

Final report

1. Project details

Project title	Assistance in relation to the Danish membership of IEA-OES 2020
File no.	64019-0594
Name of the funding scheme	EUDP
Project managing company / institution	Ramboll A/S
CVR number (central business register)	35128417
Project partners	
Submission date	11 February 2021

2. Summary

English:

This project involves assistance in connection with Denmark's membership of the IEA Technology Collaboration Program for Ocean Energy Systems (OES) in 2020. OES was founded in 2001 by Denmark, the UK and Portugal and today 25 countries are members of OES. Kim Nielsen, Ramboll was initially appointed as Danish Alternate to the EUDP relating to Denmark's membership of the IEA-OES when the OES was founded.

The assistance on a yearly basis involves participation, preparation, and presentation of Danish interests in relation to Wave Energy Conversion at the two annual meetings of the ExCo. In 2020 the EXCO meetings was held as webinars over 4 days due to COVID 19. The ExCo Meeting 38 in May was originally planned to be held in Washington USA and the ExCo Meeting 39 in November in Tasmanian Australia.

Further the project included dissemination activity, in connection with Ocean Energy, participation in the creation of new activities such as metrics for technology assessment. Dissemination of Danish wave energy activities at the ExCo meetings and synthesis to OES annual report. Ramboll is coordinating the international activity on WEC Numerical Modelling and Verification. In 2018-19 Ramboll contributed to the activity "Cost of Ocean Energy: Analysis and forecasts of the cost of energy of ocean energy converters" a task that is expected to be relevant also in the future.

The year 2020 was the last of five years with Henry Jeffrey as Chairman from Edinburgh University. Henry is followed by Yann-Hervé De Roeck, Directeur Général France Energies Marines.

Dansk:

Dette projekt omfatter assistance i 2020 i forbindelse med Danmarks medlemskab af det Internationale Energi Agentur (IEA) samarbejde på energiområdet under det såkaldte "Technology Collaboration Program" (TPC) for området Ocean Energy Systems (OES). OES blev grundlagt i 2001 af Danmark, England og Portugal og i dag er der 25 lande som er medlemmer af OES. Kim Nielsen, Rambøll er siden starten i 2001 dansk suppleant til EUDP i forbindelse med Danmarks medlemskab af IEA-OES,.

I lighed med tidligere år omfatter dette projekt deltagelse, forberedelse og præsentation af danske interesser på de to årlige ExCo møder. I 2020 blev møderne afholdt som 4 dages Webinars p.gr.a. COVID-19. ExCo møde 38 skulle have været afholdt i maj i Washington USA og ExCo Møde 39 i November i Tasmanian Australia.

Projektet omfatter desuden formidlingsaktiviteter i forbindelse med Havenergi, deltagelse i og medvirken til at skabe af nye samarbejdsaktiviteter om relevante opgaver. Formidling af danske bølgeenergi aktiviteter på udvalgte konferencer og en sammenfatning til OES-årsrapport. Rambøll er koordinator af opgaven omkring numeriske modeller for bølgekraft systemer og bidrager til LCOE aktiviteten "Cost of Ocean Energy: analyse og prognoser for omkostningerne ved energi til omdannede af havenergi".

År 2020 var det sidste af fem år med Henry Jeffrey fra Edinburgh Universitet som Formand. Henry efterfølges af Yann-Hervé De Roeck fra Frankrig, direktør i France Energies Marines.

3. Project objectives

The objective of this project is to assist EUDP concerning the Danish participation and part in the international Technology Collaboration Programme on Ocean Energy Systems (OES) under IEA. The objective of OES is to become the authoritative international voice on ocean energy, to collaborate internationally to accelerate the viability, uptake, and acceptance of ocean energy systems in an environmentally acceptable manner. Ocean Energy Systems OES concerns technologies to convert energy from the Ocean to electricity and other products from the resources in the Ocean including Wave, Tidal, OTEC and Salinity gradient. These resources are described on the OES Webpage:

<https://www.ocean-energy-systems.org/ocean-energy/what-is-ocean-energy/>

4. Project implementation

Denmark is one of the three founding members to the IEA - OES in 2001. The OES-IEA is steadily compiling results and progress in both technology development, international sharing of results as well as increasing the number of member countries which today counts 25 countries in 2020. The perspective of a closer co-operation and exchange of information between international partners, development of an international development and assessment methodology including test centres and test sites are means to help accelerate the technology development and transfer of real sea experience. The international co-operation and exchange involve little risk and might create potential benefits in terms of defining markets and collaboration projects.

5. Project results

The information and insight from ongoing Danish activities on wave energy in 2020 was and shared with OES. This included information on active Danish Wave Energy Developers members of Danish Partnership for Wave Energy. In connection with the two EXCO webinar meetings in 2020 presentations and a short summary of activities were prepared and presented. Further this information is disseminated at relevant events and meetings and at the end of the year summarised for the OES annual report. In this way the Danish Wave Energy R&D efforts has been disseminated worldwide to the 25 participating countries partners of OES – and via the OES home page.

In 2020 the EXCO meetings, was replaced by WEBINARS. As many other COVID 19 also affected the TCP OES in 2020 in terms of travel restrictions affecting the dissemination of results at conferences and Exco meetings. The outcome of the substitute webinar meetings was positive in terms of the travel time saved – but the outcome and insight affected in terms of the much more limited amount of exchange between the webinar participants compared to the normal face to face meetings which typically include extended discussion in the breaks after each presentation, technical excursions and evening arrangements including dinner.

6. Utilisation of project results

For Denmark the effort on Wave Energy Conversion is the technology of most interest. Waves are created by the wind when blowing over the surface of the ocean. West-facing coasts of continents facing large Oceans can have wave energy resources, with wave power flux between 15 - 75 KW/m. The worldwide theoretical potential of wave power has been calculated as 3000GW or about 26,000 TWh/year.

Wave energy converters (WEC's) capture energy from ocean waves to produce electricity. Wave energy converters are intended to be modular and deployed in multi-unit arrays. Now there is a little design consensus for wave energy devices. Worldwide different concepts are being tested at sea to identify the design solutions best able to operate and survive extreme wave conditions during storms and at the same time provide cost effective electricity most likely combined with offshore wind. The international co-operation OES under the IEA aims to share and help promote and disseminate the results of these experiments.

In addition Ramboll is coordinating the OES Task 10 concerning the Numerical Modelling of Wave Energy Converters. Danish participation of DTU, AAU and FPP has been funded separately by EUDP 64017-05197 co-ordinated by Ramboll.

7. Project conclusion and perspective

Nations across the world recognise the potential benefits of ocean renewable energy, pursuing the development of new technologies and projects to take advantage of their natural resources. Wave and tidal stream projects, and the associated technology, have generated interest from governments, investors, and developers, all keen to help build the sector. The successful transition from nascent technology to commercial proposition relies on the most efficient use of available resources, and world class R&D.

<https://www.ocean-energy-systems.org/newsletter.php?nID=40>

8. Appendices

Link to relevant

<https://www.ocean-energy-systems.org/>

<https://www.ocean-energy-systems.org/about-us/members/contracting-parties/>