DecomTools

Offshore decommissioning and challenges ahead for offshore windfarms

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Høgskulen på Vestlandet : 16 000 studenter + 1 800 ansatte

Decommissioning steps?

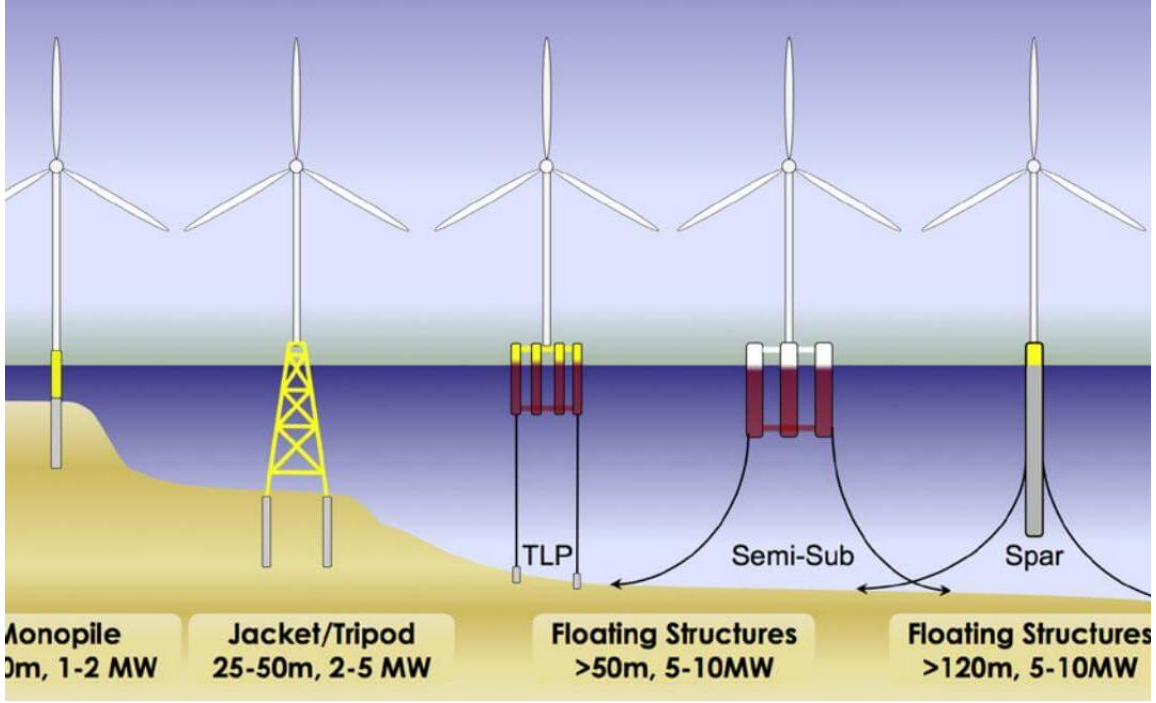
1. **Planning and engineering**
2. **Physical removal**
3. **Disposal** of the structures and equipment.
4. Regulatory compliance

The decommissioning process can be complex and costly, and may involve both environmental and economic considerations.

https://www.youtube.com/watch?v=m9znbPIX2Ys

What is offshore decommissioning?

- Offshore decommissioning refers to the process of safely removing and disposing of offshore oil and gas platforms, pipelines, and other structures and equipment at the end of their useful life.



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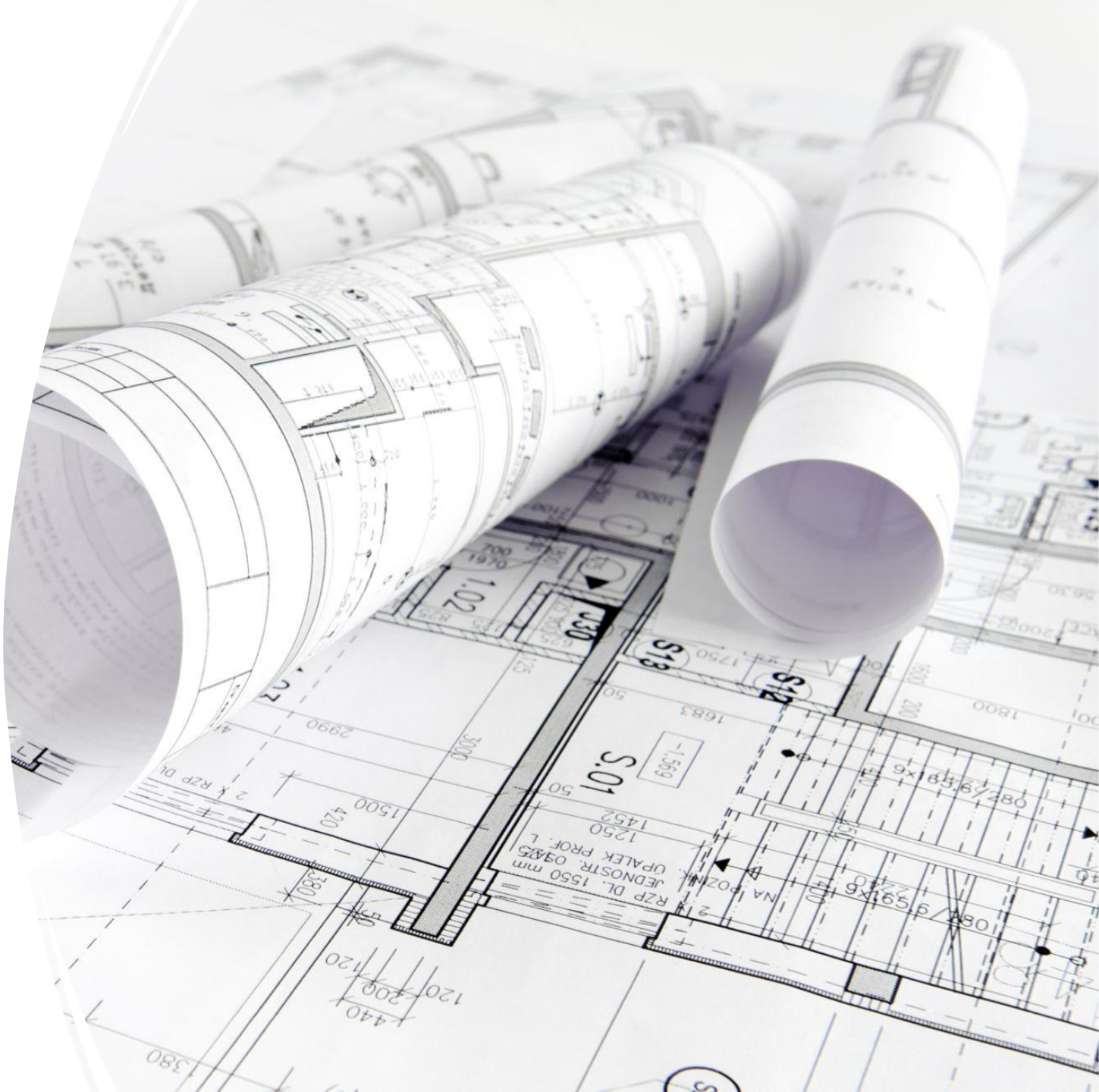
1. Planning and engineering?

- Developing a decommissioning plan that outlines the activities and timeline for the project.
- Engineering: Conducting studies and design work to determine the best methods for removing the platform and associated structures and equipment.



Example: Decommissioning operation

Use of specific vessel types – heavy lift vessels, anchor handles, LCVs, survey vessels – each selected to reduce risks during recovery operations. 8 vessels in total utilized.

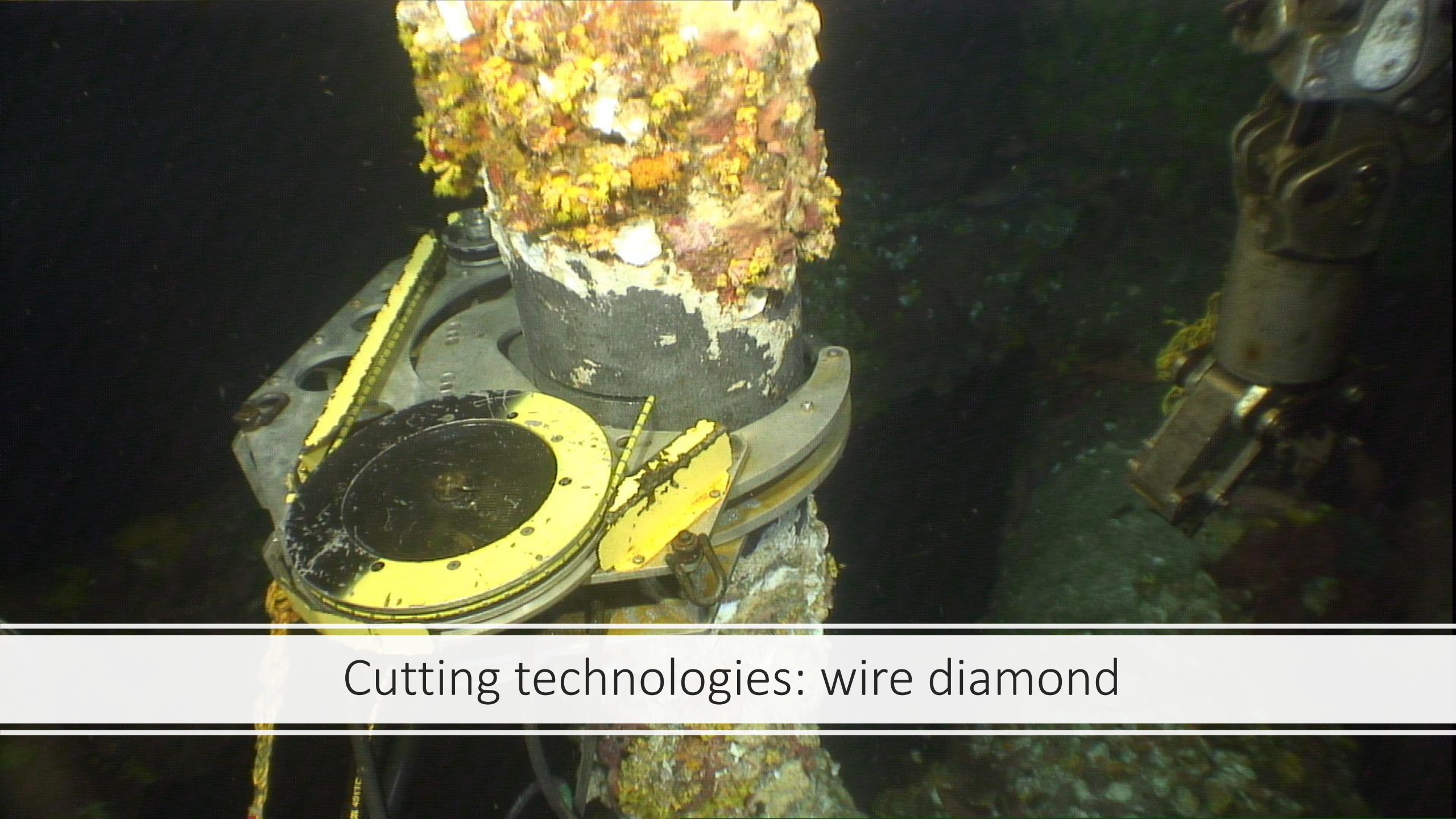
Many unknowns to be managed

- Typically poor or old survey&inspection data
- Missing information during Tender stage – but received during project phase
- Very often large data packs (drawings from the 1970´s..)

2. Physical removal

Which methods are used for removing an oil platform?

- Cutting 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

O&G offshore knowhow

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

Decommissioning strategies

- **Single lift:** The entire platform topside structure is removed as a single unit. Maximum lifted weight 48 000 tonnes.

- **Piece large:** modular removal and reverse installation methods. Potentially up to 5 000 tonnes.

- **Piece small:** removal of platform topsides in small pieces of up to approximately 20 tonnes.

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.

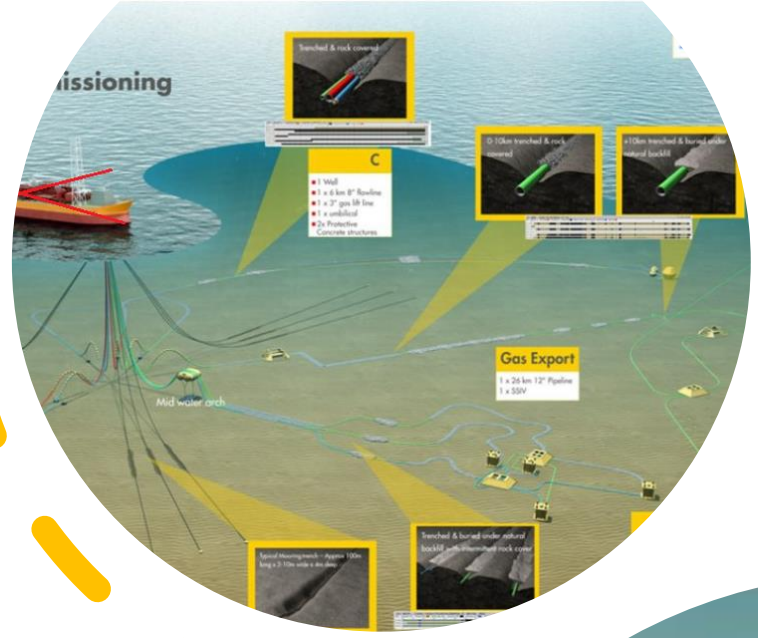
Piece small demolition

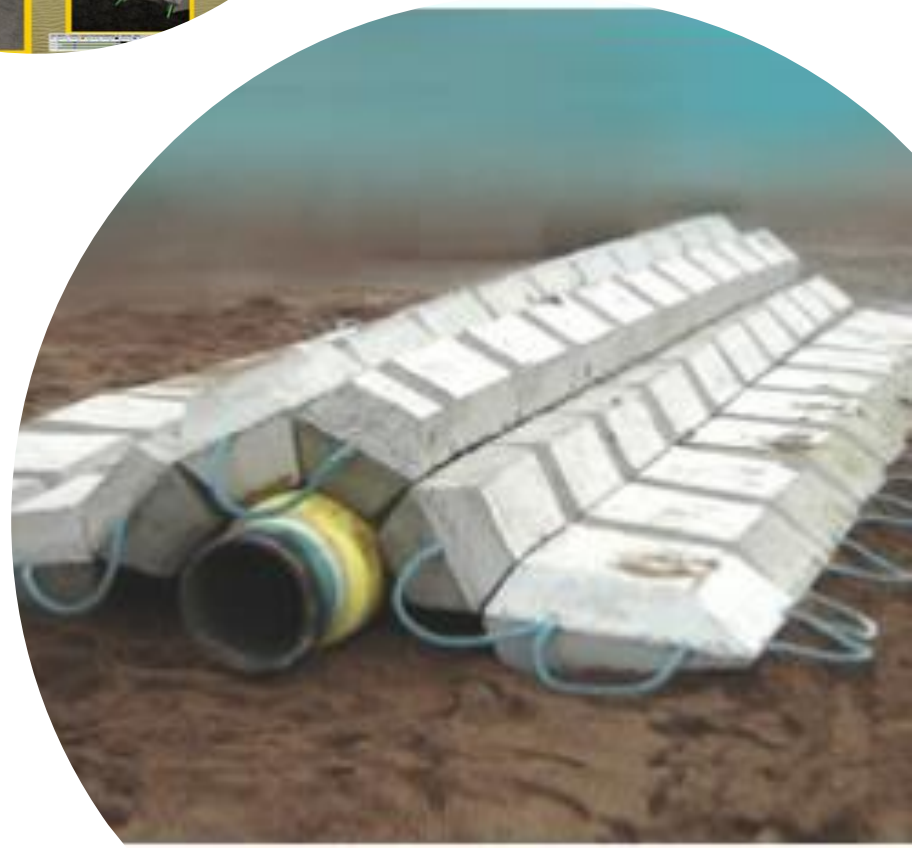
Subsea operations

Water Depths: 90-100m , recoveries:

- Mattresses
- Cut/Recover Spools & Umbilicals
- Flexible risers, flexible flowlines. (Up to 12”)
- Large structures, 40-140 t.
- Mooring Line & Suction Piles
- Subsea Debris

Pipelines left in-situ, rock installation to ensure overtrawlable seabed





3. Disposal

- Example: during a subsea decommissioning campaign a total of 8200 tonnes of Subsea infrastructure recovered

North Sea oil and gas installations

Type, location, number & size:

Country	Steel Jacket	Concrete Substructure	Subsea
UK	227	12	56
Norway	69	13	54
Netherlands	118	2	7
Denmark	39	0	0
Germany	1	1	0

Source - KIMO International

NORWEGIAN INFRASTRUCTURE FOR DECOMMISSIONING

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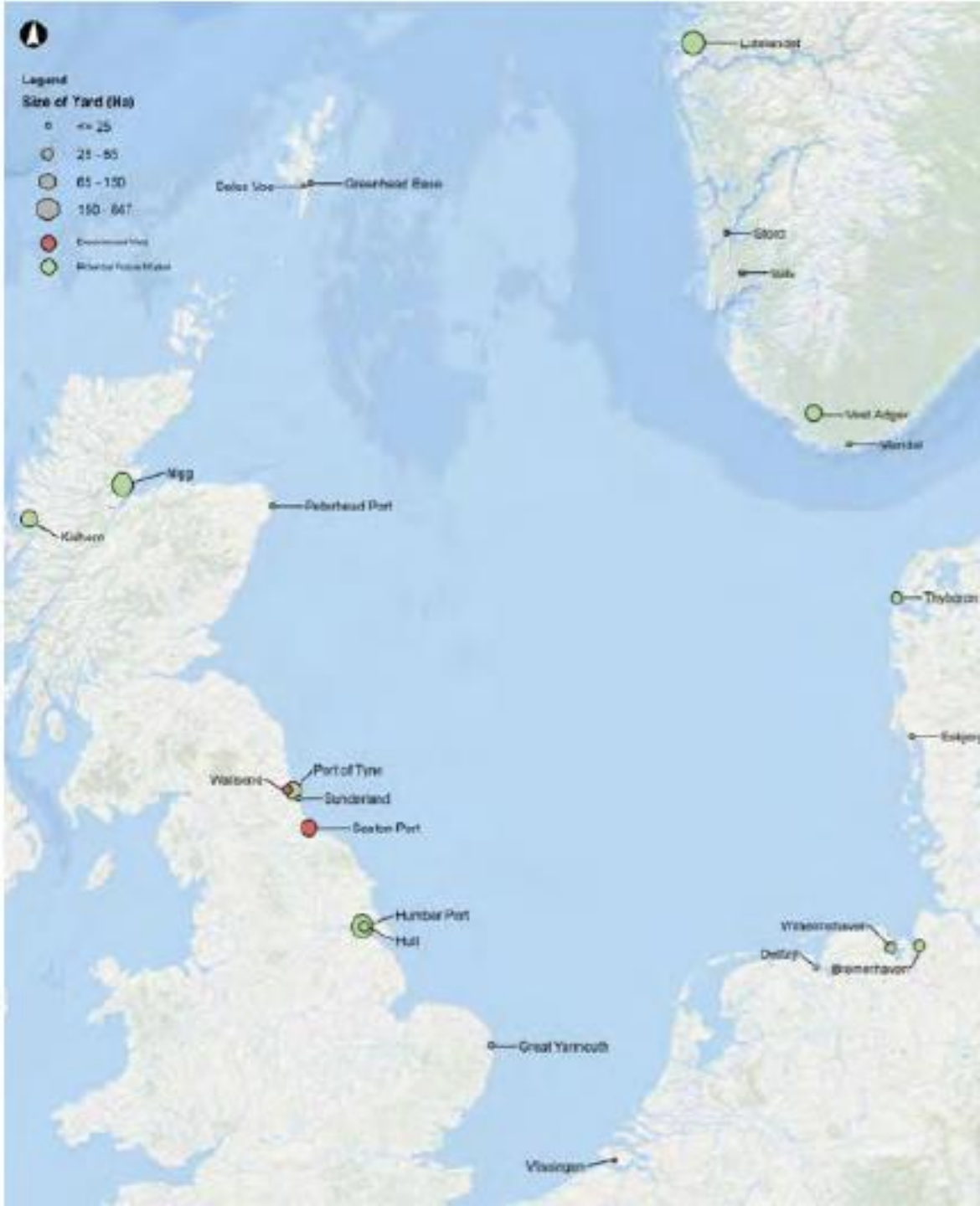
Yard locations for O&G decommissioning in UK



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

- 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.

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.

- Water treatment facilities in AF Decom, Norway.

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.

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

These companies are interested in decommissioning of large volumes!

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Thank you for your attention!

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