Renewable Energy Ireland

REI Submission to EirGrid's Shaping our Electricity Future Consultation

1. Introduction

Renewable Energy Ireland was established in January 2019 as an open partnership of sustainable energy associations working collectively to support the energy transition in Ireland.

Our members are the Demand Response Aggregators of Ireland, Energy Storage Ireland, the Geothermal Association of Ireland, the Heat Pump Association, the Irish Bioenergy Association, the Irish District Energy Association, the Irish Solar Energy Association, the Irish Wind Farmers Association, the Marine Renewables Industry Association, NOW Ireland and Wind Energy Ireland.

We are grateful for the opportunity to make a submission to EirGrid's Shaping our Electricity Future Consultation.

2. Executive Summary

1. Given the scale of Ireland's climate action ambition and the current trajectory to target, EirGrid should consider setting a target for operating the system with zero-carbon system services by 2030 and to commit to producing a roadmap setting out how this will be accomplished by the end of 2022. In tandem, EirGrid should also start to publish CO_2 emissions from fossil-fuel based system services which are currently not being measured.
2. In planning the future grid, EirGrid will need to accommodate more grid development than the 40-50 project limit suggested in the Shaping our Electricity Future consultation.
3. To deliver a net-zero energy system by 2050 and a net-zero carbon power system by 2035 it is essential that EirGrid's deliberations and planning for Ireland's future grid incorporates today the requirements not just for Ireland's 2030 targets by beyond that with a longer term view to 2050. Failure to do this could see renewable deployment in the 2030-2050 period undermined.
4. We recognise that the integration of increasingly larger volumes of non-synchronous, variable renewable energy sources together with the shift towards a 'two-way' system where generation is increasingly distributed and embedded deep into the network and consumers are more active participants, will fundamentally require a dramatic improvement in flexibility across the grid in order to ensure that consumers continue to receive a safe and reliable power service.
5. It is essential that EirGrid prioritises flexibility programmes with sufficient resources to enable the development of flexibility across the existing grid.
6. While the cost of grid development must be a factor in making the right choice, we would encourage EirGrid to re-frame grid development as an investment leading to savings delivered to consumers through reduced renewable electricity prices.

3. Scale of the Challenge

The scale of the challenge facing Irish society is neatly set out in the graph in Figure 1, recently published by Professor Brian Ó Gallachóir, Director of MaREI and Professor of Energy Engineering at UCC, which shows that the trajectory of our fall in greenhouse gas emissions is not nearly sufficiently steep to achieve the aim of a climate-neutral Ireland by 2050.

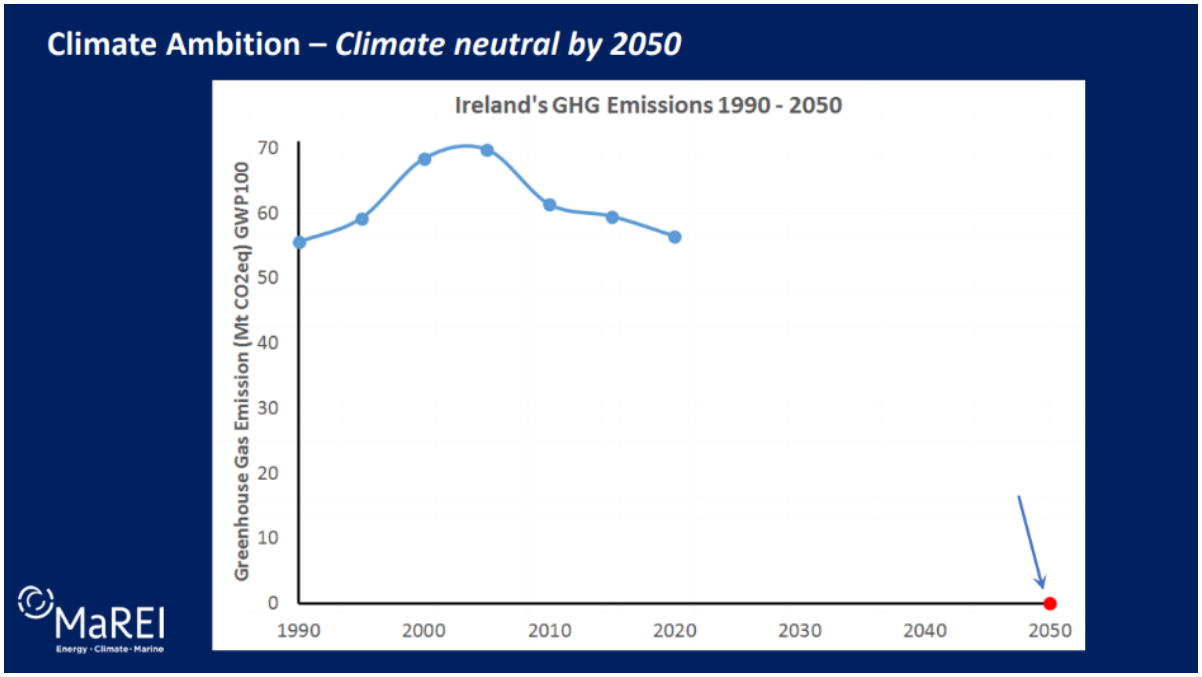


Figure 1: Where Ireland needs to get to by 2050

This trajectory underscores the need to act with urgency in the first half of this decade to implementation of our policy objectives. We refuse to accept the possibility of failure. We believe Ireland can be a climate change success story. The development of renewable energy will not only decarbonise our society but will drive our economic recovery and ensure a just transition for employees, communities and businesses.

Over the next ten years we must accelerate the development of renewable energy and invest resources in developing technologies that have yet to be deployed at scale in this country.

Renewable energy provided 43 per cent of our electricity last year and, while we must celebrate this success, we must also be conscious that no one renewable technology can do it all. A suite of renewable energy sources and new technologies will be needed and must work together to decarbonise Ireland.

Our shared vision is that by 2050 Ireland will be energy independent through using indigenous, clean, carbon-free renewable energy supported by, and supporting, communities across our country.

It is a vision we are determined to make a reality and we believe the development of the electricity grid will be the key enabler to drive forward the changes we need at every level of Irish society to achieve this.

4. Achieving our Climate Action and Low Carbon Ambitions

The following section sets out our combined response to **Questions 1-5** in the consultation.

We are world-leader in the integration of renewables on our power system and in 2020 renewables provided 43 per cent of our electricity supply. Continuing to decarbonise the electricity sector over the next decade will be essential to delivering the 51 per cent emissions reduction target set out in the Climate Action and Low Carbon Development (Amendment) Bill 2021.

As a result, we fully endorse Wind Energy Ireland's evidence to the Shaping our Electricity Future consultation relating to Baringa's 'Pathway to a zero-carbon power system in Ireland' study which is submitted as an accompanying appendix to Wind Energy Ireland's response.

The analysis shows that the emissions footprint of the electricity sector in Ireland can be reduced substantially beyond the 4 - 5 Mt of CO_2 objective of the Climate Action Plan 2019 by 2030, and it concludes that:

1. Government should **maintain the Climate Action Plan 2019 and Programme for Government renewable capacity targets** for onshore wind (8.2 GW) and offshore wind (5 GW) for 2030, along with 5 GW of solar PV.

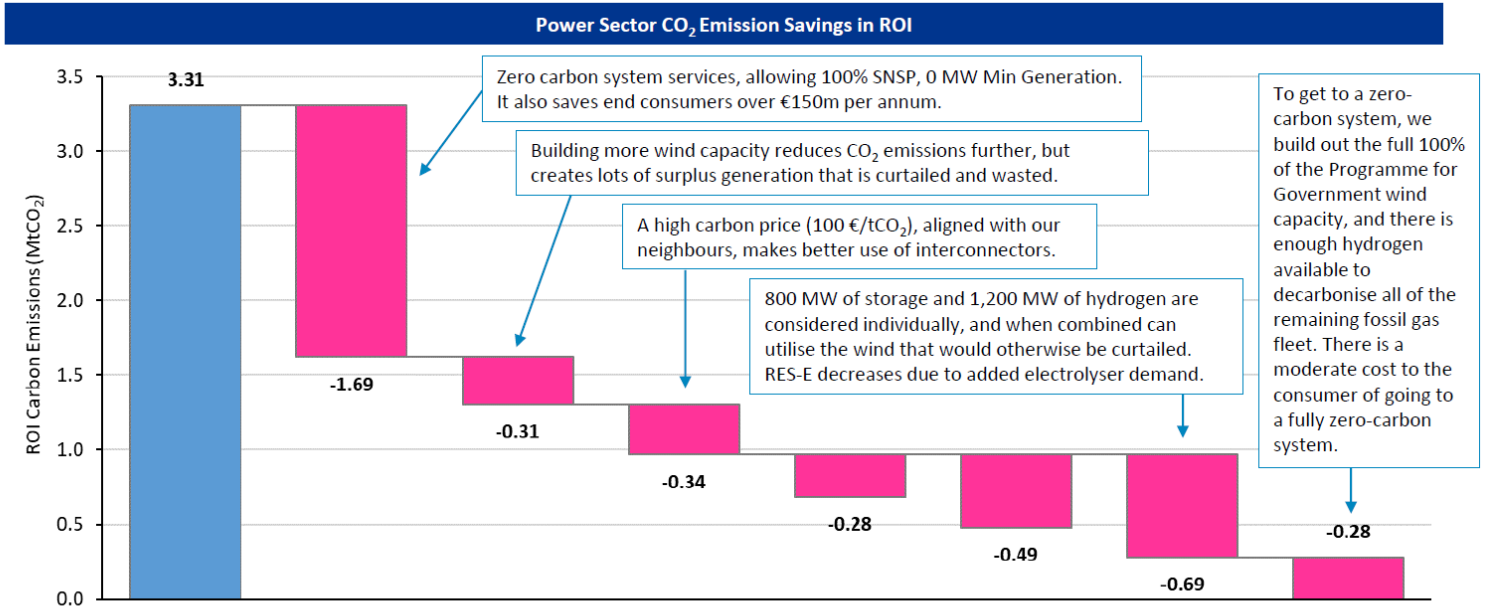
2. An **emissions target of less than 2 million tonnes of CO_2**:
    - Is very achievable by 2030;
    - Does not require a significant change in the approach currently underway for to achieve 70% renewable electricity;
    - Can be met by implementing more of existing technologies that are proven today; and
    - Can be achieved at a lower cost to the end consumer (saving approx. €150m per annum).

3. A **stretch target of a zero-carbon power system by 2030 is possible**:
    - It requires incremental investments in a suite of new technologies; and
    - It requires the introduction of a carbon price floor in I-SEM.

A summary of the findings of the analysis that shows the steps in reducing emissions beyond the 70by30 base case is shown in Figure 2 below.

Baringa's Pathway to a Zero-Carbon Power System

We demonstrate a path to zero carbon in the Irish electricity sector using known technologies, keeping the lights on and at minimal cost to consumers



	70 by 30 (3.3 $MtCO_2$)	Less than 2 $MtCO_2$	80% of PfG Capacities	Same CO_2 price as non-ETS	Long-Duration Storage	Green Hydrogen	Storage & Hydrogen	Zero Carbon (100% of PfG)
RES-E	70%	85%	94%	94%	97%	89%	90%	101%
PfG Capacity	50%	67%	80%	80%	80%	80%	80%	100%
Residual CO_2	3.31 Mt	1.62 Mt	1.31 Mt	0.97 Mt	0.68 Mt	0.48 Mt	0.28 Mt	0 Mt

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Figure 2: Summary of Pathway to a Zero-Carbon Power System in Ireland Emissions Savings

The results show that achieving less than 2 million tonnes of CO_2 in the electricity sector will not require a significant change in the approach currently underway for 70by30. It is primarily "more of the same". Industry is developing a sufficient pipeline, the interconnection required is in development and the DS3+ programme is already planned (although the objectives of the DS3 programme needs to be updated to include the complete removal of system operational constraints i.e., EirGrid's 95% SNSP target needs to increase to 100% SNSP and the system should be capable of operating with no minimum conventional generation requirements).

The most significant change is that EirGrid will need to accommodate more grid development than the 40-50 project limit suggested in the Shaping our Electricity Future consultation.

We believe the key target for the power sector for 2030 should be to reduce CO_2 emissions to less than 2 million tonnes by 2030 rather than focusing on a specific RES-E target. We believe the final SOEF Roadmap should focus on delivering the capacity targets in the Climate Action Plan and Programme for Government (8.2 GW of onshore wind and 5 GW of offshore wind by 2030, with an updated target of 5 GW of solar PV generation) rather than just achieving 70% RES-E by 2030.

Network development needs to allow these targets to be delivered and the focus should not be on delivering the minimum for 2030 as this a point in terms of the ultimate net-zero 2050 target.

The International Energy Agency recently produced a '*Net Zero by 2050 - A Roadmap for the Global Energy Sector*' report and it calls for all 'advanced economies' to have a net-zero carbon power system by at least 2035[1]. The Baringa analysis shown in Figure 2 shows the renewable capacities proposed can achieve this and we must design the power system to meet these.

These renewable capacities will be needed for further decarbonisation and the grid should be planned to achieve these capacity targets through a blended approach that delivers all the reinforcements credible within the 2030 timeframe and begins design and development of post 2030 projects in parallel as these will likely be needed in the longer run. By taking these steps Ireland can achieve substantial emissions savings in the electricity sector at a net benefit to consumers by 2030.

We therefore fully support maximising the use of the existing grid and development of new grid infrastructure to deliver on these goals.

We recognise that the integration of increasingly larger volumes of non-synchronous, variable renewable energy sources together with the shift towards a 'two-way' system where consumers become increasingly more active in the market and generation is increasingly distributed and embedded deep into the network, will fundamentally require a dramatic improvement in flexibility across the grid in order to ensure that consumers continue to receive a safe and reliable power service.

The TSO should prioritise flexibility programmes and resource them appropriately, to enable the development of flexibility across the existing grid.

Furthermore, we recommend the policy recommendations relating to grid development contained in the '70by30 Implementation Plan', also published by Wind Energy Ireland should be incorporated into the final Shaping our Electricity Future publication later this year.[2]

[1] https://iea.blob.core.windows.net/assets/4719e321-6d3d-41a2-bd6b-461ad2f850a8/NetZeroby2050-ARoadmapfortheGlobalEnergySector.pdf

[2] https://windenergyireland.com/images/files/70by30-implementation-plan-reports.pdf

Finally, we would note that the single greatest challenge Ireland faces in achieving the goals which will be set out in the next Climate Action Plan is the strength of our electricity grid.

Last year more than 10% of renewable generation was lost because the grid could not accommodate it. There was enough renewable energy lost last year to power all of Galway City, Limerick City and Sligo town for a year.

We need a complete redesign and reinforcement of the transmission system to deliver the renewable capacities outlined in the Programme for Government, with a focus on parts of the country where large volumes of renewable energy will be developed.

Our fossil fuel back-up generation must be replaced with zero-carbon solutions like energy storage and demand response that will enable an electricity system capable of operating with 100 per cent of demand being met by renewables at any one time.

We must also reform the electricity market. An electricity system where most of our power comes from renewable energy will require a very different approach to trading if we are to ensure best value for the consumer.

5. Power System Assumptions

The following section sets out our combined response to **Questions 6-9** in the consultation.

One area we consider that assumptions could be improved upon is in relation to demand responsive technologies, specifically in the industrial and commercial (I&C) sector should also have been included.

Whilst we recognise that active market participation from the residential sector is expected to be significant by 2030, we also argue that engagement from this sector is likely to follow-on from I&C sector participation. In our view the focus, at least in the medium term, needs to be on encouraging active market participation from the I&C sector, for example through modifying grid codes, developing system operations and improving market interfaces, before roll-out of equivalent demand response initiatives to residential customers can begin.

For this reason we consider more attention needs be given to the potential for large scale demand assets, and other behind the meter technologies such as storage, to provide the necessary flexibility services and system integration required to facilitate delivery of the renewables target. In our view the capability of demand side units is underestimated in the Shaping our Electricity Future consultation.

The TES analysis also appears to be underestimating the levels of battery storage considering there is already between 600 – 700 MW of storage connected or planning to connect in the coming 12 months. To date the energy storage industry has been mainly focused on fast acting reserve services as their primary revenue stream. But with the policy landscape increasingly focusing on the need for system adequacy and the need to alleviate network constraints in congested areas of the grid it is likely that technologies such as energy storage will play a greater role in other markets such as capacity, energy and congestion (when this service is defined). There will also be a shift towards longer-duration storage projects. We believe the final roadmap should reflect the levels of storage already connected or soon to connect on the system and the capacities assumed for longer-duration storage should be increased.

As outlined in section 4, we also have a significant concern that none of the scenarios proposed deliver the renewable capacity targets identified in the Programme for Government and Climate Action Plan 2019.

We also note that no analysis has been carried out on the post-2030 power system and how the 2030 system is a point on a roadmap to deliver a net-zero emissions power system, our ultimate end goal.

6. Transmission Network

The following section sets out our combined response to **Questions 11-16** in the consultation.

More ambition

EirGrid must focus on the capacity targets in the Climate Action Plan and the Programme for Government (8.2 GW of onshore wind and 5 GW of offshore wind by 2030, and an updated target of 5GW of solar by 2030) rather than just achieving 70 per cent RES-E by 2030. Network development needs to allow these targets to be delivered.

The focus should not be limited to delivering de minimis for 2030, which is a milestone on the road in terms of the net-zero 2050 target. The aforementioned capacities will be needed for further decarbonisation and the grid should be planned to achieve these capacity targets.

Consideration also needs to be given to the locations where this generation will connect. It is evident that offshore generation is only considered off the East coast in the SOEF consultation, and projects across the South and West coast are likely also to be required to hit the 5 GW target by 2030. Consideration should be given to how the transmission network can deliver the 5 GW capacity target, and how the network can evolve to take advantage of the export opportunity for offshore wind post-2030.

Recommendation: Urge EirGrid to make the right choices not just for our 2030 targets but for our long-term goal of a net-zero energy system by 2050, and a net-zero carbon power system by at least 2035.

Invest in grid development

The consultation document only assesses the cost of grid development across all four scenarios, while the cost of renewable energy if the grid is not strengthened is not presented for consideration.
The cost of this would be several times more expensive over the 15-year term of the Government's RESS support scheme.

The more we invest in grid development, the stronger we make our transmission system. And the stronger the transmission system, the less power we lose every year and the lower the cost of renewable electricity through more competitive prices in RESS auctions. Currently lost power – known as dispatch down – is responsible for approximately 10%of the cost of renewable energy in Ireland.

Recommendation: While the cost of grid development must be a factor in making the right choice, EirGrid should re-frame grid development as an investment leading to great savings delivered to consumers through reduced renewable electricity prices.

Social acceptance

All of us must work together to ensure communities are empowered to be part of our energy transition and to find ways to adapt, where possible, to meet their concerns.

The reality is we will not decarbonise our electricity system without new overhead lines, underground cables, substations, battery projects, wind farms and solar farms. All leaders in Irish society must speak with one voice to articulate this.

This may also require greater flexibility to examine all of the options for developing a project that would help ensure social acceptance. While some projects, like the North-South Interconnector, must be delivered through an overhead line and no credible case to the contrary has ever been made, others could be delivered underground and – where this is technically possible – should be considered as a favoured option.

Recommendation: Projects must be delivered in a way that supports the security of our electricity system. Where possible, and where it would not pose a risk to our secure electricity supply, underground options should be actively promoted where it can assist with social acceptance.

7. System Operations

The following section sets out our combined response to **Questions 17-22** in the consultation.

Zero-carbon system services

By 2030 the electricity system must be able to rely on zero-carbon system services. Currently, EirGrid relies on fossil fuel based generators to ensure the safe and secure operation of the electricity system.

Analysis referenced earlier in the response, prepared by energy consultancy Baringa, shows that procuring system services from zero-carbon providers could reduce Ireland's power sector emissions by almost 2 million tonnes of CO_2per year by 2030. This is equivalent to one half of total 2030 power sector emissions that could be avoided by transitioning to a Zero-Carbon Model.

There are significant cost savings to consumers associated with sourcing all system services from zero-carbon sources, with up to €150m per year of savings by 2030, primarily from avoided fuel and carbon costs.

Recommendation: Given the scale of ambition and the trajectory to target, EirGrid should consider setting a target for operating the system with zero-carbon system services by 2030 and to commit to producing a roadmap setting out how this will be accomplished by the end of 2022. EirGrid should also start to publish CO_2 emissions from fossil-fuel based system services which are currently not being measured.

Measuring emissions from re-dispatch actions

EirGrid need to start measuring and reporting on energy market and non-energy market (non-energy action) emissions and the cost of the constrained run. The TSO often position units away from the energy market schedule in order to meet system service requirements or due to network constraints. These are known as non-energy actions. The recommendation is for the TSO to model electricity system CO_2 emissions to compare energy market emissions and actual electricity generation emissions to calculate the non-energy market emissions contribution. Or in other words, the emissions solely related to actions that are required to ensure the electricity system remains stable.

As new low carbon system service and other flexible technologies come on the system it will be important to track and measure how these are being utilised and their impact on power sector emissions. Right now, this is not being measured and so it cannot be managed.

Demand Response and System Flexibility considerations

We would like to highlight the proficiency of large-scale demand assets such as DSUs, together with energy storage, in providing frequency stability and addressing issues such as congestion and resource adequacy. We also consider that in the categorisation of technical challenges, the emphasis should be on 'Resource Adequacy' rather than 'Generation Adequacy'.

We believe that the grid code and other market codes will require considerable reform in order to accommodate the levels of change required to meet targets and integrate new technologies into the system operation. It is vital that EirGrid are resourced effectively to do so.

Since the ability of all market participants to engage with the market to provide the necessary resources and services will largely be determined by the effectiveness of the system operations, we strongly believe that front loading the evolution of operational policy will deliver substantial benefit in the long term. In our view, it is imperative that investment is made in system operations as soon as possible, to ensure that they are upgraded and fit-for-purpose to facilitate optimised interaction with market participants in the early in the decade. Indeed, failure to invest in the early stages could be expected to place delivery of the renewables target by 2030 in jeopardy.

Specifically, from a demand side perspective, we anticipate that there will be a requirement for large scale aggregation of many thousands of consumer sites with increasingly small loads into flexible portfolios (DSUs). Aggregation at this scale can only be facilitated if there is sufficient control over these small-scale customer loads; it is dependent upon the availability of high-quality system operations.

General System Operations Feedback

We support the overarching structure and proposed approach for the development of operational pathways to 2030. We agree with the 4 pillars and emphasise the need for appropriate resources to be allocated to the programme from the outset to ensure the timely achievement of milestones throughout the processes.

From an industry perspective, we emphasise the need for engagement with industry throughout the development of the pathways as we firmly believe that it is only through working together that we will develop appropriate operational standards and commercial frameworks, design effective market interfaces and remove the necessary technical barriers hindering market participation. We also stress the need for TSO-DSO coordination in the overall development of the operational pathways.

In addition, clear, regular and early communication on new initiatives throughout the programme will ensure market participants are informed and a robust roadmap to support delivery will provide clarity and certainty to encourage investment in the market. Finally, we suggest that where possible efforts should be made to streamline administration procedures. Many market participants are relatively small players with limited resources and cumbersome, complex administrative procedures can comprise their ability to interact with the market.

8. Electricity Markets

The following section sets out our combined response to **Questions 23-29** in the consultation.

Electricity market evolution for renewables

An electricity market designed for fossil fuel generators is not suitable for a future where most of our electricity comes from wind and solar. We must reform the market to ensure the new system we are building is efficient and cost-effective.

In the current Single Electricity Market renewables like wind and solar are not allowed to actively participate.

In addition, the costs of dispatch down – when wind or solar farms are forced to turn down or off because the grid is unable to handle the amount of electricity they are producing – is fully imposed on the generators rather than TSO, who is arguably best placed to identify the solutions to minimise dispatch down.

This contravenes Article 13 of the Electricity Regulation of the Clean Energy Package, pushes up the price of renewable electricity at auction and means the true cost of dispatch down is hidden from the electricity consumer.

Recommendation: We request that EirGrid supports the full implementation of Articles 12 and 13 of the Clean Energy Package and commit to initiating a process to redesign the electricity market – involving all stakeholders including consumers – before the end of 2022.

Electricity market evolution for demand side technologies

Demand side technologies offer a cost-effective means of delivering demand flexibility that can be readily deployed to ensure optimal integration of renewable generation; however, several systemic issues still need to be addressed to allow achievement of these benefits to be realised.

We believe the electricity market systems need to evolve to fully integrate demand side technologies and effective signals need to be created in the form of payment categories or revenue streams for energy, capacity, and system services. REI fully support the adoption of a holistic approach in incentivising timely and affordable investments via markets. We consider that it is only through effective design and implementation of appropriate, congruent signals across all markets that industry will be provided with the certainty needed to encourage investment to deliver system requirements.

We consider that there needs to be a fundamental shift in thinking – away from the view of DSUs as a support to conventional plant towards DSUs providing a service to the system.

Electricity market evolution for energy storage

We agree that a holistic review of the energy, capacity and system services markets is needed to incentivise investment in new capability to support our renewable targets and better integrate new technologies such as energy storage. The market design to date has been primarily built around conventional fossil fuel generators but this must change if we are to design a system fit for 2030 and beyond.

There are currently several known technical limitations in the market interfaces that prevent the full and effective operation of energy storage units. This significantly impacts the ability of storage projects to operate efficiently and provide their full range of services and benefits.

It is imperative that these solutions are progressed as quickly as possible to allow the most effective use of batteries on the system and prevent the risk of stranded assets. It is important that a roadmap is set out to remove these barriers in order to provide clarity and certainty to industry.

ENDS