Policy Brief:
Data for Irish Offshore Wind-Energy

EirWind

A new analysis of Ireland's marine data has been carried out to improve planning for offshore wind energy developments. This policy brief explains the analysis and outlines some key findings.

EirWind:

Co-designing opportunities towards the development of Irish offshore wind

MaREI Centre for Marine and Renewable Energy

UCC University College Cork, Ireland Coláiste na hOllscoile Corcaigh

Environmental Research Institute

Science Foundation Ireland sfi For what's next

Graphic summary of key findings:

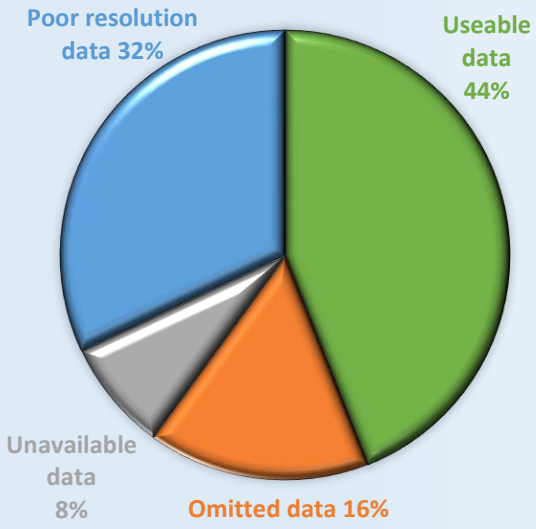

Figure 1: Chart of data quality for Irish offshore wind energy variables.

Improving future clean energy production is important both globally and for Ireland[1]. Developing such projects requires careful assessments of many factors, which in turn requires data. This chart shows the relative proportions of data quality types affecting offshore wind energy development in Ireland. They are categorized by assessing their current completeness and quality.

The **principal finding** is that, while much commendable research has been undertaken on the Irish continental shelf (e.g. INFOMAR[2]), more should be done to improve and streamline future offshore wind energy projects.

Currently, about 44% of the data required to analyse Ireland's offshore resources for wind energy development projects is already publicly available. Some data (8%) exists but is unavailable to the public. The largest obstacles to future research consist of omitted data (e.g. data gaps in seabed sediment maps); these omissions constitute about 16% of the data required for thorough assessments.

An analysis of the quality and availability of data resources applicable to offshore wind farm development on the continental shelf of Ireland was performed. The reason for this analysis was to examine the state of the information that will be required to develop Ireland's potential offshore wind energy infrastructure. Five key aims were to: (1) establish data standards; (2) outline data requirements; (3) describe data availability; (4) reveal data gaps; and (5) strategize future work. To address these goals, a review of peer-reviewed studies on offshore wind farm site selection was performed. The geographic information in these studies was tabulated and used for a comparative assessment (i.e. a "meta-analysis"), which revealed patterns in the data and suggested standards for future research. Then, data gaps were quantified by comparing the available data to the required data.

Key findings include a list of important variables for Irish offshore wind energy development, which can be described as three distinct data types: geologic (e.g. sediment type), oceanographic (e.g. seasonal wave heights), and geographic (e.g. distance from shore). By comparing the required data against the available data, four types of data gaps and shortfalls were revealed: (1) omitted data; (2) unavailable data; (3) data with inadequate resolution; and (4) data with inappropriate file types. Some of these findings are depicted in the graphic summary (Figure 1). Geological data and data for line of sight (i.e. "seascape impact") was found to have the poorest coverage and availability; conversely, many issues with oceanographic and geographic data can typically be rectified with file transformations (Figure 2). In other words, data for these variables exist, but need to be manipulated to improve compatibilities. Poor resolution data can be improved by concerted data collection efforts, computational modelling, or a combination of both. Some key findings are:

- Data standards were established and assessed using a literature review, meta-analysis, and expert opinion from both academia and industry during EirWind collaborations.
- Four types of data problems were revealed.
- Data problems cause varied impacts to research, but all require continued effort to amend.
- Most data can be improved with further analysis, but some will require offshore data collection efforts.
- Data on geological variables and line of sight ("seascape") assessments contain the most omissions (gaps).

[1] Department of Communications, Energy and Natural Resources. (2015). Ireland's Transition to a Low Carbon Energy Future 2015-2030. Dublin, Ireland.
[2] INFOMAR (Integrated Mapping Survey for the Sustainable Developments of Ireland's Marine Resources). https://www.infomar.ie/

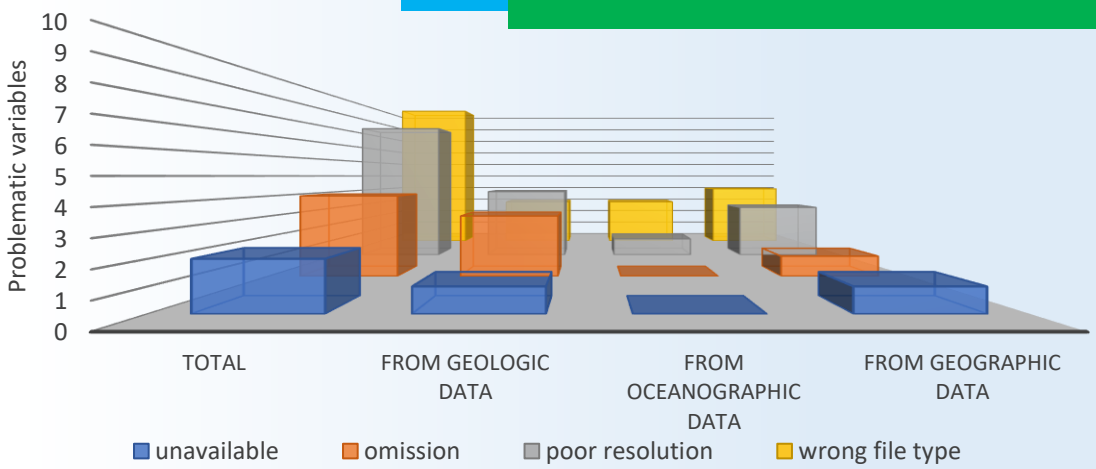

Figure 2: Chart of data problems. Bar charts illustrate categorised data problems. Most issues can be corrected or improved with file transformations that improve data compatibility, but geologic data is largely incomplete and thus, will require coordinated data collection efforts.

Strategies for future work in the EirWind project have been developed using these findings with the goal of improving assessments for future Irish offshore wind-energy developments. New multibeam echosounder data is being collected and processed to help improve assessments of the seabed and water depth. Geologic data is being improved through several types of data collection that will help characterise seabed conditions crucial to infrastructure installation. Geographic Information System (GIS) analyses and data processing are also underway, which aim to develop novel data sources that may streamline future site assessments. Future work will also include weighting the relative importance of data variables and carrying out more offshore research cruises, for which funding has already been obtained. Research cruises have been planned that will enable the collection of geologic, oceanographic, and geographic data. These data will improve existing datasets and enable examinations of site assessment methods for future work.

Policy changes can be informed by these findings to help facilitate future offshore wind farm developments and thus help Ireland to meet its energy production and climate change targets[1]. We suggest that:

1. Existing datasets (e.g. Automatic Identification System (AIS) data on vessel traffic) should be made more **accessible** by funding data compilation and dissemination projects.
2. Future national data collection efforts should address the **shortfalls and gaps** identified by EirWind research.
3. Research projects like Infomar[2] should receive funding that incentivises **data collection** efforts for offshore wind energy.
4. **Standardization** efforts (e.g. compliance with ISO standards) should be improved by directing funding towards initiatives designed for data harmonisation and open data standards.

Increase funding for offshore **data collection** and **standardization** efforts. The data weaknesses exposed by EirWind research should be the foci of these efforts

Encourage improvements to **data accessibility** by funding data compilation and dissemination projects.

These changes will help establish a development pathway by meeting governmental and industrial data requirements that enable accurate resource assessments and decision making.

EirWind

Co-designing opportunities towards the development of Irish offshore wind

EirWind is an industry-led collaborative research project, co-designing opportunities for the sustainable development of Ireland's marine resources by using offshore wind as a catalyst for innovation. It utilises the concepts of Marine Spatial Planning (MSP) where relevant, including advanced data-analysis, strategic planning, Irish marine and renewable energy policy initiatives and stakeholder management. Research is conducted by five interactive technical work packages (WP) that will:

- Develop a data management and spatial analysis framework (WP2).
- Improve cost optimization solutions for future development (WP3).
- Improve methods for stakeholder management (WP4).
- Provide development strategies for the distribution and storage of energy (WP5).
- Assess and synthesize other WP outputs to examine potential environmental and economic impacts (WP6).

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Project start date: 01st August 2018; duration: 2 years; more information: http://www.marei.ie/eirwind/

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