WESTERN
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COMMISSION

WDC Response to the EirGrid Consultation on

Shaping our Electricity Future

14 June 2021

WESTERN DEVELOPMENT COMMISSION

Introduction

The Western Development Commission (WDC) is a statutory body with a remit to promote and encourage economic and social development in the Western Region (counties Donegal, Sligo, Leitrim, Mayo, Galway, Roscommon, and Clare). The WDC operates under the aegis of the Department of Rural and Community Development. The WDC welcomes the opportunity to submit its views to the EirGrid consultation on Shaping our Electricity Future.

The WDC regards the provision of quality energy infrastructure as essential to underpin the economic development of the region. Likewise, the WDC recognises the importance of the low carbon transition and is particularly concerned that the issues for our region are addressed[1]. Our region has very significant on and offshore renewable energy resources and it is important both to the economic development of the region, and to the achievement of the national renewable energy targets, that these resources are used to best advantage.

While we recognise the importance of electricity markets and support services to ensure that the targets can be met, we do not address these issues in this submission. Our focus is on the development of renewable energy opportunities in our region, network development and enabling the low carbon transition while ensuring this transition is Just, and that our region can benefit from it.

The focus of this response is on questions relating to Renewable Targets and Ambition and on the Transmission Network. We therefore address the questions in the consultation on these areas.

Background to the WDC submission- a review of the current situation.

In preparation for the submission to EirGrid's Shaping Our Electricity Future (SOEF) consultation the WDC commissioned Mullangrid Consulting to undertake a review of EirGrid's SOEF consultation document and the potential impact of decisions arising from a new strategy on the WDC region.

As part of this Mullangrid carried out a review of the existing generation and demand in the WDC region and the pipeline of future renewable energy projects. They also examined the four options in EirGrid's SOEF and the impact on the region to 2030. A longer timeline to 2050 was also considered.

Before examining the implications of each of the four SOEF scenarios presented by EirGrid it is useful to consider the current situation. There is currently significant on shore renewable generation in the region and, with relatively low demand levels in the region, much of the

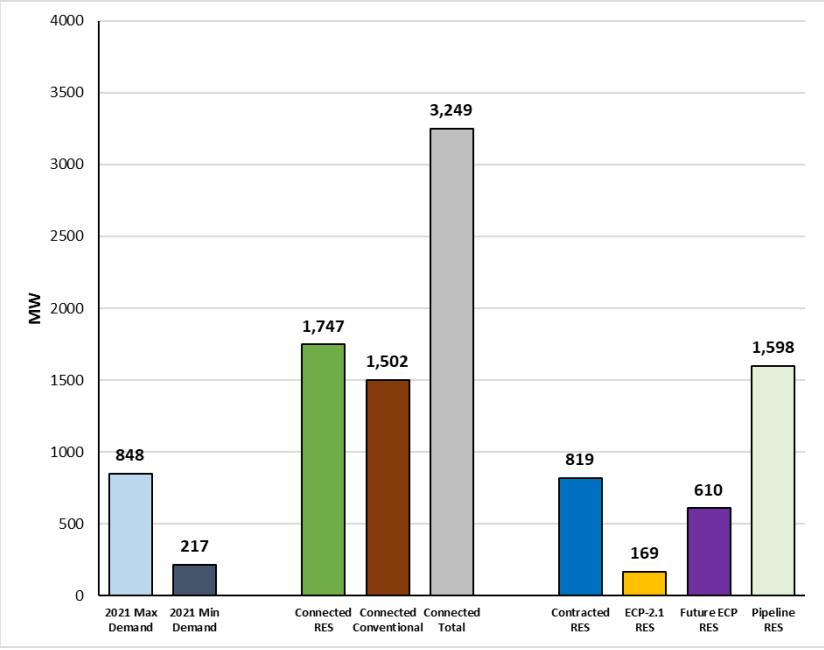
[1] https://westerndevelopment.ie/policy/publications/making-the-transition-to-a-low-carbon-society-in-the-western-region-key-issues-for-rural-dwellers-august-2020-full-report/

power generated is used outside the region. This means there is already potential for congestion on the network and constraints on the output of renewable generation. The generation currently in place already makes a contribution to achieving 2030 targets. The details of generation and demand and potential network constrains are discussed below.

While the focus of the SOEF is on what is needed in terms of transmission investment to 2030, it is important to consider this in the light of the current situation and the existing transmission network in the Region. Counties Clare and Galway have the strongest transmission network infrastructure with two 400kV circuits connecting Moneypoint in Clare to Dublin. It is noted that the Moneypoint coal generation plant is due to be commissioned in 2025 and ESB has announced plans to develop Moneypoint into a green energy hub which will include significant investment in offshore wind energy.

Counties Mayo and Donegal have relatively weak transmission networks with limited transmission capacity to Dublin (the site of most electricity demand). These counties have successfully connected a large amount of wind capacity in the WDC region. However, in recent years, renewable generators in the region have seen increased levels of dispatch down as the network has become saturated with generation. There is now limited transmission capacity available for further renewable generator connections.

Figure 1 WDC Region Existing and Potential Generation and Demand



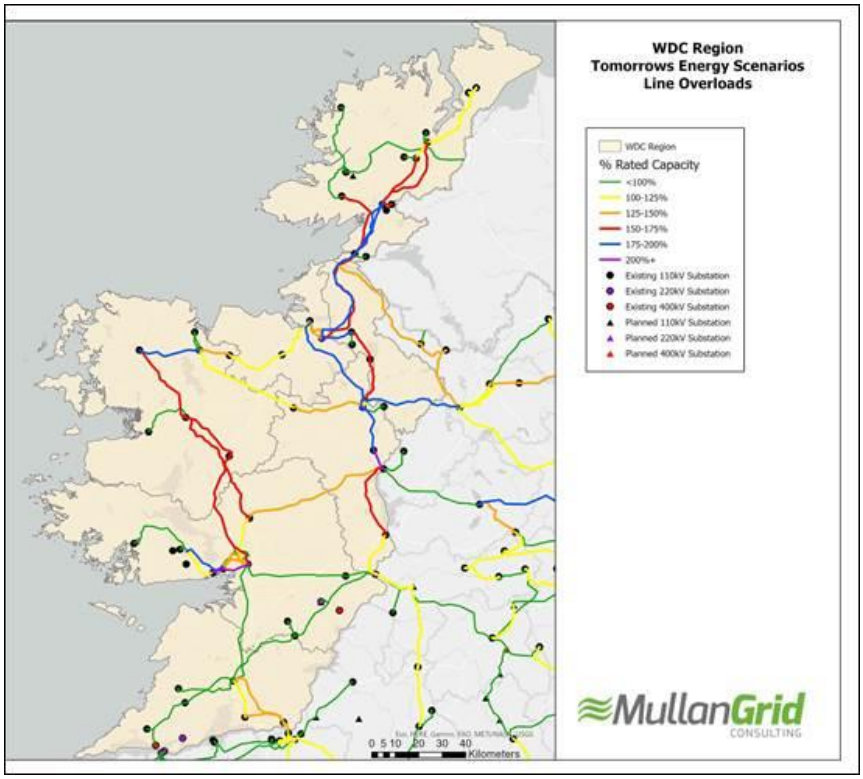
Source: Mullangrid Consulting for WDC, June 2021

There is approximately 1,747MW of connected renewable electricity and 819 MW of contracted RES generation in the WDC region the bulk of which is in Donegal (769MW

connected and contracted), Mayo (594MW connected and contracted), Galway (484 MW connected and contracted), and Clare (359 MW connected and contracted). There is a relatively large pipeline of renewable generation which may potentially be connected under ECP 2-1 (169MW in the Western Region) and up to 610MW in future ECP batches. Winter Peak (maximum) demand in the region is approx. 848 MW with Summer Valley (minimum) demand approx. 217MW. Figure 1 above shows demand along with connected and contracted generation.

Mullangrid consulting have also estimated potential overloads on the regions 110kV transmission network in 2030, with the estimates based on EirGrid's Tomorrows Energy Scenario 2019 workstream (figure 2). These overloads shown in Figure 2 are for Scenarios 2-4 in Shaping our Energy Future (assuming 8.2GW onshore wind, 1.8GW offshore wind and 2 GW of Solar generation capacity being developed to meet Ireland's 70% RES-E target for 2030.

Figure 2. WDC Region Transmission Network Constraints -TES 2030 line Overloads



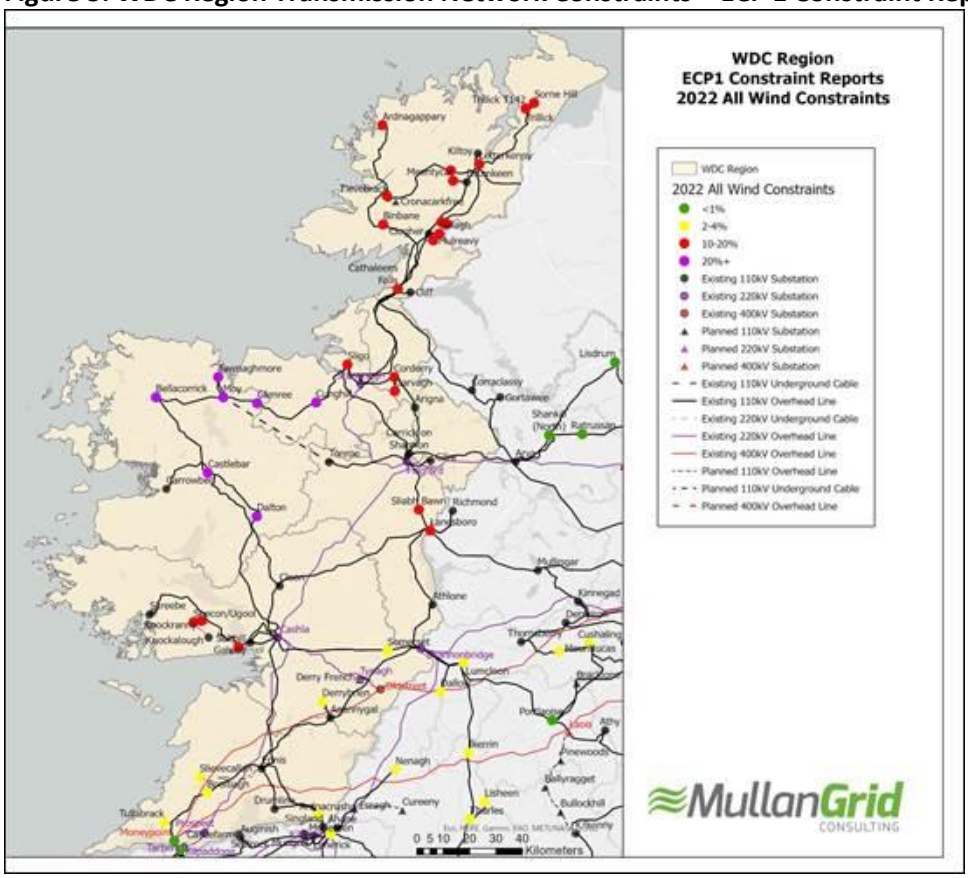
Source: Mullangrid Consulting for WDC, June 2021

In Figure 3 below the estimated wind constraints in 2022 from EirGrid's ECP 1 constraint reports (which do not include outages necessary for Transmission Reinforcement or any planned generation beyond ECP-1.)
Galway and Clare, which benefit from high capacity connections to Dublin are estimated to have constraints between 2-4% on wind farms in these areas. In contrast Co. Mayo appears

to have the highest levels of wind constraint, with estimates of 20% for 2022, while other WDC counties (Donegal, Sligo, Leitrim, and Roscommon) also appear to have constraints in excess of 10%.

These constraint levels highlight the requirement for addition transmission capacity, increased demand, and storage technologies in the region.

Figure 3: WDC Region Transmission Network Constraints – ECP 1 Constraint Reports.



Source: Mullangrid Consulting for WDC, June 2021

We have highlighted some of the existing issues for the network in the WDC region. It is important that EirGrid address these issues while also planning necessary investment to ensure the 2030 targets can be met.

The questions in the consultation relevant to us have been answered below (not all questions are relevant).

Industry Consultation: Shaping our Electricity Future: Technical Questionnaire

Context – achieving the 'Renewable Target'

1. Have we adequately explained the Renewable Targets that underpin the Shaping Our Electricity Future (SOEF) studies?

Yes. We feel that the renewable targets for 2030 under SOEF have been explained. However, the relatively short timeline needs more explanation. With many countries, including Ireland planning for a near zero carbon electricity system by 2050, we feel that the SOEF should be considering the longer term implications and requirements of meeting more stringent targets by 2050. It is important that decisions made now are consistent with the decisions needed for the outcomes required by 2050. How the 2030 targets and EirGrid's scenarios for achieving these, align with 2050 targets is not well explained. Investment in the network now will have long term benefits for 2050.

2. Would you support maximising the use of the existing grid and development of new grid infrastructure if this is required to achieve the Renewable Target?

Yes, we support maximising the use of the existing grid and the development of new grid infrastructure. As is discussed in detail in our examination of the current situation, the grid infrastructure in parts of our region is relatively weak with limited transmission capacity to Dublin (the site of most electricity demand). Some counties in the region (Donegal, Mayo, and Galway in particular) have successfully connected a large amount of wind capacity in the WDC region. However, in recent years, renewable generators in the region have seen increased levels of dispatch down as the network has become saturated with generation. There is now limited transmission capacity available for further renewable generator connections. Thus, we believe it is important, even in the short term, to maximise existing infrastructure through new technologies as well as investing in new grid infrastructure.

3. Have we adequately explained the purpose and objectives of Shaping Our Electricity Future?

Unsure

While we understand the purpose and objectives of SOEF, given the time it takes to develop new grid infrastructure, and connections for new generation, it is not clear why such a short time is being used for this strategy.

4. Have we adequately explained the process for developing our draft roadmap and how we will develop the final roadmap?

Unsure

It is a little unclear how the final roadmap will emerge from the four scenarios. It has been suggested in webinars for this consultation that the final roadmap will be a blend of the four scenarios, but how this blend will be achieved is unclear.

While it is very important to consider the costs for each of the scenarios, it is also important to recognise that these costs are associated with investments in grid infrastructure development which will be used over the next forty years, relative to the other investments

required to meet the targets (for other grid elements and generation) these investments are relatively small and should not be the main factor in developing the final road map.

5. Do you think that the final roadmap will be useful to you? Please briefly describe how you will use it.

Yes, if it provides clarity on grid infrastructure investments and developments, and on the areas which have the potential to develop more generation to 2030 and beyond.

Power system assumptions

6. Do you agree with the range of assumptions used relating to electricity demand growth from large energy users and technologies such as electric vehicles and heat pumps?

Mullangrid carried out a high-level review of the impact of electrifying the WDC region private car fleet, retrofitting the existing housing stock with heat pumps, and deploying additional data centre capacity.

Based on EirGrid's 'Transmission Forecast Statement 2019' the existing peak demand in the WDC region is approximately 836MW. The total electricity requirement (TER) in the WDC region is estimated to be approx. 4.8 TWh by applying EirGrid's system wide annual load factor (ALF) of 66%[2]. However, it is noted that the ALF can vary by region with areas such as Dublin having a higher ALF due to large energy users such as data centres having a 24/7 requirement for electricity. It is likely that the WDC region has a considerably lower ALF than 66%.

Deploying heat pumps to the entire 2016 housing stock could lead increase in demand of approx. 39% in the WDC region. This estimate is based on 2016 CSO housing stock figures and 2020 heat pump annual consumption estimates.

Electrifying the 2018 private car fleet in the WDC region could increase demand by approx. 26%. This estimate is based on 2018 CSO vehicle statistics and 2020 battery electric vehicle (BEV) efficiency/consumption.

EirGrid in the SOEF Demand Led scenario indicated approx. 600MW of data centre capacity could be located outside of the Dublin region and spread across 6 locations. The WDC region accounts for three of these locations. Assuming an even split of demand, approx. 300MW of data centre capacity could be located in the WDC region. Assuming a load factor of 75% then data centres could increase WDC region demand by approx. 41%.

It appears that EVs, Heat pumps and data centres have the potential to more than double electricity demand in the WDC region in the coming years as Ireland moves towards zero carbon emissions in 2050. There will also be increases in electricity demand from the electrification of the commercial and industrial sector. The production of green hydrogen is also likely to emerge as another source of electricity demand.

8. Do you agree with the range of assumptions used relating to renewable generation technologies such as offshore wind, onshore wind and solar PV?

[2] https://www.eirgridgroup.com/site-files/library/EirGrid/All-Island-Generation-Capacity-Statement-2020-2029.pdf

No. we believe there is significant opportunity for offshore floating wind off the west coast of Ireland and are disappointed that this has not been considered in the scenarios outlined. While EirGrid is concerned that it might not be achievable with in the short timeframe of the SOEF, we believe some west coast offshore wind can be developed by the end of the time period and that in the longer term it can make a very significant contribution to achieving our long-term targets for renewable electricity. We therefore believe that offshore wind on the west coast should have been given more consideration in at least one of the scenarios.

13. What, in your opinion, are the strengths and weaknesses of the Generation-Led scenario?

The assumption in the Generation Led scenario is that focusing on the development of offshore wind on the east coast will be able to achieve the 70% target more quickly and easily than under other scenarios.

We have significant concerns about this approach. This scenario could have a major negative impact on the renewable generation pipeline in the WDC region. Based on EirGrid's 'Tomorrows Energy Scenarios 2019' coordinated action projections for 20303, there is approx.1,435MW of onshore wind capacity that may not be developed if this scenario was implemented. As noted in our background section above, there is 819 MW of contracted renewable generation and 779 MW in development (ECP 2.1 and future ECP batches). Under this grid development scenario there are no major planned reinforcements in the WDC Region counties with much of the development focused on the east coast to facilitate that offshore wind pipeline. This scenario would indicate a shift from the grid development approach in recent times.

The other (developer, technology and demand-led) scenarios assume generation capacities in line with EirGrid's coordinated action scenario for 2030.These scenarios have a positive impact on renewable generation in the WDC region as a further 1,435 MW of onshore wind generation is connected in the region

Under this scenario there will be no further transmission investment in the WDC region in 2020-2030, although, as noted above there are areas where current connected and contracted wind will be subject to high levels of curtailment. In addition, if no transmission development works are started in the next decade, options for and timing of the longer term move to a zero-carbon electricity system in 2020 will be reduced and delayed.

It is also of concern that under this scenario, no additional on shore wind capacity is assumed to be developed in the WDC region or through Ireland, although this generation type has more certainty and predictability associated with it.

The emphasis on connecting offshore wind in proximity to Dublin is a very narrow approach and we feel it is risky to assume that one generation type in one location can provide the necessary solution. SOEF seems to only considers risks in relation grid delivery, but the east

coast offshore wind farms still need to go through planning consenting and renewable support scheme auction processes. There is potential for significant delays in these areas.

The WDC believes there are significant opportunities for offshore wind generation, and in addition to the options considered in this scenario, we believe that there is very significant potential for floating wind generation on the west coast and feel that could also have been included under this scenario.

In addition, while this scenario as it is described, might if there are no delays (and there have been many already) be achievable by 2030, as we have noted earlier, targets for 2050 are of increasing importance and they cannot be achieved with this single focus on one option. It is therefore important that a range of generation types, and system supports are planned for the system for 2030 so they can be further developed out to 2050.

14. What, in your opinion, are the strengths and weaknesses of the Developer-Led scenario?

Under this development scenario there are a number of planned reinforcements in the WDC region. As noted above, some of these are required for development which is in the pipeline in the region. They would also improve the options for development of offshore wind in the west and north west of the region. Under this scenario an additional 1,435 GW of onshore wind would be developed in the WDC region.

This scenario is consistent with the recent grid development approach in Ireland with renewable generation located across the island, under this scenario an additional 1435MW of onshore wind generation capacity is developed in the WDC region.

In the WDC region (and across the border) this scenario would require new substations (Bellacorrick 220kV, Clogher 275/220kV and Letterkenny 275kV) and new circuits (Clogher-Srananagh; Bellacorrick to Flagford; Clogher to Omagh and Letterkenny to Coolkeeragh). However, if these circuits are to be delivered as overhead lines there will be major public acceptance issues and potentially significant delays to the delivery of the infrastructure and associated generation.

The developer led approach has worked to significantly increase the amount of renewable electricity on the system, but as noted in SOEF it will require more gird investment than other scenarios. It will be challenging to deliver any 220 or 400kV overhead line infrastructure in the region and so there is a need to focus on the viability of undergrounding of transmission infrastructure (as has been the option selected for the North Connacht 110kV line. New technology options should also be investigated and combined with this approach.

15. What, in your opinion, are the strengths and weaknesses of the Technology-Led scenario?

The grid development approach under this scenario is an extension of the developer led approach but seeks to incorporate new technologies, mainly HVDC systems and other

technologies to dynamically control power flows to maximise available local transmission network capacity. Under this scenario an additional 1435MW of onshore wind generation capacity is developed in the WDC region.

Major HVDC circuits from Bellacorrick to Moneypoint, and Clogher to Woodland have been suggested. These would allow further development of onshore renewable generation in the Western Region and could potentially open up more transmission options for offshore wind development off the northwest.

There is precedent for DC links being used to reinforce networks to accommodate renewables, for example between Scotland and England. However, the HVDC proposals outlined in SOEF need further investigation in terms of technical and economic viability for both EirGrid and renewable developers. It will probably be difficult to deliver the technology within the 2030 timeline, but it would be an important asset for the transition to zero carbon post 2030 including in relation to offshore wind developments.

Other smart grid technologies could be investigated, some of these could increase capacity in the WDC region, although further network investment will also be needed. The north west of the WDC region (including Mayo and Donegal) would be an excellent test bed for new network and demand smart technologies.

While significant investment is required under this scenario, these investments would help to achieve to longer term target of a zero-carbon electricity system.

16. What, in your opinion, are the strengths and weakness of the Demand-Led scenario?

This scenario encourages large energy users to locate near renewable generation hubs. It represents a shift from the recent grid development approach by planning the location of large energy demand. The large energy users will be encouraged to locate outside the Dublin region, and to be closer to the renewable generation resources. Under this scenario, Galway, Sligo, and Letterkenny are potential locations for data centres.

The WDC welcomes this approach as it aligns with the National Planning Framework goal of more balanced development. In addition, by locating demand closer to the renewable resources, less grid development would be required.

It will still require new major transmission reinforcement in the WDC region between 2020 and 2030 (though less is required under this scenario than others). As noted above, undergrounding some of these network developments may be important in ensuring that the targeted timelines are met.

We are aware, however, that this scenario depended on the ability of the government to incentivise the large energy users to locate closer to renewable generation. We also recognise that the government and other agencies will have to drive this change so

achieving this scenario is largely out of EirGrid's control. It should also be recognised that here is a large pipeline of data centres which already have planning, some of which have connection contracts in Dublin. The focus on moving data centres will have to be on those which are currently at early stages of consideration.

The WDC Region already has significant high speed fibre connections to north America and to other European countries, these links are critical considerations for data centre location in the Region.

Conclusions

As noted throughout this submission it is important to plan for the longer term. While 70% renewable electricity by 2030 is an ambitious target, even now in 2021 we are all aware that much more will be required by 2050. Therefore, the decisions made in relation to the 2030 target should be the best decisions to achieve the 2050 zero carbon electricity systems. It is essential that requirements post 2030 are considered in relation to new RES, demand growth and network development.

While EirGrid have outlined four scenarios it is clear that the best solution lies in a combination of the approaches. No single scenario has the answers. It is projected that electricity demand nationally will grow from 28.4 TWh in 2019 to between 84 TWh and 122 TWh by 2050, an increase of between 290% and 420%). The total system peak is expected to grow from approximately 5.3GW in 2019 to 12.1GW in 2050. The UCC Marei "Net Zero 2050" study for Wind Energy Ireland[3] shows that the electricity system is expected to grow substantially to 2030 with 21 GW of wind, 4GW of solar PV, 3GW of batteries, 6GW of Hydrogen gas units and 3GW of interconnection. It is important that the network, technology, and services are planned in a timely manner to ensure that we can meet the 2050 target. To meet a zero-carbon electricity system by 2050 elements of all the scenarios, alongside a variety of generation types and storage will be needed.

The programme for government set out an ambition of 30GW of offshore floating wind capacity in the Atlantic. Moneypoint 400kV substation can facilitate offshore wind capacity located off the Clare coast. However, any offshore wind generation located north of Galway along the Atlantic will require the development of new grid infrastructure.

Converting renewable electricity to hydrogen is increasingly being viewed as a viable option for increasing the share of RES in the energy system. When hydrogen is produced from renewable electricity it can be referred to as green hydrogen and can be used to decarbonise the entire energy system. The MaREI Net Zero study for 2050 sees a role for green hydrogen in decarbonising Irelands gas grid and dispatchable gas generation fleet. Recently, the ESB announced plans for a green hydrogen production facility at Moneypoint and The Irish government is currently developing a hydrogen strategy which it intends to

[3] https://www.marei.ie/our-climate-neutral-future-zeroby50/

publish by 2023. These developments and the potential they bring should also be considered in the development of the final roadmap.

Regardless of the final roadmap selected it will be important to focus on newer technologies for enabling gird capacity and grid development. The north west of the WDC region (including Mayo and Donegal) would be an excellent test bed for new network and demand smart technologies.

Future grid infrastructure should be planned to meet the 2030 RES-E and zero carbon 2050 goals. Meeting these longer-term goals will require using our best renewable resources, which include both onshore and offshore wind across the WDC region.

The WDC is pleased to make this submission to the Consultation on Shaping our Electricity Future. If there are any queries concerning this submission, please contact me.

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