**RE: Offshore Wind Phase Two Consultation**

I would like to thank the Department of the Environment, Climate and Communications for opening this consultation to the public to offer insights and information to help with the future planning of offshore wind farm developments in Irish waters.

I am a process scientist in a global pharmaceutical company with manufacturing operations in Dublin. In this role it is essential to employ sound scientific reasoning to assess the risk and impact of planned and unplanned changes to the manufacturing process of complex biological pharmaceutical products. Outside of my profession, I am a student of Dublin City University's Postgraduate Certificate in Energy Systems Decarbonisation (PGCED). I opted to take this course as I feel so strongly about the need to make our society more sustainable that I wish to dedicate my career to this endeavour.

As part of the PGCED course, I am studying strategies for removing our reliance in fossil fuels that are omnipresent in our society. I have developed an understanding of the challenges we face in transitioning to an energy system based largely on non-dispatchable energy sources. I also understand the benefits of such a transition, namely cheap energy free of harmful emissions that will provide energy autonomy to Ireland. Through this course I have also come to understand the vast scale of the challenge we face to decarbonise our society which has given me a sense of the urgency we all should feel to cut our emissions as quickly, and as completely as possible.

There are two questions raised in this consultation in particular that I wish to address: the question of hybrid grid connections and the question of future innovation. These two sections are where I feel I have sufficient knowledge and understanding to give an informed response. I have also put forward suggestions to a number of other questions raised, however since my expertise does not lie in planning or legislature, these are only suggestions that I feel are logical and fair.

Firstly, I would like to acknowledge that the Maritime Area planning act is a welcome and necessary step to improve the planning process and speed up the delivery of essential offshore wind energy. The 5GW development is an ambitious goal but if we are to meet our commitment to prevent a 1.5$^{o}$C increase in global temperature we will need to do much more in a shorter timeline as proposed in the government climate action plan [1]

I wish to provide the following responses to the questions raised in this consultation

1. **Which is your preferred option and why of the proposed options?**

   My preferred option of al the proposals outlined in the consultation paper is option D. The early auction allows the most competitive projects will be allowed to progress to apply for MAC. An order of merit can be applied such that the most competitive bid can be processed first, speeding up the process and getting the best bids online as quickly as possible. The process that mirrors the MAC process will also act as a preliminary screening to prevent a bid securing a successful route to market then running into issues and attrition at the MAC stage and ultimately delaying delivery. It has the added advantage of fast-tracking bids that were unsuccess full in ORESS1 as they already have MAC granted.

2. **Option A proposes that a deployment security is required for to apply for a MAC in Phase**

   As I am I favour of option D, I do not think a deployment security as proposed is possible since the route to market will be the first step in the process. I do believe a deployment security can be a strong incentive to deliver by 2030. In my opinion a performance security should be paid for each bid in the ORESS2. This bond will be repaid to bids that are unsuccessful at auction. For bids that are successful

the performance security will be drawn down in parts for missing key milestones. For example, a proportion of the security will be drawn down if the MAC application is not submitted within a reasonable timeframe. A company will also be penalised for a late submission for development permission. For a company that already holds a MAC from ORESS1, the timeline should be adjusted to reflect their shorter route to development permission. This would incentivise projects to reach completion by 2030.

4. **All of the above options assume that Phase One projects retain their MACs for Phase Two. Is this the correct approach? Why?**

   In my opinion Phase One projects should retain their MACs for Phase Two. Considering the ambitious timeline of 5GW offshore wind by 2030 project attrition should be mitigated wherever possible. By allowing Phase One projects retain their MACs, valuable resources in MARA will be free to work on other applications.

   If option D was selected, it is my opinion that Phase One projects do not relinquish their MACs. By retaining their MACs, Phase one projects can move straight to the planning application. This will allow Phase one projects to come to market quicker, and will free up resources at MARA, allowing for quicker processing of MAC applications of other successful bids from ORESS2. However, I would suggest a number of conditions to the Phase One Projects. Since multiple projects can bid on the same Maritime area in ORESS 2, should a Phase One project bid at ORESS 2 and lose out to a Phase Two project bidding on the same area, the Phase one project will have to relinquish their MAC, allowing the Phase 2 project to move forward with their MAC application. Should the Phase one Project choose not to bid in ORESS 2 they will also have to relinquish their MAC and re-apply should they wish to seek an alternative route to market.

5. **To incentivise swift deployment, discourage speculative hoarding of the marine space, discourage MAC applications by projects incapable of delivering by 2030, and facilitate the coherent transition to a plan-led Enduring Regime, it is proposed that all MACs awarded in Phase One and Phase Two will expire prior to the Enduring Regime, should the holders of these consents be unsuccessful in securing a route to market.**

   I believe it is the correct approach for Phase One and Phase Two MACs to expire prior to the Enduring Regime. This will free up maritime space allowing competitors to submit MAC applications for the same area. It will also deter companies from applying for a MAC unless they have a viable plan to develop in the area in the immediate future. I believe that this approach alone is not a strong deterrent for companies with poor pre-2030 deliverability. A security deposit along with the MAC application would be a stronger deterrent, thus keeping maritime areas open for more promising projects that are confident that they can deliver.

10. **Hybrid grid connections are defined in this paper as single grid connections which facilitate the connection of both an existing or proposed thermal generation plant and a proposed offshore wind project.**

    In general, I am not in favour of hybrid grid connections that allow both offshore wind and thermal power plant grid connections.

    The basis of my objection is that the thermal generation plant would likely be, or at least can be, a fossil fuelled thermal generation plant.

    I understand that the intermittency of wind energy will pose a serious risk to grid stability as Ireland increase penetration of wind energy. However, I firmly believe we should not be accommodating

further development of fossil fuel infrastructure as this is short-term thinking. If we are to achieve our goal of preventing a global temperature increase of 1.5°C above pre-industrial levels, we will need to have decarbonised our electricity supply well before 2050. This will result in any new fossil fuel fired thermal power plants commission in 2030 and beyond becoming stranded assets, costing both money and jobs. We have already seen this happen to the Lanesboro and Shannonbridge peat fired plants. Creating hybrid connections to thermal power plants leaves us open to make the same mistake twice. What is more concerning is the $CO_2$ that will be locked into our energy system if we choose to accommodate more fossil fuel fired plants.

Given the staying power of $CO_2$ in our atmosphere all carbon we have emitted to date, and all carbon we emit in the future will contribute to the greenhouse gas effect. Therefore, we should be concerned about cumulative carbon emissions, not the rate of emissions [2].

The IPCC special report on Global Warming of 1.5°C has demonstrated that the planet has a fixed carbon budget that we must stick to if we are to achieve a 66% chance of staying below a 1.5°C increase in global temperature above pre-industrial levels. Within this global carbon budget each country has their own "fair share" carbon quota.

A paper by B. McMullen et al. has calculated Ireland's fair share quota to be, at the very most 391 million tonnes of $CO_2$. To meet our commitment to the Paris agreement and stay 1.5°C below pre-industrial temperatures, Ireland would need to reduce $CO_2$ emissions by 11% year on year starting from 2016 [1]. Since we have not managed to achieve anything near that level of reduction in any year since 2016, we will be required to make even more drastic reductions to emission over the coming years if we are to stay within our fair share quota of $CO_2$ emissions.

Furthermore, since much of the infrastructure required for renewable energy generation has embedded carbon emissions. So, in order to decarbonise we must first release more emissions, eating into our already depleted carbon budget. It is absolutely essential that we prioritise carbon budget "spending" on projects that will ultimately result in emissions reductions. By accommodating thermal power plant connections, we run the risk of throwing away our carbon budget on projects that will only serve to further pollute and offer nothing in terms of decarbonisation.

I am however, in favour of hybrid connections if the definition was adjusted to only include connections to other forms of carbon neutral energy sources. Solar energy can act synergistically with wind energy as time of high solar power output does not coincide with times of high wind power output. This has an overall effect of reducing the total output variability of the two energy sources [3].

In addition, I believe it will be essential to connect hydrogen fuel cells to the grid. This will enable the production of green hydrogen using renewable energy to be converted back into electricity through fuel cells during times when renewable energy output is low. I will discuss this further in the next section.

**11. Should any special allowances for innovation technologies be included in the Phase Two process?**

I believe special allowances should be made for innovation technologies. In particular, there should be allowances made for projects that include generation of green hydrogen.

Green hydrogen has a key role to play as an energy carrier in the transition to net zero carbon emissions.

As variable sources of energy such as wind and solar take up an increasing proportion of our electricity supply, the issue of intermittency becomes more pronounced. It is essential to counteract this intermittency to protect grid stability and ensure consistent power supply to all. As discussed above, we cannot rely on gas powered turbines to support the grid during times of low renewable energy

output. Green hydrogen offers an alternative dispatchable power source that can support the grid during times of low energy output.
The properties of hydrogen make it an ideal energy carrier that allows us to capture renewable energy and dispatch it as needed.

- Green hydrogen can be created via electrolysis using renewable energy at times when energy output is high thus preventing the need for curtailment. No carbon emissions are associated with this process
- Hydrogen is suitable for long term seasonal storage such that green hydrogen generated by wind power in winter or spring can be stored for use in summer when wind power output is lower [4]
- Hydrogen has the potential to provide enough stored capacity to provide power for days rather than hours [4]
- Hydrogen can be converted back to electricity for grid supply through fuel cells with no associated carbon emissions.
- Hydrogen fuel cells are more suitable to power large vehicles such as HGVs and buses than batteries [5]
- Hydrogen can be used as a precursor for e-fuels [6]
- In the short term, hydrogen can be introduced to the current gas network to a limited extent to reduce emissions from burning natural gas

Of these characteristics, one of the most important to note is the fact that hydrogen has the potential to provide seasonal storage of energy at a capacity that will provide electricity for much greater periods of time than is achievable with other forms of energy storage such as batteries or pumped hydro [7] [8].

I believe that capacity should be reserved in the MAC and ORESS process for these technologies to begin the development of hydrogen infrastructure in Ireland. I believe that such projects should also aim for a 2030 delivery date. To date, only a tiny proportion of hydrogen is produced by electrolysis. If hydrogen is to act as a viable energy carrier to support further expansion of renewable electricity, there needs to be rapid expansion of hydrogen infrastructure. Furthermore, by expanding capacity of hydrogen electrolysers, the cost of green hydrogen production will fall; a current drawback of green hydrogen production at present [6].

I would like to finish by saying that it is vital that we devise a controlled, equitable transition to a carbon free society, but we have reached a point where we can no longer delay making drastic emissions reductions. This may well cause hardship in the coming years, but we have no choice but endure this hardship if we are to achieve a better world than today. A quote from UN Secretary-General Antonio Guterres sums up our predicament and is something we all should remember when making decisions with respect to decarbonising our future

**“Our addiction to fossil fuels is pushing humanity to the brink. We face a stark choice: Either we stop it — or it stops us. It’s time to say: enough.”**

## References


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