

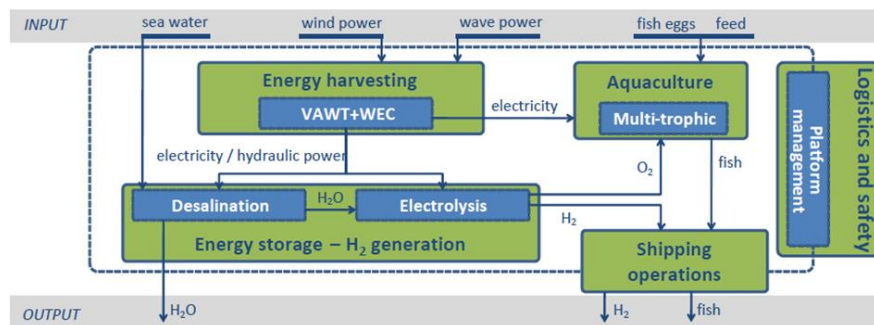
Aquaculture + wave and wind Combination for Atlantic Basin Justification Report

1. **Combination:** Aquaculture + Wave and Wind
2. **Basin selected:** Atlantic: Location.
3. **Concept:** Large scale. Example: The currently concept here is H2OCEAN. The project was supported by the EU through the FP7 Ocean of Tomorrow, “Multi-use offshore platforms” theme. The unique feature of the H2OCEAN concept, besides the integration of different activities into a shared multi-use platform, lies in the novel approach for the transmission of offshore-generated renewable electrical energy through hydrogen
4. **Basin suitability:** Atlantic is suitable due to
5. **MUS or MPP:** This concept is a Multi-Purpose Platform

6.1 Technical (Rating 5)-

Example: The currently concept here is H2OCEAN. The project was supported by the EU through the FP7 Ocean of Tomorrow, “Multi-use offshore platforms” theme. The unique feature of the H2OCEAN concept, besides the integration of different activities into a shared multi-use platform, lies in the novel approach for the transmission of offshore-generated renewable electrical energy through hydrogen

The Wind Turbine is a VAWT vertical axis turbine which is incorporated with a WEC. The aquaculture is a multi-trophic system. This is displayed in the Figure below.



This is will be at the scale of autonomous power. Some partners have worked on this concept formulation, this would make them an engaged concept.

6.2 Socio-economic (Rating 5)

The benefits of the H2Ocean project are determined by the deliverable production volumes of hydrogen, oxygen, drinkable water and the aquaculture products and the adopted market prices for all these products, shown above. The merge of this data are shown in the following benefit calculation which is an estimation based on constant prices over the duration period of the H2Ocean project of 25 years

6.3 Environmental (Rating 4)

This concept has a probable medium level of positive impact on the environment.

- The impact of the installation of the conceptual design will be highly significant during O&M, huge amount of vessels

6.4 Financial (rating 5)

Financial Rating:

- total investment costs are 12.2 billion €
- operational costs 11.4 billion €

Expected benefits vary from 2.0 billion € to -21.6 billion € negative

The total benefits (revenues) of all H2Ocean activities can be estimated with 2.0 billion € (based on constant prices) over the duration period of the H2Ocean project of 25 years.

Vertical Axis Wind Turbine (VAWT) and Wave Energy Converter (WEC, P80 by FPP): combining the two systems will lower the costs with respect to two separate systems (Lower CAPEX/MW, lower OPEX)

6.5 Short or Long Term Commercial Viability (Rating 2) This concept is 5- 10 years away from commercial viability.

6.6 Overall rating 21.

Comments

7. Key threats/challenges to be solved (7)

- Integrate the Power Take Off (PTO) systems of WEC and VAWT or keep them separated? Which PTO?
- Costs for such an installation are astronomical

In a set of alternative scenarios of hydrogen as well as oxygen productions taking place completely not fully offshore may lead to more economic feasible results as currently expected.

8. Costumer/societal problem that can be solved by combining the sector

- Alternative sources for food, energy and water are desirable.
- Climate Change needs radical solutions

9. Suggested companies

9.1 Aquaculture:

-

9.2 Wave

-

9.3 Wind

-

9.4 History status of above listed companies in combination

- + = both at status