

August 20, 2014

Robert O'Rourke  
Commission for Energy Regulation  
By email to [rorourke@cer.ie](mailto:rorourke@cer.ie)

Andrew McCorriston  
Office of the Utility Regulator  
By email to [Andrew.mccorriston@uregni.gov.uk](mailto:Andrew.mccorriston@uregni.gov.uk)

Gentlemen,

**SEM Committee Consultation: DS3 System Services Procurement Design**

Thank you for the opportunity to respond to the consultation on Procurement Design. The Power Transmission Business Department of Mitsubishi Corporation is willing to join the ancillary business as an innovative service provider. We have already found products and services for up-to-date applications on power networks and in Japan are currently collaborating with NGK Insulators Ltd, GS Yuasa Corporation and Fuji Electric. Our project is supported by Department of the Department of Communications, Energy and Natural Resources in Ireland and the Ministry of Economy, Trade and Industry in Japan (attachment 1).

NGK manufactures products for many industries, and a major business line is the NAS Battery, which is designed for large scale application on a power network. GS Yuasa manufactures and supplies Lithium-ion batteries for many applications like rail vehicle, diesel hybrid systems, EV, HEV, PHEV, aerospace, energy storage systems and etc. Fuji Electric has developed high efficient power conditioning systems using various type large scale batteries. NGK has supplied more than 300MW/2,000Mwh of NAS batteries and GS Yuasa has supplied significant MW of Lithium-ion batteries to customers in a number of markets, and the companies continues to seek opportunities to develop its business globally. Mitsubishi is actively considering investment in the island of Ireland using a hybrid battery system combining both a NAS and a lithium battery and welcome this opportunity to comment on your proposals.

If you have any follow-up queries, please do not hesitate to contact us.

Yours sincerely,



**SHIN TADA**  
Assistant General Manager  
Mitsubishi Corporation

## 1. Summary

The proposals by the committee provide a framework for suppliers to deliver a range of ancillary services to the system. The services are described in the context of conventional plant solutions and do not reflect the all of the changing technologies that are now available. Fast response battery systems (especially hybrid systems) are able to provide advanced services of high value to the grid (attachment 2). However, battery systems cost profile is based on high initial capital cost and low operating cost, in contrast to conventional plant, and so therefore certainty of income is a more critical part of project investment analysis, leading to a preference for availability payments over dispatch, and longer term contracts rather than short term pricing. Regulated prices provide certainty of income and encourage investment, while still offering value for money to the end consumer.

## 2. Demand and supply side analysis

We are pleased to note the inclusion of batteries and other energy storage in the supply side analysis, but regret that the information published by KEMA and IPA does not reflect the capability of the NAS or Lithium-ion battery system. While the present generation of flywheels is designed to meet the requirements for fast frequency response, this simplification is not correct, and should not be extended to the role of other battery types. The Lithium-ion battery is able to respond within a second time frame, and move to full discharge or charge virtually instantaneously. The NAS battery is a high power and high energy device, and has quite different attributes. It would have been prudent to have aligned it within the generation schedule.

Cost data has been drawn from the DOE / EPRI 2013 Energy Storage Handbook, and the costs should be interpreted with caution, and in particular operational costs should be considered as part of the total through life cost, which would include fuel costs if compared to conventional generation such as CCGT.

Our estimates of costs for installations on other networks have shown that the through life cost of providing ancillary services using a NAS battery is comparable to the costs from conventional generation.

We note that the SEM committee considers that the procurement process should be as technology neutral as reasonable and should incentivise the most cost effective technology to deliver best value to the consumer. In order for a technology neutral approach to be adopted, the procurement system should also be neutral and not based on capital cost assumptions associated with the procurement of services from traditional styles of generating plant. We would like to stress that the batteries charging ability should be highly evaluated.

On the demand side, we do not have any comments as the analysis is thorough. We note though, that both supply and demand estimates are estimates, and there is therefore uncertainty exposed in both sets of analysis.

## 3. Procurement Designs

We note the arguments for payment for services based on dispatch, availability and capability and the reasoning for selection of payment terms.

The underlying issue is one of providing the right signals for investment in plant to provide the services that are believed to be required. The need to provide certainty for investors and operators is recognised in the document, but the full implications of this, especially in the context of technical neutrality is not fully recognised. For example, the services are seen to have both a power and energy component. In evaluating procurement, it is assumed that operators will have access to an income stream for energy delivery. However our preliminary assessment is that without some certainty of dispatch (that is utilisation) it is almost impossible to estimate the level of energy income that would be derived, and so the business case becomes extremely weak for plant that would be dedicated to services reimbursed through dispatch payments alone. This is critical if investments in plants with a high capital cost are to take place.

We are particularly concerned with the application of the system design to electricity storage, if the full technical and commercial value is to be achieved.

#### 4. Procurement Options

We prefer procurement to be based on a combination of long term contracts, in order to provide certainty of investment. We also believe the long term contracts will be valuable to the end consumer since they can prevent the electricity price from fluctuating frequently.

We prefer procurement to be based on payment for availability, with an utilisation (or dispatch fee) to cover the actual marginal costs of providing a service. Payment made on the basis of dispatch is not satisfactory, unless there is a guaranteed minimum level of dispatch.

#### 5. Option 5 Multiple Bid Auctions

We are content with the decision to adopt Multiple Bid Auctions, preferably based on the provision of long term contract periods, in order to provide both certainties for investment, coupled with a competitive environment which encourages value for money for consumers.

Option 1, a regulated tariff, has a number of attractive features. It provides certainty and fairness for suppliers, and a strong regulated structure can deliver value for money for consumers. A regulated tariff can be adapted to meet the requirements of different plant types, and so can accommodate plant based on high initial cost and low running costs, as well as plants of the opposite configuration. Additionally, the plant with low environmental impact can be rewarded through a regulatory package, thus adding to the overall sustainability benefit of the solution.

#### 6. Payment design for services

We are concerned that the payment terms for Op reserve, RRS/RD and in particular Ramping will be based on dispatch.

The document recognises that some plant which provides RM1 may not be capable of providing other services, but there is no recognition of the value of services which can be provided by fast acting battery storage, such as our hybrid battery system combining both a NAS and a lithium battery, in the document.

Our hybrid battery system can provide a range of services, from SIR and FFR through to the ramping products and indeed should be eligible to bid into these services. However in order to justify the business case for investment, it is necessary to be able to combine services where appropriate. If the assumption that operating reserves and ramping services will be paid for as dispatched, then it is necessary to either accept a very high payment for dispatch, or to guarantee a minimum delivery level in order that the plant allocated to ramping can be kept in readiness for this service. Payments should reflect the total value of the service to the system, encompassing the avoided costs of other forms of generation, the value of renewable resources that can be maintained as well as the longer term environmental benefits gained from not using conventional fuels.

The ramping Products Operating reserves, RM1, RM3 and RM8 should be paid for with an availability payment and an utilisation payment to cover marginal costs of production.

We also note that there is no charge service described. Battery energy storage is ideally suited to both positive and negative services to the network, and this important feature should be recognised and included in the structure of services considered for procurement.

#### 7. Interaction with I-SEM

We note that under the multiple bid auctions model there is expected to be some interaction between these services and the energy market. We note the concern that participants should not be paid double for the services. However we have concerns that for plant which is designed and installed specifically to provide these services, that adding the complexity of the energy market into the ancillary services pricing structure further complicate the process. Complex pricing systems increase overheads, disincentivising participants from providing the services. This is of special concern for new entrants to the market and for small suppliers.

The actual volume of energy supplied for these services may be small, even when aggregated over the course of the year. A de minimis allowance whereby a small supplier would be allowed to spill energy without needing to contract with a supplier would simplify contractual terms and encourage entry into the market.

#### 8. Other issues

We would inform the SEM committee of the latest developments in battery technology, and in particular the fast performance parameters. GS Yuasa's high power type LiB cell can be charged or discharged with maximum 24C (in short duration). Such a feature is of considerable value, and a number of system operators consider this to be of high value. Studies by DNV KEMA and others have shown that there is additional value from using fast acting reserve to correct system instability as it reduces the amount of other reserves that may be required later. This service – super fast frequency regulation is close to synthetic inertia product and needs to be included in the assessment of requirements. As you are aware, our hybrid battery system can also provide the low voltage ride through (LVRT) service and the adequate charge of energy which are necessary to make the stable and efficient energy infrastructure systems in the countries which are introducing high volume of renewable energy. We are convinced it is they are the important key aspects in Ireland since it is the island and has the targets of 40% of demand being met by renewable energy.



3-1, MARUNOUCHI 2-CHOME, CHIYODA-KU, TOKYO 100-8086, JAPAN

The battery solution will facilitate more participants to invest in the renewable energy market in Ireland. It means Ireland will be able to reduce the import of fossil fuels, improve the trade balance as well as to reduce CO2 emissions. It would also create new job opportunities. The batteries themselves are significantly environmentally friendly compared with other generation plants. We look forward to providing this innovative solution which will benefit both countries' environment and economy.

Lastly, we point out the eligibility. According to the ENTSO-E (European Network of Transmission System Operators for Electricity) requirement, the output should be sustained for at least 15minutes. In Germany and Netherland, there is the must run condition to provide the ancillary services for 7days/24hours. We would like you to clarify and add these conditions to stabilize the grid. Please be noted that the battery can fulfil these requirements while conventional power plants including hydro pump storage plant and GTCC power plant will not operate when the wholesale electricity price is cheap.

We would welcome the opportunity to explain any of these points in a direct meeting, and we would also be prepared to provide further information on the role of battery systems used as operational plant on power networks.



Mitsubishi Corporation  
New Energy & Power Generation Division

23 April 2014

Dear Mr. Okafuji,

Ireland has a European binding target of 16% of its energy across electricity, heat and transport coming from renewable sources by 2020. In the National Renewable Energy Action Plan (NREAP) submitted to the European Commission to show how this target will be met, the electricity system plays the most significant role. There is a target of 40% of all electrical consumption by 2020 to come from renewable sources of energy (RES-E). Given the abundant natural wind resources found in Ireland it is estimated that 37% of this target will come from wind.

After our productive discussions with Mitsubishi Corporation and including EirGrid/SONI, we strongly believe that Japanese innovative technology and services could contribute to resolving such issues and also to the expansion of renewable energy in Ireland with following manner:

1. Ireland is currently studying the further development of an ancillary market to ensure the safe and stable operation of the electricity grid with world-leading renewable energy penetration. We would be happy to keep you updated regarding the progress of the study.
2. Japanese battery energy storage systems (battery, PCS, ancillary control systems) are considered to be one of a number of good technical solutions for such grid problems. The above mentioned ancillary market is being planned to allow market participants, including foreign investors, to join with such innovative technologies. We would appreciate it if Mitsubishi Corporation conducts the feasibility study of ancillary business using battery energy storage systems, and the related demonstration project. Your feasibility project will be incorporated in our study, as conducted by EirGrid/SONI.

*“Fáiltítear roimh comhfhreagras i nGaeilge*

29-31 Bóthar Adelaide,  
Baile Átha Cliath 2.

+353 1 6782000  
LóGhlao 1890 44 99 00 LoCall  
Feaics +353 1 6783 \_\_\_ Fax

29-31 Adelaide Road,  
Dublin 2.



3. These solutions will allow more participants to invest in the renewable energy market in Ireland. It means Ireland will be able to reduce the import of fossil fuels, improve the trade balance as well as reduce CO2 emissions. It could also create new job opportunities.

We understand the Japanese electricity market is undergoing a restructuring process and "unbundling" legislation will be introduced in the future. If Mitsubishi Corporation participates in the Irish ancillary market, we believe the experience gained would be valuable for the impending Japanese market, and the companies could leverage such experience in other European countries such as UK, France, Germany and Italy as well.

Yours Sincerely,

Kenneth Spratt  
Assistant Secretary General,

*"Fáiltítear roimh comhfhreagras i nGaeilge*

Merit of the hybrid battery system :

- ◆ Fast frequency response: Helps low system inertia  
LIB cell can be charged or discharged with maximum 24C (in short duration)
- ◆ Fast response : Support to low voltage ride through
- ◆ Energy efficiency: Charge/Discharge
- ◆ Wide range of services : able to provide the services from POR to Ramping Margin 8
- ◆ Fulfil must run condition and ENTSO-E requirement
- ◆ Environmentally Friendly
- ◆ Easy to add capacity
- ◆ Portable
- ◆ Low maintenance cost
- ◆ Short delivery time (9 months incl. installation)
- ◆ Innovation
- ◆ Contribution to economy and employment