

National Activities – Norway

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Ocean Energy Policy

Ocean Energy is included in general renewable energy policies and programmes

High political interest in floating offshore wind energy

Energy bill and Climate bill postponed

- No clear policy or goals

EU Renewable Energy Directive

- Norway intends to join and is presently negotiating terms
- ~60% renewable share of energy usage, target: 75%
- Yearly reports on status and measures to reach target

The National Energy Agency, ENOVA

- Funds for support of new renewable energy production (mainly wind power and bio energy) and energy efficiency,
- Investment support

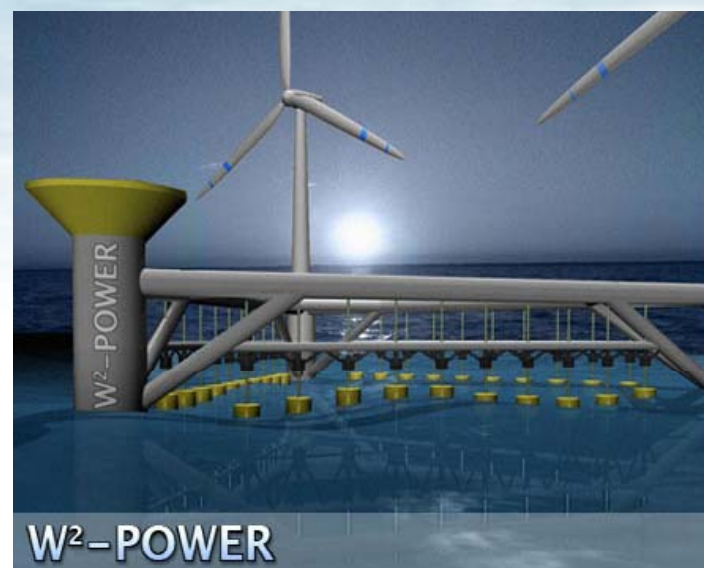
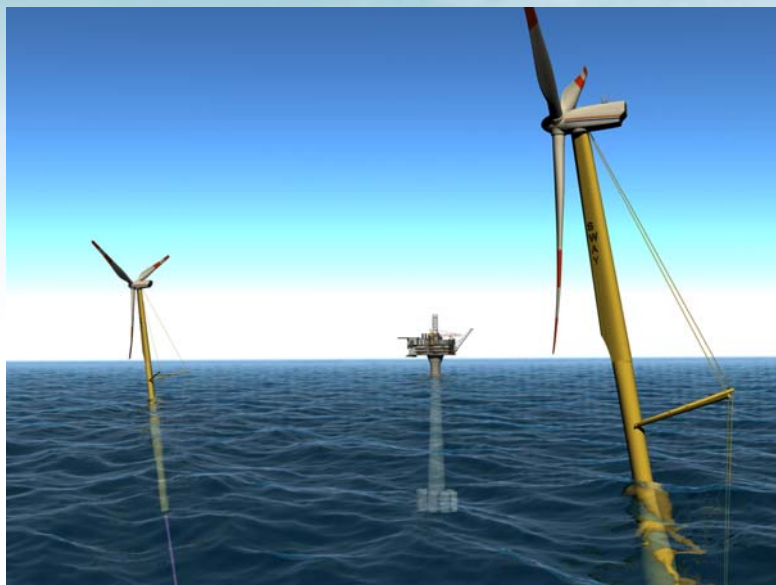
Ocean Energy Policy

Green certificates with Sweden in 2012

- Technology neutral
- Will probably favour bio, wind and small hydro

Offshore Renewable Energy Act passed in parliament in March.

- Judicial platform for exploitation of offshore wind, wave and tidal resources



Research and Development

Significant increase in R&DD funding for renewable energy the last years

- Research Council of Norway
 - RENERGI Programme 12,5 Meuro in 2007 to 62,5 Meuro in 2010
- Enova Renewable Marine Energy prototype programme 15 Meuro
- Innovation Norway

Centres for Environment-friendly Energy Research (FME)

- 2 centres on offshore wind

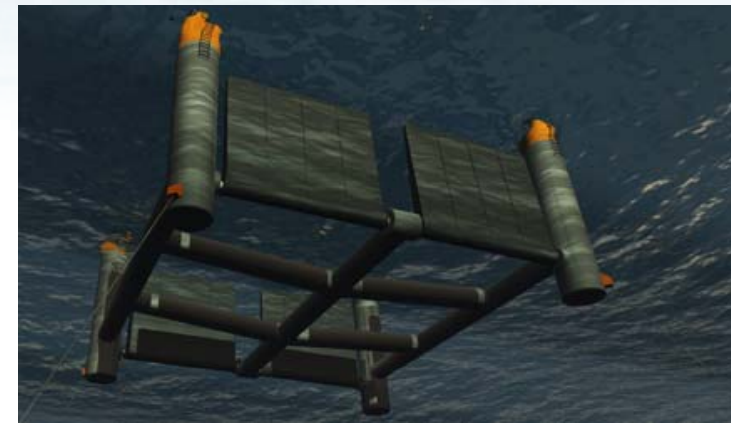
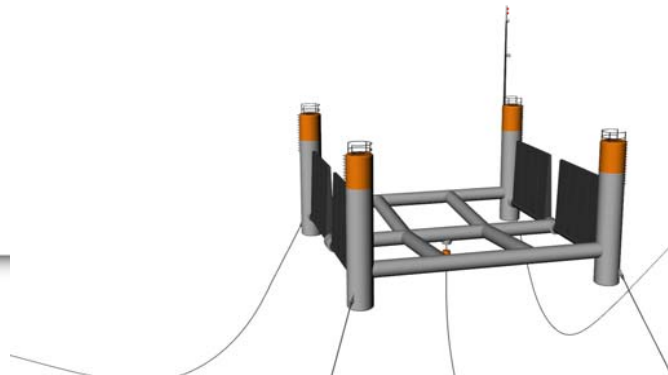


Hydra Tidal

- Analysis of forces on a floating tidal energy unit
- Turbine blades of laminated wood

Langlee Wave Power

- Exploitation of longitudinal wave energy



Technology Demonstration

Hammerfest Strøm – Tidal device

First prototype installed in 2003, 300 MW

- 4 years of successful operation (designed for 3 years, but operated for 4 years without major overhaul)

Upgraded prototype installed summer 2009 (same site)

- Increased energy output and reliability



Technology Demonstration

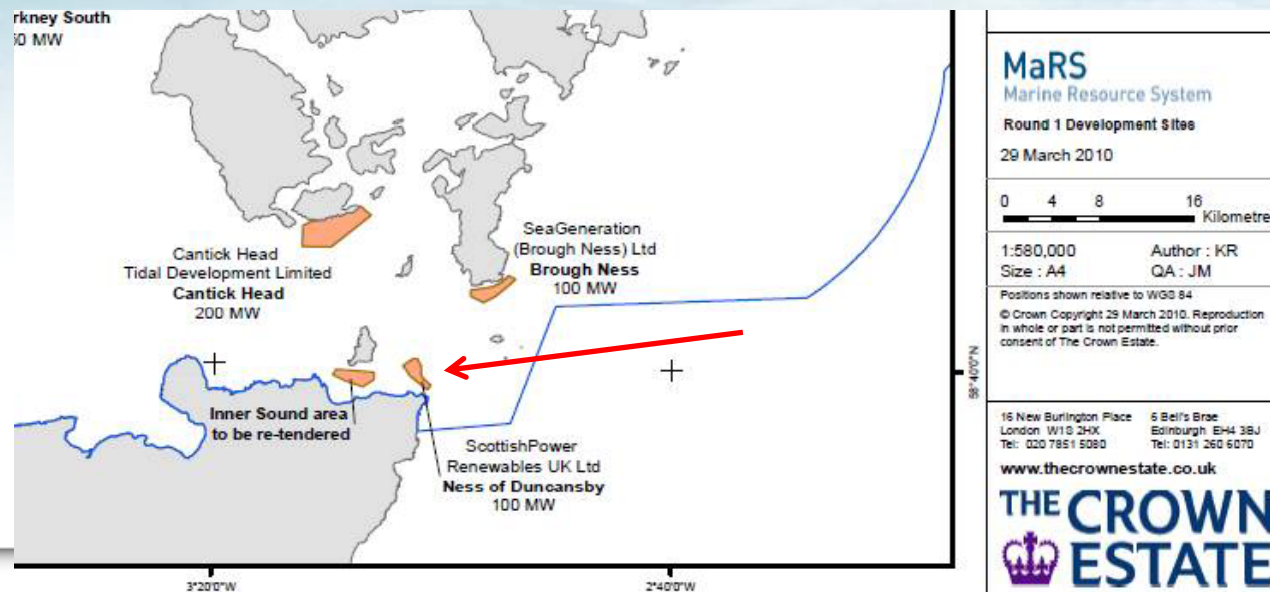
Hammerfest Strøm – Tidal device

2007 established a joint company with Scottish Power , Hammerfest Strøm UK

2010 Carbon Trust funding for 1 MW prototype at EMEC (£3.9 million)

Future plans:

- 10 MW array at Islay
- Round 1 Crown Estate, Ness of Duncansby in Pentland Firth

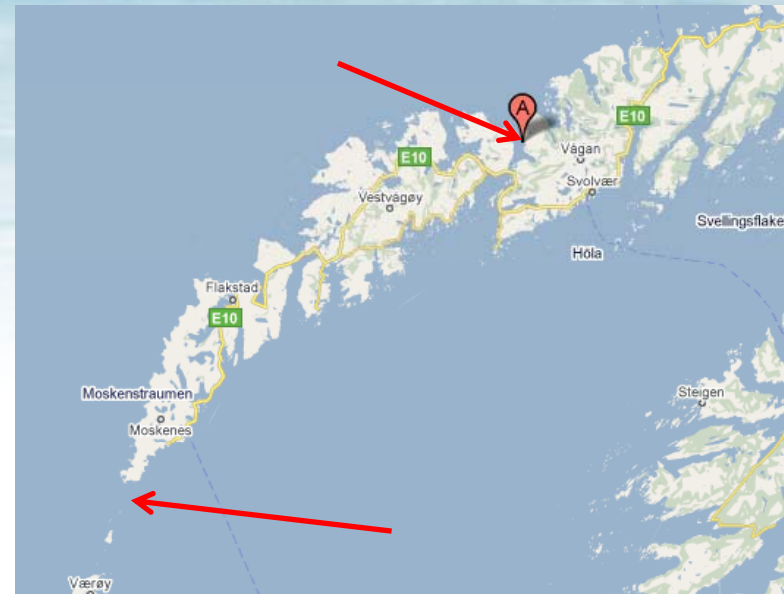
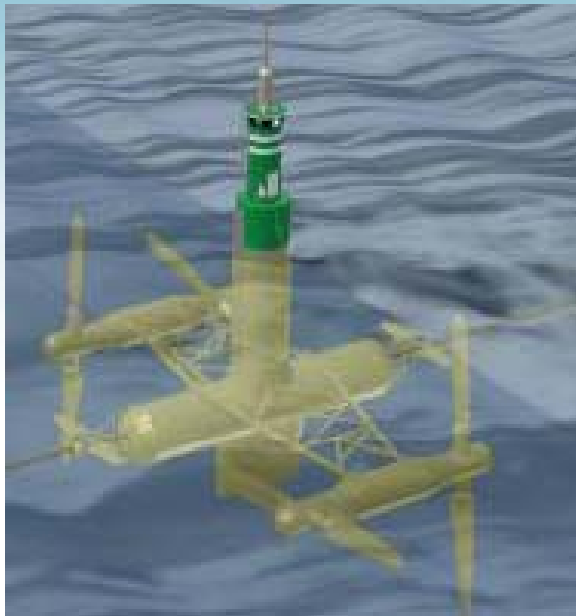


Technology Demonstration

Hydra Tidal (Morild)

Floating device, contra rotating turbine

Prototype under construction,
installation this summer



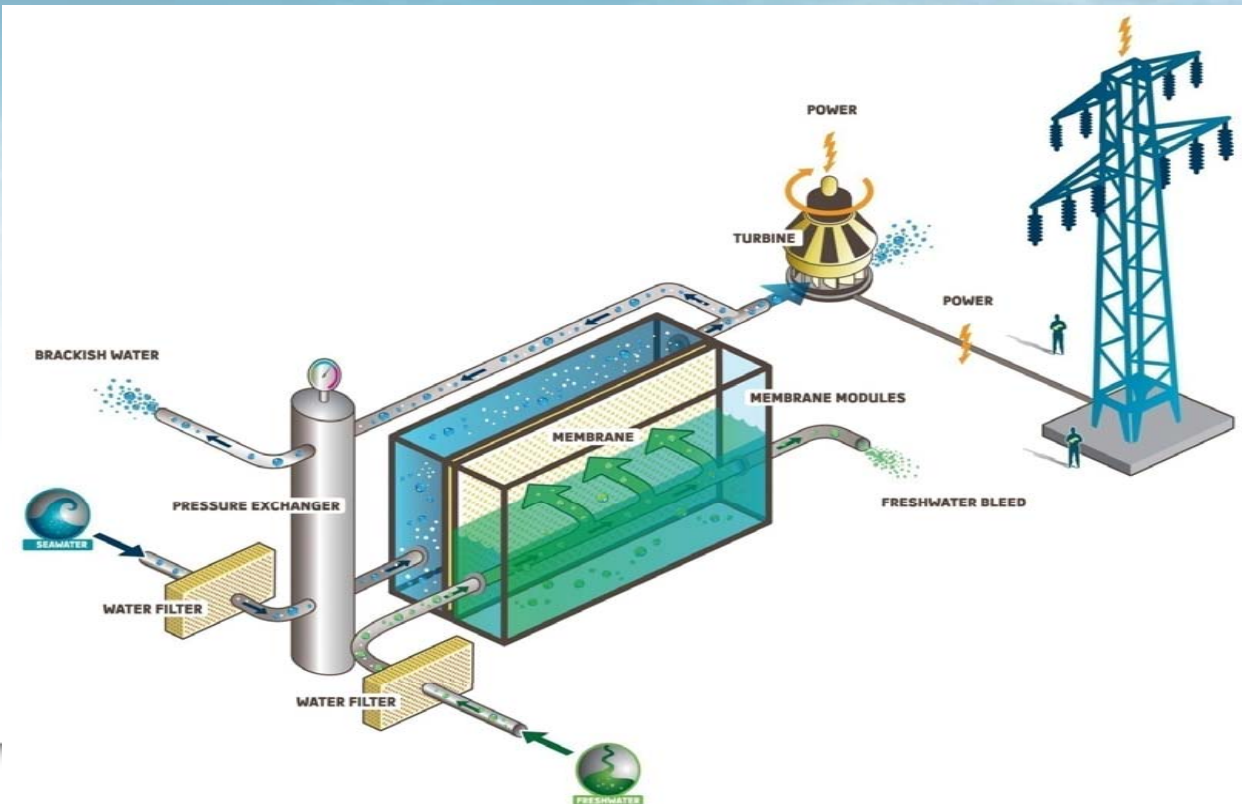
Technology Demonstration

Statkraft Osmotic Power

- Utilising the entropy of mixing fresh water and sea water
- Membrane development is the key factor

Prototype installed in 2009

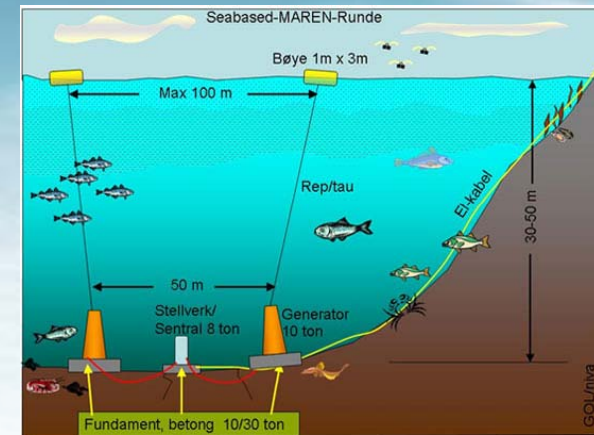
- Proof of concept



Technology Demonstration

Vattenfall/Tussa Kraft

- Seabased MAREN prototype at Runde



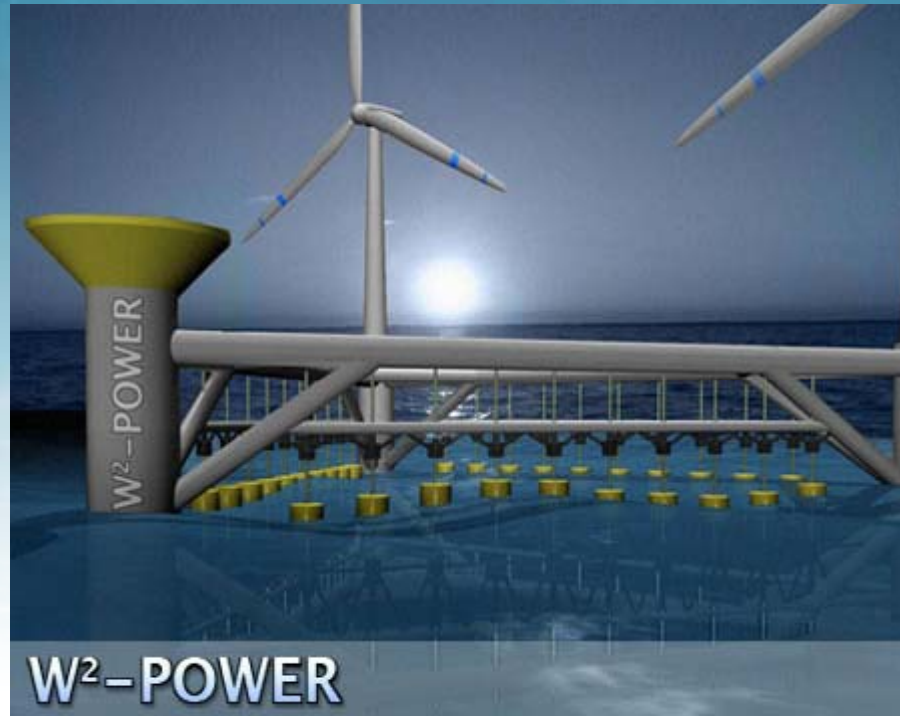
Fred Olsen

- BOLT point absorber device



Norway Country report

Thank you for your attention!



Ocean Energy Policy

Information on national programmes launched for ocean energy

Public funding/governmental support: relevant legislation and strategies

Other important supportive activities for the promotion and development of ocean energy

Grønne sertifikater, innføres 2012, Overgangsordninger diskuteres

Havenergilov vedtatt 11.mars, juridisk grunnlag for utvikling av marin fornybar energi på norsk sokkel, første skritt på veien for utnyttelse av havvind, bølger og tidevann

Tilslutning til EU fornybar direktiv

Noe om potensialer?

Research and Development

Grant support for R&D activities in ocean energy

Significant increase in R&DD funding for renewable energy the last years

RENERGI

Enova” Renewable Marine Energy”

Innovasjon Norge

Relevant R&D projects

2 FME’er på offshore vind

Statkrafts havenergi program

Hydra Tidal

 Prototype støttet av Enova

 Turbinblader i tre (wood) (Renergi)

 Analyse av eksterne miljølaster fra havet (Renergi)

Langlee Wave Power (Renergi)

Pelagic Power

Wave power

ECO seahorse