



IEA Wind TCP

International Energy Agency (IEA)

Implementing Agreement for Co-Operation in the Research and Development of Wind Energy Systems (IEA Wind)



Wind Energy-Environmental Research and Engagement Network (WREN)
Task Proposal for ExCo #94

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1 Scope

This proposal is for a new environmental Task, entitled *Wind Energy-Environmental Research & Engagement Network (WREN)*, under the International Energy Agency Technology Collaboration Programme (IEA Wind TCP). There remains a need for the IEA Wind TCP to remain engaged on environmental interactions with land-based and offshore wind energy development. Existing interactions persist while others are emerging as wind energy expands around the world. Moreover, the ambitious projections for increasing global wind energy deployment within the next 5–10 years will increase interactions and result in construction delays or alter turbine operations.

The goals of this Task are to 1) expand on the successful activities from Task 34, including the management of the Tethys website (<https://tethys.pnnl.gov>) and state of the science engagement and outreach activities, and 2) advance the findings from the Topical Expert Meeting (TEM) #109-Grand Challenges in Wind Energy Science. For the latter, the Environmental Co-design group identified three critical issues. These broad spatiotemporal issues extend beyond jurisdictions and require international effort to fully achieve the global wind energy deployment necessary to combat climate change. In addition, the Environmental Co-design group participated in several brainstorming sessions with other research areas (The Atmosphere, The Turbine, The Grid and Plant, and Social Sciences-though this one occurred 6 months after the TEM #109).

The proposed Task aligns with the IEA Wind TCP Strategic Work Plan 2024–2029.

- 1) Facilitate wind energy deployment through social acceptance, energy equity, and environmental justice – ‘Support sociological and environmental research to inform sustainable deployment of wind energy...’
- 2) Foster collaborative research and the exchange of best practices and data – ‘Support international collaboration and communication among experts in all aspects of wind energy...’
- 3) Environmental awareness – ‘Wind TCP provides research, analysis, information, and data on technology development and deployment issues, including environmental externalities...’

The participants of Task 34 would like to keep the same branding (i.e., WREN acronym and logo), but change the Title from ‘Working Together to Resolve the Environmental Effects of Wind Energy’ to ‘Wind Energy-Environmental Research & Engagement Network’.

2 Introduction

Fostering the coexistence between wind energy development and environmental conservation, for those habitats, ecosystem processes, and species impacted by wind farms, remains a priority for private industry, regulatory agencies, nongovernmental organizations, and researchers. To stave off the worst effects of climate change, over three times the current electricity generated by wind energy will be necessary by 2030 (<https://www.iea.org/energy-system/renewables/wind>). This will require nearly a five-fold increase in the annual amount of installed capacity from 75 GW to 350 GW from 2022 to 2030, respectively. This rapid increase and global expansion of wind energy, while necessary, will exacerbate the environmental effects of wind energy unless cost-effective solutions are quickly developed and implemented.

In early 2023, The IEA Wind TCP convened the TEM #109-Grand Challenges Revisited: Wind Energy Research Needs for a Global Energy Transition to facilitate dialogue within and across five key research areas: 1) The Atmosphere, 2) The Turbine, 3) The Plant and Grid, 4) Environmental Co-design, and 5) Social Science. Each research area developed a set of critical issues and next steps (Tables 1, 2, & 3). At the TEM #109, the Environmental Co-design group met with three of the research areas (The Atmosphere, The Turbine, and The Plant and Grid) to discuss high-level research ideas for collaboration. Six months later, the Environmental Co-design and Social Science groups met and held a similar discussion. Continued work is necessary to address these critical issues and further refine areas for cross-cutting research.

Table 1. Critical Issues identified by the Environmental Co-design group at the TEM #109.

No.	Critical Issue
1	Evaluate, design, site, source, transport, build, operate, and decommission wind energy and associated infrastructure to avoid, minimize, and compensate for the direct and indirect environmental impacts
2	Identify and incorporate environmental costs and benefits into every decision point, from evaluation to decommissioning, of turbine/plant development
3	Account for immediate project level concerns while assessing broader spatial and temporal scales to address future environmental impacts and tradeoffs

Table 2. Initiatives needed to address the Critical Issues identified by the Environmental Co-design group at the TEM #109.

Initiative	Descriptions
Cost & Benefit Metrics	Identify & convey metrics for environmental costs & benefits for project developers to assist in considering tradeoffs & making decisions
Standardized Practices	Develop an ISO-like standardization for data collection, analysis, & reporting to facilitate comparability across projects
Data Sharing Framework	Develop a publicly available data framework that is transparent, standardized, and objective-based
Interdisciplinary Data	Aggregate data from other research areas (e.g., The Atmosphere, The Turbine, The Plant and Grid, Social Sciences) to compliment environmental research
Mitigation System	Design a mitigation system for all stages of wind farm development (i.e., evaluation through decommissioning/repowering), incorporating measures for avoidance, minimization, & compensation

Table 3. Outreach and engagement actions to assist in addressing the Critical Issues identified by the Environmental Co-design groups at the TEM #109.

Description
Establish multidisciplinary working groups with other research fields to define research gaps and recommendations for follow-on work
Promote multidisciplinary panels/sessions at environmental & non-environmental conferences
Conduct a horizon scan of the potential environmental impacts of future deployment scenarios to help with long-term decision making
Articulate the value proposition for the wind energy industry to implement mitigation measures & share data

Given the global deployment of wind energy and the fact that many of the environmental concerns involve habitat, ecosystem processes, and species that cross jurisdictional boundaries, an international collaboration is necessary to advance solutions. Achieving coexistence will require the continued exchange of information and expertise that was led by Task 34. Thus, the purpose of this proposal is to initiate a new environmental Task in the IEA Wind TCP.

3 Objectives and Expected Results

The goals of the proposed Task are to 1) expand on the successful activities from Task 34, including the management of the Tethys website (<https://tethys.pnnl.gov>) and state of the science engagement and outreach activities, and 2) advance the findings from the TEM #109-Grand Challenges Revisited: Wind Energy Research Needs for a Global Energy Transition. Over the course of the next 4 years, this Task will:

- 1) Identify priority international needs for further research related to the environmental effects of wind energy development. The proposed Task will engage with the international stakeholder community to identify key stressors and receptors, cumulative effects, current methods and technologies used in impact assessment studies, and recommended practices to resolving existing and potential environmental barriers to deployment, and emerging issues associated with the evolution in wind turbine technology, deployment locations, and scale of development.

- 2) Aggregate, synthesize, and disseminate information on the global state of the science on high-priority issues and recommended practices within the wind energy industry. The proposed Task will facilitate dialogue among international collaborators, synthesize available resources and disseminate information across a wide range of products to reach targeted audiences, including private industry, government agencies, nongovernmental organizations, academia, and the general public. To further broaden international outreach and participation, the proposed Task will increase its engagement with non-IEA Wind nations, particularly those from emerging markets in Asia, Africa, and Latin America.

- 3) Assess the technical readiness and effectiveness of solutions and explore the feasibility of transferring technologies and methodologies among jurisdictions. The proposed Task will ensure the global community has access to current information on monitoring and mitigating solutions, their state of development and related research on their effectiveness.

4 Approach and Methodologies

The proposed Task will build on the collaborative network developed by Task 34 to complete Work Packages. This network includes representatives from the member countries, subject matter experts, and interested stakeholders. The proposed Work Packages include:

WP1: Manage Tethys

Description: Tethys (<http://tethys.pnnl.gov>) was developed in 2009 to serve as a centralized knowledge base for land-based and offshore wind energy research. Tethys provides access to relevant literature, an events calendar, contacts, and products developed by WREN, including the Monitoring and Mitigation Technologies Tool and Offshore Wind Metadata.

Approach: Expansion and enhancements to Tethys consists of the following elements:

- Continual updates of new research papers and other media as they become available
- Expansion and use of community functions of Tethys through links to and from external sites, comments page, and engagement with ongoing functions such as webinars
- Review of Tethys through a user survey and integration of suggested improvements

Deliverable(s):

- Updates:
 - Curated and expanded collection of papers, reports, and other media on Tethys
 - Increased functionality and accessibility throughout Tethys, including improved searches, filters, and tags
 - Annual metrics on use of Tethys through Google analytics and other sources, designed to support continued expansion and use of Tethys
 - Results of annual peer review and actions to address peer review comments
 - Creation of region-specific or language-specific webpages.
- Biannual updates to the Monitoring and Mitigation Technologies Tool
- Biannual updates to the Offshore Wind Metadata

Project Lead: The Pacific Northwest National Laboratory will manage Tethys.

Participants: All members will participate in submitting content to Tethys and assist in promoting the website within their networks.

WP2: Advance Cross-cutting collaborations with other IEA Wind Tasks

Description: The TEM #109 spurred cross-cutting conversations among five research areas, but these meetings were short and only provided high level research ideas. Thus, further discussions are warranted to build on the findings from the TEM #109. The goal is to develop more detailed recommendations and next steps that assist in proposals, research, and/or deliverables. Preliminary conversations with other IEA Wind Task leads, suggests there is enough interest in collaborating.

Approach: Initially, representatives from other IEA Wind Tasks will be invited to present at the environmental Task's meetings. Representatives from the environmental Task may also present at other IEA Wind Task member meetings. More focused meetings will be held to develop the recommendations and a dissemination plan. At least one cross-cutting collaboration will occur each year.

Deliverables:

- Webinars or conference sessions that focus on informing the environmental community on the challenges and opportunities of other research areas and how greater collaboration can result in more cost-effective solutions
- Research briefs or technical reports that detail recommendations or next steps for cross-cutting research

- If the opportunity presents itself, use the results of these meetings to develop proposals and implement research

Project Lead: The National Renewable Energy Laboratory will identify other IEA Wind Tasks and facilitate collaboration.

Participants: All members will reach out to their networks to identify subject matter experts working in the same field as the other IEA Wind Tasks. Members will contribute to drafting documents and representing the environmental Task at other IEA Wind Task meetings or at conferences.

WP3: Outreach and Engagement on the State of the Science

Description: The proposed Task will continue to engage the stakeholder community using targeted outreach materials designed for specific audiences. Outreach materials will be focused on specific topics identified by members, but primarily focus on addressing the critical issues from the TEM #109. Research briefs, webinars, Tethys Blasts, Tethys stories, and presentations by members at conferences and workshops. All members will identify opportunities to be ambassadors for, to draft outreach materials for targeted audiences in their nations, and share opportunities to disseminate materials and messages internationally.

Approach:

- Organize and host webinars to disseminate information to the various stakeholder groups. Topics will include both land-based and offshore applications, species focus, tools and models, and other relevant topics. Each webinar will include at least two geographic and/or stakeholder perspectives on the subject. Webinars will be recorded and posted on Tethys for future reference
- Develop research briefs designed to facilitate easier access to information and provide an overview of key findings. Briefs will center on the best-available science related to specific species or technology, or recommended practices. These documents will be available on Tethys
- Identify conference or meeting opportunities where information on Work Packages and activities can be shared
- Identify opportunities to convene expert forums on specific research questions. Forums will involve an invited panel of experts to discuss an unresolved topic. A summary of our current understanding and next steps to address the issue will be developed based on the panel discussion. If possible, the forums will be recorded and posted on Tethys
- Provide relevant wind and wildlife materials (e.g., new publications/reports, webinar announcements) to be included in the biweekly Tethys Blast
- Organize member meetings each year (one virtual and one in-person). When possible, co-locate meetings with international conferences on wind energy and wildlife

Deliverable(s): Deliverables will be based on a specific topic area and goals, and may include one or more of the approaches listed previously.

- Webinars: At least three per year. Webinars may include state of the science information (WP3), cross-cutting research topics (WP2), or topics relevant to a specific region (WP4)
- Research Briefs: At least one per year. Research briefs may include state of the science information (WP3), cross-cutting research topics (WP2), or topics relevant to a specific region (WP4)
- Technical Reports: At least one per year. Research briefs may include state of the

science information (WP3), cross-cutting research topics (WP2), or topics relevant to a specific region (WP4)

- Minutes from member meetings

Project Lead: All members. As part of their commitment to this Task, each member will be required to co-lead at least one activity each year.

Participants: All members and, in some cases, external subject matter experts will contribute to the development or review of products. All members will have the opportunity to review deliverables before dissemination and participate in outreach and engagement activities.

WP4: Foster Broader International Collaboration

Description: There are large regional gaps in representation within the IEA Wind TCP. Through conversations, with stakeholders in Latin America, Africa, and parts of Asia, there is a clear need for information exchange. Greater collaboration with non-IEA Wind countries can be mutually beneficial. Our engagement and outreach with non-IEA Wind countries can provide awareness of this Task and its resources. In return, lessons learned from other countries regarding research methods, technology development, minimization approaches, basic biological and ecological knowledge regarding species that migrate across IEA Wind and non-IEA Wind countries can assist in this Task's goals.

Approach: The proposed Task lead will conduct phone calls with representatives from non-IEA Wind countries to determine whether they are aware of the IEA Wind TCP, Task 34, and whether they are interested in contributing as observers or subject matter experts. Invite representatives from non-IEA Wind countries to attend member meetings and present on their research and/or the challenges and opportunities they experience. The proposed Task lead will also make connections with between Task members and non-IEA Wind country representatives

Deliverables:

- Webinars focused on research and perspectives from non-IEA Wind countries
- Translated documents into different languages to increase dissemination of Task products. The documents and language will be determined based interest and gaps of information for a given region

Project Lead: NREL will identify contacts, facilitate calls, host webinars, and translate documents

Participants: All members will help identify regions and contacts for engagement and outreach.

5 Chronogram and Key Dates

See Figure 1. Black boxes represent milestone dates, blue boxes represent progress, and green boxes represent deliverable dates.

Figure 1. Proposed Task Schedule: Work Packages, Deliverables, Dates.

Year	2024			2025												2026											
Month since initiated	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Calendar month	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Management & Reporting Tasks																											
Annual Work Plans (M1-4)	█	█											█	█												█	█
Biannual Member Meetings (M5-12)	█						█						█						█							█	
ExCo Meetings & Annual Reports (M13-16)						█	█	█										█	█	█							
Task extension Proposal (M17)																											
Phase 1 Final Report (M18)																											
Work Package 1: Tethys																											
Website Updates (M19-M22)				█	█	█	█	█									█	█	█	█							
Updates to Tools & Metadata (M23-30)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Work Package 2: Inter-Task Collaboration																											
Inter-task Collaboration (D1-4)							█	█	█	█	█										█	█	█	█			
Work Package 3: Outreach & Engagement																											
Webinars (D5-16)		█	█	█	█		█	█	█	█	█	█		█	█	█	█	█	█		█	█	█	█		█	█
Research Briefs (D17-20)				█	█	█	█	█									█	█	█	█	█						
Technical Report/Publication (D21-24)						█	█	█	█	█	█	█						█	█	█	█	█	█	█	█		
Work Package 4: Non-IEA Wind Engagement																											
Translate Task Documents (D25-31)			█	█	█	█				█	█	█					█	█	█				█	█	█		█

Year	2027													2028											
Month since initiated	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48				
Calendar month	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S				
Management & Reporting Tasks																									
Annual Work Plans (M1-4)																									
Biannual Member Meetings (M5-12)																									
ExCo Meetings & Annual Reports (M13-16)																									
Task extension Proposal (M17)																									
Phase 1 Final Report (M18)																									
Work Package 1: Tethys																									
Website Updates (M19-M22)																									
Updates to Tools & Metadata (M23-30)																									
Work Package 2: Inter-Task Collaboration																									
Inter-task Collaboration (D1-4)																									
Work Package 3: Outreach & Engagement																									
Webinars (D5-16)																									
Research Breifs (D17-20)																									
Technical Report/Publication (D21-24)																									
Work Package 4: Non-IEA Wind Engagement																									
Translate Task Documents (D25-31)																									

6 Reports, Deliverables, Outreach & Dissemination of Results

Reports. NREL will lead the drafting of all annual reports, progress reports and presentations delivered to the Executive Committee.

Deliverables. Each year the Task will host 3 webinars and develop at least one research brief based on topics agreed upon by the members. In addition, the Task will work with at least one other IEA Wind Task each year to develop cross-cutting research priorities and explore opportunities to collaborate. Collaboration may involve technical reports, webinars, conference sessions or workshops. At least one technical report or publication will be produced each year based on topics agreed upon by the members.

Outreach. Engagement and outreach are integral to the success of the Task and all members will be involved. These ‘ambassador activities’ allow each member to communicate with their network to ensure others are aware of the Task and its products. Ambassador activities involve identifying potential observers, identifying subject matter experts, promoting the Task at conferences, providing content, such as new publications or presenting during webinars, to post on Tethys.

Dissemination. All products, including documents and recorded webinars, will be publicly available on the Tethys website. Tethys Blasts, a bi-weekly newsletter with a subscriber list of approximately 2,750 people, will highlight products when they become available.

Table 4. Anticipated Deliverables and Schedule

No.	Deliverable	Contributors	Month
D1-4	Inter-Task Collaboration on Research Priorities	Joint Task	10, 22, 34, 46
D5-62	Webinars	TBD	4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48
D17-20	Research Briefs	TBD	8, 20, 32, 44
D11-24	Technical Reports / Publications	TBD	12, 24, 36, 48
D25-31	Translate Task Documents	NREL	5, 11, 17, 23, 29, 35, 41, 47

7 Methods of Review and Evaluation of Works Products

Biannual meetings will occur to allow Task members to discuss the status of activities. In addition, smaller group meetings may be held to work on deliverables. The Task Lead will complete annual progress reports and present status updates at the annual Executive Committee meeting.

Table 5. Anticipated Milestones and Schedule

No.	Milestone	Contributors	Month
M1-4	Annual Work Plans	All	2, 14, 26, 38
M5-12	Biannual Member meetings	All	1, 7, 13, 19, 25, 31, 37, 43
M13-16	ExCo Meetings & Annual Reports	NREL	8, 20, 33, 44
M17	Task Extension Proposal	All	44
M18	Phase 1 Final Report	All	48
M19-22	Annual Tethys Update	PNNL	7, 19, 31, 43
M23-30	Biannual Technology Tool & Metadata Updates	NREL & PNNL	7, 13, 19, 25, 31, 37, 43

8 Obligations and Responsibilities

Task Lead

In addition to the responsibilities enumerated in the IEA Wind Implementing Agreement, the Task Lead will be responsible for coordinating Task activities, scheduling and facilitating member meetings, recording the minutes of each member meeting, hosting webinars, facilitating peer review of deliverables, finalizing deliverables, attending Executive Committee meetings, meeting all reporting requirements of the IEA Wind TCP.

Members

Members will be responsible for co-leading at least one activity per year and contributing to other activities. Co-leading an activity may require members to draft documents for review, collaborate with subject matter experts, and identify presenters for webinars or workshops, and provide content for the Tethys website. In addition, members will provide an annual update on the environmental research that is recently completed, ongoing or planned in their country. Members are also obliged to attend bi-annual meetings, one of which will be virtual and the other in person.

9 Type of Funding and Proposed Operating Agent(s)

It is anticipated that the proposed Task will begin on 1 October 2024 with Phase I continuing until 30 September 2028. Initiation of the Task assumes that 1) the IEA Wind Executive Committee provides written approval of the Task, and 2) at least two letters of commitment from member nations are received.

The U.S. Department of Energy financially supports NREL to serve as the Task Lead and PNNL to manage the Tethys website. In lieu of annual dues, members are expected to co-lead at least one activity per year and contribute to other activities. In addition, members are expected to fund their travel to Task meetings.

Cris Hein, NREL will serve as the Task Lead and is supported by Samantha Rooney and Laura Dempsey at NREL to 1) assist in management activities and 2) contribute to work packages. PNNL management of the Tethys website is led by Jonathan Whiting and Hayley Farr.

10 Management of Task

As the Task lead, NREL will manage all Task activities and collaborate with members to complete activities. Task members will be required to co-lead at least one activity per year and to work with subject matter experts, as needed, to complete the activity. Activities overseen by NREL will include:

- 1) Organize and facilitate member meetings
- 2) Coordinate with other IEA Wind Tasks
- 3) Report to the IEA Wind ExCo
- 4) Coordinate with PNNL on Tethys content
- 5) Assist co-leads on activities within work packages
- 6) Facilitate peer review of Task documents
- 7) Finalize documents for publication

11 Information and Intellectual Property

Executive Committee's Powers. The publication, distribution, handling, protection and ownership of information and intellectual property arising from activities conducted under this Task, and rules and procedures related thereto shall be determined by the Executive Committee, acting by unanimity, in conformity with the Agreement.

Right to Publish. Subject only to copyright restrictions, the Task Participants shall have the right to publish all information provided to or arising from this Task except proprietary information.

Proprietary Information. The Operating Agent and the Task Participants shall take all necessary measures in accordance with this paragraph, the laws of their respective countries and international law to protect proprietary information provided to or arising from the Task. For the purposes of this Task, proprietary information shall mean information of a confidential nature, such as trade secrets and know-how (for example computer programmes, design procedures and techniques, chemical composition of materials, or manufacturing methods, processes, or treatments) which is appropriately marked, provided such information:

- (1) Is not generally known or publicly available from other sources;
- (2) Has not previously been made available by the owner to others without obligation concerning its confidentiality; and
- (3) Is not already in the possession of the recipient Participant without obligation concerning its confidentiality.

It shall be the responsibility of each Participant supplying proprietary information, and of the Operating Agent for arising proprietary information, to identify the information as such and to ensure that it is appropriately marked.

Use of Confidential Information. If a Participant has access to confidential information which would be useful to the Operating Agent in conducting studies, assessments, analyses, or evaluations, such information may be communicated to the Operating Agent but shall not become part of reports or other documentation, nor be communicated to the other Participants except as may be agreed between the Operating Agent and the Participant which supplies such information.

Acquisition of Information for the Task. Each Participant shall inform the other Participants and the Operating Agent of the existence of information that can be of value for the Task, but which is not freely available, and the Participant shall endeavour to make the information available to the Task under reasonable conditions.

Reports on Work Performed under the Task. Each Participant and the Operating Agent shall provide reports on all work performed under the Task and the results thereof, including studies, assessments, analyses, evaluations and other documentation, but excluding proprietary information, to the other Participants. Reports summarizing the work performed and the results thereof shall be prepared by the Operating Agent and forwarded to the Executive Committee.

Arising Inventions. Inventions made or conceived in the course of or under the Task (arising inventions) shall be identified promptly and reported to the Operating Agent. Information regarding inventions on which patent protection is to be obtained shall not be published or publicly disclosed by the Operating Agent or the Participants until a patent application has been filed in any of the countries of the Participants, provided, however, that this restriction on publication or disclosure shall not extend beyond six months from the date of reporting the invention. It shall be the responsibility of the Operating Agent to appropriately mark Task reports

that disclose inventions that have not been appropriately protected by the filing of a patent application.

Licensing of Arising Patents. Each Participant shall have the sole right to license its government and nationals of its country designated by it to use patents and patent applications arising from the Task in its country, and the Participants shall notify the other Participants of the terms of such licences. Royalties obtained by such licensing shall be the property of the Participant.

Copyright. The Operating Agent may take appropriate measures necessary to protect copyrightable material generated under the Task. Copyrights obtained shall be held for the benefit of the Task Participants, provided however, that the Task Participants may reproduce and distribute such material, but shall not publish it with a view to profit, except as otherwise directed by the Executive Committee, acting by unanimity.

Inventors and Authors. Each Task Participant will, without prejudice to any rights of inventors or authors under its national laws, take necessary steps to provide the co-operation from its inventors and authors required to carry out the provisions of this paragraph. Each Task Participant will assume the responsibility to pay awards or compensation required to be paid to its employees according to the law of its country.

12 Databases, Databanks, and Software

This Task does not require large databases and will not be involved in developing software. A google drive, accessed by logging into Tethys, is only available to WREN members and will be used for joint writing efforts. All deliverables will be made publicly available on the Tethys website.

14 List of Potential Participants

In addition to the support from the U.S. (NREL, PNNL, and US DOE), active Task 34 members have expressed interest in continuing their participation in the proposed Task.

Table 7. Interested Participants in the Proposed Task.

Country	Lead Participant(s)	Organization
Belgium	Bob Rumes	Royal Belgian Institute of Natural Sciences
France	Lydie Couturier	France Energies Marines
Ireland	John Hynes Pat Roberts Nicola Largey	MKO Ireland
Norway	Roel May	Norwegian Institute for Nature Research
Portugal	Miguel Repas Miguel Mascarenhas Helena Coelho	STRIX Bioinsight
Sweden	Åsa Elmqvist Oskar Forsum Jonas Bjarnstedt	Vindval Swedish Energy Agency
Switzerland	Luisa Münter	Nateco AG
United Kingdom	Jack Lucas Evelyn Philpott Alexander Gilliland	Marine Scotland Science