primary energy may have reduced. The concept of available power is well established and renewable generators have to submit this information to the network operator via SCADA therefore the service definition should substitute "available power" for "pre-fault value".*
- *The proposed service definition requires that the generator must unconditionally remain connected to the system for at least 15 minutes following the fault. This should be made conditional upon the System conditions remaining within the limits specified in the relevant code. It would not be reasonable to say that a generator had failed to deliver this service by remaining connected when the System did not allow it to remain connected or required that it should be disconnected.*

Q2: Do you agree with the proposed approach to calculating the FPFAPR volume?
A2: No. The proposed calculation is imprecise with regard to when MW is measured. Is it measured:

- *At 250ms after "voltage" recovers to 90% of its pre-fault value?*

- *At some point during the next 15 minutes (and, if so, would reducing renewable energy primary resource disqualify a renewable generator from obtaining FPFAPR payments)?*
- *As MWh or an average MW over the 15 minute period?*
- *The drafting should make explicit how the* FPFAPR *volume is used to generate system services payments.*

5.2.3.1 Replacement Reserve (De-Synchronised)

Q1: Do you agree with the proposed modification to this service?
A1: No opinion.

5.2.3.2 Replacement Reserve (Synchronised)

Q1: Do you agree with the proposed modification to this service?
A1: No opinion.

5.3.1 Dynamic Reactive Response

Q1: Do you agree with the proposed definition?
A1: No, the service definition is imprecise in the following respects.

- *What is "voltage" (as discussed in my response to section 5.2.1.3 above)?*
- *What is a "voltage dip"?*
- *What is a voltage dip of 30%?*
- *Is the service required for positive sequence voltage deviations only?*
- *Is the service to provide positive sequence reactive current response only?*
- *From when do the 40ms rise time requirement and the 300ms settling time requirements commence? Although this is illustrated in Figure 6, precise legal text is required.*
- *How much reactive current response is required to be delivered for a voltage dip of magnitude greater than 30%?*
- *For how long must the reactive current response be provided? Indefinitely?*

Q2: Do you agree with the proposed method of determining the volume?
A2: No, the description is unclear.

- *Is the volume determined by multiplying the registered capacity by the hours in which the unit was connected and able to provide the required response?*
- *How can it be determined that a unit is capable of delivering the required response at any given time? Is it assumed to be capable whenever it is connected or are there other criteria?*
- *Is a unit which delivers MVAr of 31% of registered capacity for voltage dips of 30% and 60% credited with the same DDR volume as a unit which delivers MVAr of 62% of registered capacity for a 60% voltage dip?*
- *The drafting should make explicit how the DDR volume is used to generate system services payments.*

5.3.2 Steady-state Reactive Power (SRP)

Q1: Do you agree with the proposed definition?

A1: Yes, I agree with the concept of the proposed definition. However, there are some problems with the details as drafted.

- *Although figure 7 is clear, more precise legal text is required.*
- *The definition of SRP for wind farms is unclear.*
- *Why is the active power range defined as "from registered capacity down to at least 12% registered capacity"? Is it the intention that wind farms should be dispatchable down to 12% of registered capacity to qualify for SRP payments? If so this should be stated explicitly in the proposed definition.*
- *The words "at least" are potentially confusing and should be deleted.*
- *12% of registered capacity could be delivered by a wind farm in the following ways, each of which would provide a significantly different reactive power capability. Therefore more precise drafting is required.*
    1. *12% of the wind turbines operating at their rated capacity.*
    2. *100% of the wind turbines operating above rated wind speed but dispatched to 12% of their rated capacity.*
    3. *Wind turbines in a wind farm all experience different wind conditions for various reasons e.g. due to the effects of local topology and due to wake effects from upwind turbines. A wind farm operating at 12% of rated output due to low wind speed may be operating with some winds turbines shut down and the remainder producing a range of active powers totalling 12% of wind farm registered capacity. The number of wind turbines producing power (and thus available to produce reactive power) at low wind speed giving rise to 12% of registered active power may vary depending on the wind direction.*
- *I propose that method 2 is the most relevant to the needs of the TSOs with respect to controlling the System and is the most easily tested in the field and should therefore be adopted as the conditions for defining Q_{range} for a wind farm*

Q2: Do you agree with the proposed method of determining the volume?

A2: No, it is not clear whether it is intended to define the calculation of volume at an instant (a capability payment) or whether the calculation should be integrated over the time that the unit is available to provide the service (a utilisation payment). The drafting should make explicit how the SRP volume is used to generate system services payments.

I hope that you find the comments contained in this response helpful. If you wish to discuss them, please do not hesitate to contact me.

Yours sincerely,

Joe Duddy BY EMAIL
Principal Electrical Engineer
E joe.duddy@res-ltd.com
T +44 (0) 1923 299 213

Cc Mr. Robert O'Rourke - Commission for Energy Regulation