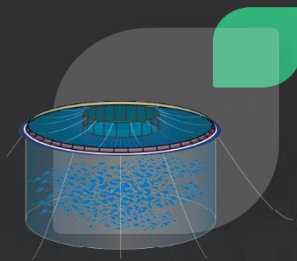


# OCEAN CLEANTECH

MARKET INTEL WEBINAR SERIES



IRELAND



WEBINAR TEXT

This is the script used in the webinar titled ‘Ocean Cleantech: Market Intel Webinar Series – Ireland’ published on August 15, 2023. The webinar can be accessed [here](#).

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**Here in Atlantic Canada**, we are on the leading edge in ocean cleantech, specifically when it comes to environmental sensing, monitoring, and characterization technologies. Our businesses and research institutions are experts at using laser, sonar, radar, satellite, environmental DNA, and other technologies to understand our impact on the environment, operating in harsh and dynamic conditions, and climate change’s impact on our industries and communities.

Atlantic Canada’s capabilities are world class, but in order for the region to maintain its competitive standing it must continue to look outwards. We know that small and medium-sized enterprises (or SMEs) and institutions that engage more on the international stage tend to be more productive and more innovative.

**We are Thinkwell Research and Strategy, and in this webinar series**, we are exploring other jurisdictions in the world with strong clusters of ocean cleantech activities with capabilities analogous to our own.

We hope this series provides you with new market intelligence and ideas on where you can partner and collaborate on projects and innovations. At the end of the webinar, we will provide you with some information on the various funding mechanisms that exist which can help you move your ideas forward.

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**In this installment**, we will delve deeper into **Ireland’s** position as a world leader in marine research, looking at its various clusters and networks, organizations and institutions leading research and development, and technologies utilized from a cleantech perspective.

Ireland is currently a leader in several marine sectors, including, aquaculture, shipping, tourism and the blue economy more broadly. Ireland also has significant plans in place to develop an offshore wind industry of up to 7GW by 2030, which is driving innovation and opportunity in the Irish marine sector.

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### **Clusters and networks**

Clusters and networks play a major role in ocean technology innovation and research, and often bring together various organizations, academia and research institutions to pool resources and combine expertise. Through clusters and networks, several major advancements in ocean technology have been made to support key marine sectors in Ireland.

Of note, we will review **five major clusters and networks** throughout the country, including the Marine Institute of Ireland, the Killybegs Marine Cluster, the Marine Ireland Industry Network, and the West of Ireland Marine Cluster.

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**Marine Institute Ireland**, a state agency leading the charge for research, innovation, and technology development in Ireland, was enacted under the Marine Institute Act of 1991, which was primarily focused on coordinating and conducting marine research and development to both foster economic development, while also protecting the marine environment.

The Institute provides services such as oceans, climate and information services, marine environment and food safety services, fisheries ecosystems advisory services, corporate services, policy, innovation, and research support, as well as the Irish Maritime Development Office. Its key areas of work include aquaculture, fisheries and ecosystems, fish health, seafood safety, the marine environment, oceanography, education and outreach, seabed mapping, as well as shipping and marine ports.

Of note, the Institute has also developed and implemented several ocean technologies used for sensing, monitoring, and mapping.

The Irish Ocean Observing System (EirOOS) is an overarching multi-platform research system operated by the Irish Marine Institute. This system is able to provide ocean and climate observation data through multiple marine platforms, with objectives of engaging industry and offering opportunities for SMEs, and also developing innovative solutions for Ireland and the world's ocean and ocean monitoring challenges.

As part of this system, the Institute also operates the SmartBay Observatory and test sites, which provides continuous oceanographic data in real-time. Located near Galway Bay, the 37-hectare test site allows for testing of a wide range of innovative technologies, including renewable energy tools, as well as sensors.

The SmartBay Observatory has been in operation since 2015 and includes a fibreoptic data and power cable as well as a subsea sensor hosting platform. The continuous data collected from the Observatory is transferred in real-time to the Marine Institute's main office and is also available on the internet for public consumption.

The SmartBay Observatory monitors various ocean data, including salinity, water temperature, and provides estimates for turbidity and chlorophyll levels.

Also, as part of the Irish Ocean Observing System, the Marine Institute operates three Teledyne Webb Slocum G3 Gliders, which are remote-piloted autonomous underwater vehicles which move through the water both horizontally and vertically to measure both physical and biogeochemical variables in the ocean. These gliders can dive to depths of 1,000 meters.

The Institute also manages and operates several other ocean technologies, including the **Irish Marine Data Buoy Observation Network**, which provides key data to determine weather forecasts, shipping notices, and swell warnings, Ireland's **Argo Network**, which is part of a global array of autonomous floats and profilers which measure both the ocean's physical and thermodynamic states.

**Recently**, according to their annual report for 2022, the Marine Institute administered over 7 million euros in new research investments through their Marine Research Programme. Their research vessels, the RV Celtic Explorer, RV Tom Crean, and RV Celtic Voyager mapped over 4,000 square meters of seabed as part of the INFOMAR programme, in partnership with the Geological Survey of Ireland.

As well, the Institute opened two global sea level observing stations (GLOSS) in Dublin and Cork in 2022. These stations are part of the Irish Ocean Observing System, and relay data to global sea level data centres to foster a greater understanding of sea level rise induced by climate change.

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Another key group in the country is **The Marine Ireland Industry Network**, which was established in 2016, and includes a wide range of companies, state organizations, research groups and academia working within the blue economy. There are over 400 stakeholders within the Network.

The Network focuses on many marine sectors, including advanced ocean technology and blue technology, maritime and coastal engineering, ocean energy, tourism and recreation, ports and shipping, and aquaculture.

The Network's advanced ocean technology sector is focused on tools such as nanotechnology, sensors, instrumentation tools, data analytics, AI, simulation, robotics and automation, as well as observation.

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**The Killybegs Marine Cluster**, formed in 2021, is an industry-driven cluster focused on building capacity and working with businesses within the blue economy. It is Ireland's only solely blue economy-focused marine cluster and is part of Enterprise Ireland's National Clustering programme. The Cluster is solely funded through the Regional Technology Clustering Fund, which was announced in 2019 by Irish Government.

The Cluster's main objectives are to establish new business opportunities in international markets, foster skills and talent, and to provide its members with access to research development and innovation tools. There are several key stakeholders involved in the Cluster, including the Letterkenny Institute of Technology, Enterprise Ireland, Donegal County Council, and Donegal Local Enterprise Office.

The Cluster's members represent a wide array of the blue economy, including aquaculture, renewable energy, tourism, fisheries and fish processing, and engineering. There are 20 members from across these sectors.

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**The West of Ireland Marine Cluster** is a leading inter-agency team which is focused on the development of a Marine Innovation Park in Galway. The park's development plans are currently underway.

The Cluster has several key objectives, including to develop the research and development centre, to encourage enterprise, attract foreign direct investment, assist SMEs, increase knowledge and employment opportunities, increase demand in the industry, and create an aquaculture. For SMEs in the region, the cluster is able to provide opportunities for training and development, research, commercialization and knowledge dissemination. Key partners, such as Údarás na Gaeltachta, the University of Galway, and the Atlantic Technological University are able to further these objectives and opportunities.

The Cluster's steering committee is comprised of key stakeholders within planning and regulatory development, as well as research and academic institutions which are focused on sustainable marine resource development. Through its key partners, the Cluster is able to

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**Beyond these clusters and networks**, there are several individual organizations and research bodies which are contributing to furthering Ireland's clean ocean technology sector. While plentiful, we will focus on five organizations and institutions which have developed and implemented a wide range of innovative tools and technology.

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**DCU Water Institute** is an organization based in Dublin that is focused on water research and education (including both oceans and fresh water). They work with a wide variety of stakeholders, from academia,

industry, and society, on research and development projects which are centered on excellence in research, education, and innovation to address the world's water problems and concerns.

Specific to the marine realm, DCU Water Institute's goals are to ensure health aquatic ecosystems, as well as reliable and energy efficient water supplies for a sustainable economy.

The Institute is conducting several projects to do with monitoring the oceans. Of note, they are developing an Advanced Water Monitoring System (in collaboration with TechWorks Marine, an Ireland-based company providing clients with marine data solutions), and have commenced a project called TechOceanS, which, in conjunction with a multitude of research partners (including Chelsea Technologies, Dublin City University, the German-based Alfred-Wegener Institute, and the UK's National Oceanographic Centre), will develop new technologies to monitor and measure ocean data.

**The Advanced Water Monitoring System** is a cutting-edge system consisting of low-cost optical sensors, robust data processing, and an intuitive and easy to access delivery platform. The system enables users to monitor marine and coastal water quality on a real-time basis and provides data in a digestible and user-friendly way, which is of high spatial and temporal resolution. The project included low-cost and easy to deploy water sensors, used for continuous tracking of chemical and physical components. This information also contributes to water quality trends, as well as pollution events.

**TechOceanS**, also developed by DCU Water Institute, will be a tool which actively engages scientists, manufacturers, and other marine stakeholders and resource managers to target "essential ocean variables" which can previously only be measured through observations from a ship. The new technologies developed through this project will enable vital and previously inaccessible data to be collected on the ocean's biogeochemistry and ecosystems biology. The project will pioneer give new sensors, two imaging systems, a novel sampler, and an AI-driven image processing methodology, all capable of operations beyond 2,000 meters in depth.

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**MaREI, the SFI Research Centre for Energy, Climate and Marine Research and Innovation**, is coordinated by University College Cork's Environmental Research Institute. Within the Centre, there are over 200 researchers and scientists focusing on areas such as the blue economy, climate action, and the energy transition. MaREI also has over one-hundred industry partners, ranging from SMEs, start-ups, and large organizations. They are currently collaborating with 36 countries around the world, from academia, government, and industry.

MaREI has several areas of expertise, ranging from offshore renewable energy, coastal and marine systems, observations and operations, and energy policy and modelling. The coastal and marine systems team has a plethora of core research areas, including remote sensing of ocean conditions, seabed and sub-bottom mapping, geomatics and GIS, and oceanographic and passive acoustic monitoring, just to name a few.

Currently, MaREI is conducting a project titled "SATURN: Solutions at Underwater Radiated Noise", which commenced in February of 2021, and is anticipated to finish February of 2025. The project, funded by the European Union's Horizon 2020 Research and Innovation Programme, aims to address the negative effects of underwater radiated noise (notably from the shipping industry) on marine species, by way of developing new technologies to measure and reduce the negative impacts of underwater noise.

Research recently conducted by the project included tagging harbour seals using DTAG-4 tags, which were attached to the seals and included three-axis accelerometers and magnetometers, depth and temperature sensors, as well as GPS. These DTAGs were able to record continuous data for a four-week period.

*MAREI is also home to the Lir National Ocean Test Centre which is a custom designed test facility for laboratory testing of offshore wind, wave and tidal energy devices.*

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**FjordStrong** is a “commercial spinout” from Queen’s University Belfast Marine Laboratory, and includes a team of scientists, ecologists, biostatisticians, and 3D imaging analysts based in both Northern Ireland as well as part of the UK.

Fjordstrong uses several technologies to conduct a wide range of surveys. **ABUV, or Auto-release Baited Underwater Video**, is a non-destructive survey tool, which is Fjordstrong’s patented marine wildlife recording system. They function by attracting marine wildlife into camera view, and bait is released to the seafloor. This surveying tool allows for observation of feeding behaviours and species interactions, suitable for ecological assessments within the fisheries industry. Similarly, **BRUVS, or Baited Remote Underwater Video Systems**, use bait to attract wildlife. This tool is functional to a depth of 250 meters and provides a cost-effective and less invasive option to other methods, such as bottom trawling or dredging. Fjordstrong also uses stereo-imaging and uses a photogrammetry technique to take accurate measurements without disturbing species or their habitats. They also use 24-hour multi-spectral lighting to minimize negative impacts on wildlife. Through these two methods, Fjordstrong is able to collect a robust array of data, ranging from species inventories, habitat use and residency, growth rates and overall health, temporal changes and patterns, and relative abundances.

In addition to these two tools, Fjordstrong has also developed a **Towfish Camera**, providing data visualization to a depth of 110 meters, with no damage or disturbance to species or their habitats. The Camera remains above the seabed and provide 360-degree full-colour video. Operators are able to control the camera’s depth, change its angle, zoom in or out, and see real-time recorded video as it is in operation. This tool is useful for classifying habitats, surveying marine infrastructure, as well as identifying seabed features.

Fjordstrong clients have included Ireland’s Marine Institute, Blue Wise Marine, and the World Wildlife Fund.

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**XOCEAN**, based in Rathcor, Ireland, was founded in 2017, and has expanded to have offices in Canada, the US, Norway, and Australia. XOCEAN’s primary objective is to improve and transform ocean data collection to manage ocean resources and to protect the marine environment. They offer data collection services to various companies and agencies, and also partner with research institutions and academia.

They provide several key services, including bathymetric surveys (utilizing multibeam and echo sounder surveys), integrity inspections (through XOCEAN’s XO-450 Uncrewed Surface Vehicles (USV) to deliver high quality data to depth of 60 metres), and data harvesting (by way of platform combining subsea acoustic transceivers and a satellite broadband connection).

XOCEAN offers a full suite of sensors which can measure environmental and metocean data, ranging from wind speed and direction, air temperature, pressure (depth), wave heights and directions, water temperature, and tidal flows. XOCEAN’s USVs can be integrated with these sensors to conduct fisheries and environmental surveys.

As well, XOCEAN offers coastal surveys, by using multi-beam, sidescan, and sub-bottom profiling and magnetometers. In low water depths, they use UAV, and USV in greater depths to ensure high resolution topographic and bathymetric data.

Currently, XOCEAN is working on **FLEETUSV**, a project which is funded by the European Maritime and Fisheries Fund through the Blue Economy Window Program. The objective of this project is to bring XOCEAN's USVs to market, with focus on the commercial ocean data collection sector.

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Our fifth organization for review today is **Ondine**, an Irish company focused on marine and aerial surveying for the offshore energy sector. They provide geotechnical, geophysical, environmental, and aerial surveying services.

Ondine's Vulcanair P68 Observer 2 is a plane used for aerial surveys and mapping. On board are sensor systems, ranging from LiDAR to thermal imagery. Ondine also owns and operates a wide range of survey technologies used for geophysical surveys, including sub-bottom profiling, multi-beam echo sounder, magnetometer, side-scan sonar, and Ultra High Resolution Seismic (UHRS). As well, Ondine provides GIS and mapping services.

For environmental surveys, Ondine also operates tools such as Wavebuoy, Moving Vessel Profilers, and an Acoustic Doppler Current Profiler (ADCP). In utilizing these tools, Ondine is able to conduct a wide range of surveys, including environmental impact assessments, passive acoustic monitoring, geochemical sampling, hydrographic surveys, and oceanographic and environmental baseline surveys. For conducting these surveys using the many technologies above, Ondine's main survey vessel, **the Jule**, is technologically advanced and environmentally friendly, and representative of Ondine's core vision. The vessel was designed by hydrographers, and fully intended for oceanographic survey work.

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## **Conclusion**

Ireland features a robust blue economy with a wide array of ocean cleantech strengths and activities. While only a fraction of that could be highlighted in this webinar, we are hopeful that the information presented has provided you some valuable information and inspired you to continue to explore.

If you are an SME in Atlantic Canada and would like to further explore this market with more targeted research, there are programs that can help through your provincial government, the Atlantic Canada Opportunities Agency, NRC-IRAP, and Export Development Canada. Also, be sure to connect with Canada's Trade Commissioner Service as a first step to better understand the market and the opportunities that it might present for you.

Be sure to check out our other webinars in this market research series!