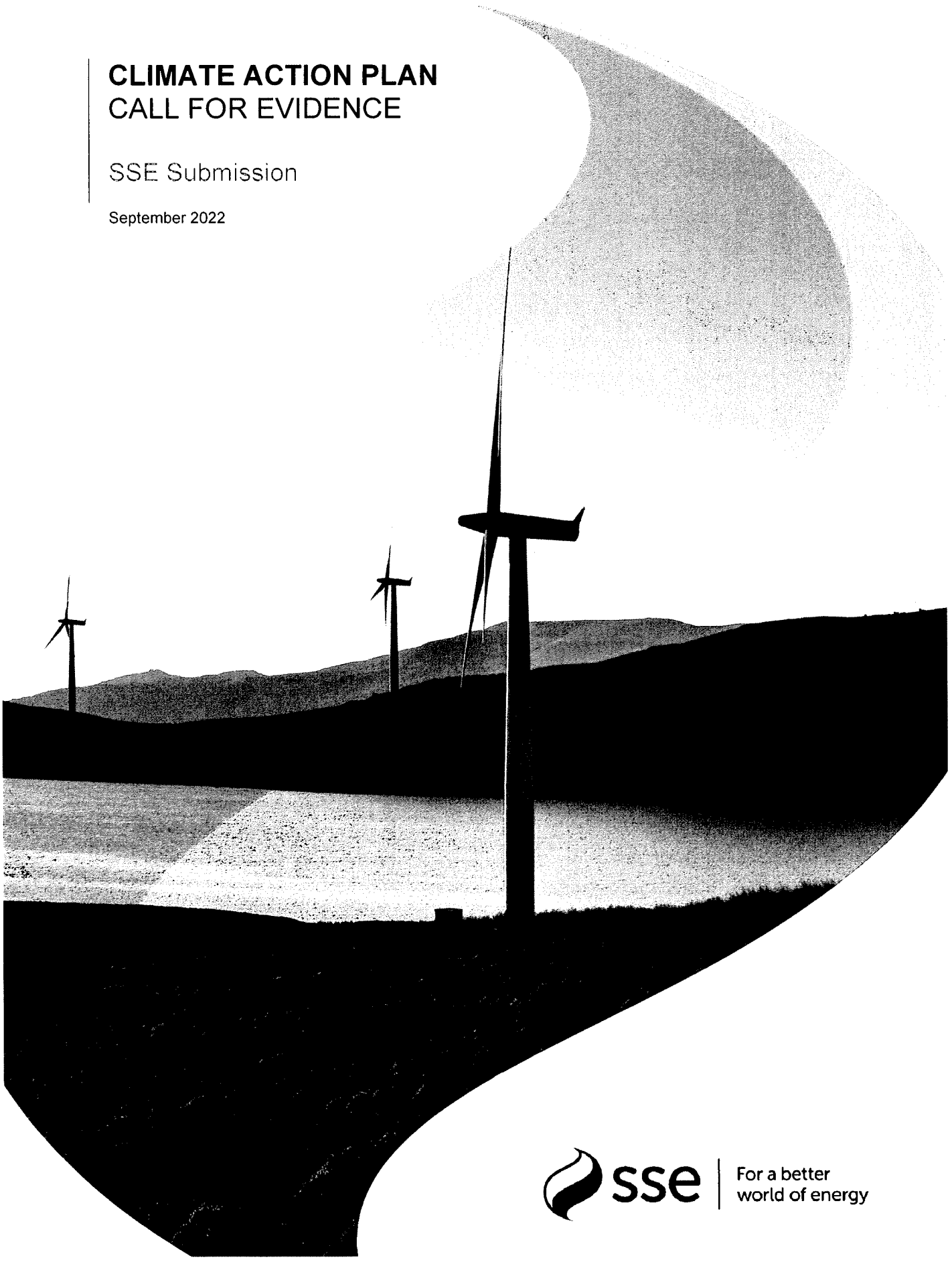
CLIMATE ACTION PLAN
CALL FOR EVIDENCE

SSE Submission

September 2022



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Introduction

SSE wishes to make the following submission to the Call for Evidence for Climate Action Plan 2023.

Who we are

At SSE, we are driven by our purpose: to provide the energy needed today while building a better world of energy for tomorrow. SSE develops, owns, and operates low carbon infrastructure to support the transition to net zero, this includes onshore and offshore wind, hydro power, electricity transmission and distribution networks, alongside providing energy products and services to customers. With current interests across the island of Ireland and Great Britain, in addition to carefully selected international markets, including East Asia, Europe and North America, SSE is both growing its footprint and its range of expertise in our bid to lead the transition to net zero by 2050.

Since entering the Irish energy market in 2008, we have invested significantly in our Irish businesses, with a total economic contribution of €3.8bn to Ireland's economy over the past five years. SSE owns and operates 700MW of onshore wind capacity across the island, 15% of the total installed wind energy capacity of the island of Ireland. Our portfolio includes Ireland's largest onshore wind farm, the 174 MW Galway Wind Park (jointly developed with Coillte). In addition to our renewable generation assets, we own and operate around 1.3GW of firm, dispatchable generation in Ireland providing vital security of supply.

SSE is committed to sustainability, as most recently demonstrated through our Net Zero Transition Plan (March 2022), which sets out the key actions we are taking to drive progress toward our net zero ambitions, including interim science-based targets aligned to a 1.5°C pathway. We have built the largest renewable electricity portfolio in the UK and Ireland and in 2020 committed to achieve net zero greenhouse gas (GHG) emissions across all operations by 2050 at the latest, covering scope 1, 2 and 3 GHG emissions. Recognising the international importance of decarbonising the power sector as quickly as possible, SSE further aims to achieve net zero across scope 1 and 2 emissions by 2040 at the latest including through investment in low-carbon dispatchable power generation options such as Carbon Capture and Storage, Hydrogen and electricity storage.

Executive summary

We outline our key recommendations and answers to questions answered in our response below.

Cross-cutting issues

- A regional-approach to the spatial planning of wind farm developments should be considered to better enable Ireland to reach its 8 GW onshore wind target. Regional Renewable Energy Strategies could be prepared for each of the three Regional Assembly areas.
- Reforms to the Judicial Review process, such as the introduction of milestones, should be explored to ensure the planning process produces outcomes in a timely manner.

- Phase 2 for offshore wind should include an early competitive MAC process to reduce risk of speculative applications.
- Ireland must implement measures in compliance with EU Clean Energy Package requirements and REPowerEU ambitions for shortening permitting times and creating "go-to" areas.
- CAP 2023 should contain provisions compatible with the development of a cohesive hydrogen strategy in Ireland.

Electricity

- Investment is needed in East Coast grid as a matter of priority, in order to accommodate the large volume of offshore wind.
- Future offshore RESS auctions should include a pre-requisite for planning permission.
- Ireland's seabed allocation process should include qualitive criteria, drawing inspiration from the Scotwind process.
- Ireland's should prioritise the use of hydrogen in the powering of flexible power stations, underpinning our security of supply.
- The Wind Energy Guidelines should be finalised with appropriate and implementable noise restrictions.
- CEP articles 15 and 16 should be implemented to ensure permitting of wind is possible within accelerated timescales.
- Repowering and extension of life need to be addressed in the Climate Action Plan. A strategy in relation to these issues is needed.
- Future ORESS auctions should include indexation of contracts.

Carbon pricing and cross-cutting issues

1. Are there any unintended barriers within the planning system that should be addressed at national policy level in order to deliver our climate ambitions?

Spatial planning for onshore wind farms

As a responsible developer, SSE is committed to best practice in developing our projects. The clear and consistent application of national planning policy and standards enable us to progress projects with confidence; unclear standards discourage investment and can result in protracted planning processes. The approach to spatial planning for wind farm developments varies across Local Authority areas with unnecessarily restrictive policies adopted in some instances. If Ireland is to double its onshore wind capacity to 8.2 GW in just a decade, sufficient land will need to be designated for wind farm development. With such an ambitious but necessary target, we believe the time may have come to approach spatial planning for wind farms in a different way.

A regional-approach to the spatial planning of wind farm developments rather than the Local Authority-level approach that has been the case to-date should be considered. Regional Renewable Energy Strategies could be prepared for each of the three Regional Assembly areas.

The benefits of this proposed approach include the following:

- A single, consistent methodology could be used across an entire region and across all three regions in the country, including across county and local authority boundary areas where approaches to-date have been inconsistent in many cases.
- A regional approach would ensure that the optimum locations for wind energy development are identified, and every county's potential is assessed in a regional and national context.
- It would ensure that national targets and requirements for the delivery of wind energy, directly translate into the identification of suitable areas, and a sufficient quantum of land is identified to ensure national targets can be delivered.
- Landscape sensitivity, value and capacity could be assessed on a broader, regional scale, rather than just within the sometimes-limited confines of an individual county. This would provide consistent, evidence-based landscape policies across local authority areas, and ensure the appropriate landscape policies are implemented irrespective of the county boundaries.

We believe an approach such as this is needed to ensure onshore wind development can reach its full potential and onshore wind capacity is not lost needlessly. We appreciate it would take time for an approach such as this to be developed. It is therefore critical that the Office of the Planning Regulator continues to proactively scrutinise and make recommendations in regard to County Development Plans and their compliance with national renewable energy policy.

SSE Recommendation: A regional-approach to the spatial planning of wind farm developments should be considered to better enable Ireland to reach its 8 GW onshore wind target. Regional Renewable Energy Strategies could be prepared for each of the three Regional Assembly areas.

Planning process for offshore wind farms

The progressing of offshore wind through Ireland's planning system will be key to us achieving or missing our end of decade targets. The implementation of the Maritime Area Planning (MAP) Bill was critical to enabling Phase 1 projects, the completion of which before the end of 2021 is to be strongly welcomed. A significant challenge in relation to timely progression through the planning process is the significant risk of judicial review. As a responsible developer, we believe it is critical that those who have legitimate concerns in relation to the planning process have access to the judicial system to pursue issues and ensure that decisions have been made accordance with the law. Reform to ensure that judges have proportionate powers to ensure that spurious claims are not permitted to proceed is necessary. We believe a review of this area should also look at how timeliness can be ensured. Judicial Review has the potential to significantly delay an infrastructure project. The introduction of milestones to ensure the process moves more swiftly should explored to ensure projects have certainty and can proceed, helping contribute to meeting Ireland's ambitious climate action targets.

The rapid initiation of Phase 2 offshore wind is also critical to Ireland's energy future. MARA's role will be key in processing applications for offshore wind development and providing resources to advance development. SSE Renewables is strongly of the view that credibility in the Irish offshore sector is equally

vital. Speculative applications could clog up resources within the system if we do not establish robust early-stage project assessments. We support, therefore, an early competitive MAC process which should assess projects based on work done to date, developer experience and likelihood of delivery.

To further aid this credibility, ORESS2 should include a pre-requisite for projects to have planning permission. Whilst we understand the circumstances that led DECC to proceed with ORESS1 ahead of projects having planning permission (e.g. the limited pool of Phase 1 projects), we should not forget that this is a highly unusual and risky approach. Repeating this approach in ORESS2 would exacerbate that risk and undermine the credibility and, potentially, the success of Ireland's offshore sector in setting down the foundations for swift, well-managed and resourced projects that will deliver Ireland's climate targets.

SSE Recommendation: Reforms to the Judicial Review process, such as the introduction of milestones, should be explored to ensure the planning process produces outcomes in a timely manner.

SSE Recommendation: Phase 2 for offshore wind should include an early competitive MAC process to reduce risk of speculative applications.

General Comments

Finally, resources in authorities such as An Bord Pleanála and MARA must be sufficient to progress projects in timelines compatible with Clean Energy Package timelines. The requirements for expedited permitting of renewable developments was further increased within the 18 May 2022 Package on Repower EU, with the Commission adopting a Recommendation and Guidance on speeding up permit-granting procedures for renewable energy projects. The revised proposal outlines the principle of renewable energy as an "overriding public interest", introduces the designation of 'go-to' areas and other ways to shorten and simplify permitting while also minimising potential risks and negative impacts on the environment.

SSE Recommendation: Ireland must implement measures in compliance with EU Clean Energy Package requirements and REPowerEU ambitions for shortening permitting times and creating "go-to" areas.

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

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

In SSE's view the most critical missing element of the Climate Action Plan is in relation to the development of a hydrogen market and economy in Ireland. We respond to this question in relation to hydrogen's use in power generation in the 'Electricity' section.

SSE considers the opportunity for hydrogen in Ireland to be vast, though key actions are required to unlock this opportunity Hydrogen can play a critical role in our energy system and provide significant economic

and environmental opportunity in Ireland. We believe that to realise the opportunity offered by Hydrogen Ireland will require the creation of an entirely new value-chain comprising:

- Low-carbon Hydrogen Production – primarily through electrolysis, maximising Ireland's renewable energy generation potential to produce 'green' hydrogen;
- Hydrogen Storage – vital to the efficient management of an energy system, balancing mismatch between demand and supply and providing security;
- Hydrogen Transport and Supply – Infrastructure and systems to connect hydrogen producers with hydrogen users;
- Hydrogen Use – Growth in hydrogen demand from a range of sectors including industry, transport, power generation, production of hydrogen derivatives and export to other markets.

Our response to the questions outlined in the consultation align with a series of core principles that we believe should guide the development of the Government's hydrogen strategy. These were outlined in our response to the recent hydrogen strategy consultation and are:

- **Developing a cohesive market** – fundamental to the success of hydrogen in Ireland is the need to develop and effectively incentivise the production and appropriate offtake of hydrogen, along with the transport and storage infrastructure required to link the two. It is vital that production and offtake support is developed in parallel - should we see focus on one area at the expense of another, it is likely that the effectiveness and efficiency of the incentives put in place will be significantly undermined. Strongly linked to this is the need to clearly define the intended use cases for hydrogen in Ireland, including the export ambition.

- **Realising our renewable ambition** – Ireland has already stated its clear ambition to become a world-leader in renewable energy. This is particularly true for offshore wind for which we now have a 7 GW 2030 and 30 GW 2050 targets. This ambition goes well beyond the level of likely domestic electricity demand. The production of hydrogen and it's derivatives (e.g. ammonia, methanol), therefore, represents a clear route to market for renewables ambitions (provided indigenous hydrogen demand and export opportunity is in place). This will, however, require the right incentives and the right policy action now. Offshore wind projects take a decade to deliver and if we intend to have offshore wind producing green hydrogen in Ireland in the early 2030s (if not earlier), we need to consider how we facilitate those projects now. This includes (but is not limited to) the need for Maritime Area Consents (MACs), planning permission and ORESS/CFDs support. Focus is also needed on ensuring the shipping technology readiness is accelerated and that we engage with EU policy and regulatory frameworks to facilitate transporting hydrogen into the rest of EU.

- **Delivering system value** – the use of hydrogen could be vast in Ireland, but it will not be the best solution everywhere. The transition to hydrogen, and the decarbonisation of the energy sector in general, will be about using energy in the right way. We would challenge the presumption in the consultation that increasing energy use is inherently negative. SSE commissioned a report by LCP to assess the cost comparison of a renewables centred energy system (including green Hydrogen production and power amongst other assets), compared to the current trajectory. This report calculated that this approach could provide the GB consumer cost savings of over £48bn between

now and 2050, relative to the current trajectory envisaged, with a further £28bn of benefits accrued through to 2060 to reach £76bn in total. This provided sufficient energy security from renewable generation and low-carbon flexible generation but requires a 'whole system' view to achieve the benefits. Considering/developing elements of the value-chain for Hydrogen in isolation may seem less economically efficient than other low-carbon solutions but combined with a 'whole system' view for the power sector, will result in system-wide cost savings when compared to other trajectories for achieving net zero. SSE is undergoing similar analysis for the Irish market, which will be shared once complete.

- **Security of Supply** – noting the above need to drive system value, there one area which SSE sees as a significant near to medium-term priority in Ireland; this being the provision of new, decarbonised flexible generation capacity to underpin security of supply. Given current security of supply challenges, Ireland is presented with a clear imperative to get new generation capacity onto the system. For this to be consistent with our decarbonisation ambitions (i.e. to halve emissions this decade) we must strongly consider how the hydrogen strategy can support these new assets and enable confidence in hydrogen-ready power stations. We should also consider the role that existing assets, sites and grid infrastructure can play in realising this opportunity as soon as possible. The importance of hydrogen storage in supporting this potential should not be underestimated and needs to be considered alongside production and power generation options.

- **Ireland's export opportunity** – In addition to providing security of energy supply to Ireland through the various use-cases described above, hydrogen offers an opportunity for Ireland to fully exploit our renewable opportunity and support energy security more widely through the export of hydrogen (particularly to our EU neighbours). During 2022 we have seen how other countries, looking to wean themselves rapidly off Russian gas, are looking to other nations to provide hydrogen. For example, in recent weeks we have seen Germany reach a deal with Canada for the provision of hydrogen. Ireland can and should be able to reach agreements with countries such as Germany to provide hydrogen. Our ability to do this will be determined based on our competitiveness – both our cost of producing electricity and hydrogen, our R&D ability and our shipping/transportation infrastructure. Conducive to this will also be heavy and early investment in the development of a domestic market for hydrogen, initiated by support for pilot projects that build up our credentials such as GH2. While EU Government funding is important – enduring supports (as noted below) will be required to under pin these pilot projects.

- **Effective business models** – Without the appropriate incentive the market does not currently support adequate growth across the emerging hydrogen value-chain. To stimulate investment it is necessary for Government to outline a clear long-term hydrogen strategy including ambitions on scale of intervention and supported applications, and to underpin this strategy with a business model. It is likely that separate business models will be appropriate for the production, storage, transport and end-use parts of the value-chain but as noted above, it is vital that these elements are all developed in parallel. There are several examples emerging of what would constitute an acceptable business models across different sectors, with mobility potentially benefiting from the likes of RTFCs and industry CfDs. Given the export opportunity, it is particularly key for Ireland to work with the EU on developing harmonised solutions. EU frameworks are already in development

and we must ensure that appropriate solutions and incentives are found for hydrogen that is created in one member state and used in another. Rules around additionality on RED II early projects may also need leeway.

SSE Recommendation: CAP 2023 should contain provisions compatible with the development of a cohesive hydrogen strategy in Ireland.

Electricity

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

SSE strongly welcome consideration of targets above and beyond 80% RES-E. The priority for Government, however, should be to facilitate the maximum use of Ireland's wind energy (both existing and planned) en route to 2030 and beyond.

Capability of the grid to facilitate renewables

To achieve our 2030 renewable electricity ambition a significant level of renewable energy build-out is required, something which will be particularly driven by offshore wind. Maximising use of this significant increase in renewable power, and reducing emissions as much as possible, can only be realised if we have a resilient power system capable of absorbing greater amounts of wind energy and meeting the demand from electrification of heat and transport. Grid infrastructure and development needs to keep pace with policy ambition and development of renewables.

To that end, EirGrid's stated strategy of, for example, increasing the all-island power system System Non-Synchronous Penetration (SNSP) level to 95% is strongly welcomed, as is the TSO's intention to reduce grid constraints and continue investment in flexibility and grid infrastructure.

Notwithstanding this stated ambition, we note that EirGrid's most recent 'Shaping Our Electricity Future'[1] is likely to fall short in its ambition for grid development, which focusses on delivery of the 2030 70% RES-E target via minimum build-out. SSE would welcome an increase in the TSO's ambition to focus on the Government's renewable targets (8.2 GW of onshore wind and 7 GW of offshore wind by 2030) rather than on delivering the bare minimum for 2030. Investment in the grid over the next decade will be needed for further decarbonisation en route to net zero and grid investment should be planned with this in mind, something which would also be more conducive to a potential increase in our 2030 RES-E targets. We would also note that a misalignment between Government ambitions and TSO plans will increase uncertainty around investment in renewable energy, to the disbenefit of consumers.

[1] EirGrid, Shaping our Electricity Future https://www.eirgridgroup.com/site-files/library/EirGrid/Full-Technical-Report-on-Shaping-Our-Electricity-Future.pdf

Reducing Constraints and Curtailment

Integrating this volume of renewable generation will bring challenges that need to be addressed if we are to manage the dispatch down of wind generation and use our renewable resources in the most effective manner.

Currently, there are two main causes of dispatch down for renewable generation, curtailment and constraints. Curtailment is used to manage challenges which impact the entire system and are not locational in nature, whilst dispatch down for a local network limitation is referred to as constraint.

There is currently a lack of transmission capacity in areas of the country where large numbers of renewable projects are planning to connect, representing a significant barrier to meeting our 2030 targets. Many connected renewable generators are already seeing very high constraint levels which means that a large amount of renewable electricity is going to waste. There is a high risk that without the significant investment in our grid infrastructure already noted, these constraint levels will increase significantly for both existing and future projects. This is likely to put significant upward pressure on overall costs of renewable development, something which is unlikely to be conducive to effective build-out of renewable energy in Ireland and will be a negative for the consumer. Whilst this investment is needed in areas throughout the country, we would specifically note the need for investment in the East Coast to accommodate the large volume of offshore wind expected to connect over the next decade.

SSE Recommendation: Investment is needed in East Coast grid as a matter of priority, in order to accommodate the large volume of offshore wind.

2. **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 2021 and the REPowerEU ambition?**

We strongly welcome the Government's offshore wind target for 7 GW by 2030.

Offshore RESS

The holding of a succesful offshore wind RESS will be vital in initiating Ireland's offshore wind sector.

We recognise that the Department are planning to run the first Offshore RESS (ORESS1) auction with no planning permission requirement or weighting. Securing planning is perhaps the single most important step in the development of an offshore windfarm and provides the basis on which detailed designs can be completed, allowing the project to engage meaningfully with the supply chain to establish cost certainty. It should be noted, therefore, that removal of planning permission as an auction pre-qualification requirement will push a very significant amount of risk into the future. It could also result in projects being awarded RESS contracts that are ultimately unable to deliver.

We also note the parallels to the Capacity Mechanism, the ineffective delivery from which has exacerbated Ireland's security of supply concerns. One of the main deficiencies of the capacity mechanism has been that projects have not required planning permission to enter, resulting in "successful" projects later pulling out.

We must learn from these mistakes and design an auction which increases certainty for the benefit of the consumer. SSE would, as such, suggest a process for auctions beyond ORESS1 which requires planning as a pre-requisite ahead of an auction.

Phase 2 – Seabed Allocation

The Maritime Area Planning Bill is a key piece of legislation and is needed to ensure Ireland can develop 7 GW of offshore wind and reach the 80% RES-E target. Phase 1 projects will only be able to get us part of the way there. New projects will also need to be brought forward to ensure we can meet our targets and address climate change.

As a developer with extensive experience in offshore wind in Great Britain and experience in recent leasing rounds held by the Crown Estate Scotland (Scotwind) and The Crown Estate England, Wales and NI (Rounds 3 and 4), we believe the allocation of seabed requires careful consideration.

An enduring and robust Maritime Area Consents (MAC) allocation process, developed in consultation with industry, is needed. There are a number of developers investigating, or with plans to investigate sites in Irish waters. To ensure developers with the strongest credentials and plans are allocated seabed, periodic and regular MAC application windows should be held. A first-come, first-served basis is unlikely to result in the strongest projects being allocated seabed. A structured process or application window will need to be put in place to deal with applications and assess them in a robust and fair way.

There is potential for this to become cumbersome and inefficient if the system is not designed carefully. While there are advantages and disadvantages to the Scottish and English systems for seabed allocation, our recommendations below are aligned with the ScotWind approach. Ireland's approach needs to recognise a developer's value in more than monetary terms and consider a broader range of issues in the leasing process, such as experience, supply chain commitments, community engagement, as we outline below.

We recommend the following be considered when developing a planning interest allocation process:

- Qualitative criteria should determine the success of MAC applications - Ireland should avoid the 'highest bidder wins' format favoured in The Crown Estate Round 4 auctions as it is a blunt assessment. Such an approach risks putting upward pressure on RESS auction bids and ultimately the cost to the consumer. Recent auctions held by The Crown Estate – England and the US show the potential for very high prices. While auctions in Ireland are unlikely to reach these highs, competitive option fees must be avoided to minimise costs to the consumer.

  i) Points-based system - We recommend a points-based system similar to that used in Scotland be put in place based on the criteria outlined in the MAP Bill. Where there is no overlap between projects, developers should be required to reach a minimum number of points to be successful. Where there is overlap, the developer that gets the highest points would win.

  ii) Assessment criteria - We support the criteria identified in the MAP Bill but believe additional parameters are needed – '*Relevant experience of the applicant*' and '*ability to deliver and*

*contribute to renewables target*s'. A key benefit of coming late to offshore wind development is that Ireland is in the position to reap the rewards of years of development experience. It is also important to acknowledge that some criteria are more important than others. Strong weighting should be applied to the technical competence of the applicant, as per the approach adopted with ScotWind. We believe 'ability to deliver' should be included as a criteria to ensure that developers with credible plans to build out and contribute to 2030 targets are prioritised if there are competing applications.

iii) Rent and fees payable – We recommend these be determined using a set formula and should not be used as an auction parameter. If it were to feature as an auction parameter amounts payable should be capped to avoid increased costs to developers and minimise cost to consumer.

The approach Ireland takes here will guide the development of offshore wind for the next decade. With ambitious targets and the climate imperative growing in importance, it is essential a robust process is put in place to avoid unnecessary delays and the emergence of additional issues.

SSE Recommendation: Future offshore RESS auctions should include a pre-requisite for planning permission.

SSE Recommendation: Ireland's seabed allocation process should include qualitive criteria, drawing inspiration from the Scotwind process.

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

One area which SSE sees as a significant near to medium-term priority in Ireland is the provision of new, decarbonised flexible generation capacity to underpin security of supply. Given current security of supply challenges, Ireland is presented with a clear imperative to get new generation capacity onto the system. For this to be consistent with our decarbonisation ambitions (i.e. to halve emissions this decade) we must strongly consider how the hydrogen strategy can support these new assets and enable confidence in hydrogen-ready power stations. We should also consider the role that existing assets, sites and grid infrastructure can play in realising this opportunity as soon as possible. The importance of hydrogen storage in supporting this potential should not be underestimated and needs to be considered alongside production and power generation options.

We would note that SSE have over 5 GW of zero and low carbon thermal in development across the UK, as outlined below.

Humber Region Hydrogen Proposal

SSE Thermal and Equinor's partnership in the Humber marks the UK's first end-to-end hydrogen proposal, connecting production, storage, and demand projects in the region. This involves two key projects: Keadby Hydrogen and Aldbrough Hydrogen Storage.

Keadby Hydrogen

SSE Thermal and Equinor have unveiled plans to jointly develop Keadby Hydrogen, the world's first major 100% hydrogen-fuelled power station. Keadby Hydrogen would replace older, carbon-intensive generation on the electricity grid, providing flexible and efficient power to support intermittent renewable generation and maintain security of supply.

Keadby Hydrogen power station would have a peak demand of 1,800 MW of hydrogen, producing zero emissions at the point of combustion. It would be the world's first major 100% hydrogen-fired power station, securing at-scale demand for hydrogen in the region for decades to come. It is estimated that the demand from the facility could account for a sixth of the UK's 10 GW hydrogen production goal, underpinning investment in hydrogen production, transport and storage infrastructure. With appropriate policy mechanisms in place, Keadby Hydrogen could come online before the end of the decade.

The project would use the parallel hydrogen and CO^2 pipeline infrastructure being developed by the Zero Carbon Humber (ZCH) partnership – which includes Equinor and SSE Thermal – and offshore CO^2 infrastructure developed by the six-member Northern Endurance Partnership (NEP) – which includes Equinor. Both ZCH and NEP won public funding from the UK's Industrial Strategy Challenge Fund in March.

Aldbrough Hydrogen Storage

The existing Aldbrough Gas Storage facility, commissioned in 2011, is co-owned by SSE Thermal and Equinor, and consists of nine underground salt caverns, each roughly the size of St. Paul's Cathedral. Upgrading the site to store hydrogen will involve converting the existing caverns or creating new purpose-built caverns for storage. With an initial expected capacity of at least 320 GWh, Aldbrough Hydrogen Storage will be significantly larger than any hydrogen storage facility in operation in the world today.

The Aldbrough site is ideally located to store the low-carbon hydrogen set to be produced and used in the Humber region, which will be vital in creating a large-scale hydrogen economy in the UK and balancing the overall energy system by providing back up where large proportions of energy are produced from renewable power.

While the Aldbrough facility would initially store the hydrogen produced for the Keadby Hydrogen Power Station, the benefit of this large-scale hydrogen storage extends well beyond power generation. The facility would enable growing hydrogen ambitions across the region, unlocking the potential for green hydrogen, and supplying an expanding offtaker market including heat, industry, and transport from the late 2020s onwards.

Hydrogen business models

Without the appropriate incentive the market does not currently support adequate growth across the emerging hydrogen value-chain. To stimulate investment it is necessary for Government to outline a clear long-term hydrogen strategy including ambitions on scale of intervention and supported applications, and to underpin this strategy with a business model. It is likely that separate business models will be appropriate for the production, storage, transport and end-use parts of the value-chain but as noted above, it is vital that these elements are all developed in parallel. There are several examples emerging of what would constitute an acceptable business models across different sectors, with mobility potentially benefiting from

the likes of RTFCs and industry CfDs. Given the export opportunity, it is particularly key for Ireland to work with the EU on developing harmonised solutions. EU frameworks are already in development and we must ensure that appropriate solutions and incentives are found for hydrogen that is created in one member state and used in another. Rules around additionality on RED II early projects may also need leeway.

SSE Recommendation: Ireland's should prioritise the use of hydrogen in the powering of flexible power stations, underpinning our security of supply.

4. What role could carbon, capture and storage have in decarbonising our power sector?

SSE has multiple CCS projects it is actively developing in GB having invested millions over the past 20 years. As is well understood, CCS has some natural advantages in GB that do not exist in Ireland including depleted North Sea oil/gas beds suitable for use as storage, as well as significant heavy industry which can also utilise CCS.

Notwithstanding these points of difference, CCS does have potential in Ireland. A 2021 EAI study undertaken by MAREI (UCC) "Our e-mission future" illustrated the additional role that CCS could have in decarbonising the electricity sector. As the report notes, "Carbon capture and storage (CCS) is a uniquely important technology that features strongly in global scenarios that achieve Net Zero emissions in line with the Paris Climate Agreement".

To become a reality in Ireland, the approach may need to be different from that in the UK. The cluster approach favoured there, utilising a mix of power generation, heavy industry and North Sea storage, is likely to have less potential here. A "shipped" approach, however, may be more appropriate with carbon emissions shipped to countries with storage capability (such as Norway, something under active development as part of the "Northern Lights" project).

As with electricity generation from hydrogen, CCS will need a sound commercial structure and effective incentives, with some form of financial support potentially needed given the high costs associated with initial development and establishment of associated infrastructure.

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

It is critical that Ireland builds on the success of onshore wind in this decade. Renewables currently account for approximately one third of our electricity generated. The vast majority of this is onshore wind. Ireland is a leading nation when it comes to onshore wind deployment and renewables penetration of our grid through EirGrid's successful DS3 programme. To reach 80% renewable electricity by 2030, it is critical that policy supports the further deployment of onshore wind so that we can reach our 8.2 GW target. Spatial planning is critical to this as we outlined in our response in the cross-cutting issues section. Reform of the planning system is also required to ensure compliance with the Renewable Energy Directive. This should also include a review of the Judicial Review system to ensure it continues to be fit for purpose. Proportionate and balanced Wind Energy Development Guidelines are also critical alongside a strategy for repowering to ensure we are able to retain Ireland's onshore wind success.

Wind Energy Development Guidelines

The Wind Energy Development Guidelines (WEDG) are now overdue by a number of years. It is critical the issues highlighted in the public consultation, particularly in relation to noise, are addressed. If not addressed, these noise guidelines could stifle the development of wind energy in Ireland. Not only will they lead to smaller and fewer wind farms, but it will be very difficult for developers to be assured that they comply with noise standards as they are poorly designed and open to interpretation. If not addressed, we have concerns that the combination of increased set-back distance, shadow flicker and noise proposals will increase costs and put Ireland's ability to reach 8 GW onshore wind by 2030 at risk.

Implement Article 15 and 16 of the Renewable Energy Directive to streamline planning process and ensure 8.2GW can be delivered by 2030.

The Renewable Energy Directive, part of the EU's Clean Energy Package, was finalised in 2018. Article 15 stipulates that national rules for authorisation, certification and licensing procedures shall be proportionate and necessary, expedited at the appropriate administrative level within predictable timeframes.

In addition, Article 16 states that the permit granting process for renewables shall take no more than two years with a one-year extension possible in "extraordinary" circumstances. It also states that Member States shall establish a single point of contact to guide and facilitate the entire permitting process i.e. a "one-stop-shop" for permitting.

The Directive also calls on Member States to facilitate repowering by ensuring a simplified permit-granting process, not exceeding one year, with allowances for a year-long extension in "extraordinary" circumstances. These aims have now been reinforced by the REPowerEU objectives, as previously outlined.

These provisions were meant to be transposed into national law by 30 June 2021. The two-year timeline would be a vast improvement as the planning and permitting phase of a Wind Farm can typically take 4-8 years at present. This is mainly due to the timeframes required to go through the planning process and time lost between submitting a grid connection application, receiving a grid connection offer and receiving consent for the grid connection. In addition, the permitting process in Ireland encompasses a host of other permits involving multiple Consenting Authorities and Government Agencies e.g. the CRU's Authorisation to Construct and Licence to Generate; Road Opening/Closing Licences from the Road Management Office and Felling Licence Grant from Department of Agriculture. Streamlining and speeding up the process of progressing these permits represents an opportunity to introduce meaningful and transformative change to the planning process in Ireland.

In the case of Article 16, the changes will need to specifically deal with both new projects and repowering projects. Repowering of projects is vital if we are to reach 8.2 GW. While modern wind turbines today can operate for 35 years+, those installed initially were typically designed to operate for 20-25 years. As turbines near end-of-life, repowering or lifetime extension provides an alternative to decommissioning that can provide a host of benefits as we outline in the next section.

Significant work will be required particularly in relation to the requirement to establish a single point of contact and repowering to deliver on what is intended by the Directive. We look forward to engaging with

the relevant Government Departments on this to realise the potential wide-ranging benefits of Articles 15 and 16 of the Renewable Energy Directive. It is critical that the implementation of Articles 15 and 16 are identified as actions in Ireland's revised Climate Action Plan.

Repowering

Repowering of projects is vital if we are to reach 8.2 GW. It can provide a host of benefits. Chief among them is the ability to continue using productive wind farm sites that were commissioned first. Installing modern technology on these sites can also vastly increase their installed capacity and annual energy production. Repowering projects in the UK have on average resulted in a capacity increase of 121 per cent[2]. Across Europe, capacities have more than doubled[3].

As noted above, while modern wind turbines today can operate for 35 years+, those installed initially were typically designed to operate for 20-25 years. As wind turbines reach the end of their design lives, three options are available; repowering, lifetime extension (LTE), or decommissioning. Repowering involves the complete decommissioning and replacement of wind turbines at a site, with existing infrastructure like roads and grid connection equipment being retained and reused where possible. While extending the life of a wind farm involves upgrading or replacing necessary parts to enable wind turbines to operate beyond their design life. Generally, for LTE projects, the layout of the Wind Farm remains the same. LTE allows the continued use of productive wind sites, can lower the levelised cost of energy (LCOE) and can increase return on investment. It is a lower risk, shorter-term alternative to repowering.

Analysis performed by WEI in 2019 shows that by 2025, 422 MW will be 20 or older. Looking ahead to 2030 and almost 1,400 MW will reach this age bracket. Ireland cannot afford to lose any MW from the system. Not facilitating repowering would be a missed opportunity for Ireland and would make the Government's ambitious target of 70 per cent renewable electricity by 2030 all the more challenging. Projects seeking to LTE or to repower in the mid to late 2020s will be considering options and will need to enter into the planning system in the coming years. This is a not an issue we can afford to avoid.

Recent policy proposals have not fully considered the need and importance of repowering or LTE. For example, we have concerns that the Draft WEDG19 as currently drafted would not allow Ireland to comply with Article 15 and 16 of the Renewable Energy Directive to provide for a simplified and swift permitting process, which is proportionate to the continuation of an established use. Provisions in the Draft WEDG19 need to be reconsidered with these objectives in mind. The lack of flexibility in the current draft and absence of a swifter and more simplified process needs to be addressed.

In addition, the repowering of existing wind energy developments will be immensely challenging if the x4 tip height setback in the Draft WEDG19 is to be applied without the possibility of flexibility or exception. Replacing existing turbines in the 80 to 125 metre tip height range, with more modern turbines, will result in much smaller viable areas being available for turbine installation. Restrictions risk resulting in a repowered project having a lower MW capacity than the older project it is intended to replace, reducing Ireland's ability to avail of newer technologies, introduce efficiencies and drive down costs.

[2] An assessment of end-of-life decision making for commercially managed onshore wind schemes
[3] WindEurope Wind Energy in Europe: Outlook to 2023: https://windeurope.org/wp-content/uploads/files/misc/WindEurope-Market-Outlook-to-2023-exec-summary.pdf

There are other barriers which could prevent the repowering of many Irish wind farms including the absence of a regulatory framework for repowering, the presence of Natura 2000 sites and a lack of available grid capacity. If these barriers are not addressed, large capacities will be needlessly decommissioned

To address these issues, we recommend the following:

- Repowering and extension of life need to be addressed in the Climate Action Plan. A strategy in relation to these issues is needed.
- Implement the requirements of the Clean Energy Package, as they relate to repowering as outlined in the previous section.
- Ensure that repowering projects can compete in future RESS auctions on a level-playing field with new builds and are not subject to any strict pre-conditions.
- In relation to grid, a lack of capacity must not prevent or limit projects. Given the timelines needed to deliver transmission infrastructure, a more proactive approach to transmission network upgrades is needed.
- Ensure sufficient flexibility is provided in the WEDG to ensure repowering projects can progress.

SSE Recommendation: The Wind Energy Guidelines should be finalised with appropriate and implementable noise restrictions.

SSE Recommendation: Implement CEP art. 15 and 16 to ensure permitting of wind is possible within accelerated timescales.

SSE Recommendation: Repowering and extension of life need to be addressed in the Climate Action Plan. A strategy in relation to these issues is needed.

5. What measures might be taken to improve the resilience of the electricity system to the impacts of climate change?

The impact of climate change on Ireland in the coming years is likely to lead to an increase in extreme weather events, evidence for which is already present. With this, Ireland is likely to see increased occurrences and durations of weather events including storm-like conditions, heavy rainfall, increased drought as well as more extreme cold and hot spells.

In the storms experienced in recent years we've seen the electricity transmission system hold up well, with impacts predominantly at a distribution level where fallen trees or disruption to overhead lines resulted in disruptions to people's electricity supply.

Whilst such disruptions are rare and localised in nature, if we do not ensure the resilience of our electricity system these could become more frequent and more widespread. Whilst localised disruptions can be resolved relatively easily (with engineers visiting affected areas), more widespread disruption can be much more problematic to resolve. A widespread disruption to electricity supply, known as a partial blackout (or

full blackout if effecting all areas) can take days to recover from, during which the impact on people and businesses would be significant.

SSE views the future of Ireland's electricity system as being firmly renewables-led. To recover from disruption of this nature, however, availability of dispatchable generation within Ireland will be of paramount importance. The ability of interconnectors and/or storage to assist in a black start (i.e. recovery from a blackout) is likely to be limited and remains relatively untested on a widespread basis. Domestically located flexible generation will not only be of benefit in this scenario but will also be critical during any periods of prolonged low winds where the ability of battery storage to provide backup will be limited in both volume and duration, with the availability of importing interconnectors entirely dependent on market conditions within the markets at either end.

For this reason and others as outlined in our answers above, SSE would support Government looking with urgency at solutions to decarbonise Ireland's thermal generation such as CCS or hydrogen. A system without such generation is unlikely to be technically feasible and will increase Ireland's vulnerability to extreme weather events. Should we not develop solutions for decarbonised thermal in Ireland now, another generation of unabated thermal generation may be needed.

Finally, we note that another mitigant against supply disruption in the case of an extreme weather event is the provision of a resilient grid which does not have single points of failure. Investment in the grid will be necessary in order to accommodate increased levels of renewables but should also benefit the overall security of supply of the system.

8. What financial incentives are needed to increase renewable generation capacity?

Ireland has established a fundamentally good mechanism for facilitating investment in renewable generation, that being a 2-way CfD contract. As we outline elsewhere, however, this mechanism can be improved significantly if risk is reduced, allowing capital investment at a lower costs. Key measures to reduce risk include having planning permission as a pre-requisite and inclusion of indexation into contracts.

SSE Recommendation: Future ORESS auctions should require planning as a pre-requisite and should include indexation of contracts.