

EirWind Webinar

Showcasing the final results of EirWind, a 24-month multidisciplinary research project exploring offshore wind development in Ireland

Question and Answers

25th June 2020



Brookfield

edp renewables



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Work Package 2: Data management for site evaluation

Question and Answers

Question Asked	Answer
Is the spatial data produced available as Open Data under Creative Commons licence e.g. visual impact, bathymetry, Wind resource etc.?	Not much is available yet. The geo stability model has been presented publicly and is being reviewed for publication now. We're pushing to make more of these outputs available. Other data will follow.
Are the weightings in the MCDA changeable according to user needs?	Yes, they are. They can be easily adjusted as the end users see fit, which enables focused assessments for different objectives (e.g. fixed vs floating possibilities). This is to allow policy-makers or developers to increase weights for their respective priorities. A model sensitivity study is under way.
Any reason for the surveys shown omitting the W/NW of the country? Also, what were the high ranking criteria from your AHP?	The NW was largely omitted for logistical reasons during cruise planning but also because there are less grid connections and O&M ports in that area. We're working on publishing the AHP results
With regard to the analysis on challenges and constraints presented on slide 19, what are the reasons why "non-renewables" in terms of offshore renewables are considered so often in the literature? Is it due to synergies, due to cumulative effects or the potential to learn from best and worse practices in the development and maybe governance of those?	I think "non-renewables" are considered so often because, as you mention, they do offer insights to working in the offshore environment and there is some research into co-use strategies. But from a GIS point of view, they often produce "hard constraints" to where new infrastructure can be built, so it's important to add these to our models.
When you integrated the layers, was a sensitivity analysis carried out? Were there layers that were more significant than others?	We haven't conducted sensitivity analyses yet--something for a future publication. Tangentially, we did cross-validate our models.
What is the comparison of wind energy in the Irish sea v the Atlantic?	Not really a simple answer since it depends on how we compare (seasonally, annually, what hind cast, etc.). However, no matter how we compare it, there is more wind energy in the Atlantic than the Irish Sea, which is why developers are keen to assess possibilities of wind farms west of Ireland despite the challenges there. Here are the publications by our colleagues Tiny and Cian, https://www.mdpi.com/1996-1073/12/2/206

Work Package 2: Data management for site evaluation

Question and Answers contd.

Question Asked	Answer
Have you plotted any work for locations that are suited to fixed and floating (mooring) in terms of the seabed stability and wave history?	Our GIS based MCDA does allow for comparisons between fixed and floating tech, and it enables users to prefer or favour one over the other. This MCDA considers seabed stability along with all the other factors we have included, but you could also use the model for just a select number of variables (parameters).
Did you produce sensitivity maps for fishing and offshore wind?	Fishing activity is represented in our MCDA with several parameters including AIS vessel traffic data and spawning grounds. These factors are considered in modelling development opportunities.
The North West is a sector that seems to be ignored in all analysis?	We didn't collect new data in the NW (see earlier comment), but we did model new GIS data there and this area was considered in as much detail as every other area of the continental shelf in the MCDA.
Is Tiny's work published at all? Fascinated to see how it's done!	No it's not published yet, currently it's only available to Industry partners
In relation to visual impact for modelling of suitable areas for offshore renewable development, it would be very interesting to understand what limits (Distance from shore or maybe elevation of coastline etc) were considered suitable for the development of modern 10MW + scale wind turbines?	This information is not published yet, currently it's only available to Industry partners

Work Package 3: Development optimisation for cost reduction

Question and Answers

Question Asked	Answer
Regarding O&M, what is the direction of travel in terms of automation of these procedures? In future might such advances make a restricted number of possible O&M days a lesser factor in identifying possible ORE development sites?	This is what is required, particularly for more extreme sites and there has been advancements in terms of increasing reliability and using robotics such that the requirement to access turbines will be less
In relation to the initial summary of LCOE model outputs presented - is the availability figure presented (68%) referring to the 'wind farm availability' and if so, is the main driver for reduced availability of turbines driven by reduced access to turbines for O&M purposes or are there other key factors influencing this figure?	Difficulty in accessing turbines due to the lack of suitable weather windows contributes significantly to the reduced availability for Atlantic sites. Improvements to turbine reliability and access methods will increase availability and lower LCOE
What, if any, work is being done to tie in with the likes of 'Catapult' set up in UK (Aberdeen / Glasgow) as it's a great link to the experience and skills including installation / OM etc., from North Sea Oil & Gas? They are doing good work on UK side to integrate and realise the mutual benefits between oil & gas & offshore wind (technologies, installation, supply chain, project management, O&M).	We have links with ORECat and consulted with them regarding the model assumptions and output
How did you estimate the different discount rates ranging between 5-6.5% used in the analysis given Ireland does not have a track record in offshore?	These rates were chosen in consultation with our industry partners as initially we had used higher rates. The logic was that if windfarms of the scale used in the case studies are being developed then the discount rates needs to be of the order of 5%. We did do sensitivity analysis on the discount rates
Killybegs has certainly got a huge capacity and openness to the emerging markets outside of fishing. deep vast harbour and great facilities and local content. has this brought any influence to the 'selling' opportunity for North Atlantic (installation and OM)?	There is a significant opportunity for Killybegs to become a hub for offshore wind development along the NW coast once development starts on sites that are in range of the harbour. Killybegs itself was not examined in our analysis as our chosen site was closer to Shannon Foynes

Work Package 3: Development optimisation for cost reduction

Question and Answers contd.

Question Asked	Answered
How does your approach and output compare with other studies that calculate LCOE	Our approach and output has been validated against other studies
What is "your" confidence in the outputs of modelling re future changes in offshore to coast wind speeds & wave heights in the period post eg., 2030 etc? Comment? Issue is one of Uncertainty/ Certainty re the input to the economic outputs.	At the moment our models do not examine the impact of climate change effects on power production and weather windows. This would make a nice research project provided we can get 25 years of weather data of different future scenarios
Since your export market areas will be doing the same things, how real is the export market for Ireland (R of I)?	If we can deploy at large scale, offshore wind energy in Ireland has potential of lower LCOE than in other areas. In addition, we have advantages of geography location for bulk exporting by ships. There are other reasons in terms of demand. Thus, the export possibility will be real in the future if we start to look at it now.
When would you envisage having a more robust LCoE model for Floating Offshore Wind energy?	My view is that our model is robust but the sector needs to progress to larger scale developments to better understand whether the assumptions made in the model stand up to practice in the field.
Have you looked at the new Flexifloat technology which combines offshore Wind and Wave - 42 MW Wind combined with 30 MW Wave giving a 72 MW total per platform?	In EirWind we only looked at offshore wind and not hybrid applications. In other projects we have analysed this and found that LCoE for hybrid applications is higher than for wind alone. The wave energy sector is not at the same maturity level as offshore wind so has higher LCoE values
How sensitive is the LCOE to O&M and in particular to distance to port?	O&M make up a high percentage of the total costs so is very important. the distance from port dictates the O&M strategy that will be put in place (CTV or SOV)
What assumption do you make about the project time scale from conception to switch on? 10 years?	There is no specific assumption made with regard to the project time scale particularly before the Installation stage as it does not influence the LCoE calculation

Work Package 3: Development optimisation for cost reduction

Question and Answers contd.

Question Asked	Answered
Is €108/MWh in line with projections for floating in the rest of Europe, or do the challenges of the Atlantic increase this by a lot?	This figure is within the range predicted by industry for Atlantic sites. The Irish Atlantic is a very extreme environment so higher LCoE would be expected but if reliability and accessibility can be improved it has high potential
Do you really think this is achievable? Why large offshore wind west coast? Will turbines survive those conditions?	Turbines have to be large as that is what is available on the market for offshore development, they may even be larger when these projects eventually get built. The conditions on the west are indeed extreme, more extreme than any site where floating has been deployed to date. The concern would not be with regards survivability of the turbine, but more the accessibility for installation, O+M, decommissioning. Lack of access to sites increases the cost of the energy produced. We are working on solutions to this. It will take time. The AFLOWT project is planning to deploy a floating platform with a 6MW turbine at AMETS. This will help to demonstrate the capability of floating wind to operate and survive in an extreme environment.
Do any recent industry developments affect results from your studies in terms of recent announcements that 14 to 15MW WTG units being commercially available by 2024 or O&M strategies also incorporating remotely operated tools e.g drones etc.	Future improvements in technology are built into the cost models as learning rates. Whilst recent announcements are interesting, they are not unexpected. Remotely operated O+M is an active area of research in MaREI under the STEP4WIND H2020 project. We see such advances as crucial to reducing the costs associated with developing more remote / extreme sites.
Can you comment on how important the onshore infrastructure is to the siting of offshore wind farms?	Very, particularly when it comes electrical cable land fall and grid connections. Port facilities for the handling and possibly assembly of components is also important, particularly as we seek to maximise the benefit of these developments to the Irish economy.

Work Package 3: Development optimisation for cost reduction

Question and Answers contd.

Question Asked	Answered
Due to what sources you expect a lower capacity factor in the Atlantic as in the Irish and Celtic Sea?	This is down to access windows. Whilst the winds are stronger and more consistent on the West, there will be increased downtime due to difficulties accessing for O+M activities. This will result an increase in hours when the turbine is not generating and hence lower capacity factors. Turbines with less failures, autonomous O+M and other innovations will mitigate this effect. I should note that I have seen capacity factor being calculated previously where downtime is excluded and is instead represented entirely separately as availability. Admittedly, this may the source of confusion.
Killybegs is a great national resource which has potential for the offshore wind market?	It certainly is and hopefully it will play a role into the future when the technology has matured to a stage where we can develop the sites on the West coast. For the next decade or so, Killybegs is potentially too far from the sites on the East and South to make economic sense for industry to consider as a development or O+M hub.
Blueprint for OFW, Atlantic Production Zone - before we get near 2030-50 action zone, is Killybegs being considered (as port Cluster or joined to shannon even) for its full potential (socio-economic and very capable base location for accepting all sorts of investment, development, access to market, border county.	Killybegs and Shannon hold great potential when technology matures to a stage where we are seeing large scale development of offshore wind on the West Coast. However, for at least the next decade, development is most likely to be centred on the East Coast along with some areas on the South. For now at least, these ports are most likely too far from the development areas to be feasible hubs.
What, if any, work is being done to tie in with the likes of "Catapult" set up in UK (Aberdeen / Glasgow)	We have links with ORECat and consulted with them regarding the model assumptions and output

Work Package 4: Ecosystem Governance and Biology

Question and Answers

Question Asked	Answered
Will the stakeholder directory developed by Yvonne be available in the public domain?	No. This is only available for the Industry Partners
Public Perception (Map), have you included the stakeholders in Donegal for the North Atlantic, as it looks like Connacht & Ulster were mapped a bit vaguely.	We used the three scenario areas as a guide to what to the areas to map in detail, as such less focus was put on Connacht and Ulster.
In terms of job creation potential, how do your modelled figures compare to others, for example actual jobs created in countries with a track record of experience of offshore wind?	We looked at the UK, which is currently a world leader in offshore wind development. If we normalise the number of domestic jobs created per megawatt of installed capacity, we can compare our modelled outputs with actual jobs created in the UK, and the figures are very similar – working out at around 1.8 to 1.9 jobs per megawatt. We also compared our job creation figures with those of other similar Irish studies, which was complicated because those studies considered different types of jobs across different geographical areas, such as the whole island of Ireland versus the Republic. Where we could make comparisons, we found our figures were broadly in line with those other studies.
There is huge distrust by fishermen as currently they are being hit by a large number of proposed windfarm developments which overlap with key fisheries. There is currently inadequate AIS or other data sets for in particular inshore fishing activity. There here the potential from government etc. about the need and potential for offshore wind energy, but key questions are not being openly discussed or led in a coordinated fashion to allay their fears such as; impact of surveys, installation and whether or not there will be effective exclusion zones that will limit or prevent their fishing activity	The research interview report suggests that fishers want early consultations, dialogue and active participation of local fisheries representatives, to be part of fishing and offshore wind co-existence practice. This practice would be new in Ireland, but it has been the norm for decades in other countries, for instance in the UK. Many of the fishers' questions can be addressed when a standard guide for the long-term co-existence of commercial fishers and offshore wind developers is established in Ireland.

Work Package 4: Ecosystem Governance and Biology

Question and Answers contd.

Question Asked	Answered
Where did you get the socioeconomic deprivation? Was it the CSO census data?	This is Pobal data, which is derived from census data. It can be found here: https://maps.pobal.ie
Killybegs has certainly got a huge capacity and openness to the emerging markets outside of fishing. deep vast harbour and great facilities and local content. has this brought any influence to the 'selling' opportunity for North Atlantic (installation and OM)?	Yes, we recognise this potential in the project reports.
Is there a Job and Economic Multiplier report available for say the next 10 years associated with Offshore and Ireland?	<p>We took a value chain approach to the economic modelling, which does not rely on multipliers to estimate employment/GVA, but rather expenditure on different elements of offshore wind development, labour requirements, and wages. This is explained in detail in the Eirwind socioeconomic study deliverable report and in a paper (Kandrot <i>et al.</i>, in press) in the International Journal of Green Energy. Some other studies have taken an IO approach (listed below), but they either do not give a multiplier (e.g. IPORES) or look at the wind industry (onshore + offshore) as a whole.</p> <p><i>Estimating Potential Job Creation from ORE Developments in IPORES 2018 A Review of Irish Ports Offshore Renewable Energy Services</i> (IMDO, 2019)</p> <p>The Value of Wind Energy for Ireland (Pöyry, 2014)</p> <p>An Enterprising Wind: An economic analysis of the job creation potential of the wind sector in Ireland (Siemens, 2014)</p>

Work Package 4: Ecosystem Governance and Biology

Question and Answers contd.

Question Asked	Answered
<p>Ocean Focus Regarding responses from fishers what concerns were raised; and what areas of compensation and benefit sharing were examined?</p>	<p>Our report has discussed the concerns raised by interviewed participants. Similar to the FLOWW best practice guidance, our study suggests a standardised compensation procedure which would be created for Ireland through consultations between stakeholders. Also, our study suggests that the potential benefits should be tailored according to the communities' needs. The research report has provided a conceptual map of potential benefit sharing opportunities according to the opinions of participants. The potential benefits examined are at two levels: benefits which are exclusive to fishers and benefits for local community.</p>
<p>Your socioeconomic analysis shows Donegal as a disadvantaged area, yet none of the analysis tries to address this from an ORE perspective? Sustainable communities need energy and infrastructure.</p>	<p>We argue that ports and harbours in economically disadvantaged parts of the country (such as Killybegs) could serve as a locus for the development of the domestic offshore wind supply chain, creating local economic and employment opportunities. This would have knock-on (induced) effects for these communities. Given the size and scale of expenditure on offshore wind projects, there is real potential for regional development driven by offshore wind. Many coastal communities in Scotland, for example, have benefitted significantly from Scottish projects (e.g. see: https://www.sserenewables.com/news-and-views/2017/07/beatrice-socio-economic-impact-report/)</p>

Work Package 4: Ecosystem Governance and Biology

Question and Answers contd.

Question Asked	Answered
Do you see Coastal Partnerships as a means to facilitate SLO's? Should coastal partnerships have a statutory input to MSP as in Scotland or just be a consultative body?	<p>Answering this question needs an extensive engagement with wider stakeholders in Ireland. Establishing coastal partnerships and forums has been mentioned by organisations such as the Sustainable Water Network (SWAN) who propose an Integrated Coastal Zone Management (ICZM); The Irish Sea Maritime Forum is conducting a survey online. Links are provided below.</p> <p>http://www.swanireland.ie/a-new-way-of-managing-our-water/integrated-coastal-zone-management-iczm</p> <p>http://www.irishseamaritimeforum.org/</p> <p>The outcome of the Public Consultation on the Draft National Marine Planning Framework would be a key milestone in understanding the required supporting actions for achieving marine planning and policy objectives.</p>

Work Package 5: Storage, Infrastructure and Markets

Question and Answers

Question Asked	Answered
Was there any attempt made to estimate and include the offshore grid costs associated with the case studies?	The offshore HV transmissions will be expected to be investigated in future research.
Energy conversion and storage as hydrogen is clearly a great option and solution for over generation /capacity. What about the likes of expansion for push through to markets via the developments of work being done by 'Supernode' high capacity super conductors, to enable longer distance distribution and again focused to Hydrogen pathway 2, would any OFW developments be more attractive to pure Hydrogen markets as opposed to multipaths? being more standalone / remote. not tied to grid.	We are looking at two system setups: grid-connected OFW and off-grid or hydrogen only OFW.
Can hydrogen produced from offshore wind energy be competitive with other fuel sources?	Yes, our forecast calculations initially show that it can in the near future, given large scale production, improvement of infrastructure, R&D and support to get to the large scale production. Fossil fuel prices are currently low, but will increase and will also be subject to carbon prices
What is the expected life of proton-exchange membrane and other promising electrolyzers? How do they compare with the 25-year operational life of offshore wind?	At present, the lifetime of PEM stack is 40-50k hours (approx 5-7 years of full operations). This will be improved in this decade by R&D and markets development. We have been accounted these in calculating our LCOH (levelised cost of hydrogen).
Will we be able to export Green Hydrogen via existing gas interconnectors unless it is 100% pure Hydrogen and zero Methane as contaminated Hydrogen will be unsuitable for some process like Fuel Cells?	Initially hydrogen will be blended with natural gas. Most existing end uses will be compatible with blends. For more demanding end uses, upgrading would be required.
Green hydrogen - Do you think a dual fuelled system is a good transition mechanism for transport and shipping? Eg. methane from Hydrogen?? to co fuel haulage and ships?	Yes, there is a lot of interest in the shipping industry in other synfuels derived from green hydrogen, e.g. methane and ammonia.

Work Package 5: Storage, Infrastructure and Markets

Question and Answers contd.

Question Asked	Answered
How is an efficiency of 65% considered good, when keeping energy in the form of electricity would be more efficient? This also does not factor in losses associated with the transport and storage of hydrogen	This was answered previously re. question in electrification. In short, there are direct demand in hydrogen and limitation of electrification.
Many scenarios see electrification as the key enabler of decarbonisation which will also bring huge efficiency gains and reduce gross energy demand. Why does EirWind insist on hydrogen for use in sectors where electrification is the obvious choice?	We do view that electrification greatly contributes and we realise that a number of national energy strategies put both hydrogen and electrification moving forwards to ensure diversity of energy conversion and storage. Thus, at present, we are looking at hydrogen as one of the options. A number of studies reported that there are limits to battery-electric vehicles (e.g. battery pack weight, charging time, not for long distances). Thus, hydrogen-fuel cell vehicles are the potential option for long-haul and/or large vehicles, as an example
Will the domestic electricity market expand to supply heat and transport; as fossil fuels are reduced for these needs?	I believe this was answered in Paul's presentation. There are also previous answers regarding electrification. In short, it will, and this should be supported, but there will be some limits on electrification
So far today, all that has been presented is hydrogen solutions for routes to market with little information on how grid development and new grid technologies can offer a route to market. Will there be more information on grid development and optimisation in the final report?	Yes, the final report will cover grid developments and system services, but there is a strong component on hydrogen.
What work was done to look at developing offshore grids for export to mainland Europe?	You might see these the interconnector slides presented by my colleague Paul Leahy. Specifically, there are great work being done by the Celtic interconnector to France, and some other proposed projects. The final report will outline some of these.

Work Package 5: Storage, Infrastructure and Markets

Question and Answers contd.

Question Asked	Answered
Is the development pace of renewable energy influenced by oil price for economic reason?	I don't think the temporary lowering down of oil price has any influence, because ORE development is driven by long-term strategy towards both energy security and climate actions
From a pure efficiency perspective, the concept of 100% electrification is obviously best. The SuperGrid concept brings with it its own range of challenges, technological, legal etc. Ireland needs a feasible route to market for large amounts of energy - P2G is one option. Is there sufficient confidence that the value of H2 per unit of energy can offset the conversion efficiency concerns and compete with electricity?	The answer to this has been covered in a previous response and is adapted here. There are number of national energy strategies published that put both hydrogen and electrification moving forwards to ensure diversity of energy conversion and storage. Thus, at present, we are looking at hydrogen as one of the options. In addition, a number studies reported that there are limits to battery-electric vehicles (e.g. battery pack weight, charging time, not for long distances). Thus, hydrogen-fuel cell vehicles are the potential option for long-haul and/or large vehicles, as an example...Moreover, hydrogen are being directly demanded by a number of industries (e.g. German national hydrogen strategy just released several days ago).
Was the total level of energy storage modelled? Notwithstanding interconnectors and electrolysis, significant storage will be required. Also, if wind is the source of the majority of our electricity and gas in the future, how is security of supply addressed	Energy supply based on domestic renewable generation including offshore wind and gas storage will increase the security of supply. Of course, the existing and planned interconnectors can also be used to import energy when necessary.

Work Package 5: Storage, Infrastructure and Markets

Question and Answers contd.

Question Asked	Answered
I agree that we need markets for our Renewable resources. Selling electricity via interconnectors at times of high Renewables at zero or negative prices adds nothing to the Irish economy or brings no revenue to Wind Farm operators. This is why Green Hydrogen is a better option.	We agree that green hydrogen is very important to open new markets and deliver revenue, particularly due to these reasons. Electricity markets will continue to be very important
We will need Hydrogen Storage, probably as Green Ammonia in Ireland as strategic seasonal storage to replace current fossil fuel storage for security & resilience of energy supplies. We cannot rely on electricity interconnectors as all North Western European countries are increasing wind generation, particularly offshore wind. Other studies have shown that we can get long periods of low intermittent Renewables for 2 - 3 weeks frequently in winter when energy demand is highest. Everybody will be short without Hydrogen storage in these circumstances.	We view electricity interconnectors are important components to the national and regional power systems to maintain system services, stability and supply, not only exporting/importing. We agree that gas storage will also be needed.
Is there a market for Oxygen produced in electrolysis?	There is a market for oxygen, especially in the Irish medical sector. Globally, the oxygen market was worth \$37.93 billion in 2019 and is expected to reach \$59.17 billion by 2023.

Research Synthesis: A Blueprint for Offshore Wind in Ireland

Question and Answers

Question Asked	Answered
Did you look into models such as in the UK where local content requirements are part of the social license to operate and part of the subsidy bid? Can Ireland implement a similar model in your view?	<p>Yes, we did look at the UK and their local content requirements. The UK's Offshore Wind Sector Deal sets a 2030 target to achieve 60% lifetime UK content. Prior to the sector deal, though, local content practices in the UK were market-driven, with no binding local content targets. This laissez-faire approach was very successful in the UK (and also in China and elsewhere) in allowing the domestic market to develop. For example, local content across the UK offshore wind sector has increased from 32% in 2016 to 50% in 2020, without any targets or requirements (Noonan and Smart, 2017; Leahy <i>et al.</i>, 2020). Conversely, local content requirements in France meant early projects were significantly more expensive than projects in other markets at that time (Leahy <i>et al.</i>, 2020). With the result, there have been extensive delays to these projects as renegotiations of the contract terms took place. So, from the Irish perspective, given the early stages of the domestic market, we would not recommend the implementation of any statutory local content requirements. However, to incentivise the use of domestic products and services (where they are available), Leahy <i>et al.</i> (2020) suggested there could be a requirement for participation in RESS auctions, whereby developers must supply a local supply chain plan and those that use local suppliers are scored higher than those who don't.</p>

Research Synthesis: A Blueprint for Offshore Wind in Ireland

Question and Answers contd.

Question Asked	Answered
Overall, does EirWind view collocation of other activities with ORE as an opportunity (bringing stakeholders along / increasing acceptability; efficient use of space) or hindrance (added complexity) to achieving offshore wind generation targets? Will the project be making any recommendations on this?	Yes, we really do. We have a deliverable looking at co-location with other ORE. We are/will be also looking at looking at possibility of collocation with other marine activities.
The project has very effectively worked through many of the technical, environmental, social and policy challenges related to optimising ORE in Ireland. This is fantastic! In light of the project having been led by industry and experts, the next stages will likely require opening up the debate and conversation to a wider audience including the public. It is possible that the multi-faceted discussions needed to make progress on this issue (gaining wide-ranging buy-in) may result in either / both lower targets or slower pace due to necessary compromises. Does EirWind perceive this as a risk?	The public consultation on the NMPF has been state of the art, however, it was not specifically focused on offshore wind. We expect OREDP2 to follow a similar process which will give the public the opportunity to comment on the next wave of offshore wind developments at a strategic level. International experience has shown that a public Marine Spatial Planning process is key to success. The “relevant” projects site selection was developer led and so were not a function of a MSP process. Thankfully, the high-level concepts of these sites have been in the public consciousness for years and the detailed design will still have to go through the planning process where the public will have their say on the finer details. This does of course introduce risk, the planning process can be contentious, however, it is important to have a solid social licence to operate particularly for this first wave of developments. We saw with the Greenwire project how the tide of public opinion can make or break large infrastructure projects of this kind, it would be a shame to see the ambitious plans for offshore wind development going the same way.



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