Response to Consultation by

the Department of the Environment, Climate and Communications

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Call for Expert Evidence – Climate Action Plan 2021

Electricity Association of Ireland

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A decarbonised future powered by electricity

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The Electricity Association of Ireland (EAI) is the representative body for the electricity industry and gas retail sector operating within the Single Electricity Market (SEM) on the island of Ireland.

Our membership comprises utilities that represent 90% of generation and retail business activities and 100% of distribution within the market. Our members range in size from single plant operators and independent suppliers to international power utilities. Our members have a significant presence in Ireland, Northern Ireland and Great Britain across the sector value chain. We represent the interests of the all-island market in all relevant jurisdictions, including the EU via our membership of the European electricity representative body Eurelectric.

We believe that electricity has a fundamental role in providing energy services in a decarbonised, sustainable future, in particular through the progressive electrification of transport and heating. We believe that this can be achieved, in the overall interest of society, through competitive markets that foster investment and innovation.

We promote this vision through constructive engagement with key policy, regulatory, technology and academic stakeholders both at domestic and EU levels.

Our ambition is to contribute to the realisation of a net-zero GHG emissions economy by 2050 or sooner, in order to limit the impact of rising temperatures. Electricity offers opportunities to decarbonise the Irish economy in a cost-effective manner.

Introduction

EAI welcomes the opportunity to respond to the call for expert evidence on Ireland's Climate Action Plan 2021. Ireland is facing significant environmental challenges, such as decarbonising the economy, preserving and restoring biodiversity, and providing clean air and water to its citizens. Climate change mitigation is crucial to preserve and improve the natural and physical environment in Ireland and increase the standard of living, not only for its current citizens, but also for future generations.

Under the Climate Bill legislation, recently approved by the Government, the framework for Ireland to meet its international and EU climate commitments has now been outlined. We welcome Ireland's ambition to reach net-zero emissions by 2050 and the commitment for 2030 to reduce emissions by 51% compared to 2018 levels. While it is positive that GHG emissions in Ireland have fallen in recent years, e.g., by 4% and 6% in 2019 and 2020 respectively, it is notable that this level of reduction falls short of the level needed to meet the commitments for 2030. The 2021 Climate Action Plan provides an opportunity for Ireland to take a leadership position in the protection of the environment and the decarbonisation of society.

There is now an urgent need to address the current policy gaps and outline a clear trajectory for energy and environmental policy in the coming decade, with a stronger emphasis on climate action across the economy, to reduce the burden of decarbonisation post-2030.

Electricity Questions

Question 1 – Options to go beyond 70% RES-E

A decarbonised All-Island electricity system is key to achieving climate ambition on the island of Ireland. Last year, the EAI commissioned UCC MaREI to look at the future All-Island power system through the lens of decarbonisation by focusing on the year 2030 where over 70% of the annual electricity on the system will be renewable. The overall carbon envelope for the All-Island power system emissions in line with the Paris Climate Agreement is between 3.4 Mt and 6.2 Mt and current projections based on 70% RES-E being met across the island by 2030 show that the future All-Island system will be just outside this range (~6.3Mt).

This goal can only be fully realised with actions that increase the capability of the grid to absorb the greatest amount of renewable generation. In the absence of such actions the power system will be outside the upper bound of what is required in terms of emissions reduction[1].

Grid infrastructure and development needs to keep pace with policy ambition and renewables development. Eurelectric recently published 'Connecting the dots' a study on the distribution grid investment needed to power the energy transition. This study finds that grid investments need to increase by 50-70% in the 2020s compared to the last decade. For Ireland, they estimate a €6.9 billion investment is needed[2]. Much of this investment is needed to electricity buildings, industry and transport, while modernisation of the grid and the rollout of smart meters also requires significant funding. The right framework conditions and smart tariff design will ensure the annual investment needs will have a moderate impact on electricity prices and grid tariffs. The clean energy transformation will bring about savings in fossil fuel imports and reduce average electricity costs in the long term. In the meantime, 90% of investments could contribute to the economic recovery from Covid-19.

[1] Our Zero e-Mission Future report

2 https://www.eurelectric.org/connecting-the-dots

There is a need to communicate the Government's policy on infrastructure and engage the public on the need for electricity infrastructure. The construction of the North-South interconnector needs to be expedited and the financial robustness of the regulatory model needs to continue to attract the required levels of investment necessary to meet projected needs and targets.

To achieve the decarbonisation ambition, a significant level of renewable energy build out is required. It also demands we have a resilient power system capable of absorbing and storing fluctuations in weather driven generation and meeting the demand of new electricity loads from electric cars, residential heating and data centres. In particular, the All-Island power system System Non-Synchronous Penetration (SNSP) level must increase to 95%, grid constraints must be removed and there must be continued investment in flexibility and grid infrastructure. Without this, emissions will increase, and a lower ambition will be realised.

Our Zero e-Mission Future report finds that wind energy will be the main driver of decarbonisation, but the reliable delivery of electricity will require conventional generation to play a necessary role providing energy, system services and flexibility. The required gas fired capacity in 2030 is similar to today, but gas fired generation will operate less (~20% less energy compared to 2019). Options to decarbonise conventional generation beyond 2030 need to be examined now to ensure investment and action in a timely manner.

Beyond the current 70% RES-E target there are a number of technology choices that could offer further decarbonisation potential and it is not clear which option (or mixture) is most appropriate for the All-Island system. Several technologies could be considered for assisting in the decarbonisation of the conventional fleet beyond 2030. Some technologies may be more suitable than others. Due to the time it takes for such projects to be developed, it is recommended that a cost benefit analysis of the options is completed in the short-term to identify which technologies are best suited to the All-Island power system.

The report reviews options for different technologies that could further assist decarbonisation in the future to go beyond 70% RES-E. These options are outlined in the grid below.

Option	Additional CO_2 removed beyond the 2030 Base Scenario	Investment needed
Remove Minimum Number of Generation Units required.	0.8 Mt	Likely investment needed in synchronous condensers, flywheel storage, or novel synthetic inertia schemes to maintain the rate of change frequency (ROCOF) at 1Hz/s.
Additional Wind Capacity.	1.3 Mt	Extra interconnection (+2.8GW), Batteries (+2.4GW), offshore grid infrastructure.
Carbon Capture and Storage Plant.	1.1 Mt	Investment required in plant and storage capacity as well as long term stable policy support.

System services are required to ensure secure and reliable operation of the power system to the required standards. Such services include frequency response, reserve and system inertia. Across all the scenarios we examined for 2030 it is assumed there will be some level of advancement of technologies which leads to the relaxation of the SNSP and the minimum number of generation units requirements from where they are today.

Proven technologies such as synchronous condensers and flywheel storage will form part of the solution, but new and innovative technologies will also be required. Appropriate market arrangements or incentives will be required to encourage investments in these technologies. A well-functioning power market and efficient carbon pricing are key tools to deliver the necessary investment signals in a technology-neutral way.

The increase in wind capacity makes a strong contribution to the All-Island renewable energy level from 72% to approximately 97% and the associated emissions reduction is ~1.3Mt from the 2030 Base scenario. However, this scenario results in significant levels of exported power and presents a challenge for policy makers as it highlights a divergence in outcomes between renewable energy policy and decarbonisation policy. In the absence of a cooperation mechanism which accounts for providing decarbonised electricity to other countries, e.g., carbon credits for exported renewable

energy, the All-Island system will only realize marginal carbon reduction benefits of being a major exporter of power.

While these options all have implicit uncertainty, they share a requirement for significant capital commitment, long lead times for construction, decades-long operational lifetime and a need for investment decisions to be made well in advance of 2030. The ongoing dialogue on the future pathways for the power system is welcomed to ensure the correct policy signals are provided to stakeholders that best position the sector to meet our decarbonisation obligations in the long term. To this end, as part of an overall energy systems integration strategy, EAI would welcome dedicated consideration of power system decarbonisation technologies with a view to identifying an optimum pathway to net zero. Given the all-island nature of the SEM, there are significant benefits to coordinating this work with the Authorities in Northern Ireland who are working through many of the same issues.

Question 2 – Increase uptake of offshore wind and solar PV

The modelled 2030 system is different in scale and configuration from the system we see today. In 2030, the All-Island system will be 60% larger in capacity and will essentially be a dual fuel system of natural gas and wind. However, smaller elements of other renewables, including solar PV, will play an important role in offering technology diversity. The table below shows the increase in wind and solar generation capacity needed to meet our 70% RES-E targets by 2030. Wind capacity will need to more than double and solar will need to increase more than 11 times. Batteries will also have to considerably scale up. Investors need clear and reliable long-term signals to allocate funds to such capital-intensive projects.

All-Island System	Capacity (MW)	
Generation Technology	**2020**	**2030**
Batteries	0	1,100
Biomass and other RES	195	455
Coal	1,331	0
Distillate Oil	582	272
Gas	4,981	5,204
Hydro and PS	529	529
Other Non RES	177	198
Peat	352	0
Solar	301	3,317
Wind	5,510	11,634
DSU Capacity	705	750
Interconnection Capacity Export	580	2,200
Interconnection Capacity Import	580	2,200

Increasing offshore wind and solar PV requires significant flexibility and improvement in grid infrastructure across the system. With lower levels of system flexibility, we are unable to reach a RES-E ambition of 70%. It results in a level of 66% RES-E but with significant levels of variable curtailment (16%) making the financing of renewable projects highly challenging. All-Island emissions are 7.2 Mt, 14% higher than the 2030 Base Scenario. In this analysis, we find that an SNSP level of at least 85% across the Island must be achieved to meet a RES ambition of at least 70%.

Our report modelled a scenario of increased wind capacity which fully incorporates the Government's plan to deploy up to 5GW of offshore wind by 2030. To limit curtailment a subsequent three-fold increase in battery capacity from 1.1GW to 3.5GW and an increase in interconnection capacity from a base case of 2.2GW to 5.0GW is required.

As discussed in our response to Question 1, increasing the level of wind capacity helps bring Ireland's proportion of RES-E from 72% to approximately 97% and the associated emissions reduction also increases by ~1.3Mt from the 2030 Base scenario. However, this scenario results in Ireland exporting significant amounts of power and presents a divergence in outcomes between renewable energy policy and decarbonisation policy. Without a cooperation mechanism such as carbon credits which could account for providing decarbonised electricity to other countries, the All-Island system will only realise marginal carbon reduction benefits of being a major exporter of power.

The values in our report are indicative only and the exact level of offshore wind, onshore wind, solar and other renewable technology will be determined by competitive auctions and technology development.

Question 3 – The role of renewable gas in the power generation sector

In the scenarios modelled in *Our Zero e-Mission Future*, we assume that 1 generation plant is fired on 100% sustainable biomass in 2030 and this contributes 2 percentage points to the RES-E ambition and reduces emissions by 0.25kt CO2eq. Other renewable elements include existing hydro, landfill gas, combined heat and power with biomass and the biodegradable portion (50%) of waste from waste to energy plants.

In July 2020 the European Commission published its hydrogen strategy for a climate-neutral Europe[3]. This strategy brings different strands of policy action together, covering the entire value chain. According to this strategy, the share of hydrogen (H2) in the European energy mix is estimated to grow from 2% today to 14% by 2050. Large-scale deployment of clean hydrogen is required. 'Blue' H2 is produced from natural gas and most emissions are captured with CCS while 'Green' H2 is produced via electrolysis and renewables. Blue H2 is cheaper but retains a reliance on fossil fuel gas, its price is dependent on gas prices and its environmental performance is linked to the success of CCS and reduction in upstream gas emissions. Green H2 is currently more expensive but improves security of supply from indigenous resources and its future price is linked to reduction in costs of electrolysers and renewable electricity. Both have challenges to overcome in terms of deployment rates, cost reduction and technologies advances and it is ultimately policy choices which will guide deployment.

Across the island of Ireland, there is important activity in hydrogen research and development with a number of studies providing cost estimates and financial analysis[4]. Importantly, hydrogen must be delivered to its intended end uses, unless production and consumption are co-located. In literature,

[3] https://ec.europa.eu/energy/sites/ener/files/hydrogen_strategy.pdf

[4] https://www.marei.ie/wp-content/uploads/2020/06/Information-Brief-Introduction-to-hydrogen.pdf

levelized cost of hydrogen (LCOH) is often reported but a difference must be made between production cost and delivered cost of hydrogen.

Our report used a simplified analysis to explore the potential for hydrogen production from the All-Island system in 2030 using only curtailed energy from variable renewables. In the Base 2030 Scenario modelled, 2.4TWhs of renewable curtailment takes place in the All-Island system, however, much of this takes place over short periods of time with sharp spikes and the level of this curtailment that can be captured for hydrogen production is related to the size of the available electrolysis capacity. In this simplified example, we examine the potential production for increased capacity up to 500 MW. We find that in this example with 300MW of Electrolysis Capacity approximately 246 GWh of H2 can be produced. This would be equivalent to the needs of 1,800 heavy good vehicles (assuming 130 MWh/pa). While the potential for hydrogen will grow with increased variable renewable production, significant research and pilot scheme deployment is required to reduce costs and fully understand the role of hydrogen in the future All-Island system. Hydrogen could also play an important role in long term energy storage on the island to provide energy in time of low wind availability. However, the economic and technology feasibility of this is still emerging.

Question 4 – The role of carbon, capture and storage in decarbonising our power sector

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[5]. The Committee on Climate Change in the UK has recommended that carbon capture technology is investigated as a potential method for decarbonising Northern Ireland's power sector and the Interim Climate Action Plan will establish a framework for analysis of the potential deployment of CCS in Ireland by Q4 2022.

Our report models an additional sensitivity, which assume that a gas fired generator has CCS with a capture rate of 85% and carbon is removed (post combustion) from the exhaust and injected deep below the ground, so it cannot enter the atmosphere and contribute to climate change. Results of the sensitivity indicate that All-Island emissions would reduce from the 2030 Base scenario of 6.3Mt

[5] https://ieaghg.org/files/2019-05_CCS_in_Energy_and_Climate_Scenarios.pdf

to 5.2Mt. Residual emissions of CCS in a long-term energy system must be considered in a wider decarbonisation context.

Long term stable policy support would be needed and investment would be required in plant and storage capacity. CCS requires a significant capital commitment, has long lead times for construction and decades-long operational lifetime. There is a need for investment decisions regarding infrastructure projects such as CCS to be made well in advance of 2030.

Question 5 – Other opportunities to decarbonise the electricity sector

Due to its isolated grid, the current level of wind generation is limited to ensure system strength is maintained. Achieving a minimum of 70% renewable electricity by 2030 will require significant infrastructure investment as well as capacity to integrate new storage technologies. According to the 2019 Climate Action Plan, the level of wind capacity may have to increase by up to 300% to achieve the higher level of ambition but also to absorb new electricity loads from electric cars, electric heat pumps and significant growth in Ireland's data centre industry. Battery and other storage will play an important role in absorbing weather driven variability. Batteries provide benefits in terms of reserve provisions, storage and reduce ramping across the system.

Our report examined the impact of increased levels of 'smartness' in demand side loads for residential heating and EVs. In the 2030 Base scenario, it is assumed that 20% of the daily demand is movable and these loads are placed at periods of the day that lead to the most efficient operation of the systems in terms of costs and emissions. In this sensitivity the level of smart load is assumed to increase to 40%. Results show that the impact is an additional emissions reduction of 0.1Mt relative to the 2030 Base Scenario.

Electricity grids are key assets to enable a cost-effective decarbonisation with electrification at its core. Their modernisation and digitalisation are critical to facilitate connection and transport of distributed, variable renewable energy and the use of technologies such as electric vehicles. Pricing grid services in the right way for generators, energy consumers and all new players will be critical to optimize the value of the grid for the benefit of network customers and the societies at large, while ensuring sufficient revenues and the right incentives for grid owners.

A dynamic view to tariff design principles is required to not only focus on cost recovery, but also with a long-term view of the evolution of the energy system and the impact that tariff design could have on electrification and evolution of demand. Eurelectric will publish a report on network tariff design later in 2021. This report will identify current practices around Europe and will identify key issues for designing tariffs for the transition.

Current and future developments that should be taken into account are:

- Changes in the structure and volumes of electricity generated and transported through the grid with increasing shares of decentralized and variable production,
- Growth in electricity consumption with new and less predictable consumption patterns,
- Significant amounts of storage assets including batteries, EVs that may challenge as well as interact positively with grid capacity,
- The increase of demand side flexibility and the ability of all players to react to tariffs,
- Digitization, smart meters and availability of much more detailed data increasing flexibility and interactive relationship between network and network customers.

There is a need to ensure those costs are recovered not only today, but also in the future. Network tariffs can contribute to the electrification and the operation of a system dominated by RES and carbon neutral technologies by providing:

- Dynamic short-term price signals that give efficient signals for flexibility and grid operation.
- Long-term signals to facilitate electrification decisions and investments by individual consumers, small and large as competition among energy vectors is much more relevant than in the past.

The planned CRU review of network tariffs in 2021 is another critical project in supporting and facilitating electrification.

Question 6 – Measures to improve resilience of the electricity system to impacts of climate change

The All-Island system will have to be remarkably flexible to deal with a wide and extreme variation in weather events. With higher electrification of final demand sectors, especially the residential and

tertiary sector, and high penetration of renewables in the power market, it becomes an important security of supply test to model the energy system during periods of low generation from wind and solar, i.e., during calm, dull days.

At times the system will produce more renewable generation than can be used, stored or exported, while it must also be resilient and reliable to deal with periods when conventional generators and interconnectors will provide the bulk of weekly generation. Demand side response units and batteries will help on shorter timescales. There will also be short periods of system stress where all available conventional generation is called upon to ensure supply is met.

Dealing with prolonged periods of low weather driven generation in the All-Island system is not trivial, and while conceptual solutions involving batteries, large scale storage and increased interconnection are appealing, the issue is not an easy one to solve.

A challenge with using electrical storage, such as batteries, in conjunction with weather driven renewable generation is the scale required to store enough energy for a prolonged period with low weather availability. Storage technologies such as batteries have many uses over short time scales and can provide important services to the grid, but current technologies cannot economically provide the scale of capacity to operate an electricity system on variable renewable generation alone. For example, if we consider a 2-week window of low wind speeds, approximately 65 million Tesla Power walls (assuming 13.5kWh per unit) would be required to provide energy for this period.

Built Environment Questions

Ireland's climate ambitions will require a transformation not just in our electricity supply but also in the built environment, transport and every aspect of our lives. We support the focus on consumers in the Climate Action Plan. It is critical that this continues and consumer centric supports are put in place to enable consumers that wish to, to retrofit their homes and switch to Electric Vehicles.

We welcome the progress that has been made to date with the roll out of the SEAI's National Retrofit Scheme. For the able to pay cohort, generous and "always on" grants in combination with low-cost finance offer the best route forward. This needs to be a key plank of Ireland's National Retrofit

Programme which is due to be published later this year. Financial institutions, regulated by the Central Bank of Ireland, are best placed to provide finance options and deal directly with consumers who wish to make investments in energy efficiency. We would caution against mandatory on-bill finance options which have not worked well in other jurisdictions.

There has been an increase in low-cost finance offerings for retrofit since the launch of the Climate Action Plan 2019. While the low rates on offer currently are attractive, Government support could help lower costs further. A recent study undertaken by Sustainability Works highlights that for energy efficiency finance to be attractive to consumers, it needs to be at a lower interest rate than generally available for the credit profile of similar borrowing[6]. Climate Action Plan 2019 commits to developing a smart finance initiative to provide a competitive funding offer with State support through a guarantee-based product would offer a degree of risk-sharing to lenders. This initiative needs to be progressed. Germany, the Netherlands, France and Estonia have all created schemes that deliver finance to homeowners at rates between 0% to 4%, underpinned by grants. In each country, the schemes operate slightly differently, showing how this approach can be tailored to meet specific jurisdictional market conditions and financing norms. All encompass different types of pricing mechanisms, different distribution routes to homeowners and include both secured and unsecured loan offerings. These options should be explored.

Sustainability and the climate action imperative have risen up the corporate agenda. Some businesses have already taken action to green their practices and decarbonise their commercial buildings. For many, however access to capital; high upfront costs and long payback periods have resulted in other business growth investments taking precedence. SMEs in particular require support yet there is an absence currently of a bespoke grant programme for SMEs since the SME Lighting Programme was closed. This SME programme should be accessible and enable SMEs to apply for grants to carry out bespoke improvements and deeper measures. Generous grants combined with low interest loans will be needed for SMEs and indeed larger businesses.

6 Financing Energy Efficiency, Sustainability Works (2020)

Our report finds that the electrification of new loads in heat and transport plays an important role in wider system decarbonisation. A lower uptake of EVs and Heat Pumps naturally leads to a lower electricity demand and results in lower emissions of 0.1 Mt in the electricity system. However, the resulting emissions in the wider energy system are higher by 0.9 Mt7. The net system wide impact is that these lower levels of electrification lead to a net increase of 0.8Mt of emissions.

To maximise the benefit of renewable generation for emissions reduction, the rate of electrification of new loads, particularly in switching from high-carbon fossil fuel, must keep pace. It is important to ensure buildings have the necessary infrastructure for EV charging. We suggest that policies that impact buildings are streamlined to make sure that heating and cooling technologies are compatible with the 55% GHG target and the barriers to electrification are addressed.

The overall charging structures for electricity should be reviewed to ensure they are compatible with facilitating electrification and decarbonisation. It is important that charging structures encourage efficient consumption decisions when renewables are plentiful and wholesale prices are low. This can more efficiently utilise the available renewables while also decarbonising the demand side.

In addition, taxes and levies in electricity markets can make up a significant component of the total retail prices and may significantly distort efficient price signals, reduce transparency for customers and are a barrier for electrification and therefore decarbonisation. The present approach to levies and taxes should be reviewed, as it often unduly hampers the competitiveness of electricity against other energy carriers. In most EU countries, the electricity bill is more expensive than other energy carriers[7]. This is not due to the price of electricity per se but to the taxes and levies that are added on top. As a result, the competitiveness of electricity is harmed and the potential for electrification is heavily affected. We recommend establishing a level playing field for electricity versus other energy carriers by reducing taxes and levies and ensuring proper recognition of electric efficiency.

Transport Questions

[7] https://eur-lex.europa.eu/legal-content/GA/TXT/?uri=CELEX:52020DC0951

Question 3 – Specific measures in the commercial transport sector to encourage a change to EVs

Earlier this year, Eurelectric, the representative body for the electricity industry in Europe, launched a study in partnership with EY which looked at increased fleet electrification in Europe over the next decade[8]. Europe is expected to see a 24-fold increase in electrification of fleet vehicles by 2030. Fleets have significant potential to accelerate decarbonisation of transport as they typically travel 2.25 times more kilometres than personal cars. The study finds incentives and discounts for bulk sales make EVs more attractive fleet purchases. Route predictability, which is a characteristic of fleet operation, enables and accelerates the deployment of charging infrastructure in key locations, which has the added benefit of making EVs more reliable for private individuals. A 13-fold increase is needed from the existing 213,000 public EV chargers, of which only 14% are fast chargers, in Europe to meet the European Commission's 2030 ambition for 3 million public chargers. Significant investment will be needed for public and private charging infrastructure. Distribution grids will also require significant investment to support the rollout of charging infrastructure.

Transport legislation should be reviewed to ensure the right signals are given to manufacturers, corporate buyers and citizens to go electric. Fleet electrification can be spurred by regulation and tax incentives. Over 300 cities in Europe have already introduced low- and zero-emission zones, incentivising delivery and logistics companies to electrify or face penalties. In addition to CO_2 standards, mandatory requirements for carmakers to sell zero emissions vehicles would shift cars and light duty vehicles to clean mobility.

Bloomberg New Energy Finance recently completed a report for Transport and Energy on EV developments[9]. That report suggests that battery electric light vans will reach cost parity with internal combustion in 2025 with heavy vans reaching parity in 2026. This suggests that market forces will see EVs come around the middle of the decade and so there should be focus in Ireland on

[8] Eurelectric and EY eVision Study

9 BNEF Long Form Template (Grid) (transportenvironment.org)

ensuring that enabling conditions are met in terms of charging infrastructure and incentives to kick start market share. Until then EV incentives will need to continue to encourage uptake of EVs.

Conclusion

The EAI welcomes the opportunity to respond to this call for expert evidence for Ireland's next Climate Action Plan. The EAI sees the Climate Action Plan as a key list of actions which must be delivered if Ireland is to transition to a low-carbon economy over the next 2-3 decades.

Some of the key points we have highlighted in our response include:

Infrastructure and grid development is key.

- Increasing offshore wind and solar PV requires significant flexibility and improvement in grid infrastructure across the system. With lower levels of system flexibility, we are unable to reach a RES-E ambition of 70%. **Today's grid is not adequately flexible to deliver the decarbonisation ambition.**
- High levels of variable curtailment make financing renewable projects highly challenging.
- Actions that increase the capability of the grid to absorb the greatest amount of renewable generation must be taken.
- **Grid infrastructure and development needs to keep pace with policy ambition and renewables development.**
- There is a need to communicate the Government's policy on infrastructure and engage the public on the need for electricity infrastructure.

Early investment is needed and requires the right incentives and policy signals.

- In 2030, the All-Island system will be 60% larger in capacity and to meet our 70% RES-E targets by 2030, wind capacity will need to more than double and solar will need to increase more than 11 times. Batteries and interconnection capacity will also have to considerably scale up.
- All technologies share a requirement for significant capital commitment, long lead times for construction, decades-long operational lifetime and a need for investment decisions to be made well in advance of 2030.

- **Investors need clear and reliable long-term signals to allocate funds to such capital-intensive projects.**
- Appropriate market arrangements or incentives will be required to encourage investments in new and innovative technologies.
- A well-functioning power market and efficient carbon pricing are key tools to deliver the necessary investment signals in a technology-neutral way.
- Cooperation mechanisms e.g., carbon credits for exporting renewable power would enable Ireland to obtain greater reductions of carbon emissions.

A decarbonised power system requires a diversified portfolio of technologies.

- The All-Island system will have to be remarkably flexible to deal with a wide and extreme variation in weather events.
- Dealing with prolonged periods of low weather driven generation in the All-Island system is not trivial, and while conceptual solutions involving **batteries**, **large scale storage, hydrogen storage** and increased **interconnection** are appealing, the issue is not an easy one to solve.
- Increased levels of **'smartness' in demand side loads** for residential heating and EVs, e.g. from 20% to 40% results in additional emissions reduction.
- Modelling indicates further emissions reductions arise from converting gas fired generation to **CCS**.

Electrification of heat and transport must keep pace.

- Electrification of heat and transport plays an important role in wider system decarbonisation and the rate of electrification must keep pace. **Slower uptake on technologies such as heat pumps and electric vehicles may reduce power system emissions, but has a net increase on energy system emissions.** Alternative methods of decarbonising those customers on or near the gas grid should be considered also.
- We welcome the progress that has been made to date with the roll out of the SEAI's National Retrofit Scheme. For the able to pay cohort, generous and "always on" grants in combination with low-cost finance offer the best route forward. This needs to be a key plank of Ireland's National Retrofit Programme which is due to be published later this year. Financial

institutions, regulated by the Central Bank of Ireland, are best placed to provide finance options and deal directly with consumers who wish to make investments in energy efficiency.

- There has been an increase in low-cost finance offerings for retrofit since the launch of the Climate Action Plan 2019. While the low rates on offer currently are attractive, Government support could help lower costs further.
- Significant investment will be needed for public and private EV charging infrastructure.
- Distribution grids will also require significant investment to support the rollout of charging infrastructure.
- Fleet electrification can be spurred by regulation, tax incentives and discounts for bulk sales.

The growing urgency for climate action requires that decarbonisation is central to all economic planning, regulation and environmental protection. Failure to act early creates a risk of fossil fuel lock in and future regret which will be costly to reverse. We believe a greater focus on emissions reduction, particularly in electricity, transport, heating, and agriculture is necessary to achieve effective and economy-wide decarbonisation, which in turn will enhance our natural environment.

The Electricity Association of Ireland, May 2021

A decarbonised future powered by electricity

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