Our history

Rosenberg 2020:
Workers        480+
Engineers      350+
Management/adm. 170+
Total Employees 1000+
Doble capacity after acquisition of Jacobs ECR

Jacobs ECR

US$3.4bn
FY18 revenue

US$286m
FY18 EBITDA

30,900
Employees

27
Countries

112 offices
42 countries
25,700 people
Our advantages:

- A complete offering for Engineering, Fabrication and Offshore support in one location
- Engineering and Construction collaboration - better solutions and higher efficiency
- Large capacity facilities and location for efficient access to resources, partners and suppliers
- Recruiting and developing people for the future needs of our industry
- Gateway to global Worleys Oil & Gas expertise and capacity
## Activity in many segments

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Flexifloat Concept

MEDIAN LCOE SCENARIO

250  LCOE ($/MWh) in real 2014 US dollars

200  LCOE ($/MWh) in real 2014 Euros

150  

100  

50   

0    

Lines/markers indicate the median expert response for the median LCOE scenario. Shaded areas show the 1st-3rd quartiles of expert responses.

Features
- Less steel
- Less mooring
- One grid connection
- Excellent stability
- Extended height
- Area efficient
- Less heavy lift
- Easy access – heli
- Less LCoE

Source: Berkeley Lab®

Note: When this system is expanded in plane dir. and in the dir. perpendicular to view plane the total system become stiff towards rotation.

Heave compensators / dampers

Basic working principle
Flexifloat – concept update

- We consider now to add on catching energy from waves:
  - Hydraulic cylinder catch energy from waves and generates power through a Hydraulic generator.
  - We have calculated that the concept may generate 30 MW energy from waves. Wind energy may generate 42 MW from 9 turbines. Total installed capacity will be 72 MW.
  - LCoE is calculated to 46 Euro/MW: We consider that the update may reduce the LCoE by 20 %.
- The Flexijoint design:
Flexifloat Concept

Link to animation: https://youtu.be/84sTc3robe8
Flexifloat – process to proof of concept

- Financed through governmental fundings approx. 50 %
- The companies Rosenberg og Flexible Floating System are financing the rest.
- FORCE Technology in Copenhagen is selected as R&D partner/ Laboratory (ocean basin and wind tunnel)
- DNV GL is selected as advisor and 3. party verification partner.
- UiS participates in calculations, numerical analysis and simulations through an industrial PhD project.
  - Filippo Malaguti is employed at Rosenberg as PhD. 27 year old Italian.
  - Professor Muk Chen Ong is Filippo’s advisor.
**Flexifloat - partners**

- Aarbakke Innovation (flexijoint)
- Trelleborg (flexijoint)
- Øglænd System (Cabeltrays, Cabelsolutions)
- ABB (Electrification)
- Nexans (Cable to shore)
- GMC (Inshore assembly and mooring inshore/offshore)
- Brimer (Compositt/Glassfiber)
- Tronds Marine (Former Eide Marine - Marine operations – lifting)
- FRAMO (Hydraulic – Wave energy)
- NES (Norwegian Energy Solutions)
- Norwegian Offshore Wind Cluster.
Flexifloat – planned technology qualification process:

- **Hydrodynamic analysis:**
  - Result from simulations by July 2020 (DNV GL + Rosenberg/UiS)

- **Design/ engineering:**
  - Flexijoint. Ongoing. Finished by 2020
  - Bridges and columns. Ongoing. Finished by 2020
  - Wave energy/ hydraulic system. Started.
  - Mooring. Ongoing. Finished by 2020

- **Laboratory test ocean basin – scale 1:50. Planned autumn 2020.**

- **Construction method. Ongoing. Finished by 2020**

- **Demo concept 2021. Scaled down 1:2.**

- **Testing 2022-2023**
Cubes assembled in Dock II
Flexifloat vs. Rosenberg Facilities

Substructure 420 x 240 x 54 m
Mooring arrangement Offshore, 10 anchor, 24 lines
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