Webinaire IEA-OES

Restitution des activités menées en France

Jean-François Filipot (France Energies Marines)
Christophe Maisondieu (Ifremer)
Nolwenn Quillien

Agenda

- Activités de l'IEA-OES et contexte international - Jean-François Filipot, France Energies Marines
- Actions menées dans le cadre de l'*OES Environmental* - Nolwenn Quillien, France Energies Marines
- Contexte français et actions futures de l'IEA-OES - Christophe Maisondieu, Ifremer
- Interactions avec l'audience

Agence Internationale de l'Energie

Rôle :

L'IEA est une organisation intergouvernementale basée à Paris qui fournit des recommandations politiques, des analyses et des données sur le secteur mondial de l'énergie. Elle compte 31 pays membres et 13 pays associés, et vise à soutenir la sécurité énergétique, la transition vers une énergie propre.

Secteurs couverts :

- Pétrole
- Energies Renouvelables
- Carburants à faible émission (H2, bio-carburants, …)
- Transports
- Industrie
- Bâtiment
- Stockage
- ….

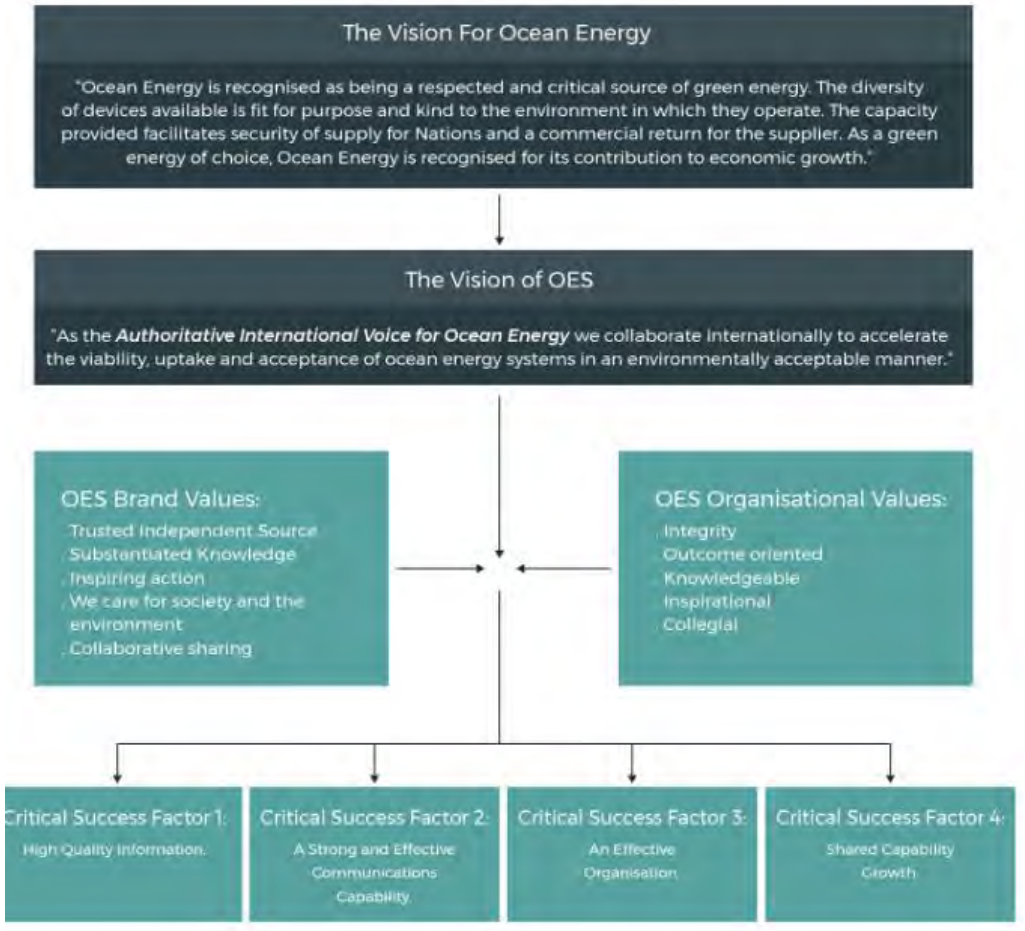
Thématiques traitées :

- Changement climatique
- Sécurité énergétique
- Intelligence artificielle
- …

IEA – Ocean Energy Systems (OES)

Technologies concernées :
- Hydroliennes
- Houlomoteurs
- Systèmes marémoteurs
- Systèmes de conversion de l'énergie thermique des mers
- Gradient de salinité

Objectifs :
« L'IEA-OES met en relation les organisations et les individus travaillant dans le secteur de l'énergie océanique afin d'accélérer la viabilité, et l'acceptation des systèmes d'énergie océanique d'une manière écologiquement acceptable »



IEA – Ocean Energy Systems

Pilotes de l'IEA OES

CHAIR

Dr. Ir. Matthijs SOEDE

EC, DG Research & Innovation

With a PhD in Chemical Engineering from Delft University of Technology, started his career at the Netherlands' Ministry of Economic Affairs focusing on international research cooperation. In 2008, he joined the European Commission's DG Research and Innovation, initially dealing with Industrial Technologies, then transitioning to Clean Energy, specifically offshore renewables. He is member of the IEA Renewable Energy Working Party, and since 2019, vice-chair of the IEA-OES. In 2021, he joined the MI Clean Hydrogen Mission as a co-lead and was appointed Mission Director.

VICE-CHAIR

Dr. Purnima Jalihal

National Institute of Ocean Technology (NIOT)

Dr. Purnima Jalihal is a senior scientist who heads the Energy and Fresh Water group in the National Institute of Ocean Technology, India. She has led device developments for harnessing ocean energy from waves, marine currents and ocean thermal gradient (OTEC) and has played a major role in developing the ocean thermal desalination technology. She has a PhD in Civil Engineering from Duke University, USA. She was awarded the Vishwakarma Medal in 2006 by the Indian National Science Academy and the Uehara Prize for 2019 by the International OTEC community for Contribution to the development of OTEC. She is on many committees of Indian Government organizations, related to water and renewable energy and is the EU led Clean Energy Mission Innovation Champion for India, 2020.

VICE-CHAIR

Mr. Tim Ramsey

USA Department of Energy

Tim Ramsey has been with the U.S. Department of Energy (DOE) since 2005 and currently serves as the Program Manager for the Water Power Technologies Office's Marine Energy Program. In this role, he leads the Program's efforts to conduct RDD&D specific to Marine Energy applications, supporting the development of new, cutting-edge technologies and the establishment of a strong and competitive Marine Energy industry in the United States. The Program provides substantial financial support to researchers at a wide range of different organizations to focus on solutions to high priority challenges broadly applicable across the industry. Prior to joining the DOE Federal Team, Tim worked for Navarro Research and Engineering, a multi-program support service contractor for the Department of Energy. Tim holds a Bachelor of Science in Chemical Engineering from Ohio University.

VICE-CHAIR

Professor Christophe Gaudin

University of Western Australia

Christophe is a professor of offshore geotechnical engineering at the University of Western Australia (UWA), Perth with over 20 years' experience in research and consulting. Over the last 7 years, his focus has been on supporting and developing marine renewable energy using multidisciplinary approaches. He is the founding Director of Marine Energy Research Australia, a research centre that supports industry, scientists and government in developing innovative offshore renewable energy technologies and in defining the future energy landscape in Australia and worldwide. Christophe is currently the Director of the UWA Oceans Institute, a multidisciplinary research centre with over 250 members and world leading expertise in marine biology, ocean science and engineering, maritime archaeology, maritime laws and oceans socio-economics.

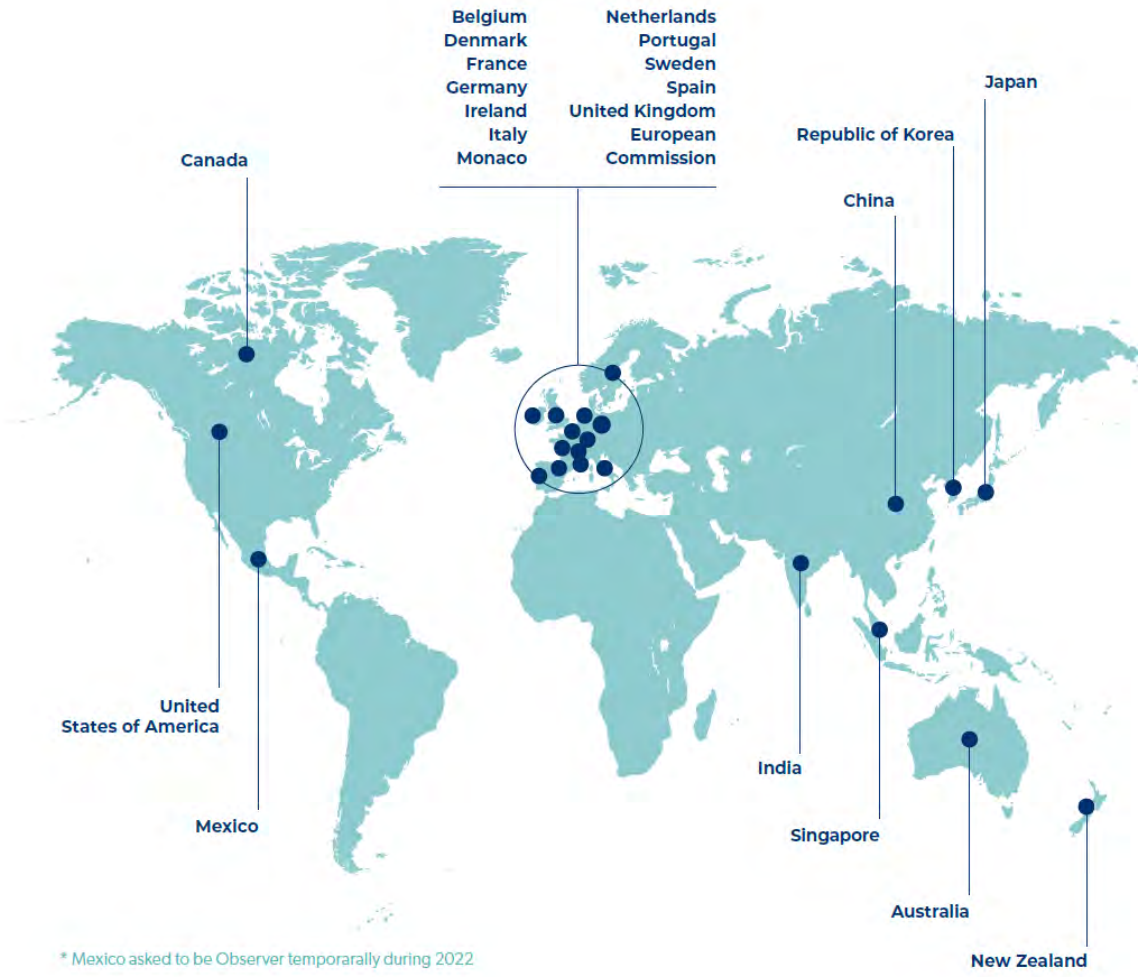
SECRETARY

Dr. Ana Brito e Melo

WavEC

Ana is a Civil Engineer with a PhD in Mechanical Engineering, and more than 25 years' experience in the field of marine renewable energies, currently Chief Operating Officer at WavEC. She developed significant research expertise in the wave energy field during her 10-year tenure with the wave energy team at Instituto Superior Técnico, University of Lisbon. Ana joined WavEC in 2003 and has been responsible for securing and executing services for major energy companies, developers, governments and public bodies. In addition, since 2002, she has held the role of Executive Secretary of the IEA-OES.

IEA OES : pays membres



Qui peut participer ?

« Toute organisation publique ou privée de pays membres ou non membres de l'OCDE, d'organisations internationales ou d'organisations non gouvernementales peut y participer.

L'adhésion à l'OES se fait sur invitation du Comité exécutif vers les autorités gouvernementales (ADEME en France) du pays concerné.

Si votre organisation souhaite participer à cette initiative, la première étape consiste à contacter le président ou le secrétaire exécutif de l'IEA OES. »

IEA OES : illustration des productions

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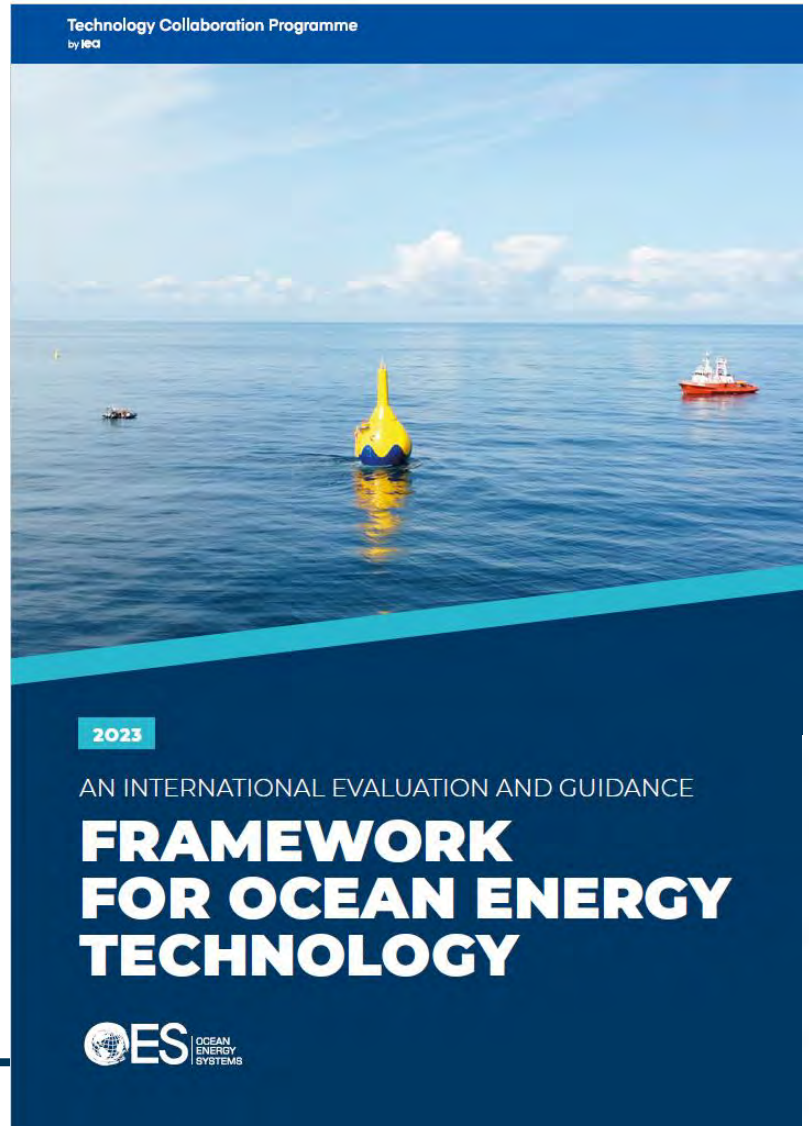
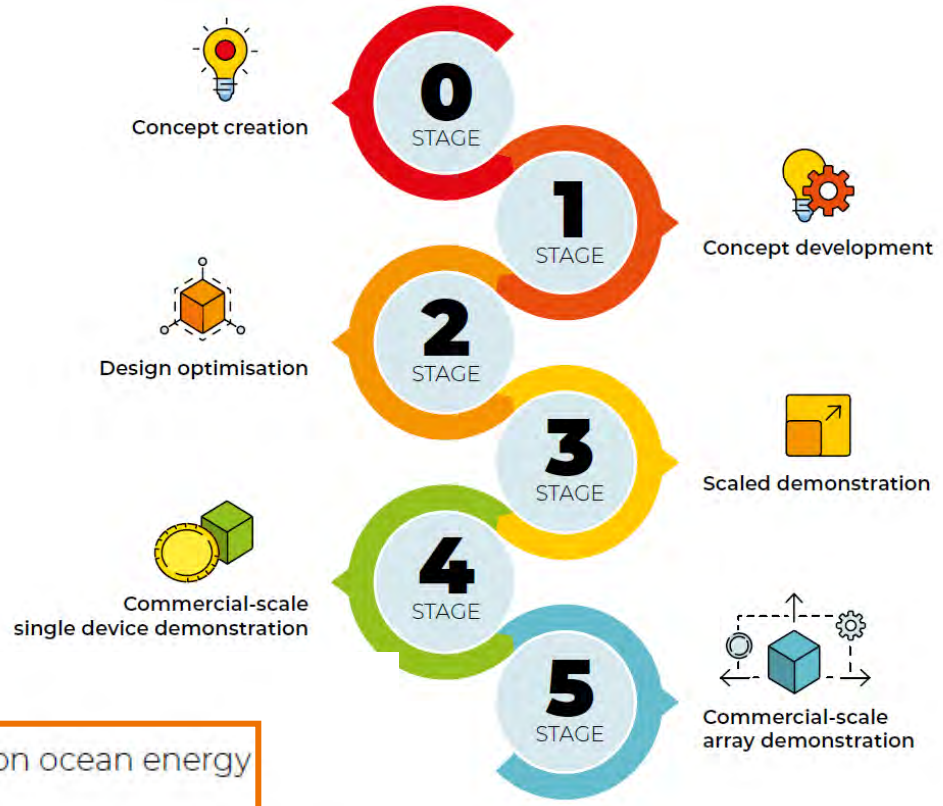


The framework breaks the development process into six stages, from concept creation to commercialisation:



The **objectives of Task 12** are:

- Build international consensus on ocean energy technology evaluation
- Guide appropriate and robust activities throughout the technology development process
- Share knowledge and promote collaboration
- Support decision making associated with technology evaluation and funding allocation

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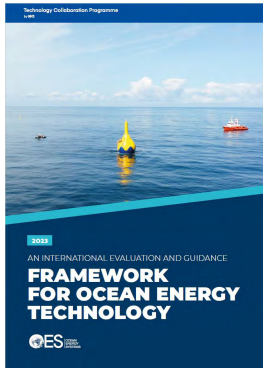

Evaluation Area	Definition
Power Capture	Power Capture is the process of extracting energy from the natural resource by the interaction with a device and making it available as an input to a power take-off (PTO).
Power Conversion	Power Conversion represents the second step in the power conversion chain, whereby the mechanical power captured by the device is converted to electricity.
Controllability	Controllability is defined as the ability for control systems to be implemented to a subsystem or device and incorporates evaluation of the benefits control can deliver and the reliance of a subsystem or device on it.
Reliability	Reliability is defined as the "probability that an item can perform a necessary function under given conditions for a given time interval".
Survivability	Survivability is a measure of the ability of a subsystem or device to experience an event ('Survival Event') outside the expected design conditions, and not sustain damage or loss of functionality beyond an acceptable level, allowing a return to an acceptable level of operation after the event have passed.
Maintainability	Maintainability is defined as the "ability to be retained in, or restored to a state to perform as required, under given conditions of use and maintenance".
Installability	Installability is defined as is the ease with which a component, subsystem or device can be prepared, deployed at the operational open-water site and commissioned, resulting in a condition of operational readiness. Installability also includes the ease with which the component, subsystem or device can be recovered.
Manufacturability	Manufacturability is defined as the ability for the technology to be manufactured quickly, cheaply and with minimum waste, and therefore its compatibility with the supply chain's capability, readiness and maturity.
Affordability	Evaluation of Affordability relates to the cost of electricity generated from the wave or tidal stream resource.
Environmental Acceptability	Environmental acceptability can be defined as the ability to make effective use of natural resources, reduce the risks and harms to the operating environment, comply with the relevant regulations, and generate induced benefits whenever possible.

IEA OES : illustration des productions

Stage 3
Scaled demonstration

- Extensive analysis of site conditions to determine what events are likely or unlikely to occur, including combinations of environmental conditions (wind, wave, current etc.)
- Analysis of seasonal variability and extreme conditions at site
- Review of Design Condition Boundary based on knowledge gained to date
- Development of an FMEA for the technology's commercial-scale system-breakdown, informed by testing and analysis experience
- Development of process for reinstatement of all normal operations following survival event
- Adaptation of installation plan, O&M model and FMEA to account for protective action
- Demonstration and evaluation of the effectiveness and reliability of survival strategies, including failsafe modes and algorithms to control protective action(s) during testing at sufficient scale to represent commercial-scale device (see section 3.1.4.1)
- Further development of increased complexity numerical model to calculate commercial-scale loads and safety factors in survival events
- Dedicated tank or rig testing to examine component, subsystem or device behaviour and loading during survival events, expanding the range of conditions used for the testing
- Validation of numerical model using data available from physical testing and any other appropriate available data
- Calculation of impact on LCOE of damage or loss of functionality and implementation of protective action (cost of required systems and reduced availability)

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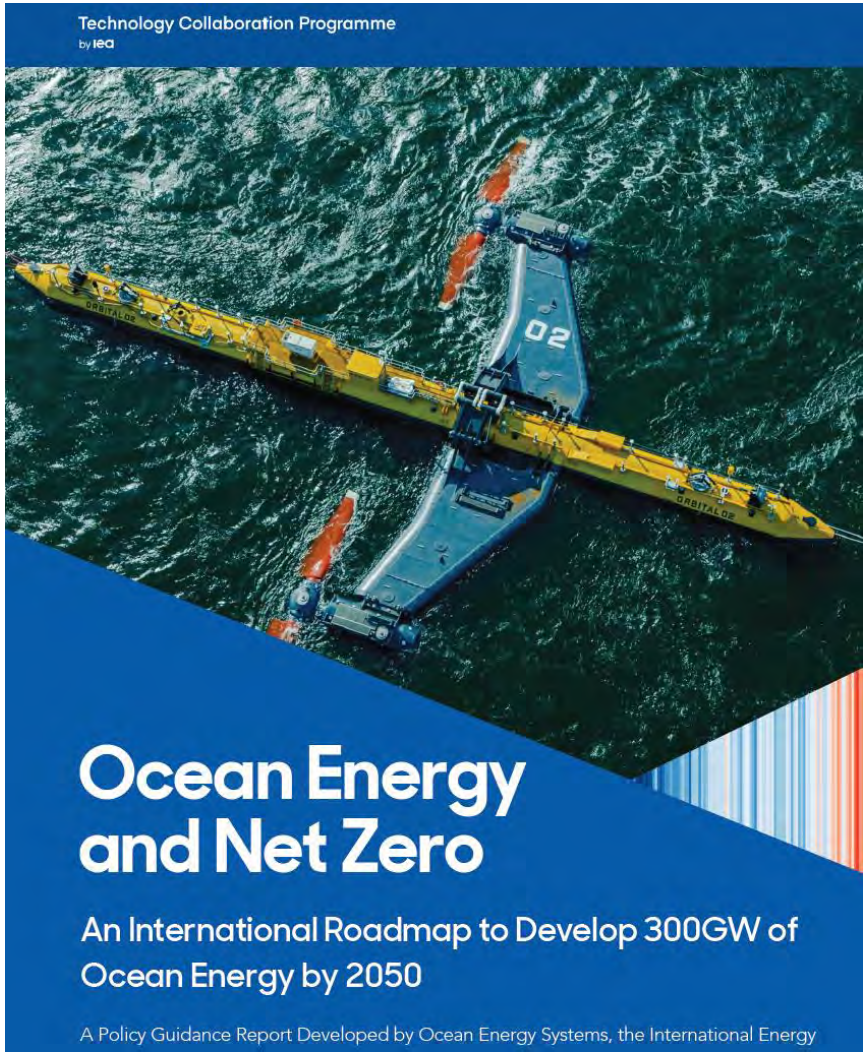
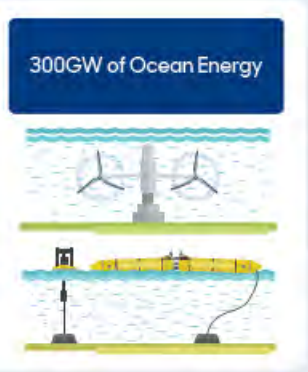


IEA-OES Roadmap Key Results

By 2050, the OES Roadmap targets have outlined that there is the potential for wave and tidal stream technologies (referred to collectively as ocean energy technologies) to contribute **300GW of renewable energy generation capacity** to the global Net Zero transition. This installed capacity of ocean energy also has the capability to **create 680,000 jobs, generate $340 billion in gross value added (GVA), and prevent over 500 million tonnes of carbon emissions.**



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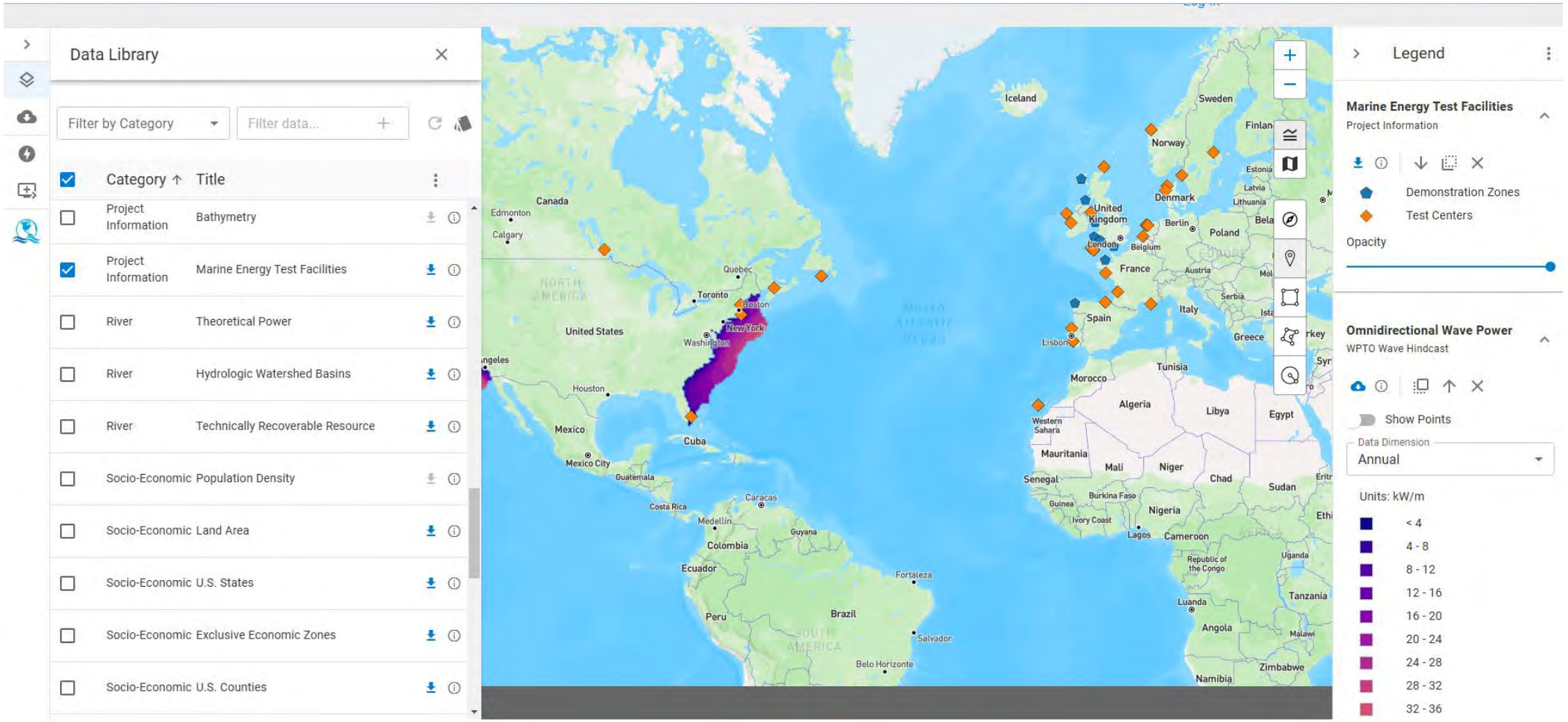


• Conclusion

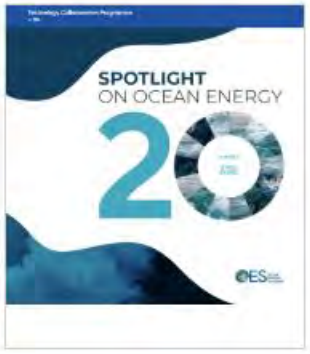
IEA est un outil puissant pour :

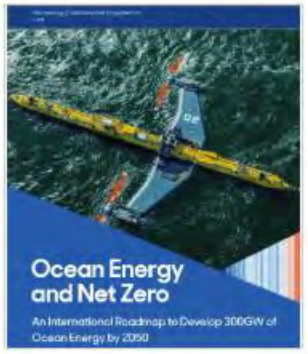
- Accélérer les collaborations internationales sur le volet R&D

- Contribuer à crédibiliser les énergies océaniques et leur potentiel à moyen et long terme

- Influer au niveau politique national, international et Européen

→ Grâce à la production de livrables de grande qualité et à l'organisation d'activités de dissémination bien ciblées.





Remerciements

France Energies Marines est soutenu par l'ADEME pour sa contribution à l'IEA OES

ADEME

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