DRAI

20 September 2022

Climate Action Plan 2023 Call for Evidence

I am writing on behalf of the Demand Response Association of Ireland (DRAI), the trade association representing Demand Side Unit (DSU) providers in the all-island Single Electricity Market (SEM). By aggregating the otherwise passive electrical loads of individual consumers into substantial load portfolios, our members create predictable, reliable, and controllable assets, which provide a valuable source of Demand Side Flexibility (DSF) that can be actively used by system operators to meet the needs of the power system.

Today, the DRAI represents approximately 700 MW of demand and embedded generation response across hundreds of industrial and commercial customer sites throughout the island of Ireland. These sites are managed by our members each of whom actively participate in the capacity, DS3, and energy markets.

DRAI members are committed to shaping the future of power system flexibility through advancing DSF on the island of Ireland. As Ireland strives to achieve its renewable generation targets for 2030 and beyond, our promise as an industry-led organisation is to champion the development of innovative DSF solutions that are designed to address the system-wide requirement for flexibility.

The DRAI expresses a single voice on policy and regulatory matters of common interest to its members, and we welcome the opportunity to provide feedback on the Climate Action Plan 2023.

On behalf of the DRAI,

[redacted]

Demand Response Association of Ireland

BACKGROUND

What is Demand Response?

Demand response asks power users to change their electricity demand during times of grid stress or congestion, and pays participants for providing this service. Whereas energy efficiency reduces energy use overall, and seeks to make permanent changes to usage, demand response is a temporary action.

It rewards customers who can provide flexibility in terms of "when" and "where" they use electricity, providing a valuable service to the power system in balancing and ensuring adequate capacity margin.

Demand Response effectively turns energy users into "virtual power plants" who are instructed to adjust energy consumption during specific times to relieve stress on the grid. Instead of turning another traditional supply source on or up (such as a power plant), a grid operator can use demand response to predictably adjust electricity demand and maintain a balanced system.

Through the use of enabling technologies, demand response unlocks flexibility in how, when and where customers use electricity, to turn consumption into a tool in operating the power system. Afterall, when balancing the grid, reducing electricity consumption has the same effect as increasing generation, but uses the underlying capability of existing resources without the need for additional infrastructure.

Demand response leverages the latent capability of existing assets to minimise the considerable costs, resource depletion, and carbon emissions associated with building new infrastructure, and retains value in Ireland's economy.

What are the benefits of demand response?

Some key benefits of demand-side flexibility include:

<u>Avoided fossil fuel consumption:</u>

- *Delivery of services from no-load state*

Demand-side flexibility delivers valuable energy and system services from a "no-load" state. This avoids the considerable cost, fuel usage and carbon emissions associated with scheduling conventional fossil-fuelled plant to operate at their minimum stable generation thresholds, where they perform at their lowest thermal efficiency, in order to provide the reserve services needed to support zero carbon generation on the system.

- *Providing power system services in high RES-E scenarios*

Increasing the volume of non-synchronous renewable generation results in a corresponding reduction in the availability of essential grid services (e.g. operating reserve, ramping) on the power system. This is due to the corresponding reduction in volume of conventional generation, which includes inherent characteristics that have traditionally provided these services.

In contrast, the availability of demand-side flexibility remains broadly proportional to the total energy consumption on the power system, matching availability with the time-of-need on the system. It also minimises instances where power system operators would be required to constrain RES-E off or down in order to schedule essential system services from conventional generators.

- *High confidence of delivery of declared availability*

Since demand side units typically contain multiple sites in an aggregated demand-side portfolio, they have an inherent resilience and are not subject to a single point of failure, in comparison to a large generation set. For instance, in the case where one or more individual consumers fail to respond to an event, this will have a comparatively small impact on the delivery of a required volume. In contrast, a failure to synchronise or a forced outage of conventional generation results in a binary outcome, whereby required volumes are either delivered in their entirety or not at all.

Recognising the reliable delivery characteristics of demand units can therefore reduce the system requirement for contingency, in the form of replacement reserve and ramping margin from conventional fossil-fuelled generation.

Contribution to meeting electricity system peak demand

- *Peaking plant capacity*

Ireland's electricity system requires the top 200 MW of peak demand for approximately 8 hours in a typical year[1]. Building an open cycle gas turbine peaking plant to meet this final 200 MW of annual demand would cost in excess of €120M and, with no such generator manufacturer in Ireland, the majority of this value will leave the Irish economy. This is before we consider the availability of fossil fuels to run the plant when needed to provide generation adequacy on the power system.

Demand response leverages the latent capability of existing assets to minimise the considerable costs, fuel usage, and carbon emissions associated with building new infrastructure, and retains value in Ireland's economy.

Resilience to external fuel and equipment dependencies

- *Retention of value in the economy*

A lack of generator and battery manufacturers, and indigenous fossil fuel sources on the island of Ireland results in the majority of energy and services payments leaving the economy in the form of capital expenditure and fuel purchases. Conversely, payments to providers of demand-side flexibility result in a much greater share of electricity market expenditure remaining in the economy; returned to indigenous consumers that actively support the operation of the electricity system.

- *Reduced life-cycle carbon emissions and supply chain dependency for energy assets*

The provision of demand-side flexibility is supplementary to the primary activities of the individual demand sites that provide it. It is provided using equipment and processes that already exist and, as such, the build phase of their life-cycle carbon emissions will have been amortised and are not related to their availability to provide flexibility services.

- *Positive promotion of consumer engagement*

Engagement in providing demand-side flexibility services fosters awareness of the power system and provides participating consumers with a source of revenue that can be further invested in energy efficiency measures. The evolution of the demand response / aggregation business model will enable aggregators to engage increasingly smaller customers, broadening consumer engagement in 'good energy citizenship'.

Demand side flexibility in Ireland

Currently approximately 800MW[2] of demand side flexibility is contracted in forward timeframes in wholesale markets on the island of Ireland. There is considerable opportunity to increase levels of participation among existing electricity customers, as well as through the electrification of heat and transport over the coming decade.

Historically, demand response was an emergency resource designed to prevent blackouts, for instance during winter evening peak, when usage is traditionally highest on the power system. However, demand response has become increasingly sophisticated and can be used to correct short-term imbalances on the grid, adjust output to relieve network congestion or provide power to balance supply and demand from customers. These services are primarily provided by fossil fuel conventional generation and so increasing utilisation of demand response will help to diversity sources of essential grid services, and lessen the dependence on imported fossil fuels.

---

[1] SEM-18-156 https://www.semcommittee.com/publications/sem-18-156-publication-crm-t-4-cy202223-best-new-entrant-decision-paper

[2] See appendix B of DRAI submission to Joint Oireachtas Committee on Environment and Climate Action March 2022

Unlike other technology types, with characteristics that remain static over their lifetimes, demand response is flexible and responsive. Through technology enablement and portfolio management Fully utilising demand response capability on customer sites all around the country, means customer actions can yield system-wide benefits

Commercial and industrial electricity customers are the richest source of demand response in Ireland, but greater incentives are required to stimulate increased participation by this evermore Environmental, Social, and Governance focused sector, including carbon credits to recognise the positive impact their local actions have on our national decarbonisation objectives.

The electrification of transport and heat will present new opportunities for demand response in the residential sector in the coming decade; opportunities to not only mitigate their impact on the local distribution systems on which they reside, but to support the broader operation of Ireland's electricity system.

CONSULTATION RESPONSE

The following outlines the DRAI response to key areas in the Call for Evidence.

Cross Cutting

Are there any significant cross-cutting gaps not previously discussed in Climate Action Plan 21 that need to be addressed?

Are there any other cross-cutting issues that should be considered in the development of the 2023 Climate Action Pan?

Demand response and demand side flexibility combine electricity user capability, including behind the meter assets, and the market and regulatory mechanisms to meet power system needs. A more holistic approach to policy, particularly where Large Energy Users are concerned, is required so that the full benefits of flexibility can be incentivised and harnessed in meeting Ireland's decarbonisation aims. Our responses below highlight where this more cohesive approach is required.

Actions impacting demand response in the Climate Action Plan, have a broad range of owners and stakeholders, among them – DECC, DETE, the CRU, EirGrid, ESB Networks and SEAI. It is vital that these parties carry out broad stakeholder engagement in relation to the actions they are delivering, including seeking input from demand response aggregators, in order to develop effective measures. To date, Ireland had taken a least effort approach to integrating customer flexibility through demand response into our energy markets, and how we operate the power system. It is important that future policies and actions under the Climate Action Plan are cohesive and provide the best means of exploiting demand response to deliver our decarbonisation objectives.

Electricity

What options are available to increase the penetration of renewable electricity beyond the up to 80% committed to in Climate Action Plan 2023?

What other opportunities exist to support the decarbonisation of the electricity sector?

What role do you see for electricity storage and demand-side response in providing flexibility to a system comprised of high renewable penetration and in supporting the decarbonisation of the electricity sector?

As well as connecting and generating power from more renewable sources of energy such as wind and solar, the power system will see major challenges in minimising constraint and curtailment, managing network congestion, and running a secure system with adequate levels of frequency response, reserve

and ramping services. Demand response is a proven resource that can meet these needs and a key provider of such services while operating a power system with high levels of renewable penetration.

Recent studies and publications, both in Ireland and at a European level, highlight the need for demand response to meet decarbonisation targets to 2030 and beyond. These take account to the challenges of meeting higher levels of renewable energy penetration, the need for low and zero carbon sources of system services, and the need to ensure security of supply while meeting these objectives.

EirGrid's 'Potential Solutions for Mitigating Technical Challenges Arising from High RES-E Penetration on the Island of Ireland[3]' study highlights that:

> *"Renewables and non-conventional technologies are well positioned to offer a range of system services capability needed for mitigating relevant technical scarcities. This is critical as these mitigation options will be available during hours of high renewable generation when the scarcities are typically more severe due to the displacement of traditional service providers such as conventional synchronous units".*

And that "DSUs in Ireland and Northern Ireland are typically large commercial and industrial-scale demand sites that are already proven to be able to provide several system services, e.g., FFR through to TOR2, Replacement Reserve and all three ramping services"

The EUSysFlex Project[4] 2017-2022 sought to identify issues and solutions associated with integrating large-scale renewable energy and create a plan to provide practical assistance to power system operators across Europe. This aim was to facilitate the large-scale integration of renewable energy. Outcomes were published in February 2022 and in relation to demand response and flexibility the view was that;

> *"With the right mix of technologies in generation and storage in addition to new flexibilities in the demand side and networks, we will tackle the challenges arising in the European Power System as we transition towards 2030 energy targets and beyond to net-zero."*

In November 2021, the EU Agency for the Cooperation of Energy Regulators (ACER) received a proposal from the European Network of Transmission System Operators for Electricity (ENTSO-E) for the first pan-European resource adequacy assessment (ERAA 2021). The purpose of the assessment is to monitor the risks to Europe's security of electricity supply and identify adequacy concerns. In their February 2022 decision ACER noted the following in relation to Demand Side Response (DSR):

> *"DSR, currently largely untapped, is widely recognised as a significant resource to meet future system needs, including for securing supplies."*
>
> *"promoting DSR lies within the key objectives of the Electricity Regulation and market rules must promote its development"*

It is clear that demand and response and flexibility will be key enablers of renewable electricity generation and running a stable and secure power system with high levels of renewables. The recent Wind Energy Ireland Report[5] - 'Bridging the Gap - Towards a zero-carbon power grid' calls out the need for demand response to help meet the needs of the future power system and to help manage the challenges of oversupply, curtailment, and constraint:

> *"Achieving a carbon budget of 66 million tonnes of CO2 in the power sector requires the build of onshore wind and solar PV capacity as early in the decade as possible and proactive investment in enabling technologies, including:*
>
> *- Sources of system flexibility to manage renewable oversupply, such as interconnection, demand-side response, and energy storage technologies"*

---

[3] https://www.eirgridgroup.com/site-files/library/EirGrid/Technical-Assessment-of-2030-Study-Outcomes.pdf
[4] https://eu-sysflex.com/the-outcomes-of-the-eu-sysflex-project/
[5] https://windenergyireland.com/images/files/bridging-the-gap-a4-report-final.pdf

In the short term, Ireland needs to remove barriers to participation in current electricity markets and system operation practices. We need regulatory authorities and system and market operators to:

- Deliver market rules and code modifications for the current markets and system operation to lift barriers to demand response participation,
- Address, as a matter of urgency, market deficiencies acknowledged in the SEM Committee Forward Work Programme[6]; specifically Project 23 - Energy Payments for DSUs, and Project 34 - Review of applicability of RO difference charges to available units,
- Implement improved messaging and communications to electricity users (particularly LEUs and those in the Industrial and Commercial user groups) to highlight the benefits of providing services to the power system via demand response and aggregation.

In the medium term, Ireland must fully utilise demand response capability to meet energy needs and deliver the items within the Climate Action Plan 2021 – Annex of Actions relating to demand response and flexibility. This should include activity to:

- Publish Ireland's Demand Side Strategy (Action 100), at the time of this response, no engagement has taken place on this action which was due for delivery in Q3 2022. Ireland has not had a demand side strategy since the 'Demand Side Vision for 2020[7]' was published in 2011
- Introduce a form of carbon credit for Large Energy Users (LEUs) that provide demand response and flexibility, encouraging and recognising participation in services that provide a benefit to the power system (see also response to next section of this Call for Evidence)
- Ensure technology inclusive future market design – for system services, flexibility markets, energy and capacity, rather than current structures which are wedded to conventional sources of electricity generation, and
- Incentivise demand participation via effective network tariff design and network connection agreement conditions. Recent attempts to introduce new network tariffs[8] have been poorly designed and represent a disincentive to market participation for LEUs. It is vital that future measures are cohesive and cognisant of demand side participation.

National policy, regulation and system operation remain wedded to mimicking the model of traditional power generation, but need to move from the paradigm of "how we have always done things" to thinking about how energy customers can become part of the solution.

Enterprise

What other opportunities exist to drive the decarbonisation of the enterprise sector?

Are the measures that can be taken to assist businesses sustain the additional operating costs associated with moving to new, low-carbon technology

The current Climate Action Plan 2021 Action 99 around Large Energy Users is welcome, and has the potential to deliver excellent decarbonisation benefits, however the delivery of the sub-actions has been apportioned among multiple agencies and has entirely missed the opportunity to include demand response and flexibility as part of enterprise actions to decarbonise.

Energy customers, particularly those in industry with high energy usage, can play an active role in managing security of supply, decarbonisation of the power system and supporting renewable generation through providing demand response and flexibility. After energy efficiency initiatives, the next opportunity is to provide power system services, as described above, which help to further facilitate renewable electricity generation and provide much-needed services to the power system.

---

[6] https://www.semcommittee.com/news-centre/forward-work-programme-october-2021-september-2022
[7] https://www.semcommittee.com/news-centre/demand-side-vision-2020
[8] DRAI Response to CRU 202281

Currently, large users who participate in demand side units, receive limited remuneration due to deficient market design and incentive structures, and there is no form of recognition for the decarbonisation benefits they provide.

Introducing a form of carbon credit for LEUs that provide demand response and flexibility, and encouraging and recognising their participation in services that provide a benefit to the power system would be hugely beneficial for all parties and provide the correct signals to LEUs.

In addition to harnessing this flexibility from demand side participation, there are additional benefits. Ireland's electricity system requires the top 200 MW of peak demand for approximately 8 hours in a typical year. Building an open cycle gas turbine peaking plant to meet this final 200 MW of annual demand would cost in excess of €120M[9] and, with no such generator manufacturer in Ireland, the majority of this value will leave the Irish economy.

Furthermore, according to NREL data[10], the construction alone of such a plant would result in the order of 100,000 tons of GHG emissions. This is significant in the lifecycle carbon emissions of a peaking plant that will only operate for a few hours per year and is often overlooked when considering the carbon intensity of our electricity supply.

Demand response can leverage the latent capability of existing assets to minimise the considerable costs, resource depletion, and carbon emissions associated with building new infrastructure, and retains value in Ireland's economy.

Commercial and industrial electricity customers continue to be the richest source of demand response in Ireland, but greater incentives are required to stimulate increased participation by this evermore ESG focused sector, including energy payments and carbon credits to recognise the positive impact their local actions have on our national decarbonisation objectives.

---

[9] Cost of New Entrant Peaking Plant and Combined Cycle Plant in I-SEM. Poyry 2018

[10] Life Cycle Assessment of a Natural Gas Combined Combined-Cycle Power Generation System, National Renewable Energy Laboratory (NREL) 2020