

Annex IV Meeting Country Analysts

March 16, 2017

| 1500 GMT Meeting Attendees: | 0000 GMT Meeting Attendees: |
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| Anne Marie O’Hagan (Ireland)* | Daisuke Kitazawa (Japan)* |
| Anna Redden (Canada)* | Ou Ling (China) |
| Jason Fairhurst (South Africa) | Andrea Copping (US – PNNL)* |
| Jan Sundberg (Sweden)* | Jonathan Whiting (US – PNNL) |
| Olivia Langhamer (Sweden) | Mikaela Freeman (US – PNNL) |
| Teresa Sims (Portugal)* | |
| Hans Chrs Soerenson (Denmark)* | |
| Jennifer Fox (UK – Aquatera) | |
| Paul Morgan (UK – Aquatera) | |
| Samantha Eaves (US DOE) | |
| Andrea Copping (US – PNNL)* | |
| Amy Woodbury (US – PNNL) | |
| Nikki Sather (US – PNNL) | |
| Mikaela Freeman (US – PNNL) | |

*Country analysts

The regular bimonthly meeting of the Annex IV analysts focused on gathering input and commitments from the Annex IV countries on Annex IV webinars and Tethys Stories, as well as to further discuss the reworked themes for the Phase 3 Annex IV workplan, present the outcome of the Tethys peer review, and to discuss this year’s conferences. The first meeting was held to engage the European, North American and African representatives, while the second meeting engaged the Asian and Oceania representatives. The US representative was on both calls.

Andrea presented slides (attached) on the following topics:

- Annex IV webinars
- Tethys Stories
- Phase 3 Annex IV workplan
- Regulator outreach
- Management measures workshop
- Conferences including an Annex IV workshop at EWTEC
- Results of the Tethys peer review
- Reminder to update Annex IV metadata forms

Annex IV Webinars

Possible webinar topics

- Anne Marie will work on RiCORE webinar, but will check in with Finlay Bennet (Marine Scotland and mentioned that the Basque government have incorporated some of RiCORE work into their strategy, providing a good example of risk-based management used in Europe. Anne Marie will also check with Juan Bald to see if he might find a speaker for an application of the work.
- Jan Sundberg and Olivia Langhamer will suggest something within 10 days. Olivia knows people working on life cycle analysis of MRE plants she will contact.
- Anna Redden said that the Bay of Fundy turbines are in the water and monitoring data are coming in, need to sort through data before presenting, but it will come. Anna is also very supportive of a webinar on social acceptance of MRE and integrating stakeholders in coming months. She thinks a country to country comparative format would be useful. Anna will contact a professor in Canada working on these issues. Andrea knows Teresa and Juan are also interested in this topic.
 - Anne Marie is hesitant to say much on social acceptance because the test site in Galway received over 600 objections to their proposed deployments, resulting in a national media storm. Andrea said we will need to look at this on an academic basis, rather than site-specific.
 - We might consider comparing MRE to aquaculture, offshore wind, and other similar offshore industries. For example, Australia is deeply involved in licensing aquaculture and considering MRE. Anne Marie will reach out to aquaculture contacts and scope this out.
- Andrea noted that regional webinars are a good idea also, as they provide a focus on an area with number of devices or projects. We held one for the Bay of Fundy before ICOE in 2014.
- Daisuke Kitazawa said that Japan has experience with socio-economics, especially fisheries and offshore wind, and has knowledgeable individuals on offshore wind issues, but they may not speak English.
- Ling Ou mentioned that China has considerable interest and experience in this for offshore wind management. She will need to confirm this topic and possible speakers later.

Andrea asked the analysts to think over additional ideas for webinars, talk with colleagues, and email Andrea with suggestions for webinars (and speakers) by March 27th. She will send out a reminder after the meeting.

Tethys Stories

We really need input and would like every country to commit to writing Tethys story in the next two years. It could be the Annex IV analysts or a colleague writing the story. Possible topics might include a researcher with an exciting new idea or paper, or new line of inquiry that is relevant, or programs that are new and different.

- Jan Sundberg said that Sweden can commit to produce something within the next two years.
- Jason has two ideas from South Africa that could include for stories on offshore floating wind/desalination and a paper on simulation modeling of WEC using real time data.

- Andrea said that desalination as MRE offshoot is interesting including potential environmental effects (especially what to do with brine). Jan has a new project looking at wave desalination in East Africa.
- Daisuke will think about what they can do. Andrea suggested something about Japanese fisheries and offshore energy industries.

Andrea asked the analysts to email her with topics for Tethys Stories within 10 days. We can put up as many stories as we want, usually about 1 per month or so and try to alternate with wind stories. She will send out a reminder after the meeting.

Phase 3 Annex IV Thematic Work Plan

Looking for intellectual leadership from other countries to move the social and economic aspects theme – benefits and risks forward.

Andrea went over the work plan. The consensus response was that the plan makes sense.

Working with US Regulators

Currently we are connecting with regulators through a webinar scheduled for March 29th 2017 on available scientific information on MRE interactions; we will ask for their input on what concerns them, and follow up with individual surveys. The US will be the starting point to see how the process works, learn some lessons, and then move forward and provide materials, suggestions, and support to repeat the process in other countries. Andrea asked if anyone would like to be involved with process and help guide what we are doing.

- Anne Marie is very interested in working on this now and especially for Ireland – this has come up as part of Irish offshore renewable energy plan and there is a governmental group looking at future of MRE development who will find it interesting; there is also a EU impact assessment directive now formally requires monitoring which regulators will need to deal with. Andrea/Mikaela will reach out to Anne Marie to involve her in the planning.
- Jan has had an experience working on the SOFIA project, and received only a limited response, as he feels that there are only a handful of regulators in this space in Sweden and most are pretty knowledgeable folks. He offered to give a 5 minute Scandinavian perspective.
- Andrea suggested that as we roll this out, maybe we address several countries together to get an adequate group and cross section of regulators.
- Anna is interested, especially in outreach activities associated with this. Andrea/Mikaela will keep Anna posted to involve her in the planning.
- Paul mentioned that the UK is definitely interested as well, alluding to the workshop on management measures coming up in May that could help focus the discussion, and gain reactions from regulators.
- Daisuke said that in Japan they have had little experience communicating with citizens (other than fishermen) and would very much like to learn more how best to inform citizen outreach.
- Ling said that in China regulators need more data to support their policies, but that the point is not to use data against projects, leading to more and more requests for basic scientific research.

The learned from their offshore wind regulations which took them 5-6 years to publish (too long).

Thoughts on Phase 3 Work Plan

- Anne Marie said she presumed that we want to look at a variety of scales for some of the studies with social and economic issues. For instance, in Ireland they are working on test sites, and still don't have lessons that can be learned at a larger scale.
- Andrea replied that Annex IV has tried to be proactive in understanding what effects there may be and what risks are perceived to be important, as well as understanding those areas that might need mitigation (and those that don't). Looking at these kinds of issues and gathering useful information upfront can help to keep them from becoming real problems. This proactive approach also helps build research agendas, informing what we know and what can we better share to move forward. Andrea asked that all the analysts think about the contributions they might make on the social and economic piece.

Management Measures Workshop

Andrea stressed that we are hoping that many Annex IV reps will be there, and/or include their colleague if you can't make it. If you have a colleague interested, let Andrea know so they can be added to the list. Currently have around 25 people attending, and want to make sure there is significant involvement outside the UK.

Anna asked who from Canada is attending so can have at least 1 person from Canada there. Andrea and Paul followed up with Anna after the meeting with the names. If other countries are interested, please contact Andrea.

2017 Conferences

Discussion here was around content for a workshop at EWTEC on transferability and standardization of data, willingness to help out with workshop planning, and the timing of the workshop (before/after/during the conference).

- Consensus solidified around holding the workshop at the end of the formal sessions of EWTEC. Jan and Andrea also discussed that they could ask that the environmental sessions be scheduled late in the week (maybe a half or full day with environmental tracks) so that attendees primarily interested in environmental effects can attend that portion of the conference and be on hand for the workshop. Andrea and Anne Marie both committed to talking with Tony Lewis (EWTEC chair) about the timing for the workshop and the environmental sessions.
- There was concern (on the call and separately to Andrea beforehand) that "standardization" can be a scary word. Andrea explained that what we are after is reaching agreement that, if a MRE deployment location has certain kinds of animals, habitats, or particular device interactions that require collecting certain data (example – acoustic data from wave or tidal devices), that the same parameters be collected everywhere. To date, there have been few datasets that are

comparable as the parameters collected are so variable. We will have to come up with a better word than “standardization”.

- Anna is interested in focusing on communication to stakeholders at all levels, as part of the workshop, specifically how different sectors are talking to each other and the language they are using. Andrea mentioned that there will be an expert forum on this very soon.
- Ling said regulators in China will be more interested in this than their developers will be, and if there’s a representative monitoring system that ought to be built, they will be very interested in it.
- Anne Marie said she is happy to help with anything on the ground for the workshop.
- There is a need to further define the content and goals of the workshop, and solicit additional perspectives and thoughts on who we want at the workshop.

Tethys Peer Review

- Andrea mentioned that we are interested in putting up more material in different languages on Tethys, but we need an English abstract for each paper or report.
- Daisuke said that Japanese documents have no abstracts so it is difficult to summarize reports, but he will try to think of a way to do this efficiently.
- Ling will look into getting a PDF for Tethys of the Chinese-English dictionary of MRE terms, will write a short introduction in English.

Metadata Updates

Andrea reminds the analysts to email Mikaela back with updates to current metadata forms and regulatory information. Also for new project sites and research studies please fill out new metadata forms; there are different forms for a project site and research studies.

Round Table

- Anna mentioned that she is hosting an international workshop at Acadia University May 23-26th, focusing on acoustic detection of fish presence and movement to inform fish population models. Mostly the participants will be from academic institutions in the US, Scotland, and Canada.
- Paul mentioned that the fourth and final Atlantis turbine (for this phase) was installed at MeyGen and has the full range of acoustic and optical cameras to look at interactions. They hope to learn about array effects as well as impacts of individual turbines. There will be lots of monitoring data forthcoming.
- Daisuke mentioned that the Japanese government reduced budgets for developing MRE while favoring offshore wind, where they are developing more site licensing and social acceptance processes with fishermen/stakeholders; they are also interested in artificial reef effects for fish. Wave energy is difficult in Japan, so they are focused on OTEC and tidal. There is an OTEC project underway off a southern island in Japan at a small scale, but they hope to scale up. It is not clear if this is possible. He will also check into projects that may be moving forward on ocean

current harvest. The IHI company developed a turbine for harvesting the Kushiro current but he doesn't know if they have funds to install it. Daisuke will send Mikaela a contact for this project.

- Ling mentioned that EMEC has EA guidelines and the Chinese are interested in how this was done. She expressed interest in a workshop to determine how to put together a standardized test program and/or describe typical monitoring setups that ought to be carried out at test sites, because test sites tend to be well characterized and controlled. She would like to know about additional updates since the State of the Science report, as the Chinese are writing a report and are looking for new information. Andrea mentioned they intend to update some of the one pagers (Short Science Summaries from State of the Science report, as well as create more). Andrea also wondered if the group would be interested in seeing the recently finished paper on adaptive management, created for wind projects. The link to the paper and a summary is at: <https://tethys.pnnl.gov/publications/assessing-environmental-effects-wren-white-paper-adaptive-management-wind-energy>