WIND ENERGY IRELAND

Wind Energy Ireland submission to the Climate Action Plan 2024 Call for Expert Evidence

14 July 2023

Contact: niall.goodwin@windenergyireland.com

windenergyireland.com

Table of Contents

Introduction

Wind Energy Ireland (WEI) would like to thank the Department of the Environment, Climate and Communications for the opportunity to provide a submission to the 2024 Climate Action Plan Call for Expert Evidence. Wind Energy Ireland is Ireland's largest renewable energy organisation with 200 members who have come together to plan, build, operate and support the development of Ireland's onshore and offshore wind generation.

We work to promote wind energy as an essential, economical, and environmentally friendly part of the country's low-carbon energy future. As a leader in Ireland's fight against climate change, wind energy creates jobs, invests in communities, and reduces CO2 emissions.

Executive Summary

Ireland's electricity sector has an enormous challenge this decade to decarbonise at an unprecedented scale and speed. The power sector has been set a budget of 60 million tonnes of CO2/eq for the period 2021-2030. That the sector currently emits between 9-11 million tonnes per year shows the challenge that lies ahead.

WEI believes that achieving this target is possible; the pipeline of renewable projects and the technology is there, however ambitious, urgent, and concerted policy actions are needed by Government and key stakeholders if Ireland is to stand a chance.

Emissions reductions therefore is the overarching theme of our consultation response. We must prioritise the actions that will remove as much carbon as possible from the system as quickly as possible. To do this, CAP24 must put a focus on:

- Ensuring the **speedy progression of onshore and offshore pipeline**, including getting sufficient volumes through planning and into ECP and RESS.

- Delivery of **onshore wind and solar consistently each year** this decade to make carbon savings early on to avoid cumulative emissions and remain within the 60MT carbon budget. Achievement of the 9GW onshore wind and 8GW solar targets is critical.

- Put all the needed policies and resources in place to ensure that 5GW of **offshore wind is connected to the electricity this decade**, with a further 2GW in development as part of Phase 3. We cannot remain within carbon budgets without the delivery of offshore at scale.

- **Proactive investment in sources of system flexibility** to manage oversupply, such as interconnection, demand-side response, and energy storage technologies.

- Provision of **zero-carbon system services** from batteries, sync comps, etc. to manage dispatch down.

- **Ambitious development of the transmission network** and the delivery of all projects identified in SOEF.

Ultimately, however, if we are serious about achieving any of the targets that have been set out – 80% RES-E by 2030, 22GW of installed renewable electricity capacity, 3MT of power sector emissions - we require a planning system that is fit for purpose and resourced accordingly.

At the time of the submission of this consultation response on the 14th of July, not a single onshore wind farm has been granted planning permission by An Bord Pleanála in 2023.

This is simply unacceptable. Without a consistent and continuous flow of projects through the system, Ireland cannot deliver the require volumes of renewable electricity to remove carbon from the system and achieve our targets.

Additionally, it is of utmost importance that national renewable onshore wind targets are also translated into regional targets and that the associated Spatial Strategies are developed to ensure their delivery. From our analysis, ambition demonstrated at a local County level is not sufficient to achieve national targets.

We are in the midst of a Climate Emergency with the recent IPCC reports showing that without immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting global warming to close to 1.5°C or 2°C, as set out in the Paris Agreement, will be beyond reach. At the same time, we are in a cost-of-living crisis compounded by our continued over-reliance on volatile and expensive fossil fuels which in 2022 delivered an average Annual Wholesale price for the Irish consumer of 225€/MWh, over two thirds higher than in 2021. This was driven by the fossil fuel supply shock caused by the war in Ukraine, which exposed our vulnerability to being entirely reliant on imported fossil fuels.

There has never been a greater need to urgently deploy renewable energy technologies, for climate, cost and security of supply reasons; yet from an Irish perspective we do not seem to have responded with the same urgency that has seen, for example, an Emergency Regulation put in place at EU-level in December 2022[1] to fast track renewable energy projects through the planning system in direct response to the war. More than half a year into the Emergency Regulation's 18-month period in force and we are yet to see substantial change within the Irish planning system.

CAP24 must be the CAP of delivery. Without significant year-on-year emissions reductions in our power sector, we will have blown our 60MT carbon budget by the middle of the decade. This plan is arguably our last chance to ensure the needed actions and policies to accelerate towards our 2030 targets are put in place.

In our response we seek to engage with many of the questions that have been posed as regards the electricity sector and identify ways in which we can accelerate progress towards the achievement of our 2030 targets and beyond.
WEI is confident that Ireland has the potential to achieve a zero-carbon power system as early as 2035.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0591

We believe that setting this out as a target and kick-starting the work to put in place the required policies and frameworks to deliver it, would ensure greater certainty for the industry beyond the 2030 date, and would drive the needed investments into the technologies that will enable us to accelerate our progress towards 2030 targets and subsequently the full decarbonisation of the sector.

Critically, as is outlined throughout our submission, **WEI believe that constructive and meaningful engagement with industry on all policy issues raised is critical to the successful delivery of the Climate Action Plan**. We would welcome the chance to engage with relevant stakeholders on these matters at the earliest opportunity.

Achieving the Carbon Budgets

At the outset of our response to the Call for Expert Evidence, WEI would like to take the opportunity to commend the Government and relevant stakeholders on the delivery of some major milestones and actions in the time since the publication of the 2023 iteration of the Climate Action Plan. Key examples here include:

- The implementation of the **Carbon Budgets and Sectoral emissions ceilings**, which set out the roadmap for Ireland to halve our emissions by 2030 and achieve Net-Zero no later than 2050.
- The success of the **ORESS1 auction** earlier this year which has awarded a route to market to more than 3,000 MW of offshore wind projects and sets us on an important pathway to our 2030 targets.
- The publication of **EirGrid's Shaping our Electricity Future v1.1**, a critically important strategy document which must be delivered if Ireland is to successfully connect the level of renewable electricity capacity needed to deliver on 2030 commitments.
- The commencement of plans to develop a **National Industrial Strategy for Offshore Wind**, which is an important step towards ensuring we maximise the enormous economic opportunity presented by our Offshore potential.

It is critical that in the 2024 plan, this momentum is maintained; Government and relevant state bodies must double down on the implementation of key actions if we are to achieve our 2030 targets and remain within the carbon budgets. The power sector has been set a budget of 60 million tonnes of CO2/eq for the period 2021-2030, split between a 40 million tonne budget for the period 2021-25 and a 20 million tonne budget for the period 2026-30.

Alongside the publication of the 2023 Climate Action Plan, EirGrid's CAP23 Emissions Analysis (December 2022) was also published[2]. The analysis focused on three main scenarios: a "Central" scenario, described as very optimistic for 2030, a low emissions scenario, with "very significant concerns" attached, and a high scenario, which would involve delayed achievement of targets. EirGrid provide annual emissions estimates based on each scenario; none of them remain within the 60 million tonne carbon budget, with the central scenario

[2] https://www.gov.ie/pdf/?file=https://assets.gov.ie/245172/2c2fd729-261b-4b64-af5e-c7f5f8d18924.pdf#page=null

totalling 79.5MT over the course of the decade, the high scenario totalling 99.2MT, and the low scenario coming closest at 61MT.
Even in the highly ambitious low scenario, which would mean accelerated renewable electricity and storage deployment and 100% renewable gas, 59.8MT of carbon would be emitted by the end of 2029. This is a highly ambitious best-case scenario.

As the legally binding limit for the period is 60Mt, this implies that our 2030 emissions target is now effectively 200kt. **Ireland would therefore need to effectively achieve a zero-carbon electricity system by 2030 to be able to remain within the limits of the carbon budgets.**

While it will be extremely challenging to deliver this by 2030, it is plausible that it could be delivered shortly after 2030. CAP24 actions therefore need to be designed around this objective – a Net Zero power system at or very soon after 2030.

Pathways to our targets

The June 2023 EPA report on Ireland's Greenhouse Gas Emissions Projections[3] must serve as a warning signal to Government that the electricity sector is not on track to remain within its carbon budget, and CAP actions, particularly those relating to actions to support the deployment of renewables, must be urgently implemented to ensure all barriers to the achievement of our targets are removed.

Additionally, as the 2022 Baringa / TNEI *Bridging the Gap*[4] report demonstrated, the pathway we choose to reach our 3MtCo2 2030 sectoral emissions target is as critically important as the target itself, and perhaps even more so. Failure to remove carbon consistently and substantially from the power system every single year this decade will see Ireland significantly exceed our power sector carbon budget well before 2030.

Total cumulative CO2 emissions from the Irish power sector out to 2030 are sensitive to the Pathway taken to get there. In the modelled pathways were able to meet Ireland's 2030 targets (at the time, less ambitious than the 2023 iteration of the Climate Action Plan), the analysis shows that cumulative power sector emissions can be reduced by 4 million tonnes of CO2 by the rapid delivery of renewables following RESS auctions compared to a delayed delivery of the same capacity.

In an ambitious Pathway that exceeds many of Ireland's 2030 targets, with rapid delivery of renewable capacity and investment in enabling technologies, the Bridging the Gap analysis showed that 66 million tonnes of CO2 are emitted from the power sector in the decade between 2021 and 2030, including 6 million tonnes resulting from transmission constraints. This was an extremely ambitious pathway, with assumptions comparable to those in EirGrid's Low scenario referred to above. It still substantially exceeds the current carbon budget of 60 million tonnes.

---

[3] https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-GHG-Projections-2022-2040_Finalv2.pdf
[4] https://windenergyireland.com/images/files/bridging-the-gap-a4-report-final.pdf

The key conclusion from the *Bridging the Gap* report, which is still extremely relevant for CAP24, is that getting as close as possible to remaining within the 60 million tonnes carbon budget 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.
- Provision **of zero-carbon system services** from battery assets and synchronous condensers, to unwind DS3 limits and moderate renewable curtailment; and
- The continued **development of the transmission network** including all projects identified in the Shaping Roadmap, and further upgrades to circuits throughout Ireland. The rapid deployment of renewables also requires the strategic deployment of constraint management solutions, such as dynamic line rating, power flow control, and dedicated energy storage assets, to address renewable constraint due to transmission limits.

Additionally, WEI notes the finding that the use of carbon intensive fossil fuels including coal and peat in the first half of the decade 'locks in' substantial emissions and puts pressure on carbon budgets.

The analysis suggested that 66 million tonnes of CO2 between 2021 and 2030 represents the minimum that was achievable for the Irish power sector under the policies in place at the time. While we have seen a welcome increase in the 2030 renewable energy ambition, major and fast interventions are required to move the dial past this figure, including solutions to phase out the usage of these carbon intensive fuels, and an acceleration of renewables and enabling technologies above and beyond existing policy.

Resourcing

Ensuring the required resources are in place in key state entity is critical. WEI believe that Government must use Budget 2024 to resource the planning system to support Ireland's climate objectives, allocate funding for the development of key infrastructure, invest in skills development to facilitate the workforce needs of the Irish renewable energy industry and finally, invest in rolling out a communications campaign to promote the future of renewable energy to society.

Ireland has huge potential, and the right ambition, to become a renewable energy hub. To facilitate this, the planning system needs to keep pace with the scale of renewable energy deployment needed to meet Ireland's targets.

The progress to date on the draft Planning and Development Bill 2022 has been widely welcomed and will bring greater clarity, consistency, and certainty to how planning decisions are made. It is hugely positive that additional resources are being deployed across government departments and state agencies to facilitate planning processes.

An important part of the overhaul of the Irish planning system, however, will be to ensure that An Bord Pleanála, the NPWS, MARA and key environmental NGOs involved in planning, community engagement, environmental assessment in areas of renewables development have the appropriate funding to enable them to hire sufficient staff with the required skills and experience to meet anticipated service level requirements in 2024 and beyond.

The acceleration of onshore wind delivery is key, and we have a continuing strong onshore wind pipeline. However, planning applications for onshore wind farms are supposed to be decided by An Bord Pleanála within 18 weeks but, on average, it is taking more than a year and can potentially delay project timelines.

For offshore wind projects, we are expecting the first ORESS 2 auction on the south coast of Ireland in Q1 2024 and, once the provisional results of this auction are complete, the successful Phase 2 project will need to engage in the same pre-planning process with the NPWS as will have been undertaken for Phase 1 projects.

With lengthy timelines for the delivery of infrastructure, this may be the last budget opportunity to put in place the resources needed to achieve our 2030 target. Government must agree with an Bord Pleanála, the NPWS, MARA and key environmental NGOs involved in planning, community engagement, environmental assessment in areas of renewables development the number and type of staff they will need to facilitate wind energy projects in submitting their planning applications.

Accelerating Renewable Energy Deployment

KPMG, on behalf of Wind Energy Ireland (WEI), recently completed an industry consultation titled *"Considerations to accelerate the deployment of renewable energy in Ireland"*. The report will be launched in Q3 of 2023, and WEI will provide copies to all relevant stakeholders involved in delivering the actions of the Climate Action Plan.

For the purposes of this consultation, WEI would like to highlight some of the key findings and conclusions that KPMG reached in putting the report together. We would welcome engagement with the relevant stakeholders on these issues.

The aim of the study is to identify the ways the development process for renewable energy in Ireland could be accelerated, in the context of the need to achieve our climate and energy targets in 2030 and beyond. Its mains findings focused on the following areas:

Resources & Planning

The report noted that progressive policy had helped deliver 40% renewable energy generation in the electricity system by 2020. However, with the delivery of 2030 in mind, the report also provided a range of suggestions as to how to improve and streamline our planning process and highlighted the resourcing challenges set to be encountered across the system.

Addressing these areas, namely increasing the efficiency of the planning system, and adequately resourcing it, as previously highlighted by WEI, is critical to the accelerated deployment of renewable energy generation.

Industry respondents to the consultation highlighted the need for **increased engagement and collaboration with decision makers**. A proactive stance on engagement will help to address problems earlier on in the process and to efficiently support the capacity gaps that currently exist in central agencies. Government and agencies could also utilise international experience-gained expertise to expediate the renewable energy role out.

The proactive stance toward collaboration should be extended to key agencies. Peer-reviewed resource plans should be the norm in key agencies as they look to manage the increased volume and complexity of renewable energy applications. To increase the pace of assessing applications, processes could be streamlined through the introduction of lean management techniques and the digitisation of applications. **Statutory time limits** should also be introduced to allow industry to have more predictable timelines and targets.

Such strict and reduced statutory timelines should particularly be applied to An Bord Pleanála (ABP), with the report recommending that their statutory periods be reduced to match those of Local Authorities. If such timelines are not met, meaningful consequences should be implemented.

The report recommends that to speed up ABP's timeline for planning decisions and ensure the necessary resources are available, a dedicated renewables energy section should be created. Separately, allowing for Judicial Reviews (JR) to be resolved whilst going through the JR process, would also help alleviate the current bottleneck of projects.

Land

The report found that accessing land is generally not an impediment to deploying renewable energy in Ireland as communities are increasingly accepting of renewable projects due to various financial and social benefits. However, securing land associated with grid development remains a greater challenge.

A significant challenge to Ireland's climate targets ambitions is the repowering of wind assets in Special Protection Areas (SPAs). Industry respondents have also called for clarity regarding repowering policy within SPAs and for land decisions to be moved from local authorities to national authorities as local authorities prioritise local considerations over national renewable capacities.

Grid

In assessing Ireland's grid infrastructure, the report noted the successful implementation of EirGrid's DS3 Programme and the CRU's Enduring Connection Policy are important tools to achieving 40% RES-E by 2020. However, several significant suggestions on how to improve Ireland's grid infrastructure were highlighted.

To reduce processing times for renewable assets by several years, industry respondents again identified **meaningful early engagement with key agencies** as critical to allowing grid connections to be progressed in parallel with planning applications. To support this engagement, greater political support is required to force action from the relevant agencies and for improved forward grid planning.

The report highlighted that forward planning of future grid infrastructure is vital to the accelerated deployment of renewable energy in Ireland. In this context, industry respondents identified the need for **peer-reviewed resource planning between key agencies**. A call was also made by respondents for the TSO and TAO to pro-actively advance infrastructure to incentivise renewable development and to speed up the grid connection/expansion process. The report highlighted that **new transmission corridors through underground cabling** will be required, while investment in **Dynamic Line Rating** has the potential to increase the grid's performance using already tested technology. **Developer-delivered cluster stations** should also be introduced as a way of securing grid connection efficiently and utilising expertise from willing developers. While improved funding, progress, clarity, and decision making is also required for hybrid connections and projects.

Route to Market

Over the last number of decades, several schemes, such as REFIT, RESS and ORESS have been successful in providing routes to market for renewable energy generators. To maintain this success **continued commitment and action is required from the government and key agencies**.

For the renewable industry to prosper, certainty is always a key requirement. It is essential that government shows its commitment to the ORESS framework by publishing **a long-term auction schedule**, allowing industry to plan for and allocate resources accordingly.

Agencies must also act to support industry's route to market. To enable an 80% RES power system, greater clarity and faster progress is needed on the **System Services Future Arrangement**, while additional supports and locational signals are required to transition to **co-located renewable energy hubs** and to **bring battery energy storage systems** online. The positive development of **corporate PPAs is also required**. Proforma PPA contracts would make it easier for generators and companies to enter cPPAs. Additionally publishing legislation on **private wires** would provide additional route to market options, while the issue of **dispatch down must be addressed to reduce the risk exposure to cPPAs**.

Zero-Carbon Electricity System

What options are available to increase the penetration of renewable electricity beyond the 80% committed to in Climate Action Plan 2023?
Looking beyond 80% RES-E, WEI believe that we have the energy, the technology, and the investment to build a fully decarbonised electricity system by 2035. To give the needed signal to investors and build momentum towards this goal, **WEI call on Government to, as soon as possible, set out a target to achieve a zero-carbon electricity system no later than 2035**.

CAP23 indicates that there will be a "Roadmap for a Net-Zero power system" for delivery during the third carbon budget period, 2031-2035 (Page 136, Table 12.5). **We strongly encourage DECC to include an action in CAP24 to produce the necessary system modelling to underpin a Net Zero roadmap.**

At a high level, meeting and exceeding our 80% RES-E target requires, the deployment of:

- Sufficient MW capacities of the renewable generation to provide the variable **renewable power** in the volumes required.
- Sufficient capacity of the technologies that will provide zero carbon frequency and voltage **stability services** at 100% SNSP, 0MW minimum conventional generation.
- Flexibility & Storage technologies that will support **time shifting of very significant quantities of renewable energy** to simultaneously manage system oversupply and local network constraints while supporting capacity adequacy.
- A **mix of technologies** with differing generation profiles that enable us to produce peak power at different times.

Additionally, it is important to consider that 80% RES-E today looks very different to 80% RES-E in 2030. Ireland's demand is expected to climb from a level of ~30TWh now, to more than 45TWh by 2030. This emphasises the crucial importance of consistent and accelerated delivery of renewable energy projects to ensure that the vast majority of Ireland's electricity needs in 2030 can be met by renewables.

Addressing these points in more detail:

Renewable Generation

In terms of the renewable energy generation, we need a blend of onshore wind, solar and offshore wind that addresses the following key considerations:

- **How quickly they can be deployed on the system:** Staying within cumulative emissions limits over the decade means that projects that can be deployed earlier have a greater impact on emissions than projects arriving later. This emphasizes the need to support and accelerate the deployment of onshore wind and solar over the course of the decade, while concurrently ensuring the implementation of a robust policy framework for offshore wind to ensure deployment later in the decade.
- **The profile of the generation:** Solar power is relatively negatively correlated with wind energy and so a reasonably optimised blend of wind and solar generation has the potential to enable more demand to be met by renewables more often. This will

support higher average RES-E levels at lower levels of network constraints and system wide curtailment / oversupply.

- **The scale of the generation:** It won't be possible to reach an 80%+ target without a significant contribution from offshore wind in the later part of the decade; offshore wind is an essential enabler to meeting Ireland's climate action targets.

Achieving the necessary renewable generation in time to support the targets in the climate action plan means we need to do everything we have been doing but faster. This applies across all elements of the planning / consenting process, grid connection applications, transmission capacity solutions, and RESS auctions.

Delivering this volume cost effectively requires addressing policy shortcomings particularly related to appropriate risk allocation in auctions. More on this in market considerations below.

Stability Services

To ensure the secure, reliable operation of the system at close to 100% SNSP levels and with close to 0MW of constrained on thermal generation, EirGrid will need to be able to access all necessary system stability services from zero carbon sources. Supporting market frameworks need to be established to allow all inertia to be procured from devices such as synchronous compensators, frequency response, short term reserves and ramping services can be procured from storage and demand side response technologies, and so that voltage support / reactive power services can come from a wide variety of sources including appropriately located synchronous condensers, storage, DSR and renewable generators. The significant value of full zero carbon system services has been illustrated in several previous reports carried out by Baringa Partners, including "Endgame – a Zero Carbon Electricity Plan for Ireland"[5] and "Store Respond and Save - Cutting two million tonnes of CO2"[6].

In addition, Afry's Low Carbon Inertia Services (LCIS)[7] report commissioned by EirGrid as part of the LCIS Contractual Consultation also demonstrated the significant cost and carbon savings that can be achieved through the procurement of LCIS. CAP 2024 should retain the action to maintain the current timeline for Phase 1 (EL/23/20) and include a dedicated action for the Phase 2 procurement to be completed in 2024.

Flexibility Services

At very high RES-E levels, it is likely that we will need to find ways of time shifting very significant renewable energy volumes. There is potentially a critical role for new and emerging long duration storage technologies to address this issue. A recent Baringa report commissioned by Energy Storage Ireland entitled "Gamechanger" highlights the potential of these technologies to manage system level curtailment and oversupply levels, and provide clean dispatchable capacity, reduced emissions, and if appropriately located in congested

[5] https://windenergyireland.com/images/files/20210629-baringa-endgame-final-version.pdf
[6] https://www.energystorageireland.com/download/store-respond-and-save/?wpdmdl=251&refresh=64afcf32009f51689243442
[7] AFRY Management Consulting, *Low Carbon Inertia Services (LCIS) – Price Cap and Imbalance Price Proposals*, April 2023

parts of the transmission grid, they also have the potential to simultaneously create significant additional "space" for renewables on the transmission grid.

CAP23 included a specific target for demand side flexibility of 15-20%, by 2025 and 20-30% by 2030. We would note that in the context of supporting decarbonisation objectives, it is necessary to consider the duration of the demand side response in addition to its peak capacity and how specific flexibility sources interact with existing fossil-based generation technologies. If it is considered necessary to set a specific target for flexibility, then greater clarity is required as to what the target means and what objectives it is expected to meet. We would draw the departments attention to a recent consultation paper prepared by ESBN (consultation process being run by CRU).

WEI note that ESBN consider that b*ased on the Ireland Capacity Outlook 2022-2031, which forecasts peak demand of approximately 6,400MW in 2025 (median scenario), 15-20% flexible system demand equates to 960-1,280 MW.*

Although the target is a power or 'MW' dimensioned value, the MWh that flexible demand will be required to deliver may vary". We would note that the system impact of 960-1280MW of demand side response will be wildly different depending on whether the response is for 1hr vs 24hr+ and depending on whether the source of that flexibility is storage charging from fossil-based generators. As such, the current target has limited meaning in the context of decarbonising the power system.

WEI would support the need for careful procurement design decisions to ensure that where we are contracting for new forms of storage and flexibility that these are designed in way that maximises emissions savings at least cost.

Energy Storage Ireland's June 2022 position paper[8] sets out a problem statement, principles and a high-level design that would allow efficient and effective procurement of storage and flexibility on a technology agnostic basis (duration and efficiency) and would suggest that such an approach is worth further exploration. We believe the implementation of such a scheme for flexibility / storage procurement would be more effective than setting specific targets for flexibility, as these risk unintended consequences where the flexibility targets are met by technology solutions that serve to either increase emissions or have negligible benefits relative to their costs.

Market Considerations

All these deployments require efficient and appropriate market investment signals if they are to be delivered. In designing these market systems / frameworks, we need to consider the inherent commercial / economic characteristics of these essential technologies that we know we will need.

For example:

[8] https://www.energystorageireland.com/wp-content/uploads/2022/11/ESI-Position-Paper-on-a-Procurement-Framework-for-Long-Duration-Energy-Storage.pdf

- **Renewable Energy Technologies:** Onshore & Offshore wind and solar technologies cannot economically respond to price or locational signals after they are built. The availability of energy from these technologies and the underlying cost of making this energy available to the system will be the same irrespective of the wholesale market price, TUoS charging, TLAF's. Therefore, there is very limited economic merit in exposing these technologies to these price signals. Long term auctions with appropriate risk allocation particularly in relation to constraint, curtailment, and oversupply and will result in much more efficient auction outcomes. This was highlighted in the recent Cornwall Insight Report[9] on improving revenue certainty and risk allocation for renewable generators.
- **Flexibility Services:** Some technology solutions such as demand side response have limited capital costs and likely more material marginal operating costs and can potentially be deployed under modestly evolved energy, capacity and system service markets, and this flexibility will have a net system value. However, it is extremely unlikely that these technologies can provide energy time shifting services at the scale and in the locations, required to support the level of decarbonisation we are targeting. Large scale long duration storage technologies will likely have very significant capex and relatively low marginal operating costs (excluding energy market charges) and as such investment in these technologies would likely be more efficient if they were provided with a much higher degree of revenue certainty. For storage technologies however, it is also important to preserve short term energy market price signals to ensure that deployed technologies operate efficiently on the system once built.
- **An efficient technology mix:** There is a value in having a complimentary blend of wind and solar assets on the system given thee complementary correlation of the profiles of each technology.
- **Appropriate Risk Allocation:** This will be critical if we are to avoid a situation where consumers pay for high constraint, curtailment, and oversupply levels by allocating these risks in renewable auctions, effectively locking in high prices for the tenor of the contracts, and then pay again to enable the deployment of flexibility solutions to solve these problems. These issues need to be considered holistically at a system level.

Market Design for Zero Carbon

The energy market was designed around the short-term marginal cost of production since it was originally conceived with fossil-fuelled power plants in mind, where marginal costs (i.e., the price of fuel) were typically the most significant expense driven by coal, gas, and oil prices. This means that the price of commodities such as coal and gas have typically determined the price of electricity in Ireland and the Irish market is therefore exposed to volatility in the international prices for these commodities. These fossil fuel plants typically have lower capital costs relative to their marginal or operating costs, so they rely on the energy market for most of their revenue to cover costs.

[9] https://windenergyireland.com/images/files/report-on-improving-revenue-certainty-and-risk-allocation-for-new-renewable-generators.pdf

However, wind energy is different in that it has relatively high capital costs but has no marginal costs (as there is no fuel or carbon cost) so when wind energy participates in the electricity market it effectively enters with a bid of zero, thus driving down the price of electricity on the market as it displaces more expensive forms of fossil fuel generation via the merit order effect.

So, what happens when Ireland's power system can facilitate 100% wind energy at a single point in time? A market design based on the marginal cost of the generators participating in it is not fit for purpose in a world where 100% of the electricity is being produced by zero-marginal cost renewable electricity. It is likely to lead to a lot of negative pricing in the market and volatile price swings, which is unlikely to provide the revenue certainty required for investments to continue in either renewable or thermal generators.

Renewable electricity will provide the majority of the energy in the market (i.e., 80%), but unlike today's market in Ireland where electricity prices for participants are set one day in advance, renewable electricity typically requires price certainty for 10-15 years in advance to be financeable due to its relatively high up front capital costs. So how can our energy market evolve to provide the price certainty required to stimulate more investment in renewable electricity?

The electricity sector will change rapidly over the next decade and so the electricity market needs to keep pace with these changes. The energy market is moving from one based predominantly on fossil fuel plants and recovering short-term marginal costs to one based on renewable electricity with little to no short-term marginal costs but with a need for longer-term price supports.

Capacity markets will also become critical to ensure sufficient generation capacity is available as a backup for low wind/low solar days and new system services and technologies need to be incentivised to support a system with high levels of variable renewable electricity. At present, there is a clear consensus that change is coming, but very little consensus on what the market design of 2030 looks like to send the correct signals for the investments that are required to achieve our renewable ambitions.

Therefore, we recommend as an action in the final CAP 2024 that the market operator, SEMO via EirGrid, the CRU and DECC should put in place a dedicated team to solely focus on what the electricity market design should be to facilitate a Net-Zero carbon power system.

Electrification

The electrification of heat and transport will play a vital role in decarbonising the Irish economy as well as providing other broad benefits to the electricity market. However, the States 2020 targets in terms of renewable heat and transport were not reached, and in the renewable heat sector the State currently has the worst performance in the EU. To fully exploit the electrification potential specific policy frameworks to encourage and support electrification must be developed.

With the correct policy framework electrification of heat and transport can be expanded in Ireland which will have economic benefits, aid in the overall growth of renewable electricity generation, aiding in dealing with curtailment and constraints, will help lower emissions, and further add to security of supply.

Ireland has seen great developments in renewable electricity generation but has been poor at the development of low carbon electrification of heat and transport. This electrification of heat and transport can be used to utilise more of the renewable electricity we produce and utilise more of the existing electricity grid.

Grid

WEI's Grid and Offshore Grid Committees have identified several priorities that must become a key focus of CAP24 to better equip our grid to accommodate the levels of renewable electricity generation that are set out in the Government's capacity targets. Below, we briefly summaries some of the main points identified by our expert members working closely on grid policy issues:

Enable hybrid connections and private wires. SOs to resource these areas to remove policy barriers.

WEI is supportive of the development and progression of hybrid connection policy which we believe can provide benefits for the connection of offshore wind generation as well as onshore renewables. WEI has proactively worked with EirGrid and the other System Operators in Ireland and Northern Ireland to break down the barriers to progress hybrid connections. These connections should be supported as they provide a range of benefits such as:

- more efficient use of grid infrastructure
- Allows renewable generation to utilise existing connections which would expedite their connection to the grid rather than having to wait on timely grid reinforcements.
- Reduction in carbon emissions by allowing the accelerated increased penetration of renewable generation.
- Greater sustainability by avoiding the building of new assets to provide the same service.

The facilitation of hybrid connections has been a clear policy objective for some time that has been included all Climate Action Plans to date. A range of measures to be taken to facilitate these connections were set out in CAP2021 Annex Action 125. The lead for these measures is shared between CRU and EirGrid in the Annex and a timeline for addressing all the measure was set out to be completed by the start of 2023. However, to date progress has been slow.

"Ensuring that hybrid technology grid connections are facilitated, and remaining barriers removed" has subsequently been included as a 'non-reportable' Action (EL/23/14) in CAP 2023 for CRU, EirGrid, and ESB Networks to be completed by Q4 2023. It important that progress is now accelerated to allow the benefits of hybrid connections to be realised and allow these connections to help in delivering on Ireland's 2030 targets.

Action is required to enable all hybrids to ensure that all regulatory hurdles are removed to allow these projects to progress. Regulatory changes take time to implement. It's critical that these hurdles are prioritised and addressed in CAP24 ensure that hybrid connections can be utilised and play their role in helping the delivery of the 2030 targets.

The primary regulatory hurdles that must be given immediate attention to enable these hybrid connections are:

- Allow dynamic sharing of MEC between units behind a single connection point.
- Multiple legal entities behind a connection point
- The cap on over-installation at connection of 120%

Currently, the dynamic sharing of MEC between different units is not allowed and limits the type of hybrids that can be utilised today. Only when units can dynamically share the connection can the full value of a hybrid connection be attained. Another barrier is the inability for multiple legal entities to connect behind the same connection. Contractual arrangements are currently between the TSO and one grid connection counterparty. The over installation clause from current grid code should also be removed for these types of projects to allow the entity/entities to build assets to maximise the utilisation of the MEC.

These barriers must be addressed by CRU, ESBN and EirGrid as soon as possible to unlock greater value from existing grid connections.

Other regulatory changes that will likely need to be implemented to facilitate hybrid connection are:

- **Grid Code:** Further Grid Code changes may be required. Some areas that need to be considered are the communication challenges of energy/capacity available and scheduling of the energy within the power system constraints. The submission of COD and TOD by the units may also need to change depending on the setup of the hybrid connection agreement.
- **DS3:** There are a number of challenges that will need to be addressed such as communication challenges of services available and scheduling of the services. There may also be potential changes to the tendering and qualification of services, and finally, the settlement of the services between the hybrid assets.
- **Trading and Settlement Code:** As the units under a hybrid connection are envisaged to be two standalone assets dynamically sharing the MEC, the impact on the T&SC may be limited. Some items to consider could be the registration of the assets as well as the settlement that is required. In instances where hybrid connection assets have participated in the CRM (acknowledging that a RESS asset cannot win a CRM contract) the settlement of difference and non-performance charges may also need to be reviewed.
- **SEMOpx Rules:** Similar to the T&SC, as these are individual assets it isn't envisaged that there should be any changes to the SEMOpx rules due to hybrids. However, REMIT does need to be reflected upon how the hybrid assets will participate in the ex-ante markets.
- **Capacity Market Code:** The CMC already allows for combining/aggregating units so the same methodology could be applied to the hybrid connections. The treatment of the de-rating methodology, qualification, volumes available to be submitted into the auction, and demand curve adjustments would need to be considered for a hybrid connection.
- **Firm Access Policy:** Clarity will be needed on how firm access policy is implemented for the new hybrid generator and how it might affect the firm access of other generators.
- **Use of System Charges:** TUoS (import and export charging) for a single connection agreement with two connection points will need to be considered.

Specifically related to Offshore Hybrid Connections:

- **Offshore Infrastructure Ownership:** It is proposed that offshore transmission infrastructure is owned by the system operator. It needs to be clarified how this would

be handled for hybrid connections. There needs to be a level playing field between hybrid generators and other offshore generators.

- **State Aid:** It is unclear if, hypothetically, a thermal hybrid plant can avail of ORESS support under the state aid rules.

Public-private partnerships. Allowing 3rd party network build and access to existing infrastructure links for grid development.

The connection of generation assets to demand customers by way of a private network or direct line (i.e., a standalone electrical connection not connected to the wider transmission or distribution network) is severely restricted in Ireland at present and there is a complete lack of direct line projects when compared to other jurisdictions, including Northern Ireland. Direct lines will be an important option to facilitate connections between demand users and renewable energy generators that will help us meet our renewable energy goals.

Modest changes to our regulatory framework would enable the deployment of direct line solutions in appropriate circumstances. In particular, the UK approach is a good template which could be easily adopted here: i.e., providing for specific exemptions from the requirement to hold a distribution license such as direct wire supplies to commercial customers. In addition, to give effect to such exemptions the restriction set out in section 37(1A) of the Electricity Regulation Act needs to be repealed.

In parallel, to provide clarity and to fulfil our obligation arising under Article 7(2) of the Electricity Directive, some industry guidance is required to establish the circumstances where direct wire is appropriate and will be permitted in principle and to inform the establishment of appropriate technical and other conditions to be included in associated authorisations granted to generators.

WEI welcomes the CAP 2023 action to develop a policy on private wires and, if necessary, pass any required facilitating legislation by the end of 2023. We look forward to engaging in this consultation process and would welcome direct engagement with the Department to discuss the issue in detail.

Build grid for net zero energy system – EirGrid to lead on development of a Net-Zero grid study.

WEI has concerns that the current SOEF roadmap is focused on delivering the bare minimum for 2030 and does not consider further plans that will be needed in terms of delivering a Net-Zero power system as early as possible in the 2030s and the ultimate economy wide Net-Zero 2050 target.

Significant additional renewable capacities beyond 2030 will be needed for further decarbonisation and to account for electrification and green hydrogen generation. 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 the design and development of post 2030 projects as these may require long lead times.

WEI welcomes that EirGrid will consult on a revised Tomorrows Energy Scenarios later this year which will look at network scenarios out to 2050, but note that CAP 24 should consider how a long-term grid strategy for Net-Zero should be put in place. It is important to consider that Ireland is on a path to decarbonising its energy system, and this will predominantly occur through direct electrification. Grid planning needs to consider this significant rise in electricity demand, and plan grid reinforcements. Upgrades, and new build for this future decarbonised energy system.

SuperGrid for Ireland – Development of offshore networks, HVDC links

A SuperGrid is essentially a large transmission network which makes it possible to move huge volumes of electricity across great distances, using high-voltage direct current (HVDC) or ultra-high-voltage direct current (UHVDC, above 800 kV) power lines.

Developing our offshore network, increasing our interconnection levels, and ultimately moving towards a pan-European grid would radically accelerate the decarbonisation of our energy system, offering Ireland as part of a wider European system the opportunity to gain energy independence from its reliance on volatile fossil fuel markets in favour of the vast, local renewable resources.

Developing a SuperGrid would be one of the most significant infrastructure projects ever undertaken. It will require international coordination at a level never seen before in the context of electricity grids. Preparations cannot begin soon enough. There are several key steps that can be taken now to facilitate the planning and delivery of the SuperGrid:

- **Marine Spatial Planning (MSP):** To support international meshed offshore grid development, cooperation is needed between national MSP authorities and energy authorities from bordering countries to identify optimal locations for corridors and transfer gates for interconnectors. The recent TEN-E revision aims to encourage regional cooperation in the development of offshore wind and the required infrastructure.

- **Resources:** A vast amount of focus at present is rightly being placed on delivering Ireland's 2030 target of 5 GW offshore wind. But planning needs to start now for a post-2030 electricity grid when Ireland moves towards a more centrally planned grid delivery model. To do this, resources must be invested in the relevant Government departments, An Bord Pleanála, NPWS, EirGrid, ESB Networks, MARA and the CRU.

- **Grid Planning:** Ireland needs to lead in the development of the TEN-E Offshore Network Development Plans to ensure that Ireland can maximise the use of its natural offshore wind resource. Now is the time to explore state-of-the-art solutions for the connection and distribution of offshore wind energy. A meshed grid connecting the Celtic Sea, English Channel and the Bay of Biscay would facilitate an increase in power flows and improve security of supply. Considering the long lead times of offshore wind farms and grid projects, interest in meshed grids must translate into bold policy-making and reinforced transnational cooperation soon before the region is further locked into a suboptimal energy system.

- **Future Grid Implementation:** EirGrid's Shaping our Electricity Future indicates a continuance of the incremental approach in grid planning. A more ambitious, transformative approach is needed. A Coordination Council should be immediately established to start investigating what post-2030 looks like and how it would operate. This would bring together industry, EirGrid, CRU, and the Department of Environment, Climate and Communications. Successful implementation will include regular engagement with EirGrid to discuss approaches to post 2030 design and implementation.

- **International Relations:** Ireland will not realise its ambitious offshore wind targets without cooperation with neighbouring countries. Concurrently, Europe will not achieve its decarbonisation goals without full cooperation of all members. Ireland must effectively use its membership of the North Seas Energy Cooperation to take an active role in promoting the coordinated development of regional and European level grids. The developments in the revision of the TEN-E have been encouraging, and now These words need to translate into action.

Market reform to incentivise strategic deployment of long duration storage.

Long-Duration Energy Storage (LDES) will be essential to decarbonising our energy system by providing a range of valuable services from congestion management, peaking capacity, alternative network solutions, increasing renewables on the grid, delivering cost benefits to end consumers, and ensuring security of supply. However current market frameworks and incentives are unlikely to be sufficient to deliver the volumes and capabilities of LDES we will need in future.

This will require new frameworks to drive investment similar to how REFiT and RESS have driven investment in renewable technologies with similar high Capex/low Opex characteristics to LDES. This is further expanded in the section on Storage below.

Pro-active TSO network build based on renewable project plans.

Wind Energy Ireland (WEI) welcomes the Renewable Hubs Pilot, and believes the concept has the potential to deliver many benefits to Irelands pathway to decarbonisation. There is an opportunity for the Renewable Hubs to bring about a more efficient and effective process for connecting renewables. With the targets for 2030 and beyond, there is a significant volume of renewables that will require connection into the Irish grid. If Ireland is to meet its Climate Action Plan and decarbonisation targets, it requires a speedy process that removes hurdles for the connection of renewables.

To accommodate this level of renewables, the grid requires significant reinforcement and modernisation. The Renewable Hubs Concept has the potential to better optimise existing grid assets as well as developing more enhanced new grid assets.

It is key that further initiatives like the Renewable Hubs Pilot be developed and trialled with the core purpose being facilitation of more renewables on the grid, and most importantly, the future proofing of grid assets. TSOs to date have not been incentivised to prioritise

development of grid assets which offer longer term benefits in operation (with higher CAPEX resulting in unsuccessful CBAs), resulting in projects which meet short term needs with relatively smaller upfront investments being successful.

Grid planning must move past thinking in 5–10-year blocks, and transition into planning the future grid with intermediate targets along the way. 2030 targets are not the end goal; 2030 is merely a steppingstone along the path to a fully decarbonised energy system by 2050. The planning and development of our grid needs to reflect this, and TSO's need to be incentivised to choose projects with longer term benefits.

Enhanced rollout of technology solutions such as DLR, PFC, virtual transmission lines, DC transmission etc.

Achieving reductions in cumulative CO2 emissions this decade for the power sector requires the rapid build out of large-scale onshore wind and solar PV capacity as early in the decade as possible. If we assume the renewable capacity connections can be accelerated in-line with the assumptions detailed in the *Bridging the Gap* pathway, to enable the lowest volume of cumulative CO2 emissions from the power sector, it is likely we will not reap the full benefit as new network capacity will not be in place on time, and constraint volumes will increase.

Technologies such as DLR and PFC are required to mitigate this impact as they enable us to better utilise existing infrastructure. We need to leverage such alternative solutions and integrate them into our network as soon as possible and revolutionise our operational approaches in parallel, to allow time for grid reinforcements to come to fruition. The SOEF V1.1 roadmap does contain more smart network solution proposals than the initial plan and these should be progressed as soon as possible in addition to exploring where further opportunities are available to enhance the capacity on the network in the short-term.

The concept of an interconnected, continental scale electricity transmission system for Europe has huge potential to benefit Ireland, in particular the ability of Ireland to maximise its capacity for offshore wind. DC cable technology has shown its advantages over conventional AC technology for high capacity and long-distance use cases. The UK has set out its plan to utilise the technology to create an offshore backbone, which will strengthen the grid through a more direct route to major demand centres in the UK and bypass constrained areas in the onshore grid. Germany has also deployed HVDC technologies.

Ireland must learn from the UK and other countries deploying HVDC technologies. There is an opportunity to develop a grid that can move energy from areas of high renewable resource to major demand centres both within the Irish grid and internationally.

Dispatch Down

Delivering upon our 80% RES-E target and the capacity targets for onshore wind, offshore wind and solar will create significant challenges in integrating renewable electricity. As set out in the table below, wind farms are being dispatched down – instructed to reduce the amount of power they generate – because the system is unable to cope with the large volumes of clean power available.

In 2019 alone more than 710,000 MWh of renewable electricity, enough to power the city of Galway for a year, was lost.

When wind farms are dispatched down, they are replaced by fossil fuel generators. Every time a wind farm is told to reduce its generation, Ireland's CO2 emissions rise. In the context of remaining within the electricity sector carbon budgets, Dispatch Down is a major issue.
To help address this issue, WEI requests that in CAP24, a clear action is set for EirGrid and ESBN to review outage management measures[10] to reduce the significant impact of transmission outages on renewable generation constraints.

Parameter	2018	2019	2020	2021	2022	2023 Jan-Feb
Curtailment (%)	4.2%	4.0%	6.4%	3.2%	3.8%	4.8%
Constraints (%)	2.5%	4.3%	6.7%	4.8%	5.4%	4.3%
Total Dispatch Down (%)	6.7%	8.3%	13.1%	8.0%	9.2%	9.0%
Estimated Dispatched Down Energy (GWh)	705	1015	1874	912	1380	296
Lost Revenue (€)*	**€49m**	**€77m**	**€129m**	**€81m**	**€106m**	**€22m**
Dispatched Down Energy equivalent to CO_2 emissions from thermal generators (Mt CO_2)**	0.256	0.370	0.688	0.345	0.721	0.140
Estimated Lost Wind Energy as Percentage of All-Island Electricity Demand***	1.9%	2.8%	5.2%	2.4%	3.5%	4.2%

- Does not consider proposed revenue cap.

** Estimates based on SEAI data: monthly energy balances and emissions factors published on their website.

*** Based on all-island demand figure obtained from EirGrid's "System-and-Renewable-Data-Summary-Report" spreadsheet on their website.

Establish national strategic infrastructure body to coordinate access to electricity, transport, water links

The delivery of the required electricity and supporting infrastructure requires a holistic approach across multiple state bodies to make sure we are making the most efficient use of infrastructure that already exists and optimising new infrastructure for the future. We suggest the establishment of a national body to coordinate access to and development of electricity, transport and water links should be included in the CAP. An example of this can be seen in EirGrid's Powering up Dublin project which brings together multiple stakeholders to ensure alignment and effective use of infrastructure in the Dublin region.

Offshore Grid

May 2023 was a hugely important month for Ireland's offshore ambitions as the first ORESS contracts were awarded to four offshore projects with a total capacity of 3.1 GW. ORESS 1 is

[10] https://www.eirgridgroup.com/site-files/library/EirGrid/TSO_TAO-joint-multi-year-plan-2023-2027-Consultation.pdf

an important signal to the increasingly competitive global offshore wind supply chain that Ireland is serious about delivering on its offshore ambition, and effectively kick-starts our journey towards the delivery of 5 GW grid-connected offshore wind by 2030.

In the lead up to ORESS 1, through Wind Energy Ireland the Phase 1 projects engaged extensively with EirGrid to get the required clarity in advance of the finalisation of ORESS bids. This engagement served to demonstrate the scale of the challenge ahead from a grid perspective and shone a light on the sheer amount of work that will be required between the TSO / TAO, CRU and the offshore wind industry if 5 GW is to be successfully connected by 2030.

The members of WEI's Offshore Grid Committee have identified a short list of strategic actions that need to be included and delivered in CAP24 to ensure the progression of the offshore industry over the course of 2024:

1. **EirGrid to establish, resource and fund new offshore TAO entity**. This includes the need for any relevant supporting legislation by DECC and price control workstreams by the CRU.

2. **Establishment of an offshore stakeholder engagement forum.** This must include industry participation to help identify and address policy gaps and ensure common understanding of route to 2030. Focused working groups should also be established to investigate specific risks or issues in the interests of accelerating delivery and reducing costs to the consumer.

3. **Development of 2040 offshore wind strategy** to signal longer term investment opportunities in Ireland and support longer term offshore wind development.

Offshore Phase 1

The following actions are considered critical for the delivery of the ORESS 1 projects:

1. CRU to establish and consult with ORESS 1 projects the new Asset Transfer Value process and establish new independent technical advisor role.

2. EirGrid and CRU to consult with phase 1 projects on the development of the offshore connection agreement including the asset transfer schedule.

3. EirGrid and the phase 1 projects to constructively engage on the design and consenting of the grid connection assets.

4. EirGrid and the phase 1 projects to constructively engage on completing the new technical codes, standards, procedures required for the connection and operation of the phase 1 projects

Offshore Phase 2

The following action actions are considered of critical importance for Phase 2 projects:

1. **Identification of DMAPs in support of 7GW target**

2. **Clear strategy outlining preferred grid nodes and capacity available for Offshore wind connections out to 2030.**

3. **EirGrid and CRU to consult with Phase 2 developers** to ensure clarity on technical, environmental, and contractual interfaces in support of the transition to a plan led model. This targeted engagement should support preparation for ORESS2 and subsequent design and delivery of the connections.

Interconnection

The focus of this response has largely been on the need to achieve the 2030 targets and transition towards a zero-carbon electricity system. Ireland must also seek to strategically plan further into the future, towards our goal of achieving Net Zero by 2050 and maximising our potential to be a major producer and exporter of renewable electricity to the rest of Europe**. An ambitious and forward-looking interconnection policy is a critical aspect of this.**

A commitment on further interconnection would help to incentivise investment in renewable generation in Ireland, particularly in offshore wind. Ireland has a significant offshore wind resource with the potential to export significant levels of power to Europe. However, further interconnection is a key enabler for increased export and a commitment on its delivery would reduce uncertainty for developers.

The Irish electricity sector can only meet ambitious Government carbon emissions targets by 2030 provided there is "a complete transformation of the planning system and grid policies", according to the WEI *Bridging the Gap* report. The recent report from the Institute of International and European Affairs[11] also concludes, specifically in relation to interconnection, that " a second electricity interconnector, between Ireland and France, will be necessary as Irelands wind economy grows over the next decade. Such an interconnection would enhance Irelands energy connectivity."

Considering the lifetime of an interconnector project and the considerable increase in electricity demand forecast over the coming decades, we believe future interconnector projects should be developed with significant consideration of future demand scenarios, up to and beyond 2050. Considering future electricity demand and energy security needs, a detailed cost benefit and risk analysis needs to be conducted on all future interconnector projects to determine the optimum capacity for a future proofed design.

Fulfilling our enormous renewable energy potential will not be without significantly larger interconnection capacity. This is because:

1. the additional export potential provided by interconnection enables a route to market for renewable projects, which also supports high renewable penetration onto the Irish grid, thus avoiding fossil fuel generation,

2. increased interconnection also provides grid infrastructure to import renewable electricity from neighbouring Member States at times of low wind in Ireland, again

[11] https://www.iiea.com/images/uploads/resources/Escaping_the_Energy_Crisis.pdf

avoiding the need for fossil fuel generation), and given the long lead time for interconnection projects to come to fruition, action must be taken now to accelerate and enable the increased development of interconnection between Ireland and neighbouring countries.

WEI has set out a vision for Ireland within our 2022 Strategic Plan (Building a Zero Carbon Ireland7) which calls for a Net-Zero electricity system, with wind energy at its heart, by 2035. Fully decarbonising our electricity system by 2035 will further support Ireland towards meeting our carbon budgets and enhance our ability to achieve a Net-Zero energy system by 2050.

Benefits of Increased Interconnection

Supporting the Energy Transition

The European Commission recognises the vital role that interconnection will play in the future energy system stating that "an interconnected European grid will help deliver the ultimate goals of the Energy Union to ensure affordable, secure and sustainable energy to all Europeans". The report goes on to further state that "well interconnected and integrated trans-European grids are indispensable for making the energy transition a success." (EU Commission: Communication on strengthening Europe's energy networks9). There should be no doubting the merits of interconnection, especially for Ireland where it is currently isolated from the European Electricity Market.

Electricity Market Integration

Towards a Sustainable and Integrated Europe[12] was published in November 2017 by the European Commission and outlined five key benefits that greater interconnection would bring to the European energy system. "Firstly, interconnectors integrate the European electricity markets in a number of ways resulting in better prices for consumers. Interconnectors help reveal the investment signals for generation capacity, allow for a better use of the complementarities that exist between the differing renewable resources across Europe and contribute to generation adequacy by lowering the needs for operational security margins and reducing grid losses." These are the wider benefits that would be realised by Europe as a whole. Deeper interconnection towards a larger grid will unlock geographic complementarities for a stable and secure energy system of the future.

Security of Supply

Thirdly, interconnection increases the security of supply of energy across the European energy system through provision of additional capacity to neighbouring systems. Provision of European energy for European consumption reduces reliance on energy imports from external markets. Europe has agreed to become independent from imported Russian fossil fuels; this cannot be achieved without reinforcing its electricity and energy system through greater interconnection of a power system largely based on solar and wind.

Regional Cooperation

[12] https://ec.europa.eu/info/news/moving-10-15-final-report-commission-expert-group-2030-electricity-interconnection-targets-2017-nov-09_en

Fourthly, interconnectors, as indispensable elements of the trans-European networks and particularly as developed by Projects of Common Interests, are truly European projects that strengthen regional cooperation between Member States.

Additional Opportunities

Finally, investment in interconnectors offer, as a positive spill over, opportunities for uptake of European technologies and thus strengthen employment, industrial competitiveness, and global leadership of Europe's clean, low-carbon industries.

"Much of Europe's electricity grid network has been designed in consideration of the locations of conventional generation plants. However, a large share of today's renewables production - notably variable wind and solar – does not correspond to this grid architecture. Interconnectors, in addition to internal infrastructure, are key to creating new electricity routes to connect areas of abundance to areas of scarcity. In this context, the Expert Group recognises that a fundamental role of transmission infrastructure is to enable the integration of areas of high renewable energy potential with main consumption areas"[13]

This is the largest single benefit to Ireland in developing further interconnection capacity. Central Europe is the largest consumer of energy and will require these power corridors to facilitate the efficient movement of power from renewable rich areas (Ireland) to the demand centres.

Export

Electricity interconnectors can flow in both import and export directions. This helps to lower the long-term costs of electricity for the consumer. At times of high prices in Ireland, interconnectors can facilitate the import of cheaper electricity from other markets. Equally, interconnections offer an opportunity for increased energy exports to European markets when necessary. Ireland has a considerable offshore wind potential, one of the largest in Europe.

However, Ireland's relatively small market size and low interconnection capacity is a major constraint to meeting this potential. Without a means of export (either directly via interconnection, or indirectly via products such as green hydrogen or e-fuels), investment will be limited to the level needed to meet domestic requirements. Increased interconnection capacity would be a key enabler to export Irish energy to the wider European market. However, interconnection capacity is just one aspect of the challenge. Creating an environment that attracts significant investment is even more important. Increasing interconnection will create additional market forces, requiring the Irish market to be even more competitive to attract investment.

Ireland currently has no plans to develop further interconnection with France beyond the currently planned Celtic Interconnector. Ireland needs deeper interconnection with France to maintain a stable and secure future decarbonised energy system.

[13] https://ec.europa.eu/info/news/moving-10-15-final-report-commission-expert-group-2030-electricity-interconnection-targets-2017-nov-09_en

Planning

The planning system is the single biggest barrier to the achievement of our 2030 targets.

Government has set out an ambitious target to deliver 9,000 MW of onshore wind by 2030. Ireland currently has an installed capacity of around 4,700 MW. The 9,000 MW target is very much achievable, and we have a more-than-adequate pipeline of projects competing to deliver for 2030, however the ability of these projects to progress through the planning system will determine whether this capacity target, the 80% RES-E target, and the carbon budget, are to be achieved.

There is currently over 11 GW of onshore wind projects in development with a view to delivering by 2030. There is 8,370 MW in pre-planning with land agreements in place and environmental surveys either complete or underway. There is close to 1.5 GW in the planning process today – 350 MW of this has been in planning since 2020 or before. Over 1,890 MW have planning permission and have secured grid connections. 955 MW of that have secured a Route-to-Market (either RESS or through a Corporate Power Purchase Agreement) and are progressing to construction.

The planning system is the main bottleneck, and with more than 2 GW of onshore projects expected to enter the system in 2023, it is of critical importance that planning decisions are made in an efficient and timely manner so that projects can progress as quickly as possible. Acceleration of delivery is essential – **onshore wind energy will save more carbon emissions this decade than any other technology in the entire Climate Action Plan.**

Later this year, we will also see the first Phase of Offshore projects enter the planning system. These projects, four of which have successfully secured ORESS contracts, are entirely at the mercy of the planning system in the context of an increasingly complex and competitive global offshore supply chain which necessitates that they reach financial close and secure vessels, foundations, turbines etc. before order books are filled up and 2030 becomes impossible.

All of this happens at a time when the not a single positive planning decision for a wind development by An Bord Pleanála since 2022.

This is entirely unacceptable and casts a significant amount of doubt over the State's ability to enable the onshore and offshore wind pipelines to progress to deployment.

Coordination across the planning system

A critical aspect to a well-functioning planning system is good coordination. The Irish planning system currently faces the significant challenge of implementing new reforms via legislation at both national and European level – the Planning and Development Bill and the Renewable Energy Directive being the two most prominent examples.

The implementation of these reforms comes at a time when An Bord Pleanála and other key state entities are in a position in which they need to scale up rapidly in terms of resourcing to enable them to adequately process the volumes of renewable energy applications set to come

in the years ahead as we seek to deploy the needed capacities for a zero-carbon electricity system.

Government Climate Action strategies must ensure proper coordination across all functions of the planning system. Legislative changes cannot be introduced in isolation; Government Departments and key state agencies must urgently align their policies to be ready to implement what is set to be imminently adopted in planning legislation.

Planning barriers to 80% RES-E

What are the planning and permitting barriers to infrastructure development to support 80% renewables; such as new generation capacity, grid reinforcements and system services? How best can these barriers be removed or mitigated against?

The planning and permitting phase for an onshore wind farm can typically take between 2-3 years at present. This is excluding the planning and permitting phase associated with a grid connection which can also typically take between 2-3 years.

It is important to also highlight factors that further add to the timelines above:

- Applicants cannot apply to the grid connection application process until a wind farm project has a grant of planning permission. The application process for a grid connection offer is only available on an annual basis (ECP 2.1 Sept 2020, ECP 2.2 Sept 2021 and ECP 2.3 Sept 2022) with this structure resulting in further increases on overall project development timelines.
- The timeline of 4-6 years for the permitting of a wind farm and its grid connection are absent of:
    - an appeal timeline which could add an additional 1-1.5 years to the project development timeline (refer to Section 3 for further information on planning decision time periods);
    - timelines associated with a judicial review challenge which could add an additional timeline of 2 years to the development process; and
    - securing a route to market through the Government supported Renewable Electricity Support Scheme (RESS) which could take approximately 1 year. Similar to the grid connection process, the RESS auction is also only run on a biannual/annual basis (RESS1 July 2020, RESS2 May 2022, RESS3 expected Q2 2023 and RESS4 expected in 2024) and qualification into the RESS process cannot be sought unless a project has planning permission, a grid connection offer or applied into the ECP process.

At a time when renewable energy infrastructure must be accelerated, developers find themselves incorporating into development timelines the expectation that every project will be appealed, that every project will be the target of an application to take a Judicial Review – which will inevitably be granted – and that every project will end up being the subject of lengthy and expensive legal proceedings.

Therefore, including the above, it can take between 8-10 years for the full development phase of an onshore wind farm to complete i.e., from commencement of environmental monitoring

to lodging a planning application/ securing planning permission, securing a grid connection, obtaining a route to market before finally entering construction. Depending on the size of a project construction can then typically take between 18 months to 2.5 years upwards to complete.

Developers also currently encounter several separate consenting regimes, with separate consenting authorities as part of the project permitting process. The process of applying for these separate consents also adds time to the permitting process.

Consent / Permit	Consenting Authority
Planning Permission	ABP / Local Authority
Grid Connection / ECP	EirGrid and ESB Networks
Authorisation to Construct & Licence to Generate	CRU
Section 48	CRU
Section 49	CRU
Felling Licence Grant	Forestry Service
Road Opening Licence	Road Management Office / Transport Infrastructure Ireland
Section 50 (crossing a stream)	Office for Public Works

Finally, while guides are available explaining how to submit a planning application to a local authority and An Bord Pleanála (ABP), applications are still submitted in hard copy format with numerous copies required. Some digital copies are accepted but this is not the primary format accepted. Streamlining procedures and making the process of submitting applications more efficient with digital methods is essential for all parties concerned.

REPowerEU and the Transposition of RED

What can be done to accelerate/facilitate the delivery/deployment of offshore wind and solar PV in particular, in the context of Climate Action Plan 2023 and the REPowerEU ambition?

As outlined above, decision timelines and delays are significantly slowing down the progression of the wind energy pipeline through the development process and the achievement of our 2030 targets. The implementation of mandatory decision-making timeframes, as provided for in the 2022 Planning and Development Bill would be an important step towards accelerating our progress towards our targets and providing a greater degree of certainty to applicants on decision timeframes.

Additionally, WEI believe that Government must implement the provisions of Directive (EU) 2018/2001[14] as regards renewable energy permitting as a matter of priority. It is now more than five years since the final trilogue agreement between the European Parliament and the

[14] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018L2001

European Council on this important legislation, yet still its provisions are not in place at national level here in Ireland.

Article 16 of the Directive addresses the duration of the permitting process, and includes key provisions that can be summarised as follows:

- A single point of contact shall be designated for the entire permit granting process to include all relevant administrative permits to build, repower and operate including grid connections. The single point of contact shall also guide the applicant through the process in a transparent manner up to the delivery of one or several decisions by the responsible authorities at the end of the process.
- The single point of contact shall make available a manual of procedures for developers of renewable energy production projects and applicants shall be allowed to submit relevant documents in digital form.
- The permit-granting process shall not exceed two years with a one-year extension possible in extraordinary circumstances.
- A simplified and swift permit-granting process shall be facilitated for repowering of existing renewable energy projects with a duration not exceeding one year, with a one-year extension also possible in extraordinary circumstances.
- A simple-notification procedure for grid connections for repowering projects may also be established.
- Member States shall ensure that applicants have easy access to simple procedures for the settlement of disputes concerning the permit-granting process.

Furthermore, since the adoption of the 2018 Renewable Energy Directive by the co-legislators, the European Commission put forward additional proposals, as part of the *Fit-for-55* (July 2021) and *REPowerEU* (May 2022) political initiatives, to further increase the ambition levels on the permitting provisions of the Renewable Energy Directive.

Following interinstitutional negotiations between the European Parliament and the European Council, the new provisions were finalised in June 2023 and will shortly be adopted by both co-legislators.

WEI have summarised the main elements of the new legislation below:

- Introduction of the concept of 'Renewable Acceleration Areas' (RAA), i.e., a specific location or area, whether on land, sea or inland waters, which has been designated by a Member State as particularly suitable for the installation of plants for the production of energy from renewable sources. These areas are subject to a Strategic Environmental Assessment (SEA).
- The permit granting process for Renewable Energy projects includes administration, grid connection permits and the EIA assessment.
    - Member States must acknowledge the completeness of the application within 30 days for plants in an RAA and within 45 days for plants outside of RAA. If uncomplete application, the developer must send complimentary info without undue delay (the 14 days deadline has been deleted).

- Applicants should not be required to contact more than one contact point, and Member States shall ensure that all procedures are carried out in digital format within 2 years of the entry into force of the Directive.
- The developer – and the public – shall have easy access to simple procedures for the settlement of disputes concerning the permit-granting process and the issuance of permits. MS to ensure that administrative and judicial appeals, including those related to environmental aspect, shall be subject to the most expeditious administrative and judicial procedure.
- Member States shall provide adequate resources to ensure qualified staff, upskilling and reskilling of their competent authority.

- In Renewable Acceleration Areas, deadlines have been set out for the permitting process:
    - For New projects: a maximum of 1 year for new projects, 2 years for new offshore projects, extendable by 6 months under extraordinary circumstances.
    - For Repowering projects: a maximum 6 months for onshore projects, 1 year for offshore projects, extendable by 6 months under extraordinary circumstances.
  - Member States can exempt wind and solar projects from this EIA, if it is needed to accelerate RES deployment to meet climate and energy targets. The developer must adopt proportionate mitigation measures, or, if not available, compensation measures, which may take the form of monetary compensation, in order to address those adverse effect.
- Outside of Renewable Acceleration Areas, deadlines have also been set out for the permitting process:
    - For New projects: 2 years for new projects, 3 years for new offshore projects, extendable by 6 months under extraordinary circumstances.
    - For Repowering projects: 1 year for onshore projects, 2 years for offshore projects, extendable by 6 months under extraordinary circumstances.
- Where repowering doesn't result in an increase in the capacity of the RES plant beyond 15% then grid connections to the T&D network shall be permitting within 3 months and the EIA for repowering projects will be limited to additional impacts.
- Renewable Energy Projects are considered to be in the Overriding Public Interest, and this is applicable until climate neutrality is achieved.

WEI believe that Government must accelerate the transposition of the new Renewable Energy Directive and put in place these provisions as a matter of urgency, in line with the spirit of the REPowerEU Plan.

Repowering

Repowering is not dealt with at all as an application type in the 2022 Planning and Development Bill. Given the necessity to accelerate the deployment of renewable energy and the imperative to facilitate repowering of renewable energy projects it should be included in the Bill. In addition, there should be a default rebuttable presumption in favour of granting permission for repowering.

The Russian Federation's war of aggression against Ukraine and the unprecedented reduction of natural gas supplies from the Russian Federation to Member States threaten the security of supply of the Union and its Member States. A fast deployment of renewable energy sources can help to mitigate the effects of the current energy crisis. Renewable energy can significantly strengthen the Union's security of supply, reducing volatility in the market and lowering energy prices.

Ireland's climate targets in relation to onshore wind assume a baseline that includes the existing operational wind farms that may be lost unless they are repowered. An analysis undertaken by WEI projected that close to 500 MW will be 20 years or older by 2025. By 2030, that number will increase to almost 1,400 MW or roughly 30 per cent of our current installed capacity. Ireland cannot afford to lose renewable generation capacity if at all avoidable. Projects seeking to repower in the mid to late 2020s will need to enter the planning system in the coming years. Not facilitating repowering for renewable energy developments would be a major missed opportunity for Ireland.

As there is currently no rebuttable presumption in favour of granting permission for repowering of an existing wind farm that has been operational for 20 / 25 years or more, wind farms that can continue to operate and therefore provide renewable energy and support security of supply would have to be decommissioned once they reach their operational expiration date under their planning permission. Alternatively, they could submit an entirely new planning application, which could take 1 – 2 years to be consented.

Ireland's 2030 targets and lack of security of supply point to the justification for a rebuttable presumption in favour of repowering, thus enabling the many wind farms which are capable of operating beyond their initially anticipated operational life, to continue to operate with little to no amendments or changes required. Under existing planning permissions which have an operational life imposed, wind farms are required to be decommissioned or taken down (which would have environmental impacts) if their operational life expires. However, if there was presumption in favour of repowering, those wind farms might continue to operate in circumstances where they have been in the community and part of the landscape for 25-30 years and are capable of further operation.

Council Regulation (EU) 2022/2577 of 22 December 2022[15] laying down a framework to accelerate the deployment of renewable energy provides that there should be a presumption in favour of repowering and that in consenting to same, planning authorities should look through the lens of the change or extension only for repowering.

The language of the Emergency Regulation has also been included in the revised Renewable Energy Directive, which will remain in force until 2030. WEI believe it to be of critical importance that Government implement these provisions and ensure that we do not lose renewable capacity from the system and start going backwards on our 2030 targets.

[15] https://eur-lex.europa.eu/eli/reg/2022/2577/oj

Spatial Planning

It is of paramount importance that national renewable onshore wind targets are translated into regional targets and that the associated Spatial Strategies are developed to ensure their delivery.

WEI has reviewed the MW potential emerging from the most recent County Development plan making cycle. From our initial analysis the onshore wind ambition at a local County level is not sufficient to achieve national targets.

WEI has long been an advocate of a regional approach to onshore wind target setting and to the development of a regional spatial strategies to inform local plan. In this regard WEI broadly welcomed Action 102 in the Climate Action Plan 2021, Annex of Actions and in particular the references to 'regional renewable energy strategies' and 'targets for onshore renewable electricity development to inform spatial plans'. These are critical to resolve challenges at the county development plan making level.

WEI calls on Government, in producing the 2024 Climate Action Plan, to ensure the urgent and effective implementation of outstanding measures in Action 102 of the 2021 Climate Action Plan, namely:

- Review and publish a revised Methodology for Local Authority Renewable Energy Strategies
- Publish a framework to set out targets for onshore renewable electricity development to inform spatial plans.
- Publish a Roadmap for the development of the Regional Renewable Electricity Strategies

The Regional Strategies have a critical role in setting a wind energy policy framework that a local authority must apply when preparing new development plans and determining planning applications. By empowering locally elected representatives who sit on the Regional Assemblies to play their part in the process we facilitate greater democratic participation in setting regional strategic planning objectives for energy. This policy framework may well need the support of section 28 guidelines incorporating 'Specific Planning Policy Requirements' or their equivalent under the new Draft Planning and Development Bill.

Markets

Ireland has set itself an ambitious target of delivering 80% Renewable Electricity by 2030. The needed policy frameworks to incentivise enormous levels of investment into the deployment of renewable energy technologies are now being put in place.

Ireland has a strong pipeline of wind projects, both onshore and offshore, currently progressing through the various stages of the development process with the aim of delivering additional capacity onto the system by the end of the decade. Having just held its first ORESS auction, which aims to procure a combined capacity of just over 3GW over four individual projects. Ireland has taken a huge step in its path to Net Zero. This first Offshore auction saw projects succeed with winning bids of €86/MWh. This is a significant win for Irish consumers and highlights the cost benefits that renewables will bring to the Irish energy system and its users.

To ensure Ireland keeps the momentum going, project developers, supply chain, and financial institutions require more certainty in the market, and reduce long term risk. These are the projects that will enable Ireland to meet its national goals and contribute to Europe achieving its own targets. These targets will negate our dependency on foreign energy imports from less politically stable regions.

Ireland, and Europe, are undergoing a change of significant scale, moving from an energy system dominated by fossil fuels, to one which harnesses renewable energy. A change of this magnitude has rippling effects on the energy system such as the need for innovative technologies and planning required for a more efficient and effective renewable energy grid. At an EU level, there is discussions around revising the electricity market design, where changes are being considered. How our electricity market evolves is key, but any changes made must be implemented in a way to reduce risks on projects under development today, as this could affect our ability to achieve our 2030 targets.

WEI believe that well-functioning EU electricity markets are crucial to providing revenue certainty and investor confidence for renewable generators. There is no doubt that discussions on electricity market design should occur, but serious discussions on its implementation are needed.

A summary of WEI's key asks as regards electricity markets is as follows:

- DECC to speed up the delivery of future auctions both onshore and offshore if we are to meet our 2030 goals.
- Ensuring coherency between renewable and storage roll out to provide the most optimal outcome for the end consumer.
- Urgently provide clarity on the implementation of Articles 12 & 13 of the Clean Energy Package

Visibility on the timelines and dates for future auctions – onshore and offshore – to provide certainty to the industry.

Having held two onshore renewable auctions already (RESS-1 and RESS-2), it has been encouraging to see the successful running of Ireland's first offshore wind auction (O-RESS 1), and the positive nature of the onshore RESS-3 auction terms and conditions. It has shown the industry that the Government is taking requests on board and is trying to implement them as best they can. WEI are now asking for DECC, in consultation with industry, to speed up the delivery and provide clear visibility on the timing of future auctions if we are to meet our 2030 goals. This includes visibility on RESS auctions post 2025 and future ORESS auctions. This will give industry certainty as to what auction they will be bidding into and send positive investment signals to potential vendors.

From a broader standpoint it is important for the country to speed up the roll out of renewables, particularly following the European Commission's publication of the REPowerEU[16] plan in May of last year. This publication sets out a series of measures to rapidly reduce the EU's dependence on Russian fossil fuel well before 2030 by accelerating the clean energy transition.

The Commission has proposed to increase the target in the directive to 45% by 2030, with the co-legislators ultimately agreeing on a 42.5% target that can be revised upwards to 45%. Ireland must demonstrate to our fellow member states that we are ready to deliver our share of the collectively binding target. Regular auctions of sufficient capacity, as committed to by the Government parties in Programme for Government: Our Shared Future[17],are vital to reaching this ambition, and giving confidence to an international supply chain that Ireland is where they should focus and invest. Continued, ambitious, accelerated, delivery of onshore and offshore wind will be crucial to Ireland's climate and energy security goals.

Ireland not only can meet its own targets but can play a vital role in helping Europe decarbonise. The plans, developments, and projects put in place to achieve our 2030 targets can set Ireland up to become a major exporter of energy in the future decarbonised European Energy System.

Coherency between renewable and storage roll-out

WEI believe there is a need to urgently put in place well-designed routes to market to drive the required investment into Storage, Flexibility and Zero-carbon system services to enable bulk time shifting of energy to minimise curtailment, constraint and oversupply issues and enable the electricity system to operate at 100% renewable power.

As Ireland move towards an 80% RES-E system by 2030 and Net Zero energy system in 2050, Ireland will need to deploy significant storage capacity, flexibility capacity, and net zero carbon system services to maintain a secure and stable electricity grid with the growing additions of renewable energy capacity. These services have the potential to significantly reduce network constraints while simultaneously managing system oversupply and providing clean dispatchable capacity.

---

[16] EUR-Lex - 52022DC0230 - EN - EUR-Lex (europa.eu)

[17] gov.ie - Programme for Government: Our Shared Future (www.gov.ie)

It is worth considering that other markets that are attempting to work towards net zero power systems are recognizing an important role for large scale long duration storage deployment (e.g., NSW Australia & GB). It is important that the procurement of the available renewable energy through RESS mechanisms and the procurement of the storage/flexibility services to help manage the large volumes of variable renewable energy are complimentary and are in tandem with one another. Ultimately, rolling out renewables without batteries is a waste of MWh generation and rolling out batteries without renewables is a waste of MW capacity, as such it is important that the two are kept in tandem to optimise the use of both. This will help to reduce emissions with the cost to the end consumer at the most optimal price.

Provide clarity on the implementation of Articles 12 & 13 of the 2019 Electricity Regulation

In March 2022, the SEM Committee issued a Decision (SEM-022-009) regarding the implementation of Article 12 and 13 of the Clean Energy Package (CEP). This decision has caused great uncertainty within the industry. WEI wish to highlight the importance of ensuring alignment across several interwoven elements of market policy.

Whilst this uncertainty remains, it only serves to impact future RESS/ORESS auctions. This can have the effect of pushing up prices for consumers, who will face higher electricity bills than anywhere else in Europe and GB, at a time when prices should be coming down with increased renewable capacity.

Like government, WEI members are committed to playing our part in achieving future targets on emissions reduction and delivering renewable solutions at the lowest cost to end consumers. However, we are gravely concerned that the Decisions communicated in SEM-22-009, if implemented, will significantly adversely impact on the ability of the industry to deliver sufficient volumes of new projects to enable the Irish government to achieve our collective decarbonisation goals at a reasonable cost to consumers.

WEI members strongly believe that the Decision in relation to “grandfathering” will jeopardise the build out of new renewable capacity in Ireland with immediate risk facing deployment of projects already contracted in RESS-1 and RESS-2. Ultimately at some point post-2026, there will be “grandfathering” of constraints for all new generators. This means that when there is a need to turn down renewables to solve a network congestion problem, new generators (including all RESS and O-RESS projects) would be turned down before any other contracted generators, as they do not have Priority Dispatch status which existing contracted generators have. The implications for projects successful in RESS-1 is particularly serious. These generators bid into the RESS-1 auction on the assumption that constraints would be prorated across both priority dispatch and non-priority dispatch generators. The ECP constraint reports carried out by the SO had these assumptions included when they were provided to generators in advance of bidding.

If the new ruleset for constraints is implemented as set out in SEM-22-009 then this means the constraints analyses used by generators in setting bid prices for RESS-1 and RESS-2 are completely inadequate. The bid prices submitted would in no way reflect the constraint levels

which will be imposed upon them, creating enormous uncertainty on the bankability of these projects. This is almost certainly the case for all RESS-1 projects and most RESS-2 projects.

This poses major risks to future renewables delivery. Project developers could see constraint levels increase to between 2 – 5 times greater than before, which will significantly affect the bankability of the project. In our view, more clarity is urgently needed surrounding the decision and we as WEI are calling on government to engage with industry on how this can be fixed.

Ultimately the current methodology risks acting as a deterrent to new renewable energy projects, which will:

- Decrease the delivered renewable MW capacity.
- Decrease the MWh generated by renewable generation.
- Increase Carbon emissions from the power sector, leading to the need for greater cuts elsewhere.
- Increase customer energy bills in the medium to long term.

Seizing our Offshore Opportunity

Offshore Wind Delivery Taskforce

WEI welcomes the introduction and establishment of the Offshore Wind Delivery Taskforce (OWDT) for driving forward the development of the industry in Ireland. We would, however, continue to stress the importance of including the offshore wind industry on the Taskforce itself, as well as all 8 workstreams which have been implemented under the Taskforce.

Currently WEI are involved in 3 of the 8 workstreams, including Supply Chain, Skills & Workforce and Communications, however there are 5 other workstreams across critical areas such as planning, consent and grid development, which industry have no direct involvement in.

Large international players in offshore wind are members of WEI and leading activities across several WEI Offshore Committees and Working Groups and who have the track record and hands on experience of delivering offshore wind projects across multiple jurisdictions and markets.

These members also bring experience of policy development in these jurisdictions to enable the successful deployment of offshore wind, which is expertise that will be significant to supporting the OWDT and the success of the offshore wind industry for Ireland.

National Industrial Strategy for Offshore Wind (NISOW)

WEI have also welcomed the recent announcements from Minister for Enterprise, Trade and Employment, Simon Coveney TD, of plans for an industrial strategy for offshore wind, which makes clear the Government's commitment to ensuring that as we cut carbon emissions and prices, we create jobs at home and support Irish businesses.

It will be important to ensure the industrial strategy is aligned with wider ORE policy in place and currently under development, such as the EirGrid's Shaping our Energy Future V1.1, the Hydrogen Strategy, the updated Interconnection Policy for Ireland, and the wider ORE Future Framework being developed by DECC. As there are several aspects of policy which will impact on the future development of ORE in Ireland, coordination across each of these areas is essential to ensure a coherent and transparent process and long-term roadmap, which provides the required level of certainty to the international supply chain and investment community.

Industry and Government working in partnership will be the cornerstone to the delivery and implementation of the industrial strategy roadmap for offshore wind and WEI would recommend the introduction of a joint industry-government forum or working group to progress development of the NISOW ahead of and beyond the wider industry consultation phase.

Phase 1

Four projects were successful in the ORESS-1 auction for a total of 3.1 GW of capacity. This is more than half of the Government's target of 5 GW of offshore wind energy for connection to the grid by the end of 2030 and the equivalent of powering more than 2.6 million Irish homes annually.

While the awarding of contracts represents a landmark day for Ireland's renewable energy industry, none of the projects who were successful in the auction have yet been able to apply for planning permission.

The lack of resources and capacity in An Bord Pleanála, the National Parks and Wildlife Service and the delays in getting the Maritime Area Regulatory Authority (MARA) set up are critical concerns for the industry and particularly the projects successful in ORESS-1.

Ensuring we have a robust planning system that can quickly and fairly assess applications from these projects needs to be a top priority for the Government.

Phase 2

WEI welcomes the Government's March 2023 Accelerating Ireland's Offshore Energy Programme: Policy Statement on the Framework for Phase Two Offshore Wind[18] and the end this brought to a full 12 months of uncertainty around what form the next phase of Ireland's offshore journey would take.

However, a change from the expected policy direction by Government upon publication of the Policy Statement brought a significant amount of uncertainty, particularly to the international supply chain and investment community.

WEI has previously warned that the Government's changes to offshore wind policy will undermine efforts to achieve the targets set for offshore wind energy in the Climate Action Plan.

The Phase 2 Policy Statement sets out the Government's plans to deliver the second group of projects needed to reach the 5 GW target, as well as proposals for the long-term development of offshore wind post 2030.

The 2 key changes which will have implications for achieving the 2030 targets are:

- Firstly, the policy provides that all future offshore wind farms must be built within Designated Marine Areas (DMAP) which have yet to be finalised. There remains significant uncertainty around this process both for the initial South Coast DMAP, and subsequent DMAPs that are set to form part of Phase 2.

[18] https://www.gov.ie/pdf/?file=https://assets.gov.ie/249823/bbd8b13c-73cd-46d4-9902-533fbf03d7fe.pdf#page=null

- Secondly, it proposes that future offshore wind farms, at least for the initial projects within Phase 2, will connect to offshore substations to be designed and built by EirGrid.

WEI is not opposed to the State identifying locations for the development of offshore renewable energy, nor that the projects would connect to offshore infrastructure developed under a plan-led system by EirGrid. However, if this was to be the policy it needed to be identified and clearly communicated years ago.

Policy changes bring uncertainty and costs Ireland time we cannot afford to lose. These risks prolonging our dependence on imported fossil fuels and locking in more carbon emissions.

Ireland's burgeoning offshore industry requires a stable and predictable policy and regulatory framework. Industry, as well as the supply chain and investment community, both domestically and internationally, need clarity and certainty on the short to long-term plans for offshore wind development in Ireland. The approach taken needs to be coherent and communicated at the earliest opportunity, setting out a step-by-step roadmap which indicates what we are going to do, when we are going to do it, and how we intend to deliver on those commitments.

Government and the relevant State Bodies must engage and work in partnership with the industry to put in place a consistent, stable, and workable model for the development and delivery of offshore wind energy in Ireland, now and for generations to come.

Additionally, WEI asks Government to work closely with industry in setting out the Phase 2 programme**.** It is crucial that we accelerate the process to give ourselves the best chance of achieving our 2030 target, however, at the same time, it is important that timelines are realistic and coherent in order to ensure the required information can be provided in time for projects to compete in an auction, and that the required certainty is provided to the global supply chain.

Finally, it is important to provide clarity on the offshore delivery model. EirGrid-led offshore transmission delivery is understood to be the model for ORESS 2.1 but certainty is still needed on the model for subsequent Phase 2 auctions.

Phase 3

WEI also welcomes the clarity Phase Two Policy Statement brought to subsequent phases beyond Phase Two and the 5 GW objective, namely the new Phase 3, which targets an initial 2 GW of floating offshore wind off our South and West Coasts.

WEI notes that the Policy Statement sets out that these floating projects in Phase 3 are expected to be in development by 2030 and may include projects available for green hydrogen production and other non-grid uses.

As WEI clearly set out in our July 2021 Revolution paper, with floating offshore wind, Ireland is on the cusp of a major opportunity, and actions are needed to fully grasp it. To fully capture

the benefits of floating offshore wind, it is important that Ireland builds on the work already being carried out by offshore wind energy developers to become an early mover in floating offshore wind and establish a strong indigenous industry.

Our burgeoning floating offshore wind industry can create thousands of jobs by 2050, through staging, installation and the operations and maintenance of wind farms. There may also be opportunities for Ireland to contribute to the manufacturing of floating foundations and smaller components, providing further employment.

2024 is a critically important year for this industry and key actions must be delivered by Government if Ireland is to get these projects in development by 2030. What we need in 2024 is:

1. The Phase 3 Policy statement published without delay no later than Q1 2024 (the draft document should be issued for consultation by in Q3 2023)

2. Draft DMAPs for Phase 3 floating offshore wind projects published by Q1 2024.

3. Industrial Strategy (to outline requirements for supply chain, ports, and alternative routes to market for Phase 3 and the Future Framework) to be finalised by Q1 2024.

4. A detailed strategy for Phase 3 with a timeline (year by year) of what needs to be delivered between now and 2035 to be published by Q3 2024.

5. Completed DMAPs (with SEA and AA) by Q4 2024.

WEI also notes that a critical factor that prohibiting progress on floating offshore wind is the lack of a dedicated workstream within government. If Phase 3 is to be a success, it is vitally important that in 2024 we need to see a clear mobilisation of resources within relevant government departments, along with the establishment of a dedicated floating offshore wind workstream within the Offshore Wind Delivery Taskforce to ensure coordination on Phase 3 and the Future Framework, given the unique characteristics and scale of opportunity of the sector.

Future Framework

WEI welcomes the long-term targets included within the Phase Two Policy Statement of deploying 20 GW of offshore wind generation by 2040 and 37 GW by 2050. However, there remains an urgent need for a spatial roadmap and delivery plan for this scale of deployment, including setting out predictable spatial plans, processes for award of MACs and consenting arrangements. WEI understands that DECC are still working on the policy regime for the Future Framework, which must now be expedited as part of CAP24. Clarity is also needed on how and where Phase 3 will sit within this wider Framework and how the broader policy landscape will align under the Framework as well, including the National Industrial Strategy for Offshore Wind.

WEI submitted a detailed response on the Offshore Renewable Energy Development Plan II (OREDP II) consultation in April 2023 outlining our key concerns and recommendations on the

proposed approach, with a further submission in response to DECC's call for updated and new datasets to inform OREDP II finalisation and DMAPs in June 2023.

We understand the Plan is undergoing an extensive revision following broader feedback received via the consultation process, including removal of Broad Areas of Interest which were included in the draft plan issued for consultation and greater focus on the preparation of DMAPs. WEI welcomes this and would urge Government to engage further with industry on the revised approach, particularly in relation to the seabed award process and future DMAPs.

A co-ordinated approach to marine spatial planning will be vital to maximise the economic, social, and environmental benefits of offshore renewable energy deployment and to ensure co-existence between maritime uses and priorities. Whilst ORE development will be plan-led, this must not preclude the consideration of the best available data from all available sources, including from developers who have already examined potential sites in Irish waters, to inform robust marine spatial planning. New mechanisms should therefore be developed at pace to enable data collated to date by developers to be provided to DECC for spatial planning purposes and to inform the preparation of DMAPs. CAP24 should commit the Government to developing such a data sharing mechanism to support future marine spatial planning.

In addition, one of the key points raised by WEI in our response was that beyond Phase 3, - which has ringfenced 2 GW to kick-start floating offshore wind in Ireland to be in development by 2030 - the Future Framework beyond 2030 should be technology agnostic, catering for both fixed-bottom and floating offshore wind, so as not to hinder the future pipeline of projects, or to limit the potential to harness Ireland's ORE resource.

DECC have recently shared with WEI that 2 key pieces of economic analysis are being undertaken, on how to maximise the return to the State from offshore wind and on the export potential for Ireland from ORE. WEI would welcome further engagement and collaboration with DECC to support both pieces of work.

Supply Chain and Port Infrastructure

Earlier this year WEI provided a position paper on key supply chain issues for Ireland to the members of the Supply Chain Workstream under the Offshore Wind Delivery Taskforce. In this paper we highlighted the fact that in terms of offshore wind, Ireland is part of a global competition, for infrastructure, products, services, suppliers, and resources.

The supply chain is facing increasing constraints which poses risks to the deliverability of offshore wind projects, but also, critically, to meeting decarbonisation targets. 2022 saw only an additional 2.5 GW of new offshore wind capacity deployed across Europe, the majority of this capacity delivered by the 2 largest offshore wind projects in the UK, Hornsea 2 and Seagreen.

30% more capacity was expected to be delivered in 2022, which did not materialise for several reasons, including increased demands, limited capacity and access to resources, confidence

in market conditions and rising costs due to inflationary pressures. Therefore, Ireland must focus its efforts on attracting the international supply chain to prioritise the Irish market, while at the same time, developing a robust system which encourages and support the indigenous supply chain to flourish.

The offshore wind sector in Ireland has gained momentum in recent years, further driven by the recent success of the ORESS-1 auction, and we cannot afford to lose that momentum now. Recent policy developments have triggered uncertainties and shaken confidence across the international supply chain and investment community which we must work to rebuild.

Ireland must put in place a clear, robust roadmap which sets outs exactly what we are going to do, when we are going to do it and how we intend to deliver on those commitments. This will be vital to providing the required level of certainty and clarity on the process and pathways for delivery, as well as concrete timelines, so that we can ensure Ireland's place as a credible and serious market player that is committed to offshore wind and secure access to the resources the industry will need to enable delivery.

Ports are a critical enabler across every aspect of offshore wind development, including unlocking the wider supply chain. WEI published the *National Ports Study*[19] in September 2022, which carried out an assessment of 13 port and harbour sites across Ireland, to identify their existing and planned (if any) infrastructure and capabilities to support the marshalling and construction of ORE projects. The report found that currently only Belfast Harbour has the capability to support the build out of offshore wind projects, but due to increasing demands from projects domestically as well as internationally, will have limited capacity over the coming years to be able to support multiple projects. Therefore, it is essential for Ireland to provide strategic investment into a number of port and harbour facilities across the country at the early stages, to enable these sites to expand their infrastructure capabilities and be ready to support Irish projects to build out in Irish waters, from Irish ports.

More recently, WEI published the report *"We can build them: Supporting Irish ports to build offshore wind farms."*[20] This report built on the previous National Ports Study, by focusing on the investment requirements for ports to support ORE and how several strategic port locations have been funded to do so internationally. This report proved the economic opportunities for Ireland in the long term, from making these investments into our port infrastructure in the short to medium term.

WEI welcomes the recent news that Rosslare-Europort and Doyle Shipping Group have each received €2.5 million in funding from the Connecting Europe Facility funding call for 2023 to progress their port infrastructure plans to support the offshore wind industry at Rosslare, Cork and Greenore. This is a fantastic step in the right direction to stimulate the additional investment which will be required to expand the facilities and infrastructure at several ports and harbours around the country to meet the needs of the offshore wind industry.

[19] https://windenergyireland.com/images/files/final-national-ports-study.pdf
[20] https://windenergyireland.com/images/files/20230329-final-irish-ports-funding-study.pdf

WEI equally welcomes the implementation of the ORE Facilitation Forum, led by the Department of Transport, as a key steppingstone to bring the relevant Government departments, State Agencies, ports and ORE industry together to discuss challenges and opportunities and ensuring the infrastructure is in place to support the first phase of offshore wind projects in Ireland. We would stress the importance of this group for supporting the future phases of offshore wind, both fixed and floating, bearing in mind that requirements will differ.

Additional Points

In addition, there remains uncertainty as we move into Phase 2 around several aspects of offshore consenting which should be addressed in CAP24. Guidance documentation should be prepared for Offshore Renewable Energy ("ORE") development on ancillary and subsidiary elements of offshore projects, including grid connections/route to market, particularly where EirGrid has not yet applied for key grid infrastructure updates to support the development to ensure that planning permissions are not unduly refused and that modified proposals are not requested as part of the planning process.

Additionally, as regards MARA, regulations should be published outlining set timeframes for the overall determination of licences and specific elements during the determination process.

Hydrogen and Electrofuels

What role does renewable gas have in the power generation sector?

Hydrogen production can increase RES integration in time of high output, time shift to use in hydrogen turbines in low RES. Therefore, increases power system security via zero carbon dispatchable units and provides flexibility to the power system and decreases reliance on imported fossil fuels.

In times of low wind speeds and low levels of sunlight, Irish demand may exceed renewable electricity supply. Battery system storage solutions can provide short- and medium-term solutions to this and bridge the energy supply gap over short periods of time. For a secure and robust energy system with a high proportion of renewable generation there is a need for energy storage that can span several months and support inter-seasonal supply.

While there is an important role for hydrogen in the current and future energy system, it is important to analyse where, and almost as importantly when, hydrogen demand in the power generation sector is expected to materially contribute to a net zero energy system.

Short term (present – 2030)

Natural gas-fired power generation currently provides around 55 per cent of Ireland's electricity requirements. Hydrogen-fired gas turbines and/or fuel cells are a promising option for future dispatchable renewable generation in periods of low wind. However, the quantity of hydrogen needed for powering Ireland, for even a few hours, is significant.

Hydrogen can be expensive to store. Green hydrogen in the form of liquid e-fuels (green ammonia, eSAF, eMethanol, etc) will play a significant role in the energy security of Ireland. As these e-fuels are relatively easily stored, and energy dense, they will provide a huge storage of energy, using existing above ground storage tanks. These products will be required as part of our energy system anyway (shipping, aviation, etc.) and as such it makes sense to store our energy supplies in the form of finished liquid products. A full cost-benefit analysis will be needed to examine the most optimum overall method of storing hydrogen when considering end-use, location, transport, energy efficiency, etc.

Medium term (post 2030)

The IEA says to reach net zero emissions by 2050, advanced economies must reach net zero electricity systems by 2035. We have recently seen the UK commit to this 2035 target. Ireland must follow suit and set out the ambition to achieve a zero-carbon electricity system by 2035.

The WEI/Baringa Endgame[21] report provides a roadmap to a net zero Irish electricity system and shows the role that green hydrogen can play, with 1,290 MW of electrolyser capacity needed, along with 4,380 MW of gas generation capacity retrofitted to run on hydrogen.

In Baringa's analysis, the levels of renewable penetration in what is termed the 'Less than 2 MtCO2' scenario induce around 1,500 hours of zero-price in the day-ahead market. This figure increases to over 2,100 hours in Phase 2 of the study, which looks at a zero-carbon scenario.

[21] https://windenergyireland.com/images/files/20210629-baringa-endgame-final-version.pdf

Zero-price hours arise when wind and solar plant, bidding at zero cost, can provide enough generation to meet demand levels in the day-ahead market. Any excess RES generation must either be exported to neighbouring markets via interconnectors or curtailed as oversupply.

The analysis examined the impact an installed electrolyser capacity of 1,600 MW throughout I-SEM by 2030 would have on reducing CO2 emissions. These electrolysers are configured to produce hydrogen when day-ahead prices fall below 50 €/MWh. It assumed that the hydrogen produced is utilised in generation assets during the hours of highest price, displacing fossil gas offtake in these hours. To allow this targeted hydrogen offtake, it is assumed that storage volumes are not a limiting factor in this scenario, with 3 and 1 TWh of hydrogen storage available in ROI and NI respectively.

The results show that of the 2.6 TWh of gas-fired generation in Ireland in this scenario, approximately 1.3 TWh is hydrogen-fired. Power sector emissions are reduced as a result by 0.49 Mt of CO2 in Ireland from this displacement of fossil gas relative to scenario A. The electrolysers act to increase the domestic I-SEM demand during low price hours, acting to reduce renewable curtailment.

The electrolyser capacity is assumed to have a power-to-hydrogen efficiency of 70%. 1,600 MW of capacity produces 3.9 TWh of hydrogen from 5.6 TWh of electricity during hours of day-ahead price below 50 €/MWh. The electrolysis-weighted cost of production is around 15 €/MWh. Green hydrogen produced at these power prices is cost-competitive relative to fossil gas-fired generation under an ETS carbon price of €100/tCO2.

This hydrogen is utilised for generation within 900 MW of retrofitted fossil gas-fired capacity in ROI and 300 MW in NI. The hydrogen-fired units are dispatched when day-ahead prices exceed 80 €/MWh, displacing fossil gas generation during these hours.

Hydrogen can be stored cryogenically or in high pressure tanks, or more economically, in underground caverns where the geology permits.

Retrofitting the I-SEM gas fleet is considered technically achievable according to suppliers such as GE, Siemens, and Mitsubishi. It should be noted however that all gas customers, as well as the gas transmission and distribution system, would need to convert to a hydrogen blend (or 100% hydrogen) at the same time. It was outside the scope of the Baringa study to determine the feasibility, economics, or timing of such a change, but it does prove that it is technically possible.

This analysis by Baringa and, other recent analysis by MaREI shows the potential role Green Hydrogen will play in getting Ireland's electricity system to zero-emissions. Green Hydrogen will also provide a new route to market for wind energy in Ireland, unlock a massive export opportunity to European countries in need of Green Hydrogen and other Electrofuels, and enable us to make the most of our significant offshore wind resources.

Policy Consistency

WEI welcomes the publication of the National Hydrogen Strategy[22] in July. This is a vitally important document which provides needed clarity and direction to a new industry with major potential to contribute to our Net-Zero transition. As the strategy is implemented, it will be important to ensure a consistency and coherence between it and other relevant energy strategies.

For example, the National Hydrogen Strategy sets out that prior to 2030, hydrogen will be produced from grid connected electrolysis from surplus renewables. It notes that this will initially be needed to meet EU targets in specific end-use sectors such as transport and will likely be used in the power system. The operating models for these should be beneficial to the electricity system and sufficient grid infrastructure is needed to facilitate this.

The strategy notes that Infrastructure is key to enabling the scale up and large-scale deployment of cost competitive renewable hydrogen in Ireland. Delivering this requires better integration between renewable spatial planning, electricity, gas and water networks, long-term supply and demand planning as well as identifying and progressing the development of large-scale storage solutions. Hydrogen's role is that of an enabler of a more integrated net zero energy system. As such, future systems planning in this space must ensure clear alignment with Ireland's climate ambitions, energy policy and be applied consistently across all sectors.

At the same time, in EirGrid's Shaping our Electricity Future v1.1, this additional offshore wind has not been included in the network model. The working assumption was that the demand for hydrogen production would not be supported by the wider transmission network when the output of the 2GW of offshore wind is below the demand of hydrogen facilities.

It is important, to ensure investment certainty, that there is clear alignment between all strategies that are expected to contribute to the achievement of targets.

Storage and Demand-side Response

The Role of Energy Storage and Demand-side response in a high RES-E scenario

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?

To ensure the secure, reliable operation of the electricity system at close to 100% System Non-Synchronous Penetration (SNSP) levels and with close to 0MW of constrained on thermal generation, European Transmission System Operators will need to be able to access all necessary system stability services from zero carbon sources.

Supporting market frameworks need to be established to allow all inertia to be procured from devices such as synchronous compensators, frequency response, short term reserves and ramping services can be procured from storage and demand side response technologies, and

[22] https://www.gov.ie/pdf/?file=https://assets.gov.ie/263248/f982c10f-eca6-4092-a305-90000e5213ed.pdf#page=null

voltage support / reactive power services can come from a wide variety of sources including appropriately located synchronous condensers, storage, demand side response and renewable generators.

As we approach very high levels of RES-E penetration, a growing need emerges to find ways of time shifting very significant renewable energy volumes. This brings a critical role for new and emerging long duration storage technologies to address this issue.

In June 2022, the Baringa Gamechanger[23] report was published, setting out the benefits of deploying energy storage in Ireland and Northern Ireland. This followed the December 2019 Store, Respond and Save study, also by Baringa, which outlined the benefits of zero-carbon system services provided by battery technology.

The reported demonstrated that by participating in the Irish day-ahead energy market, energy storage can reduce day ahead carbon emissions by 50% by using long-duration storage technologies. This makes a material contribution to meeting ambitious 2030 power sector decarbonisation goals.

Additionally, the strategic deployment of energy storage in transmission constrained regions of the network reduces the dispatch-down of renewable generation from constraints without the need for network reinforcement, unlocking additional carbon savings.

Thirdly, by contributing to security of supply, helping to support renewable capacity, and displacing fossil fuels in the balancing market, energy storage can deliver a net saving to end consumers in Ireland of up to €85m per year.

These benefits are additional to the carbon, renewable curtailment, and end consumer savings offered by energy storage through the provision of zero-carbon system services. Overall, energy storage helps the integration of renewables at all stages by ensuring that generation is not wasted, reducing oversupply by up to 60%, constraint volumes by up to 90%, and curtailment by 100%.

Such deployments require efficient and appropriate market investment signals if they are to be delivered. The design of the future electricity market that is fit for a zero-carbon system will need to consider the inherent commercial / economic characteristics of these essential technologies that we know we will need.

Some technology solutions such as demand side response have limited capital costs and likely more material marginal operating costs and can potentially be deployed under modestly evolved energy, capacity and system service markets, and this flexibility will have a net system value. However, it is extremely unlikely that these technologies can provide energy time shifting services at the scale and in the locations, required to support the level of decarbonisation we are targeting.

[23] https://www.energystorageireland.com/wp-content/uploads/2022/05/GameChanger-ESI-Report-May2022-Web-1.pdf

Large scale long duration storage technologies will likely have very significant capex and relatively low marginal operating costs (excluding energy market charges) and as such investment in these technologies would likely be more efficient if they were provided with a much higher degree of revenue certainty. For storage technologies however, it is also important to preserve short term energy market price signals to ensure that deployed technologies operate efficiently on the system once built.

WEI strongly supports the positions put forward by Energy Storage Ireland as regards the energy storage being a critically important aspect of the transition to an electricity system based on clean, renewable electricity. As set out by ESI in its June 2022 position paper on Long-duration storage[24], Energy storage will play an essential role in facilitating the higher levels of renewable generation on the power system required to achieve national renewable electricity targets. The- flexibility of storage systems and their ability to contribute to the energy, capacity and system services markets allows them to deliver a wide range of benefits to end consumers such as wholesale energy price reductions, reduced CO2 emissions and flexible system support services to help manage the grid with higher levels of renewables.

However, Ireland currently lacks a coordinated strategy for energy storage is needed and will help to ensure investment is supported through the various pillars of the market and that new energy storage technologies are fully integrated into the electricity system and market to unlock their full potential. Such a strategy should bring together the relevant stakeholders such as the System Operators, Regulatory Authorities, Government departments and industry to ensure a coordinated approach to energy storage going forward.

Long-Duration Energy Storage (LDES) will be essential to decarbonising our energy system by providing a range of valuable services from congestion management, peaking capacity, alternative network solutions, increasing renewables on the grid, delivering cost benefits to end consumers, and ensuring security of supply. However current market frameworks and incentives are unlikely to be sufficient to deliver the volumes and capabilities of LDES we will need in future. This will require new frameworks to drive investment similar to how REFiT and RESS have driven investment in renewable technologies with similar high Capex/low Opex characteristics to LDES.

To drive the needed investment into storage technologies and reap the system benefits it would provide, WEI fully support ESI's call for the development of an LDES procurement framework, based on the following high-level principles:

- The LDES procurement framework should be technology agnostic and support investment in an appropriate broad portfolio of storage technologies and capabilities that meet the needs of the system and national decarbonisation objectives.
- The procurement process should maximise long term certainty for a floor revenue for winning technologies. This will reduce investment hurdle rates enabling easier, greater and more cost-effective deployment.

[24] https://www.energystorageireland.com/wp-content/uploads/2022/11/ESI-Position-Paper-on-a-Procurement-Framework-for-Long-Duration-Energy-Storage.pdf

- The procurement should be based on an estimation of overall system value vs cost taking account of any locational benefits.
- The selection of "winning" technologies needs to be based on a transparent full system & network model that bidders can understand and replicate. This doesn't have to be perfectly optimized, but it is critical that it is consulted on and is transparent / replicable. The process should clear projects with the highest deltas between overall system value and bid cost first.
- The process should be designed in a manner that recognises the hedging value of storage. LDES investment will be Capex driven rather than Opex which means more stable pricing and less exposure to gas price volatility.

There are challenges associated with designing a market capable of accommodating the high levels of renewable penetration required to deliver on our 2030 and longer-term targets. The electricity market will need to drive investments across a wide range of technologies, including low carbon generation, electricity storage, and flexible demand from consumers.

To cost effectively get to a net zero economy, and before that to a fully decarbonised electricity system, we must ensure that the market is designed to optimise both investment and dispatch (where and when to produce and use electricity) given the current market design is one based on a fossil-fuel powered electricity system. Long-term contracts would appear to be the best way of incentivising the needed levels of investment in a cost-efficient way.

The incentivisation of flexibility is also a key aspect and it will be important ensure accurate market signals for these technologies. Such market signals could deliver much of the flexibility needed for a zero-carbon electricity system, but there are challenges around investor certainty and therefore a mechanism to de-risk investment will likely be needed at Member State level.

In terms of ensuring capacity adequacy and avoiding the kinds of issues we're seeing on the system in Ireland today, a reform of the Capacity Market to ensure better support for firm low carbon technologies is critical to reaching zero carbon system and would be welcome if addressed in this revision process. Electricity market design must drive the significant investment in the low carbon technologies that are essential to delivering on our Climate and Energy objectives.

A fine tuning of our current market design would give the needed signals and incentives for investment into the zero-carbon technologies that will help us achieve our climate objectives.

Security of Supply

Security of Supply in a high RES-E system

What measures can ensure the security of electricity supply sustainably in a system with a high amount of variable renewables?

Against the backdrop of uncertainty for next number of years, Wind Energy Ireland recognises the urgent importance that security of electricity supply is maintained throughout the

transition to a system emitting no greater than 3 Mt of CO2 by 2030, as per the recent Carbon Emission Ceilings agreed by Government.

WEI believes that a suite of additional measures, in addition to those already by Government, will be needed in the short, medium, and longer term as we seek to improve capacity adequacy on the power system and reduce the prevalence of system alerts. Given the large financial investments that will be required to deliver on Ireland's climate and energy objectives, policy certainty is critical. This certainty will underpin our capability to transition to a zero-carbon electricity system.

Implementing Demand Side Response / Energy Efficiency

Wind Energy Ireland recognises the potential benefits that demand side response measures can deliver for capacity adequacy and congestion management in the short term. Utilising demand side, whether using Demand Side Units (DSUs) or by shifting household demand, can provide system operators with increased flexibility and an additional tool for operating a secure system at peak periods. As such, policy can be designed to reduce peak demand on the system by shifting demand to lower demand periods and effectively smooth the demand curve.

A further benefit of demand side response is congestion management. In congested areas of the network, such as the Dublin region, demand side response can be used to alleviate congestion when required. Demand side response also has some potential to alleviate wind and solar constraint and curtailment by shifting demand to periods with high levels of renewable generation.

Deploying Storage and Hybrid connections

As outlined previously, there is a clear need for significant investment in energy storage technologies to ensure security of electricity supply. In the short term what we need to see is development of sufficient market mechanisms to ensure the multi-layered value energy storage provides is accurately remunerated.

Energy storage technologies are a key enabler for a decarbonised electricity system. Their deployment supports climate change and energy security goals by providing valuable services to the grid. Storage systems can act in the energy, capacity, and system services markets to deliver a wide range of benefits such as wholesale energy price reductions, reduced CO2 emissions and flexible system support services to help manage the grid as detailed in Energy Storage Ireland and Baringa's Gamechanger report.

There are important policy changes that could be prioritised in the forthcoming Climate Action Plan which would greatly improve the ability to increase the deployment of Battery Energy Storage Systems (BESS) on the system. For example, while EirGrid has the ability to dispatch batteries for export via EDIL, current interim policy is that battery energy storage systems (BESS) will not be dispatched or scheduled (except in limited circumstances at the discretion of EirGrid), instead being held back primarily for reserve.

There is already significant BESS capability of over 670 MW on the system that could be more actively participating in wholesale energy markets and contributing to security of supply for

the coming winter periods. However, due to the policy position above, all BESS are dispatched to zero MW and units have to buy power back in the balancing mechanism. Those without firm access are settled at the market imbalance price only (rather than their balancing market DEC price) and therefore exposed to imbalance price risks. Regardless of firm access quantities, very limited physical dispatch of energy from BESS is currently happening due to TSO policy and system limitations.

The quickest solution to unlock this capability is for the CRU to grant a deemed firm status to all non-firm BESS units in the market and for EirGrid to update their scheduling & dispatch tools and policies to allow more active dispatching of BESS. This would have a positive contribution to both energy prices and security of electricity supply, particularly during peak demand periods when BESS units are more likely to be active as a useful resource.

Furthermore, there is a large pipeline of energy storage projects in Ireland today with planning permission that could be deployed quickly to help meet our supply needs. To facilitate this, zero-carbon energy storage solutions should be prioritised over fossil fuel gas generation where possible to avoid locking-in polluting fossil fuel generation for many years to come. The major bottleneck for most energy storage projects at present is the ability to obtain a grid connection. As a simple policy measure, WEI believes that changes are needed to the CRU's Enduring Connection Policy (ECP) process to remove the current caps on the number of offers for storage projects per batch, which itself is an annual process.

There is also an opportunity to enable quick deployment of energy storage units on existing wind and solar sites by removing current barriers to hybrid grid connections. These grid connections have already been constructed and by enabling quick to deploy solutions such as energy storage on these sites can increase capacity factors for renewable sites and provide additional system support services.

The three key policy barriers that need to be facilitated for this hybrid policy to be effective are as follows:

- Enable multiple legal entities to behind the same connection point.
- Enable sites to over install beyond the current 120% MEC limit.
- Allow multiple technologies to share MEC behind the same connection point.

WEI would welcome the opportunity to engage with the relevant Government stakeholders on this matter in advance of the publication of CAP24.

Reforming the Capacity Market

As we increase our dependence on intermittent renewables, we will need to have adequate sustainable solutions in place to address scenarios when wind and or solar generation is low. The Capacity Renumeration Mechanism (CRM) is intended to ensure that this generation capacity is provided and has a route-to-market. As it currently functions the CRM does not seem to be fulfilling its function as was seen in advance of winter 2022/23 and the capacity situation Ireland faced, the necessity of acquiring emergency generation capacity for winter 2023/24, and the predicted generation capacity shortfall highlighted in EirGrid's GCS over coming years.

Beyond the immediate issue of capacity shortfall in the SEM, WEI believe that there is also a need to ensure that the new developments securing capacity contracts compliment the low carbon electricity system being created. Investments made now will remain a part of the electricity system for the next decade at least and must align with Ireland's decarbonisation ambitions.

There is a need for urgent and essential reform of the capacity market, to ensure it delivers the right type of flexible, low carbon ready, back up generation on the grid when we need it. WEI welcome the ongoing work by the SEM Committee to review the CRM. However, addressing the questions of why sufficient capacity has not been delivered is important but it is equally important that the new capacity procured aligns with our decarbonisation pathway:

- Investment in zero and low carbon capacity needs to be encouraged and facilitated. New gas thermal plants need to have a pathway to decarbonisation for example by being able to transition to green hydrogen. Restrictions on how energy storage projects can engage in the energy markets need to be removed to ensure they have a viable route-to-market.
- The timelines of the T-4 auctions are challenging to deliver projects within. Especially given the delays projects can face with respect to the planning process and grid connections. Reform and streamlining of these processes would reduce the risk of projects not delivering while also having ancillary benefits for development of the wider electricity system.
- Appropriate market and pricing signals that apportion risk in a balanced way that incentivises investment are needed. Adopting an overly penal approach will not deliver the capacity required.

Rolling out Zero Carbon System Services

WEI's *Bridging the Gap* report showed that significant emissions are caused by the need to constrain conventional units to meet DS3 system service requirements under EirGrid's Shaping Our Electricity Future (SOEF) baseline assumptions.

Conventional generators providing most of these services also expel many times more the emissions of low/zero carbon technologies that could otherwise provide these same system services in their lieu. The report shows around 10 Mt-CO2 as the cumulative emissions impacts in Ireland from the TSO having to redispatch plant to meet DS3 system services requirements over the decade (the SOEF baseline assumes at least 4 conventional thermal units are always needed on by 2030).

The report also shows that, even with rapid delivery of renewables beyond the SOEF baseline, Ireland is still likely to exceed its carbon budget limits for 2021-2030. It is clear therefore that shorter timelines are required for replacing fossil fuel system services with a low/zero carbon alternative mitigating against further emissions, while promoting the build out of additional renewable projects.

In 2030 alone emissions from DS3 limits make up around 40% of total power sector emissions according to this analysis. In short, the updated plan from EirGrid, SOEF V1.1 needs to go further than SOEF V1.0 as the electricity system must be able to operate with zero-carbon

system serviced by 2030, including the ability for the power system to operate without a 'minimum generation units' constraint on the system. Achieving the 3MtCO2 emissions ceiling by 2030 for the power sector will only be possible if the minimum number of conventional thermal units that are required to run is reduced to zero.

There are also significant cost savings from moving to full low carbon services capability. The Bridging the Gap analysis estimated consumer savings of €440 million in Ireland per year by 2030. This is due to avoided fuel and carbon costs from having to redispatch plant to meet DS3 limits. This reinforces the need to reduce our reliance on fossil fuel generation and a key means of doing this is to reduce minimum generation levels and source these services from low carbon providers instead.

The decision paper SEM-22-01215 ensures a gradual transition to non-conventional provision of system services. However, bringing the timelines for low/zero carbon system service provision forward would help to deliver objectives regarding carbon budgets and the minimum number of must run generators being set to zero in 2030.

Most concerning at things stand is the pace at which System Services Future Arrangements (SSFA) policy and design is being progressed. The current arrangements for System Services that were implemented in 2017 initially had an April 2023 end date. The expenditure cap of €235 million was designed for 2020 system needs, based on analysis carried out in 2014.

There would have been no reasonable expectation from industry in 2017 that we would be in the current situation with no certainty on the timelines for the future arrangements and still working within the constraints of the current expenditure cap. Investment assumptions were based on the new arrangements being in place by 2023, with access to new products and services supported by increased expenditure on system services needed to deliver 2030 goals.

The TSOs have recently signalled that their best-case implementation date for the future arrangements is October 2025. There is still no movement on the detailed design for the future arrangements so it can be assumed that this is an optimistic timeline. It is of paramount importance that the CRU moves to provide clarity on the timelines for detailed design on SSFAs, and that industry workshops are held without delay.

Installing Renewable Capacity at Pace

WEI firmly believe that the best solution to increasing energy security, while also moving to a cleaner energy future, is to deploy Ireland's indigenous renewable resources at scale – onshore and offshore wind, solar, and with technologies that enable the transition e.g., energy storage, green hydrogen, and other clean e-fuels. This ambition is relevant for the short-medium and long term. optimum choice of technology for our transition over the coming decade should be informed by the following factors:

1. **How quickly they can be deployed on the system:** Staying within cumulative emissions limits over the decade means that projects that can be deployed earlier have a greater impact on emissions than projects arriving later. This emphasizes the need to support and accelerate the deployment of onshore wind and solar in the period to 2027-2028 in particular.

2. **The profile of the generation:** Solar power is relatively negatively correlated with wind energy and so a reasonably optimised blend of wind and solar generation has the potential to enable more demand to be met by renewables more often. This will support higher average RES-E levels at lower levels of network constraints and system wide curtailment / oversupply.
3. **The scale of the generation:** It won't be possible to reach an 80%+ target without a significant contribution from offshore wind in the later part of the decade. Achieving the necessary renewable generation in time to support the targets in the climate action plan means we need to do everything we have been doing but faster. This applies across all elements of the planning / consenting process, grid connection applications, transmission capacity solutions, and RESS auctions. Delivering this volume cost effectively requires addressing policy shortcomings particularly related to appropriate risk allocation in auctions.

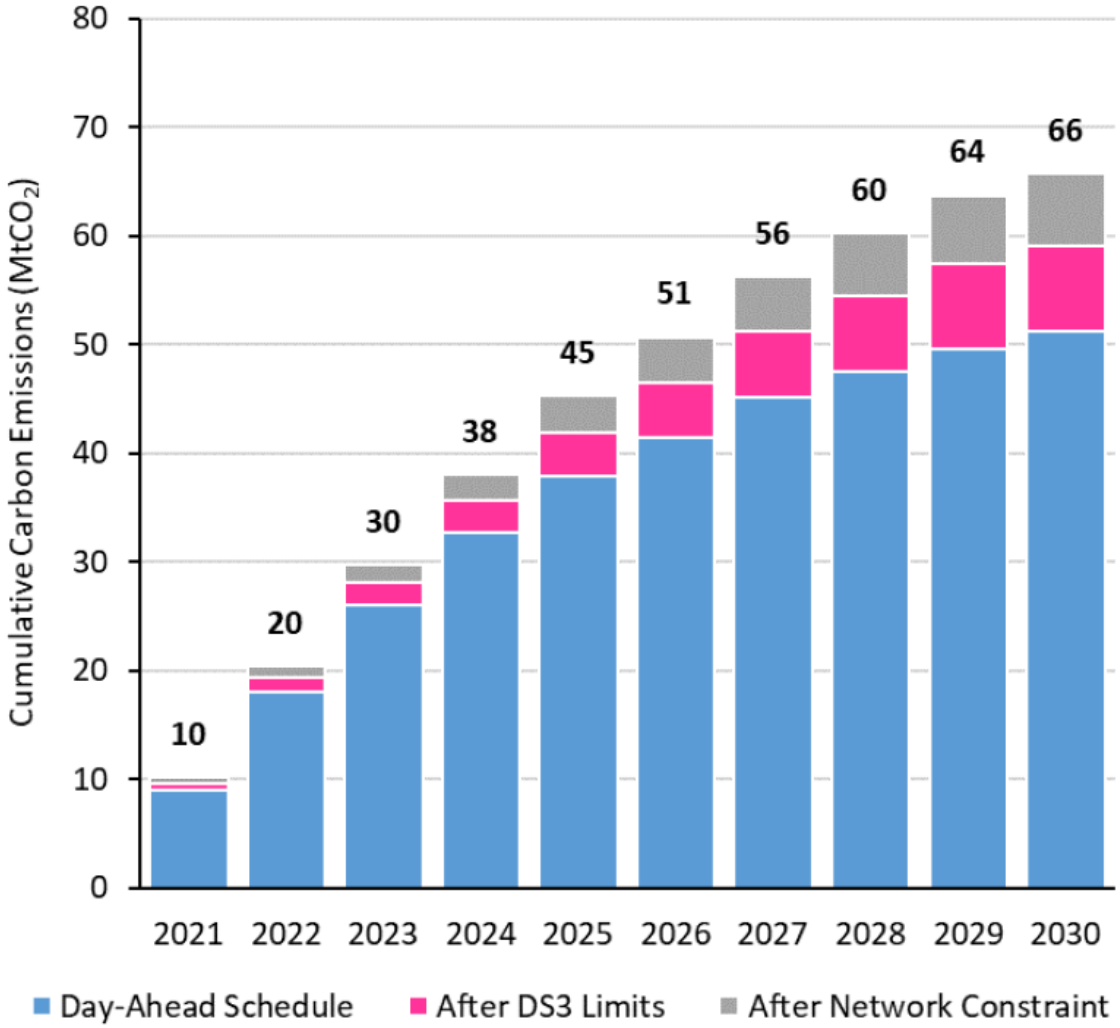
Ireland is a world leader in integrating onshore wind, which supplied 36% of our electricity in 2020. We need to build on this, by increasing our deployment of tried and tested onshore wind and diversifying with offshore wind, solar energy, and other renewable sources. WEI's pipeline analysis consistently shows that there is a large volume of projects that are in development and would be more than enough to deliver on our 2030 targets.

Climate Action Plan 2030 has set a target of 7 GW of offshore wind, 9 GW of onshore wind, 9 GW of solar, alongside an overall target of 80% renewable electricity by 2030. It is critical that CAP24 sets out clear policy actions and strict timelines that would enable the delivery of these targets, ensuring a robust grid, streamlined planning process and fast-functioning route to market that delivers change quickly for us to stay within our carbon budget set for the entire decade.

The *Bridging the Gap* report, referenced earlier, reinforces these points in much greater detail. It makes clear that without urgent and sustained reform of Ireland's current renewable energy policies we simply cannot achieve our 2030 climate goals while also delivering a secure, uninterrupted source of electricity.

As outlined earlier in our response, even with the fastest implementation of renewable energies under the policies in place the time of the report with the most optimistic and accelerated outcome, Ireland's power sector would still emit 66 Mt-CO2 between 2012-2030 as shown below in the graph.

Figure 7: Cumulative total power sector CO2 emissions in Ireland in Accelerated Decarbonisation



Rapid deployment of renewable energies will require coordinated development of the electricity grid and infrastructure along with continued integration of renewable energies. It is clear that the benefits of deploying renewable energy in Ireland as fast as possible are two-fold. Not only will the rapid deployment of renewable energies in Ireland increase the security of supply of energy, but this same strategy will cut our carbon emissions and set us on the path to energy independence.

Connecting our Grid to Other Markets

Looking to the longer term, interconnection of Ireland's electricity system is essential to provide greater security of supply and reduce reliance on volatile fossil fuel imports. The Irish electricity system currently has approximately 1 GW of electricity interconnection supplied by the East West interconnector from Ireland to Wales and Moyle interconnector between NI and Scotland. Increasing interconnection will add to our energy security, meaning we can import electricity in times of high demand or low generation at home.

Ireland is currently progressing plans for two major interconnections in the coming decade, the Celtic interconnector between Ireland and France (2026), and Greenlink interconnector connecting Ireland to the UK (2023). It is crucially important that we see these projects

delivered within the coming four years. We also welcome reports that a new interconnector project to the UK, the MaresConnect 750 MW HVDC is being progressed.

It is critical that work must start now to identify future interconnections to be completed in the early 2030s. Ireland has further opportunity to progress its interconnection through the North Sea Energy Cooperation for which Ireland holds the presidency in 2022. One of the aims within NSEC is to look to joint and hybrid cross-border projects and increased levels of interconnection among the members. We would encourage DECC and other State actors to progress any mitigation options that can increase Ireland's interconnection to our fellow EU Member States.

When considering the potential benefits of new interconnection, it is important to consider the impact this interconnection will have on renewable generation on the island of Ireland. While interconnection can benefit renewable generation, it can also result in challenges for both indigenous renewables and the transmission system. Interconnection with high wind penetration areas has the potential to deliver imports onto the island of Ireland at times of high wind which can result in the dispatch down of indigenous renewable generation.

Therefore, the local areas of interconnection should be carefully examined. The presence of increased interconnection also creates the potential for the island of Ireland to be utilised as a power corridor between the electricity markets of other countries. Power may be scheduled to flow from one country, through Ireland to a third country which would stress the transmission network in Ireland. This again should be considered in any interconnection decisions if/when they are made.

Looking further into the future there is an opportunity for Ireland to be a leading contributor to the development of a European SuperGrid. The concept of a European SuperGrid is a transmission network spanning the continent which can help to connect resource-rich areas with high renewable energy potential – such as Ireland (offshore wind) or Spain (solar) – to Europe's main demand centres, with less renewable energy potential relative to their demands.

Ireland's Programme for Government outlined an ambition to make Ireland a major contributor to a pan-European renewable energy generation and transmission system, taking advantage of at least 30 GW of offshore floating wind power. A SuperGrid can become a large element in achieving these goals and can bring a host of other benefits to Ireland and Europe as we aim to decarbonise our economy by 2050.

Transitioning Away from Gas

In any policy measures taken to address capacity adequacy and security of electricity supply, WEI advocate for dispatchable capacity that comes from flexible and clean technologies, such as green hydrogen. We believe that any new fossil fuel generator being deployed on the grid, as part of a data centre connection or elsewhere through the capacity market, must be required to be capable of transitioning from a fossil fuel gas to a sustainable fuel in the future.

Any new gas plants constructed in this decade need to have a pathway to decarbonisation for example by being able to transition to green hydrogen in future years. While we acknowledge

that our natural gas infrastructure will continue to play an important role in the coming years, it is essential that if new generation is to be built that it must help and not hinder the deployment of renewable power and sustainable solutions that can ultimately achieve Net-Zero goals.

Given the geopolitical situation over the course of the last year, the EU's focus has shifted towards energy security. Being dependent on non-EU countries for fossil fuel supply has emerged as a key weakness for Europe and represents a significant challenge for various European industries. The production of green hydrogen as a form of a sustainable, indigenously produced green fuel will enable Europe to be less dependent on external fossil fuel imports and, ultimately, help support price stability for consumers. Over the coming decade, there is a need for Ireland to increase our efforts in decarbonising gas supplies by injecting green hydrogen and biomethane into the gas grid. WEI believes that Ireland is far behind the curve on green hydrogen. Policy needs to be introduced to encourage and incentivise work on a hydrogen strategy and facilitate growth of supply and demand.

Green Hydrogen or green hydrogen derivatives can be used to decarbonise the gas-fired dispatchable thermal generation required by the system to back-up intermittent generation like wind and solar. These technologies need to work in parallel to support the security of our energy system in totality.

While in the near-term hydrogen we acknowledge that this is likely to be an expensive fuel for this category of plant, in the medium-term fuel costs are likely to drop as electrolysers are deployed at greater scale, and the fuel cost would become less impactful as less is required on this very high RES-E system i.e. the opportunity may emerge to completely decarbonise the power system at modest costs if all new gas fired generation is hydrogen ready.

It is perhaps also noteworthy, that if hydrogen production facilities could be located behind wind generation network constraints, then this could also reduce the network congestion problem i.e., we would be using renewable electricity that might otherwise be constrained due to network limitations to produce hydrogen to support clean capacity provision. Our understanding is that the current market system has limitations in differentiating the volume of curtailed electricity at an individual site level. Being able to do this will support windfarm operators in business cases to deploy electrolysers at windfarm sites.

Decarbonising the power sector will require a significant volume of green hydrogen and green hydrogen derivatives that may need to be stored and/or transported. This will impact cost but is worth further consideration given existing renewable and green hydrogen storage options being explored by Irish companies and the wider role storage plays in increasing capacity adequacy and securing energy supply.

Marine Environment

WEI has also sought to provide short responses on the specific questions posed in the Consultation paper on the Marine Environment. These responses are listed below:

1. **What sort of role could Ireland's marine environment have in delivering climate mitigation?**
   What are the building blocks that need to be put in place to support the role of the marine environment in climate mitigation (e.g. a regulatory framework, measurement and accounting rules)?

   While it is difficult to succinctly describe the role Ireland's marine environment can have in delivering climate mitigation WEI believe the following could help support its role:

   - An essential building block to support the role of the marine environment is data and best available scientific evidence. It is imperative that funding of baseline data collection and yearly data collection programmes in the marine environment be included in future government agency budgets (e.g., NPWS, Marine Institute).
   - Additional protection to marine biodiversity will need to be supported by appropriate government policy.
   - A streamlined consenting process to mitigate delays will be achieved through the implementation of decision-making timeframes in legislation.

2. **What specific measures can be taken in the marine environment to adapt to climate change?**

Integrate the aspects related to climate change (e.g. sea level rise, increase in storm intensity, species distribution shifts) into marine spatial planning. The State should include for yearly data collection programmes and provide funding to ensure baseline environment and changes in the environment are being tracked and monitored.

3. **What other opportunities exist to support the decarbonisation of the marine sector?**

Reduction of greenhouse gas emissions in the marine sector is being examined by several organisations. WEI suggest an initial review of work being undertaken in other jurisdictions by organisations such as the Carbon Trust[25].

4. **How can public understanding of the impacts of climate change on our seas and oceans be improved?**

WEI strongly suggest that increased awareness is raised in relation to the impacts of climate change on our seas and oceans. It would be beneficial for this awareness to be connected to local issues, with links provided to online educational materials, and advertising the location of the tools through social media push tools.

[25] https://www.carbontrust.com/what-we-do/market-transformation/maritime-decarbonisation

Outputs from the Marine Institute and other agencies on impacts specific to Ireland and any modelling done would also be useful if distributed in the form of a non-technical summary for ease of dissemination to communities.
Access to good educational materials in libraries and for schools and different age groups would also benefit public understanding.

5. **How can research and innovation contribute the development of the plan-led approach to offshore renewable energy to maximise the economic and social benefits for all? [Offshore / Offshore Consenting]**

An example is the future interconnection between countries and Ireland's ambition to be an exporter of energy. Use of a cap and floor model, or similar approach, could provide a combination of stability and opportunity whilst sharing risk between developers and consumers. Private developers incentivised in the right way, can bring innovation and cost reduction to projects.

6. **How can the State build its marine environment and biodiversity evidence base and identifying priority areas for research?**

As above, a strategic forum is needed to identify research priorities comprised of government agencies such as NPWS, Marine Institute and MARA and industry in consultation with key stakeholders such as IWDG, Birdwatch Ireland and Universities. Transboundary engagement is required on mobile species, particularly in line with climate change and species distribution changes. WEI suggest tying into to other jurisdictions to review existing research that could contribute or support with Ireland's priorities.

To fill the data gaps identified in Strategic Environmental Assessments, programmes specific to sectors can be developed and funded, like ScotMER programme[26] run by Marine Scotland. Another example is the Offshore Wind Evidence and Change programme[27]:

Building the biodiversity evidence base in Ireland requires a robust and adequately resourced and funded data collection programme.

7. **How can the State build its marine environment and biodiversity research skills base?**

The State can build its research skills base through provision of funding to universities and programmes such as '*Nature + Offshore'* or biodiversity programmes being run by University College Dublin (UCD)/others. Government can look at co-sponsorship of biodiversity research programmes with the various marine industry sectors.

---

[26] https://www.gov.scot/policies/marine-renewable-energy/science-and-research/#:~:text=Our%20National%20Marine%20Plan%20commits%20us%20to%20make,licensing%20and%20consenting%20processes%20as%20well%20as%20policy.

[27] https://www.thecrownestate.co.uk/en-gb/what-we-do/on-the-seabed/offshore-wind-evidence-and-change-programme/offshore-wind-evidence-and-change-programe-themes-and-projects/#:~:text=The%20Offshore%20Wind%20Evidence%20and%20Change%20programme%20comprises,on%20users%20of%20the%20sea%20and%20onshore%20communities.

A review of the degree structure in universities to provide more specialist training during the specific module.

8. **How can the State best coordinate a plan of work across bodies/agencies with the relevant expertise on marine environment and biodiversity? What are lead Departments/agencies and appropriate structures to ensure this is effectively managed?**

As above, a strategic forum is suggested to effectively manage the work across the marine environment, opening it up to key agencies such as NPWS, Marine Institute DECC (Marine spatial planning unit), DHLGH, NGO's Birdwatch Ireland and IWDG and Universities such as UCD and UCC, with expertise in the marine environment and biodiversity. Key agencies to be involved in the marine environment also include the Marine Survey Office and The Commissioners of Irish Lights as the programme is applicable to wider stakeholder group interests.

Finally, WEI suggest that industry is also involved and an example of this is The Crown Estate programme referenced earlier.