Norwegian Energy Partners

Norwegian offshore expertise in offshore wind

Global Wind Day - Seoul

22. June 2018

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Norwegian Energy Partners

Norwegian Energy Partners

- **Independent non-profit foundation**
- **270 partners/members**

Founders

Government

- Ministry of Petroleum and Energy
- Ministry of Trade and Fisheries
- Ministry of Foreign Affairs

Trade organisations:

- Energy Norway
- Federation of Norwegian Industries
- Norwegian Oil and Gas Association
- Norwegian Shipowners' Association
- The Norwegian Confederation of Trade Unions

Industry

- Statoil
- Statkraft

FAR SUN

We use our heritage..

….to deploy strengths from the hydropower, maritime and offshore oil and gas industry in new renewable energy!

We are not giving up on oil & gas

but ..

….utilising our expertise from offshore and shipping to add value in the offshore wind industry!

75 MEUR annual public R&D spend

	Nowitech	Norcowe	IRIS	MARINTEK	SINTEF	IFE	UiA	UiB	UiS	NTNU
Structure and mechanical	■		■		■	■	■	■	■	■
Marine and wind loads			■	■		■				■
Electrical, systems and grid	■				■	■	■		■	■
Wind resources and planning		■				■			■	■
Marine installation and logistic	■			■						■

3DWind park wake model *TRL6*

INVALS general purpose optimization *TRL8*

Commercial grade rotor CFD *TRL5*

SIMO-RIFLEX *TRL7*

WindOpt *TRL4*

Real time hybrid model test in ocean basin *TRL5*

Novel floater *TRL5*

Variational Multiscale Error Estimator *TRL3*

Seawatch Wind Lidar Buoy *TRL9*

CFD simulation *TRL5*

Droplet erosion resistant blade coatings *TRL3*

Droplet erosion testing *TRL5*

Fleet optimization *TRL5*

Gearbox fault detection *TRL3*

Gearbox vulnerability map *TRL3*

Dual layer corrosion protection coatings *TRL5*

Routing and scheduling *TRL2*

Thermally sprayed SiC coatings *TRL5*

Buckling resistant blades *TRL3*

Fatigue damage simulation *TRL4*

PSST Power System Simulation *TRL5*

NetOp network optimization *TRL4*

Viper Estimate Energy Output from OWF *TRL4*

Smartgrid Lab HVDC gri *TRL4*

Turbine control *TRL3*

Wind turbine electrical interaction *TRL4*

Network Reduction *TRL3*

STAS Linear State-Space W.P. Plant Analysis *TRL4*

PM generator magnetic vibrations *TRL4*

PM generator integrated design *TRL3*

Wind farm collection grid optimization *TRL2*

Long distance AC transmission *TRL3*

Norwegian Energy Partners

Offshore strengths

Large komplex projects with multiple contracts

Marine operations key

Understanding of ocean and material strength

Knowledge of offshore operations and maintenence

Understanding technology risk and use

H&S

Large pool of ressources

1
2
3
4
5
6
6
6
7
8
9
10
11
12
Source: BVG Associates

Norwegian suppliers

Development and project management		Turbine supply		Balance of plant		Installation and commissioning		Operation, maintenance and service	
1	Surveys, site investigations and development services ✓	2	Turbine components manufacture and assembly	3	Foundation supply ✓	6	Turbine and foundation installation ✓	8	Wind farm operations ✓
				4	Cable supply ✓	7	Cable installation ✓	9	Turbine maintenance ✓
				5	Substation supply ✓			10	Inspection and repair services ✓
								11	Offshore logistics ✓
12 Cross cutting activities ✓									

BVGassociates

Norwegian offshore expertise in OW

- Development & project management
- Balance of plant
- Installation and commissioning
- Operations & maintenance

Sub element	Lifetime spend*		Norwegian suppliers
Environmental surveys	0.1%	55 kr million	
Consenting and development services	0.5%	264 kr million	
Site investigations	0.5%	264 kr million	
Project management	2.1%	1,156 kr million	

Sub element	Lifetime spend*		Norwegian suppliers
Subsea cables	4.8%	2,643 kr million	
Transmission	3.2%	1,762 kr million	
Substation structures	2.1%	1,156 kr million	
Turbine foundations	7.6%	4,185 kr million	
Secondary steelwork	1.4%	771 kr million	

Sub element	Lifetime spend*		Norwegian suppliers
Installation ports and logistics	0.6%	330 kr million	
Turbine and foundation installation	4.9%	2,698 kr million	
Cable installation	2.4%	1,322 kr million	
Substation installation	0.4%	220 kr million	
Installation equipment and support services	3.0%	1,652 kr million	
Onshore works	0.6%	330 kr million	

Sub element	Lifetime spend*		Norwegian suppliers
Maintenance and inspection services	14.8%	8,192 kr million	
Vessels and equipment	16.4%	9,091 kr million	
O&M ports	3.8%	2,109 kr million	

Floating wind first mover advantage

- Engineering of substructures and towers, system engineering
- Procurement services
- Transportation of substructures
- Preparations for the installation of top sections and generators
- Towing, mooring operations and connecting
- Static and dynamic cabling and associated accessories
- Platform technology; safety; marine verification; and warranty surveys

PRINCIPLE
POWER
AkerSolutions

DR. TECHN.
OLAV OLSEN

DOCKWISE
MIGHTY SERVANT 1

OWEC TOWER AS

seatower

BOLD TERN
Fred.Olsen Windcarrier

SIEM MOXIE SX 163

SIEMENS
WINDEA
WIND
POWER
SERVICE

ESVAGT
SHIPNAME
ESVAGT
SHIPNAME

UPTIME
UPTIME
Marine Aluminium Group

EDDA TBN
UT 540 WP
Rolls-Royce

umoe
RESCUE ZONE
SES
WAVECRAFT

KONGSBERG

Kongsberg EmPower

Nexans

SEAPROOF SOLUTIONS

menco SMART SOLUTIONS
JOTUN

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