D6.6 Coordination of inputs from a User Group into MEECE

Jessica Heard and Manuel Barange, PML

Contents

Executive Summary

The MEECE User Advisory group was formed with two key aims in mind. Firstly to provide strategic advice to the MEECE Consortium to ensure that questions relevant to a broad user community were considered as the project developed and reached maturity. Secondly to support the dissemination of MEECE knowledge and outputs to help ensure they are used in the EU policy process and support the broader application of model based information and tools outside of the modelling community. To this end the Group provided useful guidance and feedback at key stages of the project, and supported the project to its successful conclusion.

1. Introduction

The aims of MEECE knowledge transfer are to communicate MEECE science to target groups and promote its use in the wider management, policy and user communities to influence the debate and action on issues relevant to the impacts of climate and anthropogenic drivers on marine ecosystems. Europe has been branded as a "knowledge society", which requires that each European research effort includes a range of activities which aim to capture and transmit knowledge, skills and competence from those who generate them to those who will transform them into commercial and non-commercial economic outcomes. Effective knowledge transfer constitutes a key mechanism of the European Research Area and ensures that publicly-funded research exerts an effective impact on EU competitiveness. In MEECE, Knowledge Transfer is not necessarily focused on financially exploiting research, but on developing a number of less tangible benefits for research institutions, for industry and for the society as a whole, such as helping research institutions focus their research on the wider needs of society and industry.

The MEECE User Advisory Group (UAG) was formed to facilitate the dissemination process and ensure MEECE science reached a broad range of users through harnessing their experience and networks.

2. Project Scope

MEECE (Marine Ecosystem Evolution in a Changing Environment) FP7 project was launched in September 2008 to investigate the sensitivities and potential responses of marine ecosystems to both climatic change and the direct effects of human activity. MEECE brings together over 60 scientists from 22 organisations to form a vibrant research community to address this challenge. The focus of the research will be on the most important components of both the planktonic and benthic marine ecosystems. MEECE is the first project to attempt to use predictive models that consider the full range of drivers to elucidate the responses of the marine ecosystem in a holistic manner, rather than driver by driver as has been done in the past.

3. Objectives of User Advisory Group

The aim of the MEECE UAG was to provide user requirement input at all stages of the project and to provide user advice to validate the developments and outputs from the project. The group was intended to meet approximately once a year to provide feedback and advice on the scientific development of the project, with key strategic objectives to act as facilitators of knowledge transfer/exchange through:

   a) Providing advice to the MEECE Consortium to ensure that questions relevant to user communities are taken on board by MEECE.

   b) Advising and assisting in the dissemination efforts of MEECE knowledge, results, expertise and skills to potential users (e.g. managers, policymakers, regulators, etc.).

   c) Sharing information about other work in progress or about policy and practice development, thus providing a context for MEECE.

   d) Ensuring a focus throughout the project on how the findings could be used and how they need to be presented.

   e) Using their own networks to publicise the project's findings.

4. Establishment and Membership of MEECE User Advisory Group

The establishment of the UAG was considered from the outset of the project as it was clear that feedback given both in the early and final stages of the project would be most relevant. Early-on to provide advice on the general work plan whilst there was still time incorporate and act upon the ideas, and during the later stages of the project when knowledge transfer products were being developed and tailored for the use community.

The Chair of the UAG was the WP6 Work Package Leader, Manuel Barange. Membership of the MEECE UAG was initially by invitation, with members selected by the Knowledge Transfer team or recommended by project partners.   Once appointed members were asked to consider other possible members that they thought would make a useful addition to the group. A list of the people identified for potential membership during the project and to whom invitations were sent is shown in Annex 1 of this report.   During the kickoff phase of the project an initial a User Group of five people was established with the intension to expand the membership as required during the life of the project.

The UAG membership at the close of the project was as follows:

- Ahmet E. Kıdeyş/Volodymyr Myroshnychenko (Black Sea Commission)
- Anaïs Mangos (Plan Bleu)
- Johnny Reker (European Environment Agency)
- Jan Busstra (Dutch Ministry of Transport and Water Management)
- Luis Valdes (Intergovernmental Oceanographic Commission)
- Niall McDonough (European Science Foundation)
- Wojciech Wawrzynski (ICES)

4.1 Responsibilities

In joining the MEECE UAG members agreed to receive and comment on project documents including meeting reports, deliverables and periodic reports as well as attend meetings, no more than one per year, generally intended to follow on from the Annual Science meeting to which they were also invited.

4.2 Confidentiality

UAG members acted in a personal capacity and not as representatives of their organisations, their role in the project was an in an advisory capacity and as such they did not have management responsibility for the project or its finances. Topics were discussed at UAG meetings on the basis that they were confidential to the group.

4.3 Expenses

All expenses incurred by UAG members to attend meetings were covered by the WP6 allocated funds, reimbursed to the members following the meetings.

5. Communications

The MEECE UAG membership was broad and geographically spread, as a result the most efficient mode of communication was through electronic communication and documents available on the project website. During the early stages of the project there was regular communication with the group in order to receive their feedback and guidance on how the project could best develop.

Those members that were available attended the Annual Science meeting and participated in a follow up meeting directly afterwards to gain their thoughts and feedback on the science presented.

A dedicated section of the MEECE Knowledge Transfer website was set up for the UAG, which outlined the group's objectives, membership and provided links to meeting presentations and reports. Internal project documents which were sent to the UAG for consultation were exchanged through email rather than the public website.

In summary the UAG was engaged for consultation through a range of mechanisms including:

- Presentation of each Work Package work plan
- Close contact with the leader of the Knowledge Transfer WP
- Newsletters
- Project Meeting reports
- Face-to-face meetings
- Electronic communication
- EU Project Reports
- Viewing of products during developmental phase

6. UAG Meetings and Feedback

6.1 UAG Meeting 1. Amsterdam 2009

At the inaugural meeting of the User Advisory Group in Amsterdam in 2009 the key aims of the project and the user group itself were highlighted followed by presentations on the work plan from MEECE Work Package (WP) Leaders. This provided the UAG members with a full overview of the project's scope, intended activities and outputs. Following the presentations there was a closed meeting with the UAG members and Chair to gain their initial feedback.

Key points raised by UAG

The discussion with the UAG was very useful with a range of suggestions made as to how to steer the work plan towards policy relevant topics, with the importance of linking the projects outputs to current policy particularly stressed. The full report from this meeting is included as Annex 2 and some of the key suggestions and resultant actions reported in Table 1, Section 8.

Meeting Participants

- Manuel Barange (PML) WP6 Leader and UAG Chair
- Jan Busstra (Dutch Ministry of Transport and Water Management)
- Anaïs Mangos (Plan Bleu)
- Niall McDonough (European Science Foundation)
- Wojciech Wawrzynski (ICES)
- Icarus Allen (PML) MEECE Project Coordinator
- Jessica Heard (PML) Knowledge Transfer Coordinator and MEECE Project Manager
- GerJan Piet (IMARES) WP5 Leader
- Mike St John (UHAM) WP2 Leader
- Marco Zavatarelli (UNIBO) WP4 Leader

Apologies: Eva Royo Gelabert (EEA, Denmark), Luis Valdes (IOC, France)

6.2 UAG Meeting 2. Heraklion, Crete 2010

Three members of the UAG attended the first project science meeting held in Crete in 2010. Following the science presentations and general discussions of the consortium the group met in private to provide their feedback. Discussions focused on how to ensure links between MEECE and overarching policy objectives, summarised below:

Recommendations to help links to policy objectives:

- Link into to Marine strategy framework directive
- Access JRC ICES documents.
- Identify indicators relevant to MEECE to help target scenarios.
- Focus on one particular policy to help MEECE input into user needs. First step to get indicators and get MEECE to commit to which they will work on

Following the Crete meeting the MEECE Consortium altered the work plan to ensure the indicators and scenarios selected for use in model projections were directly linked to the MSFD indicators.

Other thoughts from the UAG

UAG could potentially participate in the scenarios workshop if the timing is right and ICES position paper on climate change would be available by then. Members were later invited to attend the MEECE Scenario Definition workshop in Bolgona but no one was able to attend.

Meeting participants

- Anaïs Mangos (Plan Bleu)
- Jan Busstra (Dutch Ministry of Transport and Water Management)
- Jessica Heard (PML) Knowledge Transfer Coordinator and MEECE Project Manager
- Manuel Barange (PML) WP6 Leader and UAG Chair
- Wojciech Wawrzynski (ICES)

6.3 UAG Meeting 3. San Sebastian 2011

By this stage of the project additional members had joined the MEECE UAGE, including Volodymyr Myroshnychenko from the Black Sea Commission, he was the only member of the UAG able to attend the meeting in San Sebastian.

Following the general presentations and discussions of the meeting, an informal meeting was held between Volodymyr Myroshnychenko, Manuel Barange (UAG Chair), Icarus Allen (Project Coordinator) and Jessica Heard (Project Manager). Discussions mainly focused on how to engage further with the Black Sea region, including model development for the region and links with the Black Sea Advisory group, these suggestions were followed up by Baris Salihoglu the PI from the Middle Eastern Technical Institute in Turkey. One general comment provided was around the focus of MEECE on seaborne rather than land based drivers. The project team explained they were aware of this but it was a decision made at the proposal stage and at this late stage of the project it is difficult to now include a new set of drivers, however this was something that could certainly be considered in future proposals.

6.4 UAG Meeting 4. Istanbul 2012

At this final project meeting held in Istanbul in June 2012, again only one UAG member was able to attend. Wojciech Wawrzynski from ICES joined the meeting and provided very useful feedback on the structure and presentation of the web-based MEECE Model Atlas which was in its developmental stage at that point. He also suggested that the content of the MEECE Descriptor Fact Sheets be more heavily focused on what MEECE could offer in support of the descriptors in terms of modelling and decision support tools rather than providing details on the descriptors themselves as he felt that users would have sufficient prior knowledge so it was best to focus predominantly on the science. As a result the structure of the fact sheets was altered to focus nearly entirely on MEECE science and how it could be applied in support of policy.

7. Broader UAG Consultation

The UAG was engaged to provide feedback on a number of occasions outside of face-to-face meetings, to ensure those who were unable to participate in meetings could still contribute. The most notable issues that the UAG consulted on include:

First periodic report and review: both reports were sent to the entire group for their response, several of which were received providing positive feedback on how the project was developing and making suggestions were possible to respond to the reviewer's comments.

MEECE fact sheets: As new fact sheets were produced hardcopies were sent to certain members of the UAG for dissemination, particularly relevant have been contacts at ICES and the European Environment Agency, the fact sheets were given out and displayed at relevant meetings held at these institutions with positive feedback received.

MEECE Model Atlas: A draft version of the website was twice circulated to the UAG for comment. We received feedback from 4 members which proved useful in the continued development and tailoring of the website. For example the European Science Foundation representative suggested it would be useful to be able to compare model projections across regions. As a result the 'Comparison Tool' was created, this allows users of the Atlas full flexibility to select exactly what outputs they would like to view, for example all future climate projections for zooplankton across Regional Seas, or maps showing changes in primary, secondary and fish biomass for a particular sea of interest under a particular anthropogenic scenario.

8. Summary of key feedback received from the UAG

Table 1. Examples of feedback provided by MEECE UAG and the response of the consortium to these suggestions

Feedback point	*Action taken and impact on project*
Modelling results alone cannot provide advice – context is needed.	In order to ensure our modelling results could be viewed and applied with relevance to policy, the Project Consortium decided to directly link its activities to the newly emerged European Marine Strategy Framework Directive (not in force at the beginning of MEECE) by studying the key drivers of change as laid out in the Directive. As an example of how this was achieved, MEECE simulated present and future primary production states in several regions which were expanded to include simulations with coupled plankton fish models during in order to make it an integrated assessment we linked human activities to the MSFD descriptors through the MSFD Annex III pressures and impacts.

Whilst the MEECE Model Library may not directly influence policy making, it would be very valuable to particular expert groups (e.g. ICES working Groups).	A fact sheet on the Model Library was written and disseminated to a range of audiences, particularly relevant ICES working groups. A MEECE scientist also presented the library at the ICES Working Group on Modelling of Physical/Biological Interactions
A key challenge for MEECE is how to paint a simple picture of their modelling activities for the end users who may have limited understanding of how models work and what information they can provide. MEECE needs to show out model outputs can be used in policy development and also explain their limitations.	The MEECE Model Atlas deliverable was developed into an easy to use web-based Atlas providing model outputs per European regional sea in the forms of maps and graph for a range of different future climate and anthropogenic scenarios. The individual maps are explained, regional summaries provided and a range of other interactive tools available. There is also a section with directly explains potential impacts on MSFD Descriptors from the model simulations. To further compliment the Atlas, a series of MSFD Descriptor Fact Sheets was produced with highlights with examples specifically how MEECE science can be used and applied in support of the European Marine Strategy Framework Directive.
It was noted that MEECE seems to have little focus on Marine Protected Areas. This is a key issue and a very hot topic at present. Can habitat destruction be considered in MEECE modelling scenarios?	It was decided that unfortunately these areas were outside the remit of the project and could not be incorporated with in the work plan now that the project had begun.
Impact Assessment: there is a growing need for project outcomes to be related to societal and economic impact assessments. MEECE's function in this context needs to be made explicit. This is not currently in project, but could identify ways of linking research with the assessment processes to feed into impact assessments.	MSFD descriptors will be linked to human activities through the MSFD Annex III pressures and impacts, considering all the MSFD Annex III characteristics that constitute these descriptors. This was done by creating two matrices: one linking the GES descriptors to the pressure/impacts, the other linking the pressure/impacts to the human activities.
UAG suggested using urbanisation as the main driver for one of the scenarios. This would involve describing the 'pressures' in terms of habitat loss, urban development, etc., driven by an increase in the use of the marine coastal environment over time.	Following this suggestion a proposal was put into for national funding to work on this (Capri Project). Funding was not successful this time but alternate sources are being investigated.
Discussion as to the connectivity of MEECE with society's urgent needs	The MEECE Model web Atlas was created.
European maritime day – 20th May? Should be in Spain next year.	Coordinator attended and presented MEECE at this event
Two technical specific comments to feed to MEECE: • Could modellers try and use shortest time	The time scale of the models were defined by policy

scale as possible – so that results are more easily fed into policy • Scenarios discussed so far have been set mainly by IPCC SRES. However, these are currently being revised. MEECE needs to think carefully about relevance of scenarios before they are selected, or have a good reason to stick to outdated IPCC SRES.	needs but also process understanding and data availability contracted the time slices used per region.. Scenarios now related to GES from Annex 1 MSDF
In general it was discussed that there is not a clear description of target audience for MEECE e.g. is it authorities or the scientific institutes that advise them? Unclear whether private enterprises are targeted? The interfaces between science and users (i.e. how will the final product be delivered to the target user group) are unresolved. In this context, would a workshop/meeting specifically for end users be useful?	In response to this comment a statement on target audience was been included in the KT Strategy (http://www.meece.eu/kt/docs/KT_Strategy_May10.pdf) and included in the text on the home page of the knowledge transfer web pages
UAG discussed when particular drivers (e.g. pollution) switch from positive to negative. If thresholds could be provided these would be of great importance for policy development	Decision Support Tools for detecting thresholds for pollution and invasive species under development.
It was agreed that WP3 and WP4 could benefit from UAG feedback to develop scenarios, especially for fisheries. UAG indicated that issues such as urbanisation and habitat loss, for example, are not included in the models, although these are the most pressing issues requiring technical input.	UAG input to scenario development decisions was sought, but unfortunately no UAG members were able to attend the project workshop in Bologna where these discussions were held and agreements made.
Plan Bleu noted that some of the main issues in the Mediterranean Action Plan include; urbanisation, tourism, agriculture (including fishing and aquaculture), environmental statement. Plan Bleu can provide some contextual information about their past and prospective regional trends if needed, to feed scenario. Could MEECE reflect those concerns and provide input such as determining the kind of future ecosystems, their abundance/vulnerability, their spatial dispersion?	The was discussed at the Bologna Scenario development meeting, but no further input from Plan Bleu was provided.
Could MEECE help in calculating policy compliance?	MEECE currently does not have the scope to work on policy compliance
Could MEECE 'stress-test' specific policies? Examining the "do nothing" principle versus the impact of different policies could be very interesting and of great relevance to policy makers. Is this something to be done with in WP4? This may further help in defining scenarios within MEECE and force the rationale behind scenario development. **ERG (29/10/09):** Again 'policies' means nothing. It should be policy or better (policy-derived) management measures that should be considered if MEECE wants to be useful.	Assessments of policy interventions were not considered in the remit of the project, but MEECE agreed that if required its models would be useful for this purpose.
Strategic Committee on Maritime Issues, meets every 4-6 months, would it be appropriate for MEECE to try reporting directly to them?	This action was considered but a regular route of contact was not established.

Harnessing ocean energy is a very competitive area currently undergoing rapid development in technology. Many countries are looking at quite large offshore installations which will have an inevitable impact on marine ecosystems. The onus is on marine science community to ensure this is done in the least harmful way. There is a unique opportunity to influence this process before it starts to help ensure it is sustainable. Can MEECE get involved in this?	This probably beyond the scope of MEECE models, but the requirement will be considered

9. Summary

The MEECE User Advisory Group proved to be a useful mechanism for guiding the project and helping to tailor outputs and products to improve their meaningfulness to potential users. Their knowledge of current policy debates and future development proved particularly relevant at guiding the path of the project in the early stages to ensure MEECE's activities were aligned to policy developments. The group's expertise and geographical spread helped to ensure that MEECE's activities could be disseminated broadly across Europe. By utilising member's existing networks we were able to disseminate project outputs to a broad selection of interested groups and ensure MEECE science was discussed in the right places, for example ICES working groups. The group also provide invaluable support to help to shape some of our final products to ensure they were presented appropriately and usefully to future users of MEECE science.

On the other hand the MEECE UAG was frustrated by the limited scope they could play in influencing change. The UAG was appointed at the implementation phase of MEECE, and thus many of their suggestions and ideas were considered to be outside the grant agreement. This does not preclude the fact that many suggestions did guide the project towards policy goals, but in retrospect it may have been useful to appoint the UAG at the planning phase, thus allowing them a chance to influence the design of the project and not just its implementation.

To maximise on their expertise members of the MEECE UAG were by design key players in their field and as such were likely to have heavy commitments. As a result attendance at annual group meetings proved to be a challenge for many of them. Our communication approach was thus adapted to meet the needs of our members, becoming more heavily reliant on electronic communication than originally intended. Despite this, we still received input from many of the members on a regular basis; however there were some issues around disengagement from certain members. Engagement was strongest at the beginning but dissipated to some degree during the 'development' phase of the project (years 2-3), members where then re-engaged during the final phase when their feedback was again sought in preparation to help refine products and outputs. It was necessary to wait until the science activities had to some degree been completed before the process of disseminated could begin. Unfortunately by this time, several members had changed roles in their organisations or moved on, as a result new members were invited to join, which had the positive benefit of bringing a fresh perspective and new insights.

The experience from the MEECE UAG provides a lesson for the formation of project User Groups. Whilst ideally the group would include key decision makers from a particular area, but as mentioned above their heavy work load should be considered as it may prevent them from fully engaging with the group and thus the project. Targeting membership at professionals who are more likely to have the time and desire to actively engage could prove more effective, as would appointments at the planning phase of a project.

In summary the MEECE UAG proved an invaluable resource in the development and final dissemination of the project. Several members have continued to be involved with future projects that have their roots in the MEECE project, and our now engaging with other FP7 projects, such as the new FP7 project OPEC (Operational Ecology), which takes the regional model developments achieved through MEECE a stage further to make operational modelling based products and ecosystem forecast tools to help assess and manage the risks posed by human activities on the marine environment, helping to improve the ability to predict the "health" of European marine ecosystems.

Annex 1

Invitees to the MEECE User Group over the course of the project, those who joined are in indicated in blue.

- Dr Adi Kellerman, Head of Science, ICES, Denmark
- Professor Ahmet E. Kıdeyş and Dr Volodymyr Myroshnychenko, Black Sea Commission, Turkey
- Anaïs Mangos, Programme Officer, Plan Bleu, France
- Dr Armando Astudillo, Conservation and Environment Advisor
- Eva Royo Gelabert, European Environment Agency, Denmark (later replaced by Jonny Rekker)
- Mr David Johnson, Executive Secretary, OSPAR
- Jan Busstra, Dutch Ministry of Transport and Water Management, The Netherlands
- Dr Lars Horn, ESF Marine Board, France
- Linda-Rose Santhagens, Ministerie V&W, DG Water. The Netherlands
- Dr Luis Valdes, Head of Marine Science, IOC-UNESCO, France
- Dr Paul Degnbol, Scientific Adviser, EC DG Fish
- Dr Niall McDonough, Marine Institute, Ireland
- Dr. Sybille van den Hove, Director MEDIAN
- Wojciech Wawrzynski, ICES, Denmark

Annex 2

Marine Ecosystem Evolution in a Changing Environment

1st MEECE User Advisory Group Meeting

Amsterdam, 6th October 2009

Contents

Meeting Participants

Manuel Barange (PML) WP6 Leader and UAG Chair

Jan Busstra (Dutch Ministry of Transport and Water Management)

Anaïs Mangos (Plan Bleu)

Niall McDonough (European Science Foundation)

Wojciech Wawrzynski (ICES)

Icarus Allen (PML) MEECE Project Coordinator

Jessica Heard (PML) Knowledge Transfer Coordinator and MEECE Project Manager

GerJan Piet (IMARES) WP5 Leader

Mike St John (UHAM) WP2 Leader

Marco Zavatarelli (UNIBO) WP4 Leader

Apologies: Eva Royo Gelabert (EEA, Denmark), Luis Valdes (IOC, France)

Comments from Eva Roya Gelabert added 29th October 2009

Action Points

Action	Assigned to
Contact Richard Bellerby (WP1; cc Icarus Allen)re technical FS: summary of datasets	Jessica Heard
Approach Icarus Allen and Mike St John (WP2) re technical FS on model library	Jessica Heard
Contact Xabier Irigoien (WP3), Marco Zavatarelli (WP4) re FS summarising scenarios to be used in MEECE.	Jessica Heard (cc Icarus Allen)
Contact GerJan Piet (WP5)(cc Icarus Allen) re FS on MSE examples	Jessica Heard (cc Icarus Allen)
JH and WW to identify ICES expert groups that could benefit from MEECE model library factsheet.	Wojciech Wawrzynski and Jessica Heard
Circulate ICES report when available (expected March 2010)	Wojciech Wawrzynski

Send list/ copies of position papers that would be of interest to MEECE.	Niall McDonough
Prepare a short statement to clarify the target audience of MEECE with regards user communities.	Manuel Barange/Jessica Heard
Consider a second UAG meeting during the planning of the MEECE Science Meeting	Jessica Heard/ Icarus Allen

Meeting Report

The presentations delivered under agenda items 1-7 are summarised below. Copies of the full presentations can be downloaded from http://web.pml.ac.uk/meece/kt/UAG/amsterdam_meeting.html

1. Aims and objectives of the User Advisory Group (UAG) by M. Barange

Key points from the presentation include:

- EU Lisbon Treaty - Knowledge lies at the heart of the European Union's Lisbon Strategy to become the "most dynamic competitive knowledge-based economy in the world". The 'knowledge triangle' - research, education and innovation - is a core factor in European efforts to meet the ambitious Lisbon goals. Numerous programmes, initiatives and support measures are carried out at EU level in support of knowledge.

- MEECE definition of knowledge transfer/exchange - KT is the process which facilitates the dissemination of research-based knowledge, expertise and skills. Effective knowledge transfer requires communication between MEECE scientists and global users (e.g. policy makers, advisory bodies, research managers, conservation and user groups, management bodies), and results in the production, dissemination and use of existing or new research-based knowledge in decision-making and enterprise.

- The term knowledge transfer covers the processes by which knowledge, expertise and skilled people exchange between the science base and its user communities, to contribute to economic competitiveness, effectiveness of public services and policy, and quality of life. This includes:

    – Knowledge normally presented in scientific papers or at scientific meetings.

    – Knowledge that can be commercialised (based on the ownership of intellectual property).

    – Tacit knowledge (also called know-how) concerned with the methodology used in scientific processes or experiments.

    – Pieces of scientific knowledge, or observations of a scientific nature, that by themselves are not enough to constitute a scientific paper, but could be key pieces of information for other scientists or users of science.

    – Knowledge produced as scientific advice or evidence for policymakers or other users of science.

- Strategic objectives of MEECE UAG - A facilitator of knowledge transfer/exchange

    f) Provide advice to the MEECE Consortium to ensure that questions relevant to user communities are taken on board by MEECE.

    g) Advise and assist in the dissemination efforts of MEECE knowledge, results, expertise and skills to potential users (e.g. managers, policymakers, regulators, etc.).

- The membership of the UAG is not closed and additional members may be invited as deemed necessary over the course to the project. Current UAG members are welcome to propose additional names.

2. MEECE overview by Icarus Allen

This presentation described the strategic aims of the project as well as general description of the science activities to be undertaken.

- *Establishing the tools*

    - WP1: Comparative analysis to define model parameterisations for key processes (acidification, pollution response, fishing and alien invasive species impact); Establishing scenarios and hypothesis for testing based on the existing historical analysis of ecosystem response to the drivers

    - WP2: Coupling biogeochemical models to upper trophic level models; modification of models to include response to acidification,; Model skill assessment

- *Running the Scenarios*

    - WP3: Scenarios Climate and circulation drivers, impact on ecosystem end-to-end

    - WP4: Scenarios Direct anthropogenic drivers and multiple driver impact on ecosystems end-to-end

- *Implications and Knowledge Transfer*

    - WP5: Implications for resource management.

- ❖ Comment from Eva Royo Gelabert (29/10/09): That is the key output of the project in my view and should be developed down to the level of 'management measures' (responding to the policy 'needs'). I'm generalising here but I'm afraid that most of this type of work (i.e. the further 'digestion' and elaboration of the science/research into management) has to fall on the scientists; decision-makers (administrations, policy developers, politicians, etc.) do not make the effort plus they do not get/understand much of the science... *See below*

    - WP6: Knowledge Transfer and Outreach

- ❖ UAG suggested that a technical Fact Sheet could be prepared summarising the Datasets/bases to be used in MEECE, the rational behind the sets selected, and the experimentation needs that emerge from the gaps in knowledge identified. *Action: JH to contact Richard Bellerby (WP1; cc Icarus Allen).*

3. WP2: Advanced modelling by Mike St. John

The principle objectives in WP2 include:

- Creating a library of models which can be coupled to existing coupled hydrodynamic and intermediate and complex NPZD type models.

- Providing the integrated End-to-end modelling tools necessary to assess how ecosystems are impacted by global change via drivers such as ocean circulation, ocean climate, ocean acidification, pollution, over fishing and invasive species.

- Identification of system specific and generic key feedbacks and forcing for focused modelling activities.

- Creation of a library of biogeochemical, ecosystem, higher trophic level, alien invasive species and ecotoxicology models necessary to assess the impacts of MEECE drivers on ecosystem dynamics.

MSJ explained how MEECE uses the rhomboid approach to achieve these objectives. In order to accomplish the end-to-end ecosystem modelling principle using "rhomboid" principles they intend to:

- <u>Identify a system specific and generic key feedbacks and forcing</u> for focused modelling activities.

- <u>Create of a library</u> of biogeochemical, ecosystem, higher trophic level, alien invasive species and ecotoxicology models necessary to assess the impacts of MEECE drivers on ecosystem dynamics.

- <u>Develop a modular modelling structure</u> to enable the flexible coupling of biogeochemical, ecosystem, higher trophic level, alien invasive species and ecotoxicology sub models modules to existing ocean atmosphere models.

- <u>Develop a "model coupler" system</u> to enable the implementation of feedback loops into end-to-end modelling frameworks. A coupler is a software tool that a) exchanges information between models with minimal code interference and b) transforms the coupling fields from the source model grid to the target mode grid and c) contains no "science"; does not define the components.

He described briefly the different modelling approaches, with particular emphasis on the multiple approaches for fish modelling: IBMs, Stochastic Multispecies Models, ECOPATH+ECOSYM, OSMOSE, APECOSM. Some time was used to explain the technical difficulties involved in the planned work, using the IBM (Individual Based Modelling) approach as an example.

- ❖ UAG suggested that a technical Fact Sheet could be prepared summarising the library of models to be used in MEECE, their characteristics, benefits and shortcomings, and some details on the thinking behind the model coupler to be implemented in MEECE.

- ❖ **ERG (29/10/09):** In this context, see the results of the project "Scenarios and models for exploring future trends of biodiversity and ecosystem services changes" available at: http://ecologic-events.eu/biodiv-scenarios/documents.htm The Final Report contains a review of marine models that may be useful.

Action: JH to approach Icarus Allen and Mike St John (WP2).

4. WP3: Ecosystem response to climate change drivers and acidification, *Icarus Allen on behalf of Xabier Irigoien*

The objective of this WP is to scenario test the impacts of climate drivers on the structure and functioning of marine ecosystems. The first task will define the common scenarios and metrics that will allow model-model inter-comparability. He described the basic simulations:

- Reference simulation: climate – 1860-2100, IPSL-CM4 GCM, ORCA2 PISCES hydrography/nutrient, SRES A1B emission scenario. Daily resolution for the atmosphere, monthly for the ocean.

- Reference simulation: re- analysis - ERA-40, 1960-2002, Observed rivers, Re-analysis forced ocean model for boundaries.

- Time slices - 2000, 2025, 2050, 2100

- Spin-up from reference initial condition.

- Need to be long enough to encompass inter-annual variability (2-30 yrs).

IA explained that a common set of scenarios are planned for each of the 9 geographical regions of MEECE. These will be analysed for the effects of climate forcing and ocean circulation on ecosystem function on time scales of daily to seasonal to inter-annual variability. Particular issues that will be investigated are effects of varying mixing, temperature and transport on nutrient availability, light availability, changing acidity, carbon flux, and metabolic processes. The results will provide background fields for WP4.

- ❖ UAG discussed when particular drivers (e.g. pollution) switch from positive to negative. If thresholds could be provided these would be of great importance for policy development (WP3 and WP4). **ERG (29/10/09):** Yes, but then the thresholds have to be very relevant for

the policy. They have to be formulated in a way that shows how they link to the policy objectives and/or targets. Otherwise, it is unclear how to use them in management.

5. WP4: Ecosystem response to direct anthropogenic drivers by Marco Zavatarelli

MZ described the main objectives of WP4 as:

- To define the envelope of response to combinations of direct anthropogenic drivers on marine ecosystem on a regional scale.

ERG291009: The regional scale is the most useful one from a policy point of view. The Marine Strategy Framework Directive's (MSFD) 'management units' are the 4 European marine regions on (sub-regional divisions also possible for management but, in the end, everything has to be aggregated regionally). The Common Fisheries Policy (CFP) aims at moving towards 'regionalisation' (decision-making at the regional sea levels, cf. CFP Reform Green Paper April 2009)

- Ascertain the impact on ecosystems end-to-end of changes in pollution, fishing effort, fluvial nutrient and CDOM inputs.

- The above focused on physics, biogeochemistry, ecosystem productivity, higher trophic levels.

To differentiate from man made climate change, this WP focuses on drivers originating from a direct human pressure on the marine environment, such as eutrophicating substances (nutrients), toxic substances (e.g: herbicides, antibiotics), optically active substances (CDOM), exploitation of living marine resources, introduction of invasive species. The approach followed for each of these direct pressures was presented.

On the issue of scenarios, MZ noted that MEECE a) assumes that policy drivers will seek either the maintenance or the reduction (up to the phasing out) of the current inputs, in accordance with the EU water framework directive **ERG (29/10/09):** Offshore (beyond 1nm for 'biology' and 12 nm for 'chemistry') but also in coastal/WFD waters (1nm or 12 nm) for some issues, the MSFD applies. The final aim of this Directive is achieving 'good environmental status' of European marine waters by 2020 of the basis of the further EU-level definition (the JRC/ICES 2010 work referred to below) of the 11 descriptors found in its Annex I. See them to judge whether what will be needed is the maintenance or the reduction (up to the phasing out) of the current inputs, b) will ensure appropriateness of policy related scenarios, and c) will seek interaction with expert advisory group (stakeholders and users). Specific details of the scenarios to be considered for each driver were provided, although it was clear that these are not yet fully defined.

- ❖ It was agreed that WP3 and WP4 could benefit from UAG feedback to develop scenarios, especially for fisheries. UAG indicated that issues such as urbanisation and habitat loss, for example, are not included in the models, although these are the most pressing issues requiring technical input.

- ❖ UAG suggested using urbanisation as the main driver for one of the scenarios. This would involve describing the 'pressures' in terms of habitat loss, urban development, etc., driven by an increase in the use of the marine coastal environment over time. Such a scenario would help bridge the gap between technically driven scenarios and those driven by societal needs. **ERG (29/10/09):** The 2006 and the 2012 update (to be drafted over 2010-2011) of the EEA's 'Coastal' Report may be useful in this context providing a general, European-wide picture of the above-mentioned coastal 'pressures'. The same with the marine/maritime/coastal assessment in the EEA's 2010 'State of the environment' Report (advanced draft available February 2010) .2006 version of the 'Costal' Report available at: http://www.eea.europa.eu/publications/eea_report_2006_6

- ❖ UAG suggested that a technical Fact Sheet could be prepared summarising the scenarios to be used in MEECE and the rational behind them. This could be the result of a scenarios

workshop. *Action: JH to contact Xabier Irigoien (WP3), Marco Zavatarelli (WP4) (cc Icarus Allen).*

6. WP5: Implications for resource management by GerJan Piet

GJP described the objectives of WP5 as the:

- Development of a methodology to integrate the dynamic response of marine ecosystems to the combined effects of various anthropogenic and natural drivers into multi-criteria tools supporting the decision-making process.

- Development of management strategies that support the EC Marine Strategy, EC Maritime Policy and the EC Common Fisheries Policy and their long-term ecological and resource management objectives.

- Evaluation of the tools supporting the decision-making process and management strategies using the MSE tools.

- Further development and implementation of Management Strategy Evaluation (MSE) tools.

Underlying these objectives is the understanding that resource management in the European area is changing from a present situation focused on the effects of fishing on commercial fish stocks under CFP, to a future defined by the Marine Strategy Framework Directive and a reformed CFP. Present objectives to keep stocks "within safe biological limits", scientific advice based on stock-assessments, and fishing considered in isolation, will change to a system based on the implementation of the Ecosystem Approach, the desire to achieve Good Environmental Status and the need to apply an integrated management of human activities.

The development of MSE tools was described, and the goals of the comparative methodology in the WP defined as:

- Common methodology to compute and estimate ecological indicators. . **ERG (29/10/09):** It is mentioned below (UAG comments) and I already referred to it above, the MSFD 11 descriptors (Annex I) of 'good environmental status' are being further defined/made more concrete at the European level by the JRC & Ices and this work should be finished by spring 2010. The work, under the MSFD Common Implementation Strategy, involves both developing a conceptual framework for assessment, most possibly an indicator, and deriving some idea of thresholds for what 'good' may mean for each of them. The results will have to be general enough to apply to the whole of Europe, but the indicators (and thresholds?) would be extremely useful in the context of MEECE here. There is also a possibility that there will be follow-up work over 2010-2011 on further adapting the developed descriptors to the specific situation of each European regional sea….

- Common protocol for elaborating a diagnosis on ecosystems state. **ERG (29/10/09):** *See above.*

- Common communication methods for transferring scientific knowledge to the general public.

- Website presenting the generic dashboard (computation and visualisation of ecosystem indicators) on several world ecosystems.

- For the main links (where driver compromise objectives) management strategies will be developed that take MEECE climatic drivers (temperature, acidification, circulation/ stratification and light) into account.

- Indicators of both Pressure and State will be (further) standardized and consistently implemented as part of decision-support tools.

- Management strategy evaluation tools will be developed and implemented to select the best strategies, indicators and decision-support tools and to assess the improvement achieved.

❖ **ERG (29/10/09):** As I have advanced above, unless this goes down to the level of 'management measures' - at the very least of the level of detail included in the WFD's Annex VI - it will not be as useful as it could. The MSFD Annex VI is much less helpful than the WFD and does not include concrete examples or much detail on anything. So there is a clear gap/niche there. In relation to the CFP, the Green Paper puts forward some general options for management but noting concrete yet, so it is good to come up with something concrete!!. Of course, there must also be a link between the measures and the ecological indicators, which (as said above) should also be linked to the policy objectives/targets.

QUESTION: Will you account for cost-effectiveness in this management (measure) evaluation? That is a key requirement of the policy. If 'yes', how will you do that?

It was emphasised that this WP has the strongest links to WP6 (Knowledge Transfer) and the UAG.

❖ UAG pointed out that Management Strategy Evaluation cannot be carried out for all drivers and situations. It would be important to narrow early on where MSE will be applied and why. **ERG (29/10/09)**: Following from the WFD Article 5 analysis and the 2012 MSFD 'Initial assessment' approach, it could be done for areas at risk of failing the 'good status' policy objective?

❖ It was suggested that a specific example should be selected and run through the MSE system as a test case.

❖ Indicators are crucial to the work of WP5, these must be selected carefully. UAG pointed out that ICES and JRC are preparing a set of reports on indicator to define "good environmental status". These would be very useful for MEECE.

ERG (29/10/09): TOTALLY!! I also think that there should be MEECE representation in the MSFD Common Implementation Strategy, possibly at the Marine Strategic Coordination Group. This would help to keep abreast of 'policy needs' and policy development with regards the MSFD but also, to a lesser extent, the Integrated Maritime Policy (e.g. EMODNET, which is mentioned below) and, to an even lesser but still valuable extent, with the CFP reform. It would also be key for dissemination, for linking with stakeholders etc.

❖ GJP indicated that some specific examples are already available (e.g. Baltic). It was pointed out that such an example could be the focus of a Fact Sheet. *Action: JH to contact GerJan Piet (WP5) (cc Icarus Allen).*

7. WP6: Knowledge Transfer and Outreach *by Manuel Barange*

MB introduced the main objectives of WP6:

- Develop strategies and tools to transfer knowledge arising from MEECE to user groups.
- Use web-based tools and printed materials to facilitate KT and outreach.
- Coordinate users inputs to MEECE through a User Group.
- Train next generation of modellers.

The following Tools and Strategies to be used were identified:

- Web pages
- Fact sheet series (and electronic updates)
- Coordination of inputs from User group

  • Contacts Database

  • UAG

- Website on marine world's ecosystem status – work carried out by WP5

  ERG (29/10/09): Really? This sounds very ambitious. I though MEECE was only

European. At which level of 'resolutions' will this be done? How does it fit with the work of Halpern, 2008 and 2009?

- Modelling Summer School

Closed discussion of UAG

In this first meeting of the UAG the discussions were centred on two specific issues:

- Provide advice to MEECE to improve the relevance of the results to the user community.
- Identify synergies and complementarities in the work of the UAG member's Institutions.

The following points were raised:

❖ "Modelling" results alone cannot provide advice – a context is needed and an active UAG can provide some of this policy context. **ERG (29/10/09)***:* Not only a context is needed, but beyond: For MEECE to go down into 'management measures' as much as possible.

❖ Sharing of results is still weak across European projects, resulting in duplication of work and missing important gaps. There is a strong need to ensure effective dissemination. **ERG (29/10/09**)**:** YES! But what to do about it that really improves the situation?

❖ Whilst the Model Library (WP2 output – see point 3 above) may not directly influence policy making, it would be very valuable to particular expert groups (e.g. ICES working Groups). Expert Groups can in turn provide feedback. *Action: JH and WW to identify ICES expert groups that could benefit from MEECE model library factsheet.*

❖ ICES/JRC work on indicators could provide information for prioritisation of modelling runs for MEECE. This could also be the focus of a MEECE Fact Sheet. *Action: W. Wawrzynski to circulate ICES report when available (expected March 2010).*

❖ A key challenge for MEECE is how to paint a simple picture of their modelling activities for the end users who may have limited understanding of how models work and what information they can provide. MEECE needs to show out model outputs can be used in policy development and also explain their limitations.

❖ There were discussions as to the connectivity of MEECE with society's urgent needs. For example, can MEECE address some of the following questions:

⟩ What ecosystems will exist in future?

⟩ What fish species will there be and what will their spatial distribution be?

⟩ What level of exploitation will be sustainable?

It was noted that MEECE seems to have little focus on Marine Protected Areas. This is a key issue and a very hot topic at present: **ERG (29/10/09):** Similarly deep-sea ecosystems….

Can habitat destruction be considered in MEECE modelling scenarios?

❖ Data issues: data exchange, availability etc. is currently a major issue for scientists at European level. For example: EMODNET (European Marine Observation and Data Network) a network of observations, uses a range of technologies, sensors, platforms to monitor marine environment. The data is made available to data managers and then end users in most efficient way possible. What is MEECE's perspective on this? Is there data sharing program? How can data be fed into other programs? What access to datasets is required? Some specific issues were flagged:

⟩ How data access was being handled within the project?

> How are issues with incompatibility being overcome?

> Does MEECE have all the historical data it requires and how is this source?

> How are differences in methodology dealt with?

> Are people only using data that is easily available, what if some data is being missed?

It was discussed that a position statement (or/and Fact Sheet) on Data issues be prepared by the Consortium (see point 2 above).

❖ Could MEECE 'stress-test' specific policies? Examining the "do nothing" principle versus the impact of different policies could be very interesting and of great relevance to policy makers. Is this something to be done with in WP4? This may further help in defining scenarios within MEECE and force the rational behind scenario development. **ERG (29/10/09):** Again 'policies' means nothing. It should be policy or better (policy-derived) management measures that should be considered if MEECE wants to be useful.

❖ **Scenario development** – This was discussed following on the questions during plenary. Decision makers prefer to have two or more potential scenarios to explore. It is useful to have predicted outcomes of potential policies. Could MEECE scenarios be set up to reflect habitat destruction, potentially modelling urban development?

❖ There was considerable discussion on the **target level** of MEECE, and the importance to address national, regional and global levels as well as European. National challenges will be different in every country and so will need to find a suitable entry point to get the MEECE message across. MEECE is taking a regional approach to its work, but issues for which there is national devolution of policy implementation, require national-level input. MEECE does not seem to have thought this issue through enough. Following on the above point, the setting of targets in EU policy making is sometimes left at national level, and MEECE could assist those countries setting targets. *ERG291009: Too ambitious? I would leave it at European regional sea level. Nevertheless, the link to global would be very important for high seas' and integrated management of the whole sea/ocean. Are you familiar with the UN 'Assessment of Assessments' towards a Regular Process for reporting on the state of the marine environment? For the MSFD, countries will have to come up with their own, specific national indicators and targets to evaluate progress towards 'good environmental status'; much of that would be vey political (?). I doubt that MEECE could influence them all in all countries. It is better to focus at the European and regional sea level and this is why the MSFD CIS, as suggested above, is a good entry point for dissemination (see what I wrote under point 6).*

❖ Could MEECE help in calculating policy compliance? Regulations are generally outcome based, so tools that help to identify whether a measure taken in one way or another way would have a similar outcome would be useful. This may help Member States find solutions which can take into account their specific needs. **ERG (29/10/09):** See above plus legal compliance should be the exclusive competence of the European Commission. You could do it as a 'shadow' type of work but, as I said, too many indicators, targets and countries….plus the fact that. If I have understood correctly, MEECE will not cover all the topics covered by the MSFD, the IMP and the CFP so it would only be partial compliance anyway

❖ Impact Assessment: there is a growing need for project outcomes to be related to societal and economic impact assessments. MEECE's function in this context needs to be made explicit. This is not currently in project, but could identify ways of linking research with the assessment processes to feed into impact assessments. **ERG291009:** Indeed, for me an 'impact assessment' of a plan or a project is a type of 'management measure' in a way.

❖ **There was some discussion regarding strategic project objectives, and particularly considering that the Marine Strategy Framework Directive (MSFD)**[1] will be revisited every few years. MEECE could be one of the tools to help re-define the objectives in the next cycle (2015), as part of its legacy. Over the coming year Member States need to translate indicators into measures that will be taken and rolled out in 2015. From 2015 onwards the timing of this updates will be in line with updates in the Water Framework Directive. While it may already too late for 2015, MEECE could offer input to the 2021 version as **a support tool in the life cycle of strategic marine directive.** This would see MEECE outputs going straight into policy making.

ERG (29/10/09): There are 2 ways in which MEECE could 'help' (but check dates are correct):

> a) Supporting the repetition of the 2012 'initial (baseline) assessment' (DPSIR & cost of degradation), which would be a wider, 'state of the environment'-type assessment than that linked to the 'good environmental status' indicators. It is a national responsibility but it could be carried out at the regional level or at least very well coordinated at that level. MEECE to help put 4 regional pictures of that, one for each sea would be very useful. Needs to link to the work of regional sea conventions…

> b) Influencing the programmes of measures (which are part of Marine Strategies), which would contain the management measures (the ones I've been mentioning all along) required to get to 'good environmental status' (based on the 2012 'initial assessment the first time and then on the repetition of that as a context but mostly on the indicators and targets towards 'good environmental status'). The targets and indicators are national but there could be some regional coordination via the of regional sea conventions.

❖ In general it was discussed that there is not a clear description of target audience for MEECE e.g. is it authorities or the scientific institutes that advise them? Unclear whether private enterprises are targeted? The interfaces between science and users (i.e. how will the final product be delivered to the target user group) are unresolved. In this context, would a workshop/meeting specifically for end users be useful? *Action: JH and MB to prepare a short statement to clarify the target audience of MEECE with regards user communities.*

The discussion also noted synergies between MEECE and the objectives of the Institutions of the members of the UAG. These are worth noting:

❖ The major role of ICES is to provide advice to policy makers therefore the outputs of WP5 will be of great interest to them.

❖ **ERG (29/10/09):** That WP will also be the most relevant for the EEA. Thus, the European Environment Agency (EEA) is an agency of the European Union. Our task is to provide sound, independent information on the environment, including Europe's seas and coasts. We are a major information source for those involved in developing, adopting, implementing and evaluating (the effectiveness of) environmental policy, and also the general public. Currently, the EEA has 32 member countries (cf. http://www.eea.europa.eu/about-us/who)

❖ The Marine Board-ESF convenes Expert Working Groups (http://www.esf.org/publications/position-papers.html) on marine science areas of identified strategic importance. These Working Groups produce position papers which examine the state of European research effort, develop strategy and foresight and define future research priorities for the specific scientific area. The target audience for these position papers are policy makers, program developers (at both national and EU level) and the marine science

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[1] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) *OJ L 164, 25.6.2008, p. 19–40.* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0056:EN:NOT

community itself. A Marine Board Working Group is currently being put together to develop a position paper on Marine Protected Areas (MPAs). The activities and outputs from MEECE would be very interesting for that Working Group and particularly for the strategic analysis of European policy with respect to MPAs. It was suggested that MEECE may benefit from reference to some completed position papers and provide input to current and future papers of relevance. Working Group experts are normally identified by the national Member Organisation Delegates. UK Delegates include Ed Hill of NOCS and Mike Webb of NERC. Action: Niall McDonough to send list/ copies of position papers that would be of interest to MEECE.

❖ The ESF Marine Board also produces high level papers called 'Navigating the future' – now in its third edition this paper looks at priority areas and identifies key strategic areas in Europe. The European Commission uses these in future planning, for example the earlier 'Navigating the future' papers were used in the development of FP7. Navigating future IV' is currently in the planning stages set for publication in 2011. Potentially some of outputs of MEECE could feed into this paper by providing information on the current state of play in the modelling community and how model outputs are being put to use.

❖ Plan Bleu noted that some of the main issues in the Mediterranean Action Plan include; urbanisation, tourism, agriculture (including fishing and aquaculture), environmental statement. Plan Bleu can provide some contextual information about their past and prospective regional trends if needed, to feed scenario. Could MEECE reflect those concerns and provide input such as determining the kind of future ecosystems, their abundance/vulnerability, their spatial dispersion?

Future of the UAG

It was suggested that the next meeting of the UAG should coincide with the first MEECE Science meeting to be held in Crete, 1-4 February 2010. *Action: JH and IA to consider this in the planning of the Science Meeting.* It was suggested that the group could be expanded to include additional end users such as fisheries managers.

Other advice from UAG to MEECE

High level platforms

➢ Strategic Committee on Maritime Issues, meets every 4-6 months, would it be appropriate for MEECE to try reporting directly to them?

➢ EUROCEANS 2010 conference (October, evening event for MEPs in European parliament, Ed Hill speaking). Then two days in Ostend. The meeting allows the marine science community to get together with a focus on policy. Currently identifying topics for working groups and presentations. Indicators are one of these topics. Could MEECE get involved?

➢ European maritime day – 20th May? Should be in Spain next year. It would be possible to ask for a side event.

➢ Two technical specific comments to feed to MEECE:

-   Could modellers try and use shortest time scale as possible – so that results are more easily fed into policy?
-   Scenarios discussed so far have been set mainly by IPCC SRES. However, these are currently being revised. MEECE needs to think carefully about relevance of scenarios before they are selected, or have a good reason to stick to outdated IPCC SRES.

➢ **ERG (29/10/090:** See comments above regarding MSFD CIS.

Future Strategic input to policy

> Harnessing ocean energy is a very competitive area currently undergoing rapid development in technology. Many countries are looking at quite large offshore installations which will have an inevitable impact on marine ecosystems. The onus is on marine science community to ensure this is done in the least harmful way. There is a unique opportunity to influence this process before it starts to help ensure it is sustainable. Can MEECE get involved in this?

> Although this is beyond current remit of MEECE, its set of models provides a legacy that cold be used later on to assess alternative uses of the marine environment. It should be an aspiration of MEECE to pan the way for this to happen at a later stage.

Meeting Agenda

10:00   **1. Welcome and Introduction** Manuel Barange

Introduction to the meeting, role and objectives of the UAG

10:20   **2. General Overview of MEECE** Icarus Allen

10:40   **3. Advanced Modelling (WP2)** Mike St John

11:00   **4. Ecosystem response to climate change and acidification (WP3)** Icarus Allen (on behalf of X. Irigoien)

11:20   **5. Ecosystem response to direct anthropogenic drivers (WP4)** Marco Zavatarelli

11:40   **6. Implications for resource management (WP5)** GerJan Piet

12:00   **7. Knowledge transfer and outreach (WP6)** Manuel Barange

12:15   Discussion and questions

12:30   Lunch

Parallel sessions:

13:30   **8. Closed session of UAG**

Short presentations from UAG members highlighting their organizations main activities and interest in the MEECE project would be most welcome.

13:30   **9. Management meeting for WP leaders**

16:00   Meeting close