



Submission to AEMC
Demand Response Mechanism
Draft Determination
(ERC0247)

Version 1.0

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Electricity Exchange

Electricity Exchange is a leading provider of Demand Response (DR) technology and services. We are the second largest provider of Demand Response services to the Irish electricity system, itself one of the world's most advanced Demand Response systems. Electricity Exchange has world-leading expertise in DR platform design, high-speed DR hardware and communications systems development, client on-boarding, and DR operations. The company delivers DR to the Irish market from a broad spectrum of participating industries including water treatment and pumping, food processing, biomedical manufacturing, pharmaceutical manufacturing, and heavy industry.

EirGrid, Ireland's TSO, and its DS3 System Services programme is recognised as a global exemplar in the utilisation of advanced system services from DR and other distributed resources to address the challenges of integrating unprecedented levels of non-synchronous renewable energy. Represented by our managing director, Electricity Exchange is a long-term serving member, and only DR member, of EirGrid's DS3 Advisory Council; a panel of industry experts assembled by the TSO to support the development and successful delivery of the programme. Electricity Exchange also represents Ireland's established DR industry on the TSO's Grid Code Review Panel and the Market Operator's (MO's) Trading and Settlement Code Modifications Committee. The company played active roles on these bodies throughout the TSO's introduction of DS3 System Services and the MO's transition to I-SEM, the new electricity market designed to integrate with European electricity markets, which went live in October 2018. This included close engagement with the TSO, MO, and Regulatory Authorities (RAs) on matters including the interpretation and redefinition of regulatory requirements and the definition of technical requirements to maximise the delivery of DR in both the capacity market and DS3 System Services market.

Through our central role in the development of Ireland's DR industry, in addition to our regulatory expertise Electricity Exchange has built a reputation for the design and delivery of refined technologies that maximise the potential of DR resources to address critical power system needs. The company has engaged with Ireland's TSO to develop DR performance monitoring methodologies, demonstrate the provision of <150 millisecond fast frequency response (FFR) by DR, and deliver digitised communications systems aimed towards facilitating the increased utilisation of distributed resources on the electricity system.

Introduction to Submission

Electricity Exchange welcomes the opportunity to make a submission on this draft determination. As a leading provider of demand response technology and services in the Single Electricity Market (SEM) on the Island of Ireland we would like to provide some observations on the draft determination based on our experience in a wholesale demand response programme that is playing a key role in the facilitation of renewable generation in Ireland.

We would like to acknowledge and commend AEMC on the detailed consultative approach that has been taken. The development of a wholesale demand response program in Australia is a positive step that has the potential to improve system reliability and reduce costs for consumers. The potential benefits of active demand response participation in the wholesale market in Australia should not be underestimated. Given the expected closures of some conventional generators it will be important that the demand response mechanism makes active participation in the wholesale market as accessible as possible to a wide range of providers. It has been demonstrated that the right design can facilitate a very wide range of DR types.

Comments on Mechanism

OVERALL STRUCTURE

The Commission's decisions behind the draft wholesale demand response mechanism are clearly mature and have been well informed by a lengthy consultative process. Electricity Exchange's view is that the draft mechanism is underpinned by a number of well-considered key tenets. However, we are concerned that two main elements of the draft mechanism

1. Settlement and cost recovery, and the
2. Baseline Methodology

may undermine the inclusiveness of the resulting programme and the longevity of the programme due to administrative overhead.

SETTLEMENT AND COST RECOVERY

It is the view of Electricity Exchange that a demand response programme in the context of a power system with increasing penetration of renewable energy, particularly from non-synchronous sources, should aim to maximise the provision of services from demand response in a manner that is **predictable, controllable, and reliable**. As such, the provision of active, centrally dispatched DR should be more beneficial to the participating consumer than the provision of passive, price-responsive DR as it supports the deterministic operation of the power system.

This view appears to be shared by the Commission who express concern about the uncertainty of demand forecasts which will be exacerbated by further increases in passive, price-responsive DR resulting from

consumer led actions or by unmonitored retailer DR programmes. While we understand that the proposed settlement and cost recovery mechanism aims to minimise the level of changes that would be required for billing and settlement systems, we believe that it undermines the objective to promote active DR participation and will result in passive DR presenting a more favourable opportunity for prospective participants. While we believe this to be the case with the majority of transaction scenarios that we have considered, it is particularly significant where prospective participants engage in direct spot price pass-through contracts with their retailer. We agree with the views echoed by other stakeholders that the retailers will be incentivised to discourage their customers from engaging in the wholesale demand response mechanism. We also believe that this leads to an unnecessarily complex settlement flow.

Although contrary to stakeholder feedback in response to the proposal of a separate wholesale demand response market, we believe that the socialisation of the cost of the delivered DR among retailers would considerably enhance the level of participation in the mechanism. In contrast to the views expressed by other stakeholders, we believe that this could be implemented in a manner that increases the net benefit to the average consumer. Note that this would result in a divergence between the spot market price for retailers and for generators during instances where DR is scheduled.

For example, in a given spot market interval the system requires 500 MWh. If the marginal unit is a DRSP at \$1000/MWh and it is scheduled to deliver 25 MWh (5% of the total requirement), then:

- The price paid to the scheduled units, including the DSRP is \$1,000/MWh,
- The price charged to retailers, including socialisation of DR costs, is \$1,050/MWh.

This will result in a benefit to the retailers, and ultimately to consumers, provided that the next lowest cost marginal unit's offer is $> \$1,050/\text{MWh}$. This condition can be guaranteed to be met if DRSP offers are adjusted in the price stack to account for the socialisation uplift before being inputted into the market scheduler. In doing so, in the above example, a conventional unit with an offer of \$1,049/MWh, for example, would be scheduled ahead of the DRSP it results in a lower price to the consumer.

We understand that this could be perceived to be a double benefit to the participating DR consumer as they will also benefit from the avoided cost resulting from their demand reduction. However, a portion of the payment will be retained by the DRSP for the provision of their service and the remainder, the amount received by the participant, will serve to allow them to offer DR to the spot market at a price below their true marginal cost, while still receiving a net benefit, which will increase the number of occasions on which they clear in the market and are scheduled to operate. This will help to maximise the return on the investment in the DR program.

As this methodology can be entirely administered by AEMO, it would eliminate the need for retailers to alter their billing and settlement systems and would simplify the proposed settlement flow considerably.

BASELINE METHODOLOGY

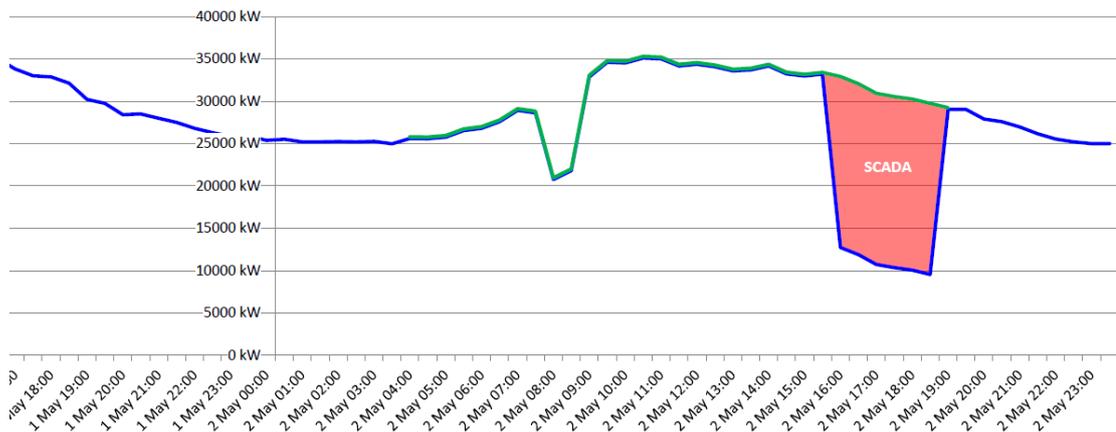
Demand response presents a performance monitoring challenge, which has been clearly identified by the Commission, in that it necessitates the measurement of something that never occurred. The measurement of a void. However, a suitable performance monitoring methodology must aim to facilitate demand response rather than being a barrier to participation as is noted to be the case in the draft wholesale demand response mechanism paper.

The proposed baseline methodology reflects the methodology that was initially used in Ireland when the function of a demand response provider was separated from the function of a supplier unit (retailer) in 2012 with the establishment of the Demand Side Unit (DSU) construct. This was, however, found to be inaccurate, challenging to administer, and punitively biased in practice and was replaced by a validation methodology in 2014. The former method was found to be particularly punitive in the instance of heavy industry who offered considerable DR potential but demonstrated irregular high magnitude demand modulation.

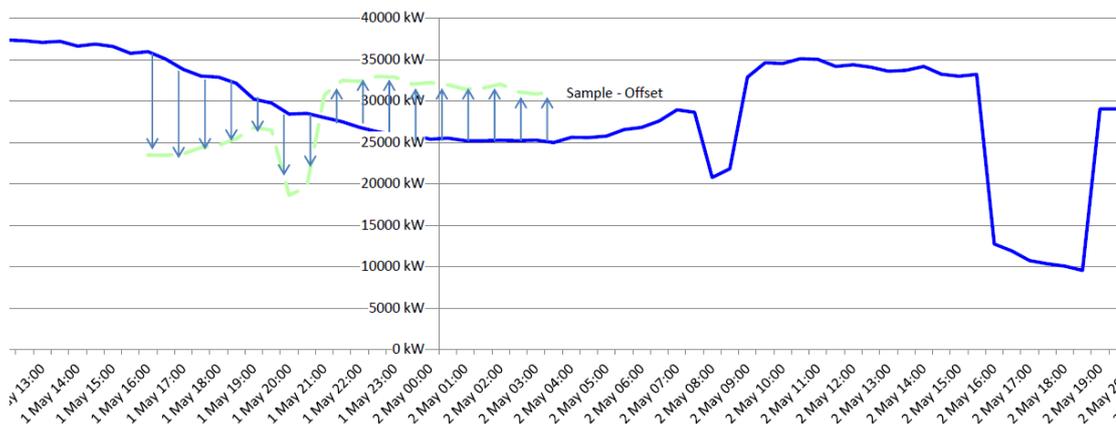
While the Commission has proposed that DRSPs could propose their own baseline methodologies, this will create a significant administrative challenge. As such, Electricity Exchange suggests that the Commission adopts a validation methodology which would allow DSRPs to choose the most appropriate forecasting as they see fit, provided the forecast reflects previously observed behaviour within a specified historical period such as the previous 12 weeks.

The premise of the validation approach is:

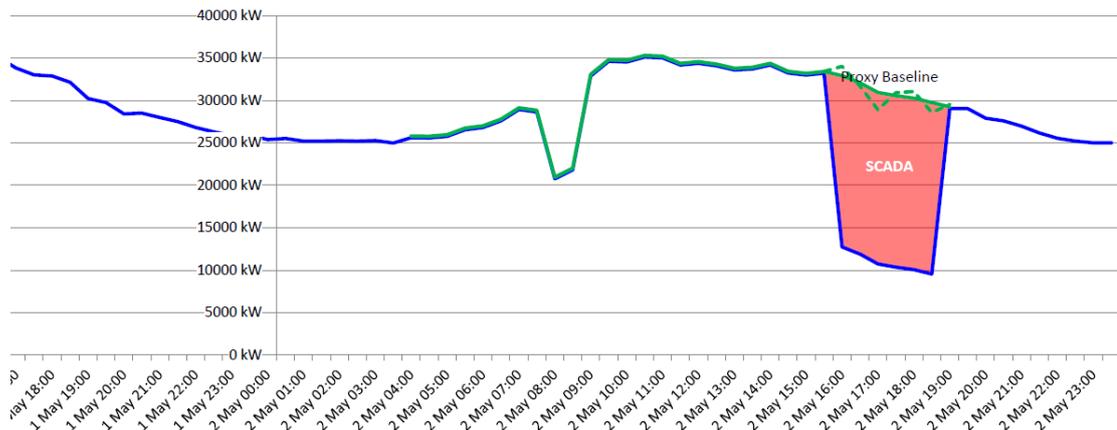
1. When scheduled to deliver response, the DSRP uses data from within the specified historical period to determine the demand benchmark for imminent time horizon. The DSRP reports its response as the benchmark minus the metered demand. The market can then determine the counterfactual demand by adding the reported response to the metered demand.



2. Post-event, the market operator takes a sample of the profile which includes the counterfactual demand and the preceding 12 hours of metered demand and searches the specified historical period for the closest matching proxies.

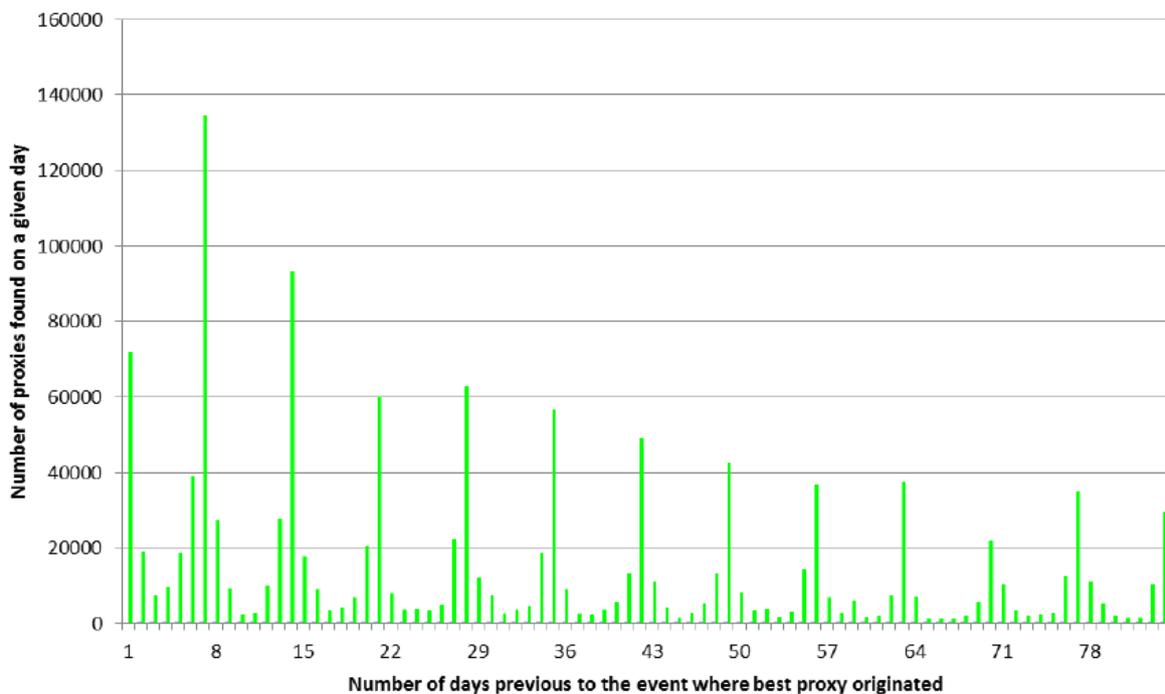


3. A number of the closest matching proxies, four for example, are averaged to produce the proxy baseline which is then used to assess the DRSP's response.



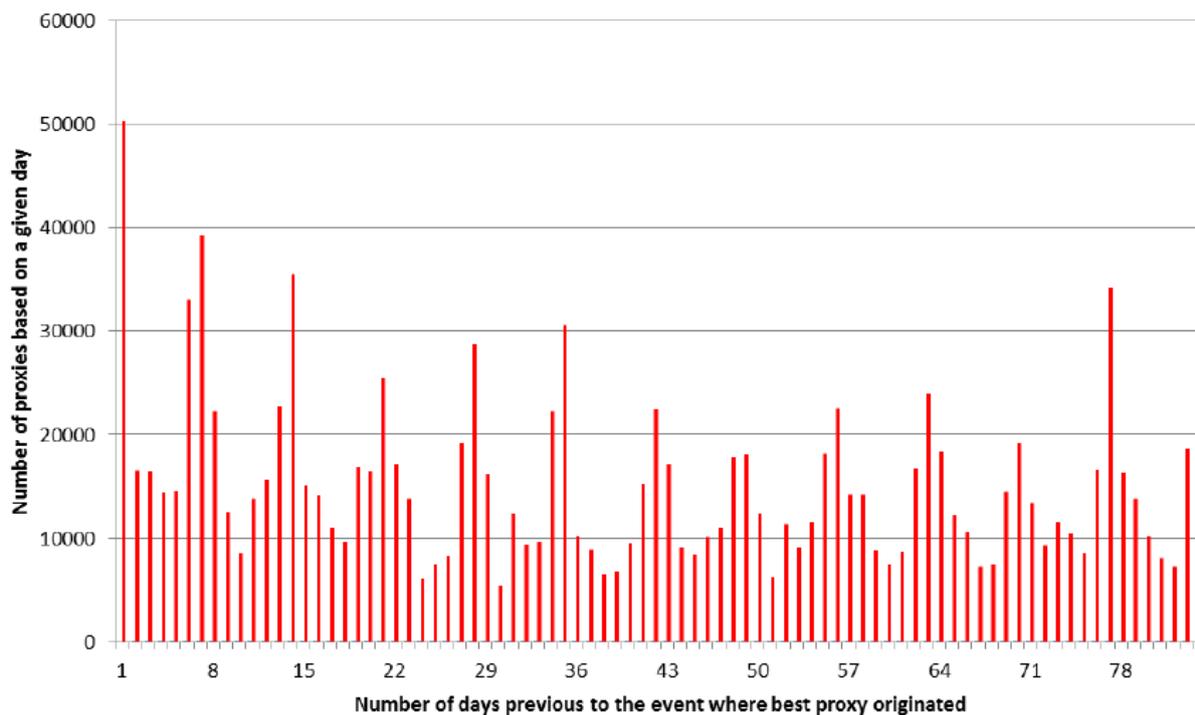
4. Provided the DRSP had used a reasonable baseline methodology based on previously observed behaviour within the specified historical period, it is expected that the market operator's proxy baseline should closely, within a reasonable tolerance, reflect that used by the DSRP and validate the response they had declared. The proxy baseline then replaces the actual metered demand in the historical data set so it can also be referenced going forward. This avoids regular provision of DR resulting in participants historical data being 'data poor' when searching for proxies.

An assessment of reasonably periodic participants highlighting the periods from where the best-found proxies originate indicates that the best proxy is generally, but not always, found at the same time one week prior to the event with diminishing likelihood of finding good proxies at increasing time-distances from the event. This informed the determination of the agreed historical period as 12 weeks.



Heavy industry participants that were deemed to be 'mathematically erratic' demonstrated a wider distribution of where the best proxies were found. These participants would have been incompatible with

the original baseline methodology but the validation methodology made it possible to verify their response.



Choosing a validation methodology rather than a baseline methodology allows DR participation to be more inclusive of a broader range of participants and, in particular, industries that can offer the highest DR volumes. It would also allow DSRPs to determine the best forecasting method that will produce the most plausible counterfactual demand profile. It should be noted, however, that based on our assessments, this methodology is only suitable when DSRPs are expected to be scheduled for a maximum of ~4 hours or less.

Concluding Remarks

The introduction of a wholesale demand response program in Australia is a very positive step. It has been demonstrated in a number of markets that demand response can provide predictable, controllable, and reliable capacity. The ability of demand response to provide fast acting frequency response will also be a major benefit to the Australian power system as intermittent renewable penetration increases.

The draft determination is underpinned by a number of well-considered key tenets, but we do think that two key elements of the draft mechanism would benefit from some additional consideration. As it stands the settlement and cost recovery approach and the baseline methodology may undermine the inclusiveness of the resulting programme and the longevity of the programme due to administrative overhead. Within our submission we have some listed some potential approaches that could be followed that will help to maximise the effectiveness of the program. If you would like any clarifications or additional detail on our submission, we would be more than happy to provide it.

Electricity Exchange looks forward to AEMC's final determination.