


Brief by IUML

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An aerial photograph of a small red and white boat moving through the ocean, leaving a large, circular, white wake that resembles a stylized letter 'C' or a similar shape. The water is a deep blue-green color, and the wake is a bright white foam. The boat is positioned at the bottom of the circular wake.

Marine Renewable Energy Survey - Seanergy 2021

Authors:

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Introduction

Seanergy is the major international professional fair in France about renewable energies.

IUML is an interdisciplinary research federation (**FED Label by Ministry of Research in 2004 and FR labelled by Ministry of Research and National Center for Scientific Research in 2012**) gathering **+20 units of research** and **850 people** working on Marine and Maritime science including littoral issues. It is recognized since 2012 by the CNRS and is in the top 3 clusters in France.

IUML is highly engaged since 2019 in **Responsible Research Innovation** within the **H2020 project GRRIP**. This implies a change in the governance of IUML and the simulation of changes in research organization and practices with a special focus on the 6 keys of RRI: Gender equality, Open Science, Science Education, Ethics, Public Engagement and Governance. After an audit, it was shown for most of the 5 Marine and Maritime sites involved in GRRIP that **Public Engagement of one of the major issues**.

IUML published an Action Plan in 2021 with the aim to improve the practices that engage the society (Local Authorities, Citizens, Associations, Industries) in the Science. One of the tools is to **conduct regular surveys on hot topics** for IUML in view to capture the feeling of the society and analyze how it could impact the research or the education to science.

During the **two days of Seanergy conference (Sept 2021)**, 6 students of IUML were asking to the participants questions about the trends and challenges of Marine Renewables Energies. The duration of the survey was **10 minutes** only.

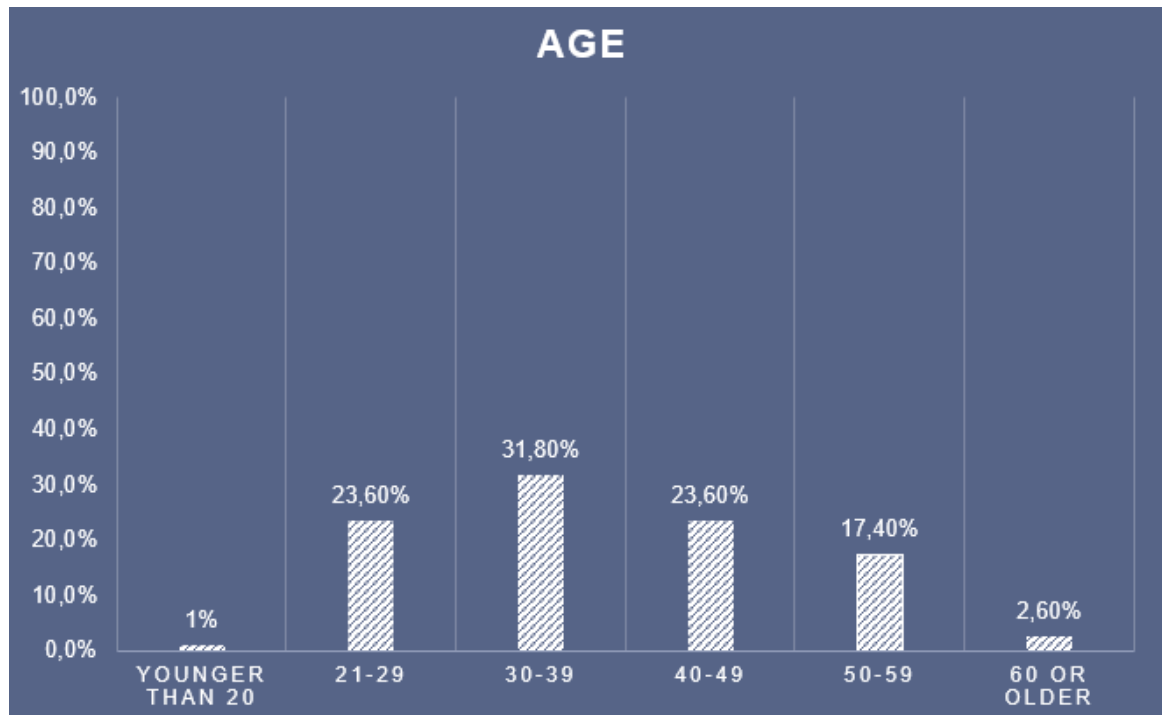
A total of 59 complete responses from paper survey and 137 (out of 147) complete responses from online survey were available. In total, there are **196 (95.15%)** complete responses from which 195 gave a consent to disseminate the information, 69.9% of which were from online survey and 30.1% were from paper survey. **98.3% of participants reported have a job/activity related to Marine Renewable Energies.**

IUML thanks Solution&Co and SEANERGY for giving the opportunity to IUML for this survey.

IUML would like to warmly acknowledge *Allan Delecourt, Clément Freyssinet, Martin Guyot, Nicholas Gooding, Ziad Maksassi, Undergraduate, Master and PhD students and Indrani Mahapatra University College Cork, Ireland) and Xiaoyue Tan (Erasmus University Rotterdam, Netherland)* for their support in

Typology of the attendees

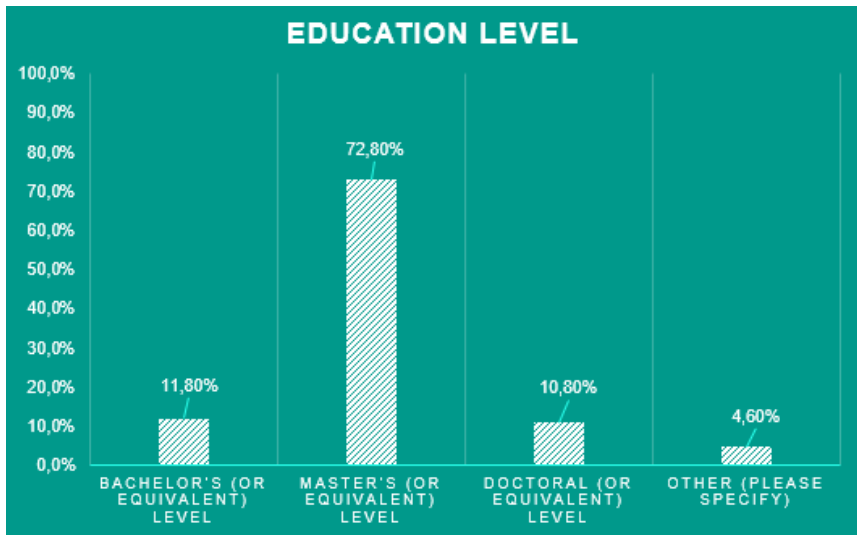
The typology of the attendees is one of the **keys for understanding the context** in which the answers are given and reflects also the sociology of the attendees to the conference. In this commercial fair about Marine renewable energy, about **75% of participants were above 30 years old** and around 25% of them were under 30. The graph below indicates that the event was attractive to all age groups from 20s to 50s, except for the groups under 20 or above 60.



According to the table below, **many more males than females attended this event**. It might be that the technological and commercial field of MRE is more males-dominated.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	58	29.7	29.7	29.7
	Male	137	70.3	70.3	100.0
	Total	195	100.0	100.0	

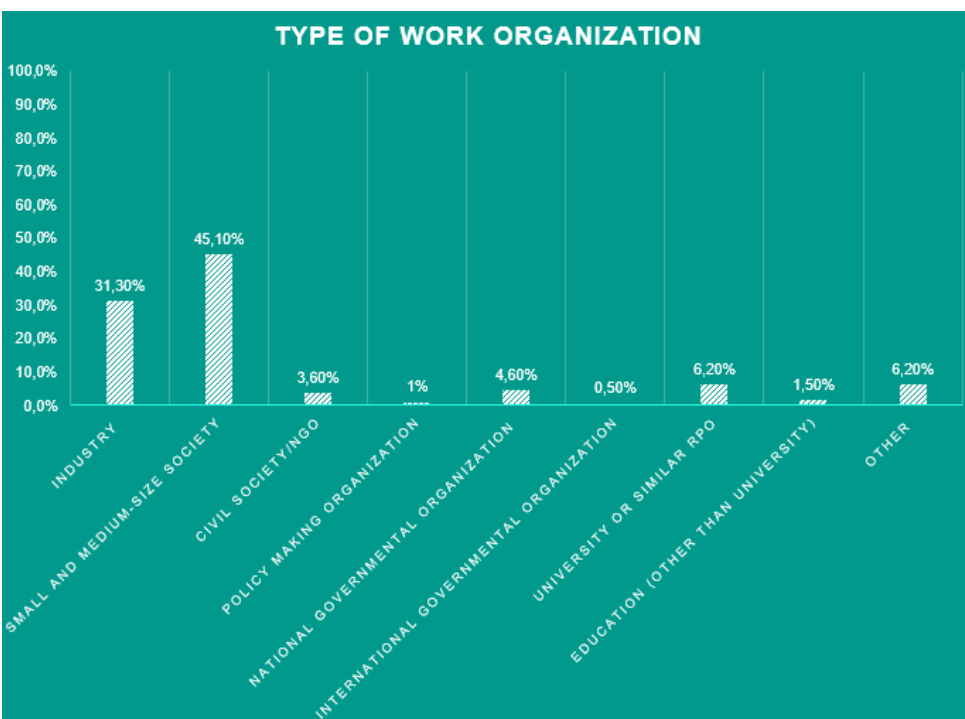
Around **80% of the participants were French**. But among the other participants, 16 other nationalities were found, then second one being Belgium. Consistent with the nationality data, around 82% of the participants were living in France, while around 18% of them were living in at least 12 other countries (Belgium, UK, then Netherland).



83% of the participants had master's (or equivalent) degree or Doctoral (or equivalent) degree. It was interesting to see that around 11% of the participants had Doctoral (or equivalent) degree, who were assumed to work in the innovation field. **This indicated this fair was also able to promote innovations preparing for the emerging market.** Most of the participants (around 85 %) were employed full time, 4.6 self-employed and 6.7% of attendees were students. **This figure confirms the interest of students in a Region (Pays de la Loire) being the first education center in France about MRE (both initial and continuous training).**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor's (or equivalent) level	23	11.8	11.8	11.8
	Master's (or equivalent) level	142	72.8	72.8	84.6
	Doctoral (or equivalent) level	21	10.8	10.8	95.4
	Other (please specify)	9	4.6	4.6	100.0
	Total	195	100.0	100.0	

The participants represented different types of stakeholders, including stakeholders from public authorities (6.1%), **industry (76.4%)**, civil society (3.6%), academic (7.7%), and others (6.2%). This indicated that all four Quadruple Helix stakeholders were covered. However, the industry group was the majority, consisting of 31.3% of participants from large companies and a high percentage (45.1%) of them from companies of small and medium size.



Topics that reflects the need, trends and wishes of the sector:

The management committee of IUML decided to focus on several topics that reflects the need, trends and wishes of the sector:

- internal factors that constitutes the 3 main barriers for increasing the electrical power produced offshore;
- key solutions for dealing with these barriers;

First, concerning internal factors that constitutes the 3 main barriers for increasing the electrical power produced offshore, the most selected one was “Societal (acceptability)”. Around 60% of the participants ticked it as one of the top three factors. “Law and regulation” and “Capacity to reduce costs for deep water (>200 m)” were the second and third most selected factors respectively for increasing the electrical power produced offshore. About 54% of the participants ticked “Law and regulation” and about 45% of the participants ticked “Capacity to reduce costs for deep water (>200 m)” as one of the top three factors. It is interesting to highlight that these non-technological topics were selected before others such as storage or AC/DC converters development.

Options	Percentages of being chosen among top 3
Societal (acceptability)	61.5%
Time to develop standards	25.1%
Law and regulation	53.8%
Capacity to reduce costs for deep water (>200 m)	44.6%
AC/DC converters development	10.3%
Cybersecurity for the production far from the cost governmental organization (including research/innovation funders)	6.7%
Awareness of governmental organization (including research/innovation funders)	22.6%
Low Capacity of Storage	39.5%
Other: please specify	10.3%

According to these barriers, the most selected option for key solutions was “Local authorities and state awareness”. Around 54% of the participants ticked it as one of the key solutions. “R&D development” and “Citizen awareness” were the second and third most selected key solutions respectively. About 53% of the participants ticked “R&D development” and about 47% of the participants ticked “Citizen awareness” as one of key solutions.

Options	Percentages of being chosen among top 3
R&D development	52.8%
Citizen awareness	47.2%
Local authorities and state awareness	54.4%
Store more energy	22.6%
Share the space with other activities (solar + wind + aquaculture)	27.2%

Multi-usage platforms are one of the promising solutions for sharing the sea by consuming a limited space. The question here was to ask what are the 2 most promising combinations according to the following set of combinations: Wind + Current , Wind + Solar, Wind + Aquaculture, Wind + Current + Solar , Wind + Solar + Aquaculture, Wind + Current + Aquaculture.

Options	Percentages of being chosen among top 3	Percentages of being chosen as top 1
Wind + Current	45.1%	27.2%
Wind + Solar	30.8%	16.9%
Wind + Aquaculture	26.7%	12.8%
Wind + Current + Solar	25.6%	10.3%
Wind + Solar + Aquaculture	20.0%	7.7%
Wind + Current + Aquaculture	16.9%	4.1%

The most selected option for “the 2 most promising combinations in the case of multi-usage platforms” was “**Wind + Current**”. Around **45%** of the participants chose this option as one of the 2 most promising combinations. The second most selected option was “Wind + Solar”, for which option around 31% of the participants ticked it as one of the 2 most promising combinations. The third option was also a combination of 2 usages “Wind + Aquacultures” (around 27%).

We focus now on the needs in terms of R&D and innovation by asking to the attendees in which fields (3 main) do they think that R&D efforts should be produced in the next 5 years.

Options	Percentages of being chosen among top 3	Percentages of being chosen as top 1
Increase the power of each turbine	40.5%	18.5%
Recycling	64.6%	35.4%
Design of anchors	13.3%	1.5%
Design of mooring systems	21.5%	8.2%
Innovative anti-fouling solutions	19.0%	3.6%
Innovative inspection devices	21.5%	3.6%
Innovative mast	7.2%	1.5%
Innovative Floatters	44.1%	8.2%
Cybersecurity	11.8%	3.6%
Other: please specify	15.9%	

When people selected others, the main topics were hydrogen, storage, aquaculture, environmental impact, port infrastructures and maintenance.

The most selected option for “the three main fields that R&D efforts should be produced in the next 5 years” was “**Recycling**”. About **65%** of the participants ticked this option as one of the three main fields. The second most selected option was “Innovative Floatters”, and about 44% of the participants ticked this option. The third most selected option was “Increase the power of each turbine”, for which option about 41% of the participants ticked it.

Finally, we wanted to analyze what is the limit of power for each wind turbine in commercial farms forecasted by attendees in 2026 knowing that the sector is expecting 15-17 MW. We suggested 12 MW (actual), 15 MW, 17 MW, 20 MW, 25 MW or + and I don't know.

What is the limit of turbine power the sector will reach in 2026?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	12 MW	8	4.1	4.2	4.2
	15 MW	34	17.4	17.7	21.9
	17 MW	60	30.8	31.3	53.1
	20 MW	49	25.1	25.5	78.6
	25 MW or +	41	21.0	21.4	100.0
	Total	192	98.5	100.0	
Missing	System	3	1.5		
Total		195	100.0		

About 31% of the participants chose 17 MW as the limit of turbine power the sector will reach in 2026 which is in line with the prediction but it is interesting to notice that 47% of the attendees are expecting 20 or plus.



