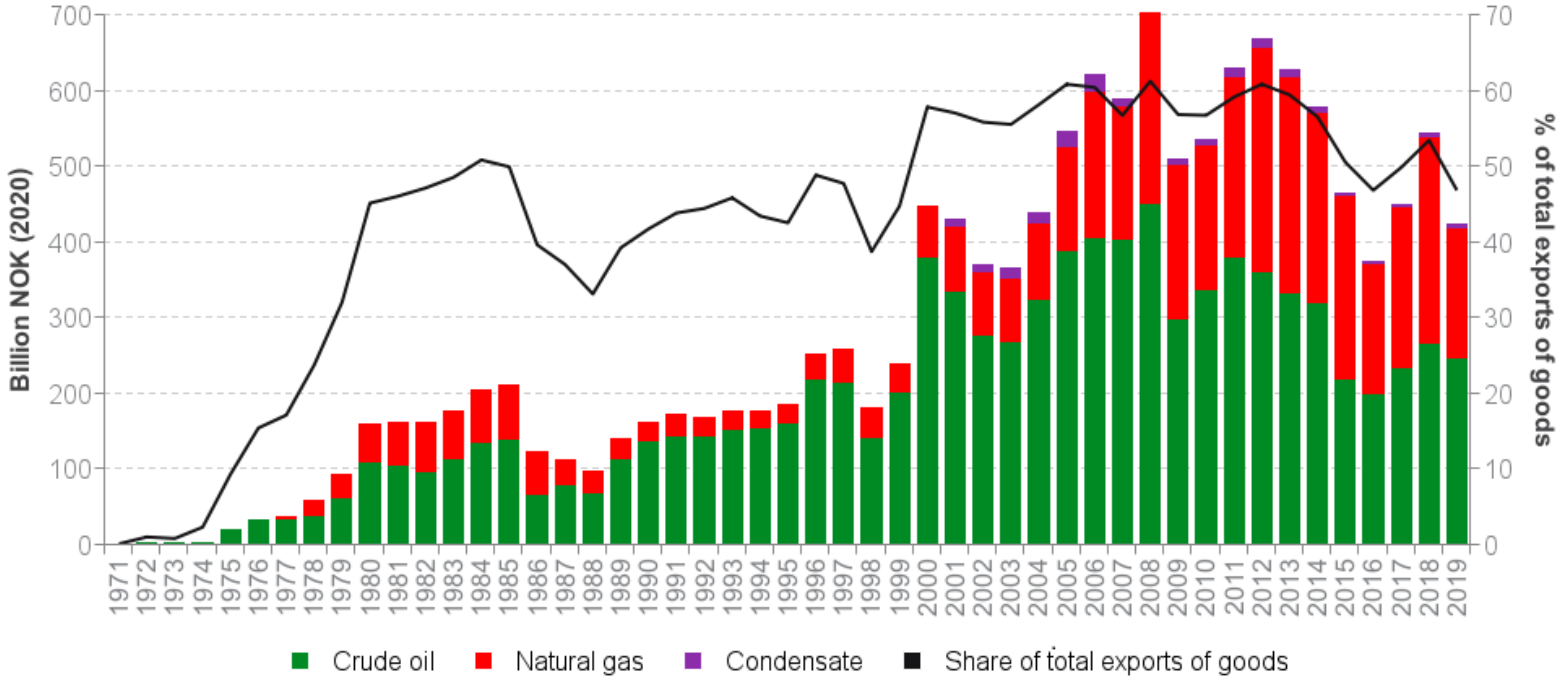
Decommissioning of Oil&Gass offshore structures in Norway

Mid. term Conference Decom Tools
9-10th , February 2021

1. NORWEGIAN O&G
2. O&G DECOMMISIONING OPERATIONS
3. NORWEGIAN INFRASTRUCTURE FOR DECOMMISSIONING

Andres Olivares, *Western Norway University of Applied Science, Haugesund*

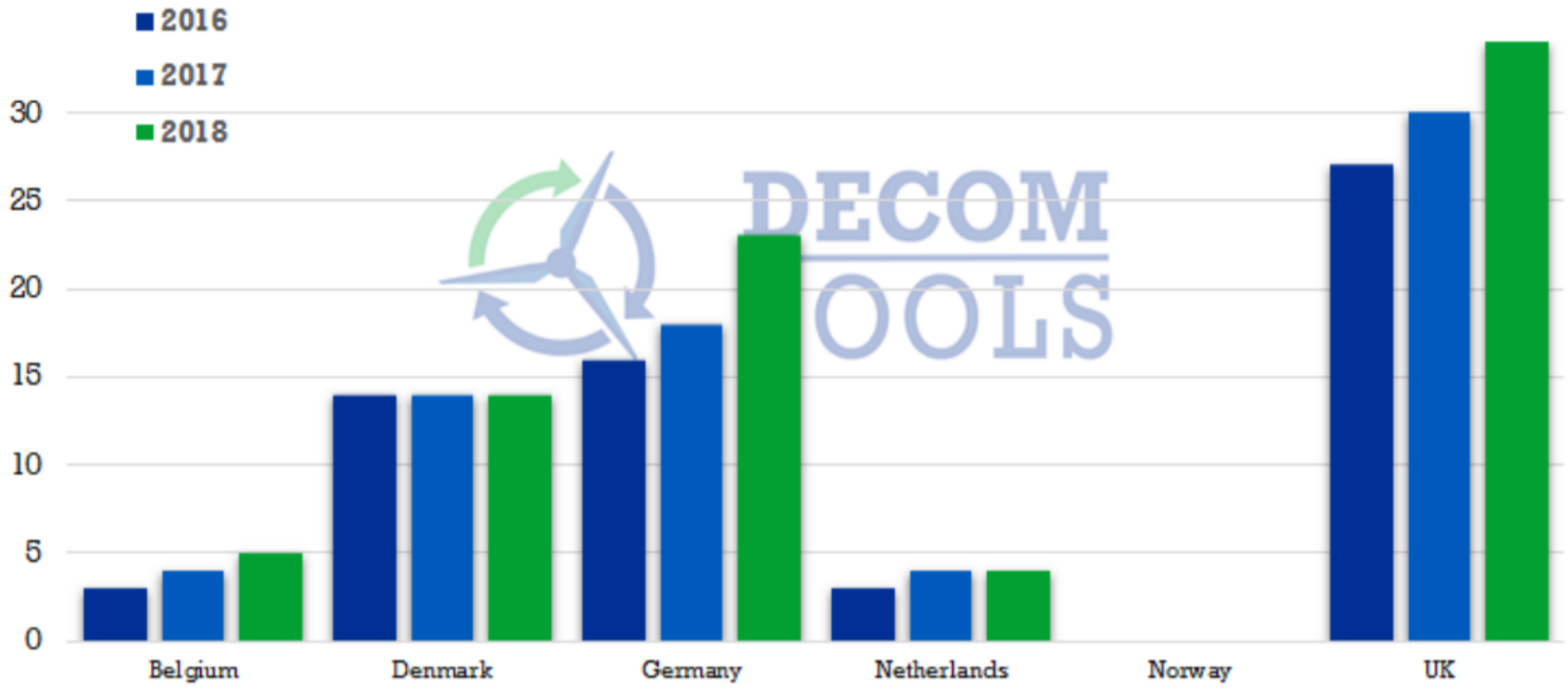


Norwegian crude oil production peaked in 2001 .

Norway supplies about 25% of the total gas consumption to the EU.

DECOM TOOLS

Number of Offshore Wind Parks



Why offshore wind power development was stop in Norway?

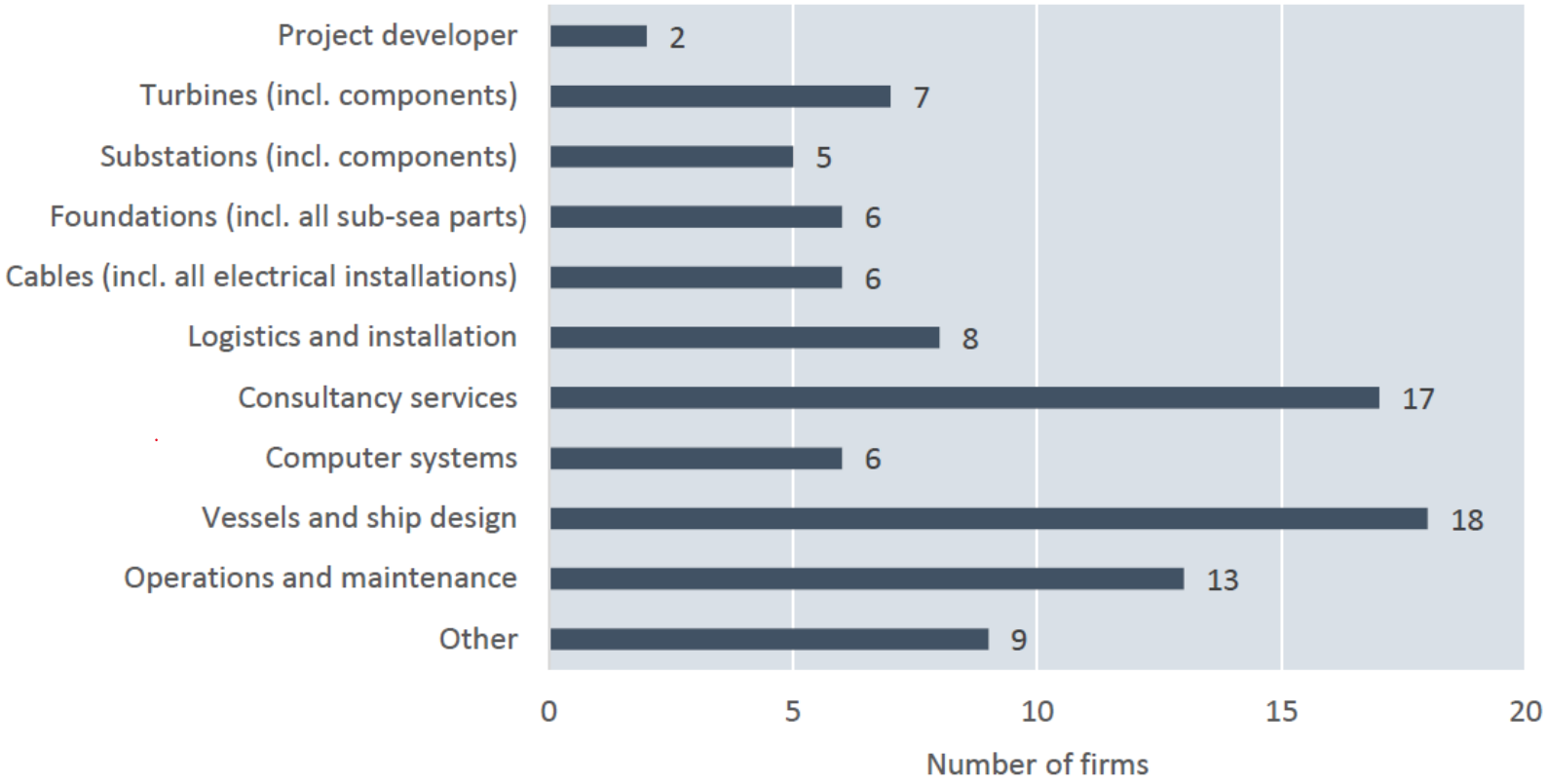
- Strong growth in revenues from O&G in the period 2011–2014 when oil prices averaged well above US$100 per barrel.
- The discovery of the Johan Sverdrup oil field in 2010, (the third largest in the North Sea) altered the expectations for offshore wind and the legitimacy for public policy.
- Norway has a lack of a domestic demand for electric power. Hydropower provides 96% of the domestic electricity consumption

Diversification of O&G is back in public Agenda!

Norway's largest oil company Statoil officially changed its name to Equinor on 2018 as it forges ahead with its drive into renewable energy.

Norwegian Offshore Industry is diversyfying

Norwegian's product or services delivered to the offshore wind industry



Jack-up installation vessel Brave Tern in service since 2012

Norwegian duo to develop wind turbine installation vessel

Offshore

Ocean Installer and Vard are entering into a partnership to develop an offshore wind turbine installation vessel.

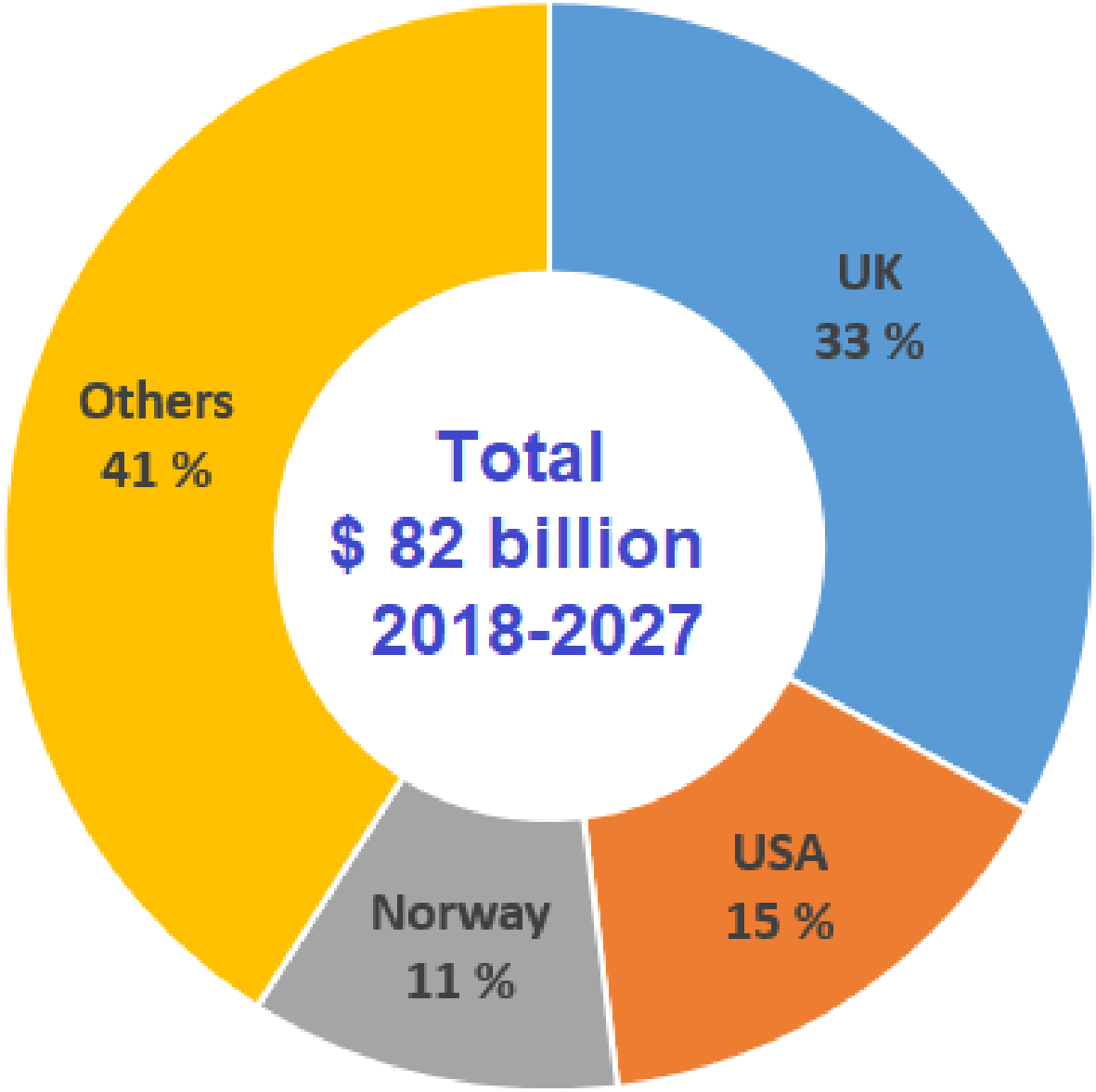
Aug 31st, 2020

2. O&G DECOMMISIONING OPERATIONS

2. O&G DECOMMISIONING

Decommissioning of O&G is a significant emerging area in the Norwegian sector.

The Norwegian Petroleum Directorate estimates that decommissioning could cost around NOK 160 billion.



O&G decommissioning industry includes segments specialized in different operations.

- Some decommissioning companies primarily offer services related to the decommissioning of offshore installations, such as plugging and abandonment of oil wells

- **Others specialize in services related to infrastructure removal or recycling of large structures.**

O&G offshore knowhow

- O&G offshore structure are modular, hence the main methode used for decommissioning is reverse installation.

Modular structures are used to build up the offshore platforms

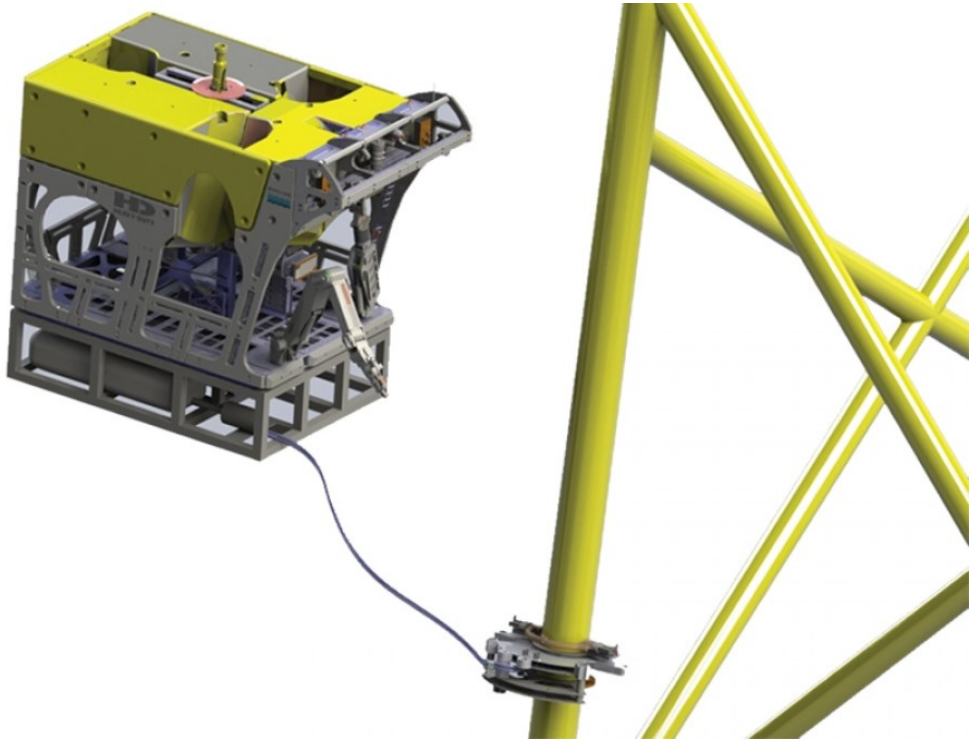
Specialized SLV

- Specialized SLV (Single Lift Vessels) have been emerging on the market to remove the much larger, multi module assets in one lift.
- As with reverse of installation, significant preparatory works, including strengthening of the structure, are required to facilitate this method.

Demolition in-situ:

- A team of specialists with industrial demolition machines and hydraulic shears reside on the platform and dismantle the asset over an extended time period.
- There is limited preparatory work required for this option, but may require more people offshore for longer compared to the other options.

Piece small demolition



Cutting and Cleaning technologies

- Abrasive waterjet technology and high-pressure pumping systems have been used extensively in the industry to provide cleaning of marine growth and cutting of subsea structures.

Cutting technologies: wire diamond

Use of buoyancy for lifting operations

3. NORWEGIAN INFRASTRUCTURE FOR DECOMMISSIONING

.

Yard locations for O&G decommissioing in UK

Yard	Location	Facilities	Sea Accessibility	Proximity to waste disposal	Waste licences	Liquid containment
ABLE UK	5	4	3	H	Y	Y
Greenhead Base	5	3	4	H	Y	Y
Harland & Wolf	3	3	3	H	Y	Y
Peterhead	3	3	3	M	Y	Y
Swan Hunter	3	3	3	M	Y	Y
Ardesier	3	3	3	L	N	N
Ardyn Point	2	2	3	L	N	N
Burntisland	3	3	3	H	N	N
Methil	3	3	1	H	N	N
Dales Voe	3	3	1	H	N	N
Hunterston	2	2	2	L	N	N
Montrose	4	3	2	H	N	Y
Nigg Energy	4	4	4	H	N	Y
Port of Dundee	3	4	3	H	N	N
Kishorn	3	3	4	L	N	N
Leith	3	3	3	M	N	N
Wick	3	2	3	L	N	N
VATS	5	5	5	H	Y	Y
STORD	5	5	5	H	Y	Y

The future of energy in Scotland

A consultation on Scottish Energy Strategy

by the Scottish Government

GMB SCOTLAND

RESPONSE FROM

GMB SCOTLAND

THE UNION FOR ENERGY WORKERS

22 May, 2017

Norwegian fjords are often very deep, this give them good sea accessibility

Recycling of large structures

The onshore recycling of topsides and substructures from O&G require high technical standards at the facilities that do the waste handling.

AFDecom Miljøbase Vats – Norway.

High technical standards for decommissioning infrastructure

- The dismantling activities of large structures are carried out onshore in open areas close the sea. This create a risk for possible contamination of marine environment or ground water from the falling rain.

Deconstruction area from Kværner AS, Norway. The picture shown a topside structure and jacket from an oil platform in the process of dismantling.

The area for deconstruction activities must have a membrane below the top layer of concrete in combination with a drain system to collect the rainwater.

Water treatment facilities in AF Decom, Norway. A large cave in a mountain is use for collection of large volumes of water. The collected water is then send to the water treatment plant in the left.

Norwegian companies can redeploy their existing technologies and competences from O&G for decommission of Offshore Wind Power

- Left: Hydraulic guillotine at AF Decom facilities. Metal segments shown in the picture are around 50 mm in thickness.
- Right: Human operators are a relevant part of everyday activities, but this may change. Kværner is exploring alternatives to automate cutting operations during disassembly.

These companies are interested in decommissioning of large volumes!

From O&G to offshore wind?

- Norwegian O&G is diversifying, many companies are already providing service related to marine operations for the offshore wind industry in Europe
- Norwegian companies will enter in the market for decommissioning of offshore wind park projects if the volume for decommissioning is large enough.

Western Norway University of Applied Sciences

DECOM TOOLS

Interreg North Sea Region Decom Tools
European Regional Development Fund

EUROPEAN UNION

Decommissioning of Oil&Gass offshore structures in Norway

Mid. term Conference Decom Tools
9-10th , February 2021

Thank you for your attention!

andres.olivares@hvl.no

https://northsearegion.eu/decomtools/