OIL FOR DEVELOPMENT

UN environment

Environmental and societal considerations during decommissioning

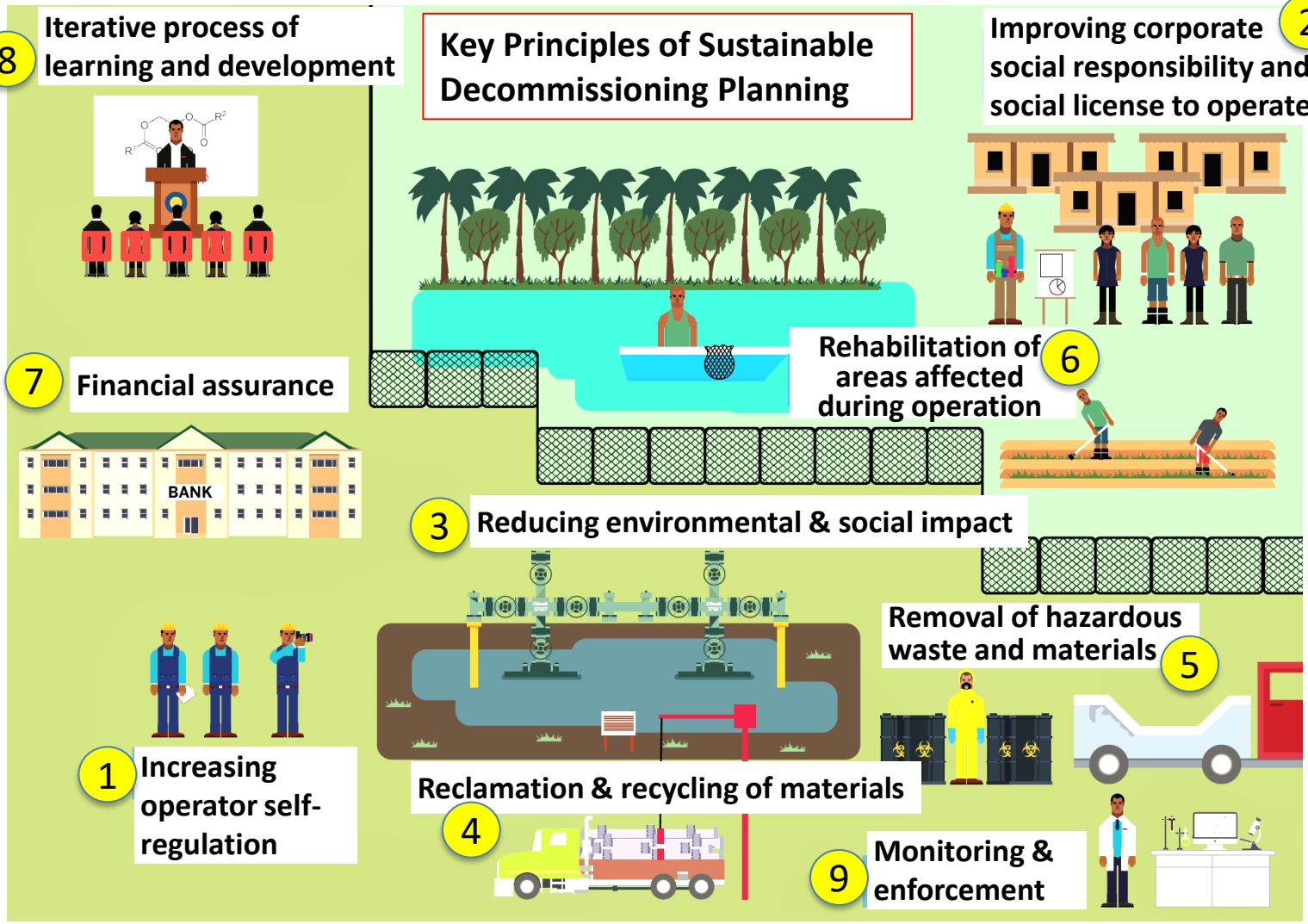
Module 5

Contents

- Key principles in sustainable decommissioning of oil and gas fields
- Environmental impact and issues related to decommissioning & ESIAs
- Incorporating Best Practice tools (BPEO, MCDA, CA & BAT)
- Best practice and Risk Management
- Materials, Removal and Reclamation
- Costs, Liabilities and Legacies

Key Principles of Sustainable Decommissioning Planning

The following **9 principles** should be articulated as minimum standards by ESIA department and regulator of decommissioning.



Source: modified from SUSTAINABLE CLOSURE AND DECOMMISSIONING OF ONSHORE AND OFFSHORE OIL AND GAS ASSETS IN NIGERIA 2015- www.stakeholderdemocracy.org

Abandoned wells – on land/coast

Whether even properly plugged wells can leak is still an open question.

Abandoned oil storage tanks

BEHIND THE SCENES, FEATURES, URBAN DESIGN, WILLIAMSBURG

Behind the scenes at Williamsburg's abandoned Bayside Oil Depot, set to be NYC's next public park

POSTED ON MON, AUGUST 27, 2018 BY DANA SCHULZ

Key Principles of Sustainable Decommissioning Planning

The following 9 principles should be articulated as minimum standards by ESIAs and decommissioning regulators. Prospective operators should illustrate that their decommissioning will satisfy the principles in the submission of an initial **Decommissioning Plan** prior to receiving an operator license.

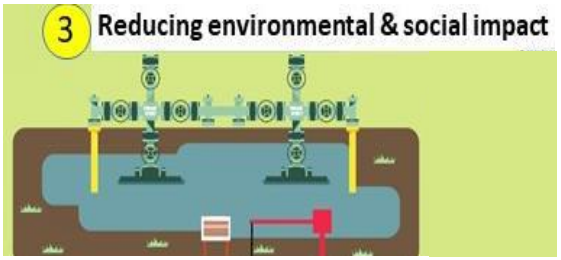
1 - Increasing operator self-regulation of operations throughout project life-cycles vital for improving industry procedures, while making sure the process of regulation, or impacts of closure and post-closure are not borne solely by the Government.

2 - Improving corporate social responsibility and social license to operate oil and gas companies will require better closure and decommissioning procedures that have a broader focus than profit, and demand a better relationship with the communities which they operate within.

Source: *Stakeholder Development Network April 2015 - www.stakeholderdemocracy.org*

Key Principles of Sustainable Decommissioning Planning

3 - Reducing the environmental & social impacts of closure and decommissioning will require thorough planning over many years, verified by experts and the regulator, consultation with communities and stakeholders.



4 - Reclamation & recycling of materials can be maximized with forward planning, which in turn will reduce costs of decommissioning/closure.

5 - Removal of hazardous waste & materials that have accumulated in the region through years of operational negligence can reduce exposure to harmful substances.

6 - Rehabilitation of areas affected during operations can be carried out during decommissioning to start process of returning the environment to its natural state and remove the barriers to thriving biodiversity & local livelihoods.

Source: *Stakeholder Development Network April 2015 - www.stakeholderdemocracy.org*

Key Principles of Sustainable Decommissioning Planning

7 - Financial assurance for decommissioning is an area that needs immediate clarification to ensure that costs of implementing activities are known in advance and funds are available to execute.

8 - Iterative process of learning and development for operators, regulators, civil society and government through the establishment and review of a national decommissioning framework and regulatory regime will strengthen institutional capacity.

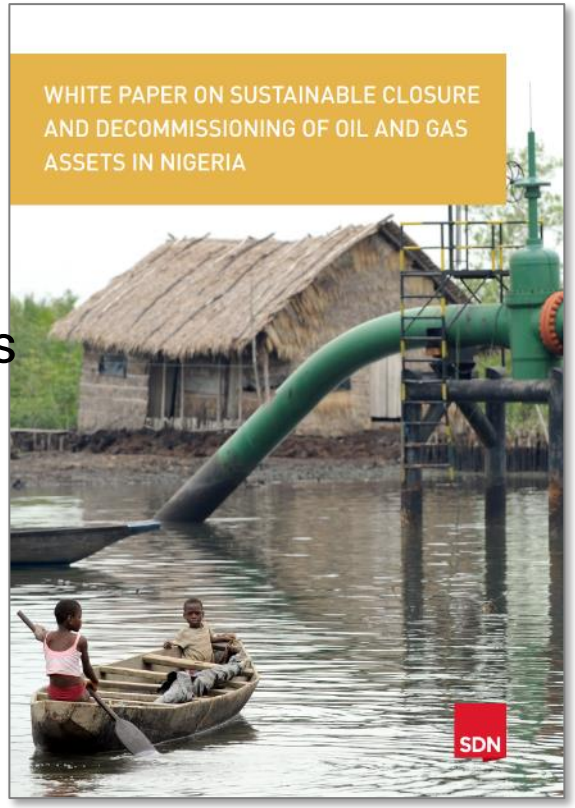
9 - Monitoring and enforcement of legislation to protect the social, economic and environmental wellbeing of the nation in a uniform way across the oil and gas sector can only be done when supported by a fair and uniform process, defined by the government.

Source: *Stakeholder Development Network April 2015 - www.stakeholderdemocracy.org*

Potential Environmental/Social Impacts

The following are some of the most common environmental impacts **associated with decommissioning** of oil and gas infrastructure:

- **Discharges to sea**: sewage, food waste, ballast water, treated bilge
- **Gaseous emissions**: from vessels & equipment
- **Underwater noise**: from vessel operations, dynamic positioning system, cutting methods
- **Physical disturbance** to seabed: suspended sediment, local smothering, rock dump
- **Waste and NORM***: waxy deposits, oily sludges or NORM scale need to be handled
- **Odours, noise and disturbance** from onshore waste facilities to local residents
- **Metals**: trace amounts from sacrificial anodes (e.g. Zn, Al) might enter sediment

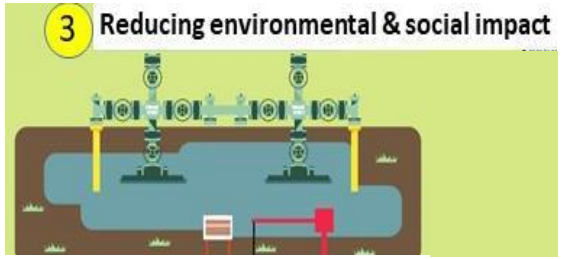


*Naturally occurring radioactive material

Source: DECC Guidance Notes Decommissioning Programmes https://www.og.decc.gov.uk/regulation/guidance/decomm_guide_v6.pdf

Environmental & Social Impact Assessments

- ESIAs for exploration and development, in many countries are mandatory, specifically, nowadays to **include** decommissioning.
- Specific ESIA also nowadays for Decommissioning Programmes
- Evaluation of environmental and social impacts, and how to make the best choice to protect the environment?
- Some of the **tools** commonly used by the industry for managing environmental impact in decommissioning include **Multi Criteria Decision Analysis** (MCDA),
- **Comparative Assessment** (CA), **Best Available Techniques** (BAT) and **Best Practice Environmental Options** (BPEOs).
- Some of these link to national regulations.



Different countries/ region use different tools

Source: DECC Guidance Notes Decommissioning Programmes https://www.og.decc.gov.uk/regulation/guidance/decomm_guide_v6.pdf

Remember

Goal is to ensure safe decommissioning

HOW?

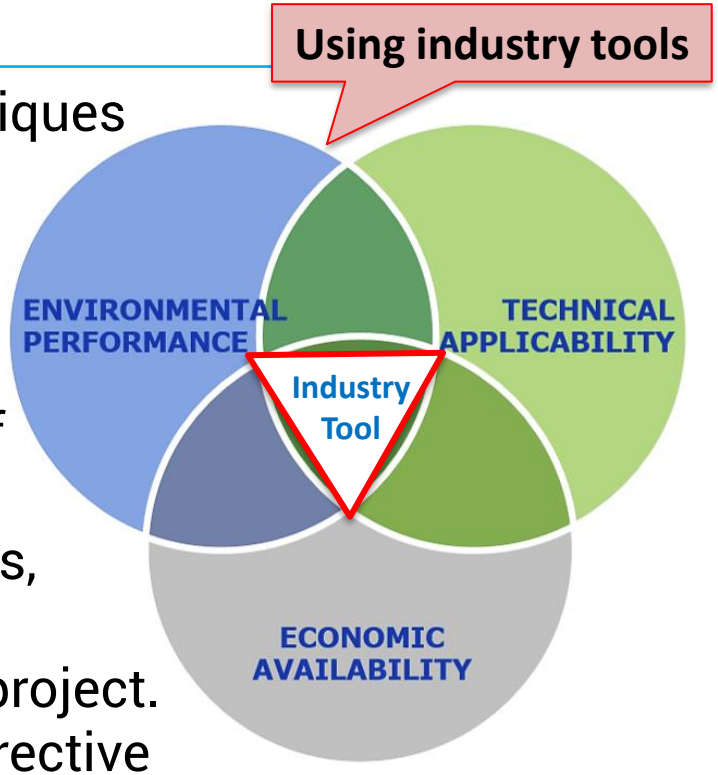
1. Improve Environmental Performance
2. Reduce Emissions to Air
3. Reduce Discharges to Sea, Soil and Groundwater
4. Increased Energy Efficiency
5. Reduce Environmental Risks

Principle no. 3

Source:

Using MCDA, BAT (and other industry tools) to make the right choice

- The selection of Best Available Techniques consists in finding the appropriate **balance** between environmental performance and technical & economical availability.
- This **balance** depends on a number of parameters, such as the project's environmental requirements and goals, technical constrains, stakeholder's expectations & economic viability of project.
- BAT is a principle defined in the EU directive on Integrated Pollution Prevention and Control (IPPC) (2008/1/EC). The purpose of IPPC is to prevent and control pollution from various sectors, such as energy industries or the chemical industry.



Principle no. 3

Source: DNV-GL October 2019

Best Available Techniques (BAT) Definition

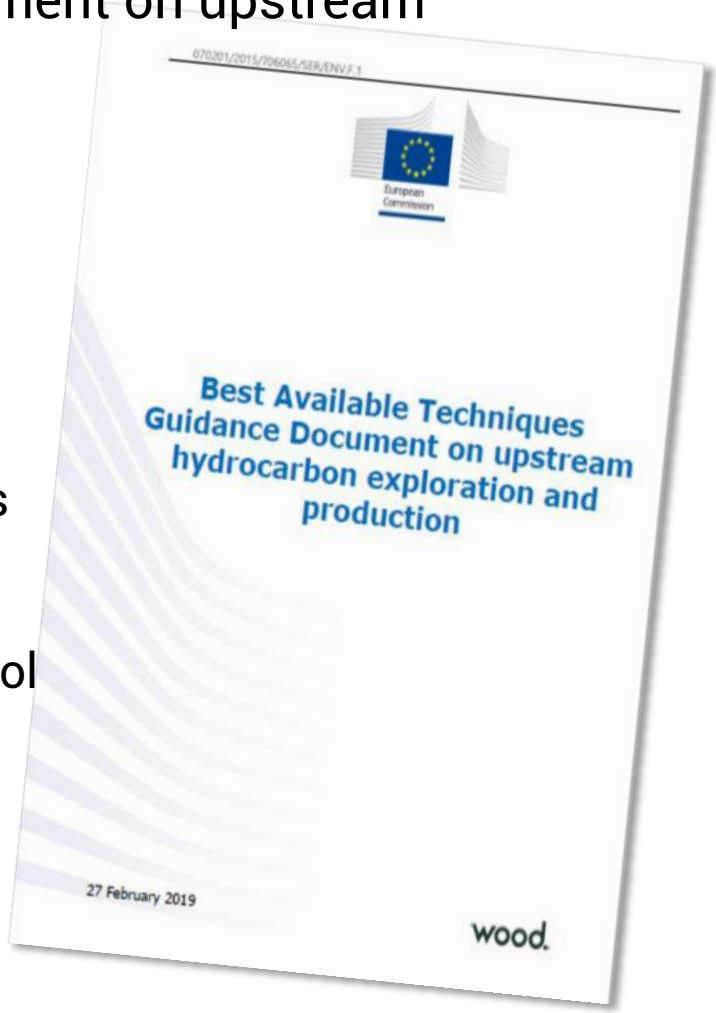
BAT definition in European Union Industrial Emissions Directive (2010/75/EU)

- **Best** means most effective solution in achieving a high general level of protection of the environment as a whole.
- **Available** techniques means those developed on a scale which allow implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced locally, as long as they are reasonably accessible to the operator.
- **Techniques** includes both technology used, and way in which the installation is designed, built, maintained, operated & decommissioned.

Source: DNV-GL October 2019

How to ensure safe decommissioning?

Best Available Techniques Guidance Document on upstream hydrocarbon exploration and production



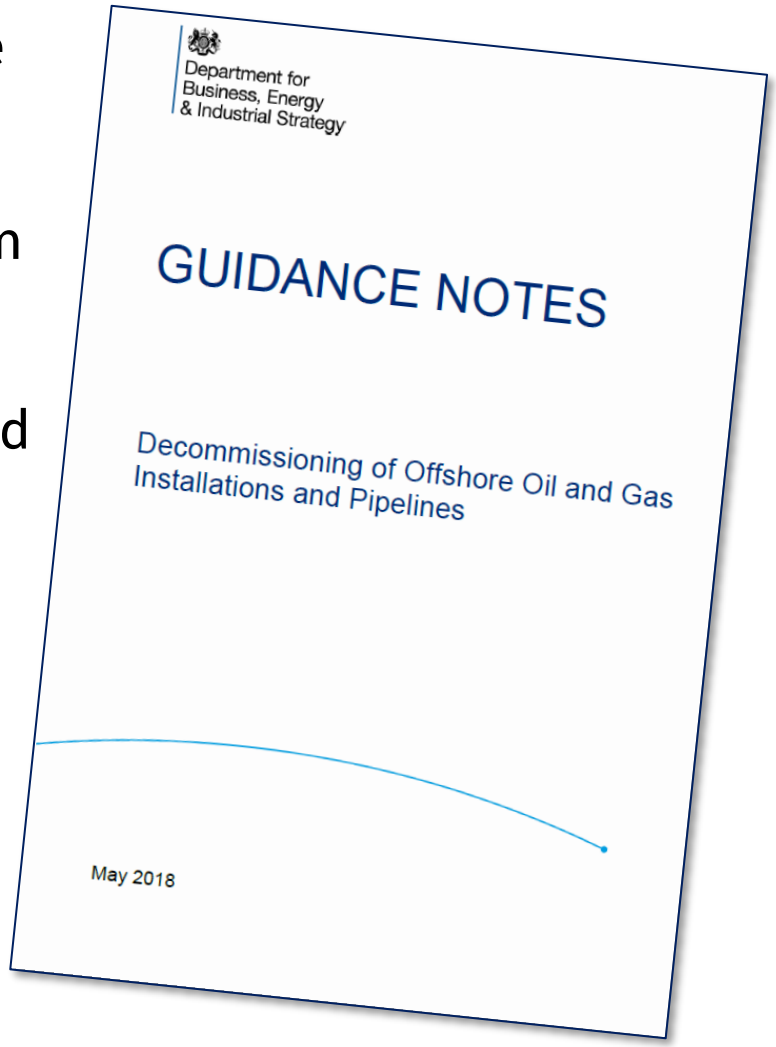
Purpose

- The main driver behind the Guidance Document is to improve protection of the environment.
- Targeting O&G industry and Authorities
- Relevant for planning of new facilities, and modifications to existing facilities, as well as in permitting activities across the European Union (EU).
- The Guidance *Document* is a non-binding tool designed to support organizations and the Regulatory Authorities.
- There are also other tools to help the operators and regulators

Source: DNV-GL October 2019

Country: UK Competent Authority

- **Responsibility for ensuring** that the requirements of the Petroleum Act 1998 and international obligations comply with the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) within Department of Business, Energy and Industrial Strategy (the "Department"), (formerly Department for Energy & Climate Change).
- OPRED is also the **competent authority** on decommissioning in the UK for OSPAR (international regulations) purposes.



Source: DECC Guidance Notes Decommissioning Programmes https://www.og.decc.gov.uk/regulation/guidance/decomm_guide_v6.pdf

Pipeline removal screening exercise

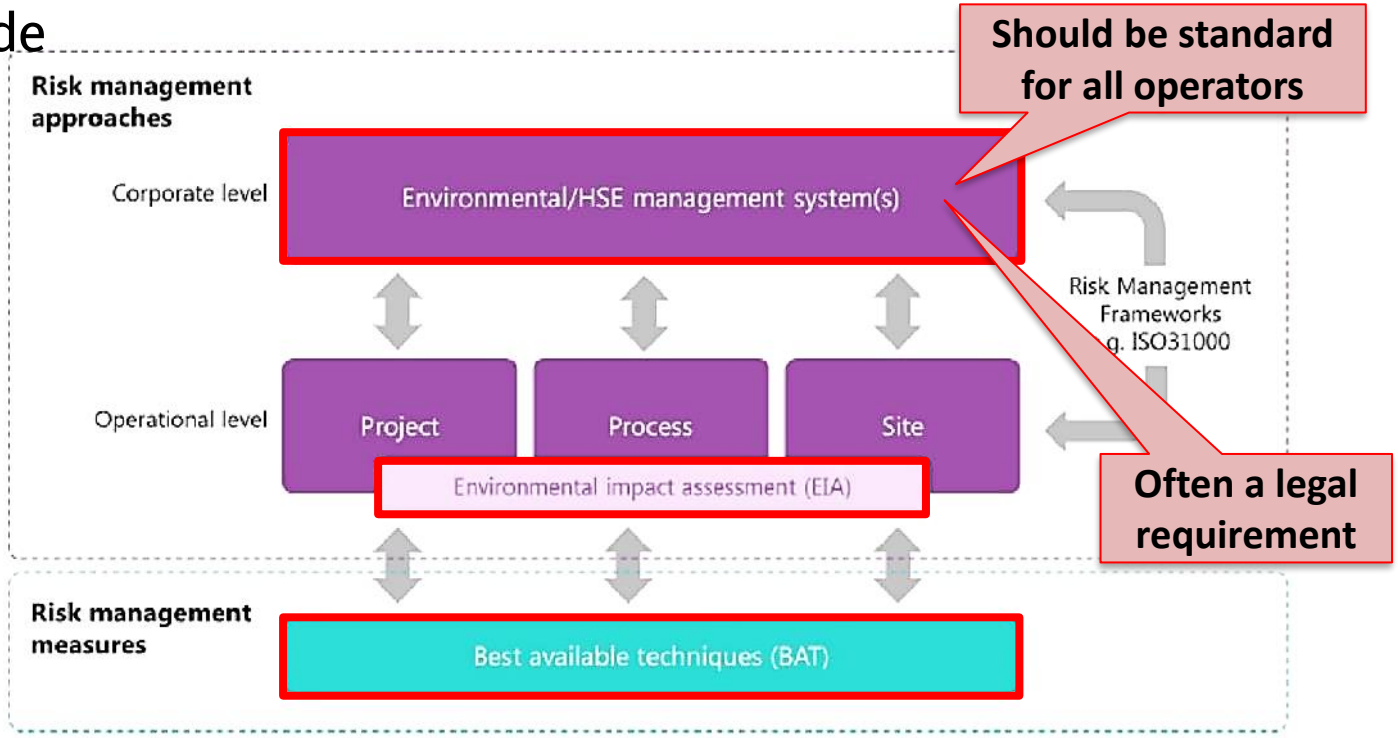
- Operator proposes to decommission a pipeline in-situ.
- A Comparative Assessment (CA) of the options is required.
- This involves a two-stage process with an early option screening process to **narrow options** to a manageable number that are then assessed in more detail following the CA framework.

Pipeline Decommissioning - Option Screening	Safety	Environment	Technical	Societal	Economic	Selected for further study
Leave the pipeline as is						
Backfill an open trenched pipeline	N/A	N/A	N/A	N/A	N/A	
Trench the pipeline into an open trench						
Trench and Fill the pipeline						
Deepen the current trenched pipeline	N/A	N/A	N/A	N/A	N/A	
Rock Dump to bury the pipeline						SELECTED
Remove by Reverse S Lay						
Remove by reverse J Lay						
Remove by Reeling						SELECTED
Remove by Cutting and Lifting						SELECTED
Remove by towing						SELECTED

Source: DECC Guidance Notes Decommissioning Programmes https://www.og.decc.gov.uk/regulation/guidance/decomm_guide_v6.pdf

Risk management approaches at corporate and operational levels

- **Approaches to minimize** likelihood and severity of impacts from accidents, environmental incidents, and routine operations.
- Represent **strategies** that aim to prevent, detect, control and mitigate impacts, by reducing frequency of occurrence and/or their magnitude
- ESIAs represent an operational risk manage-ment process for projects
- BAT assessment is part of risk management



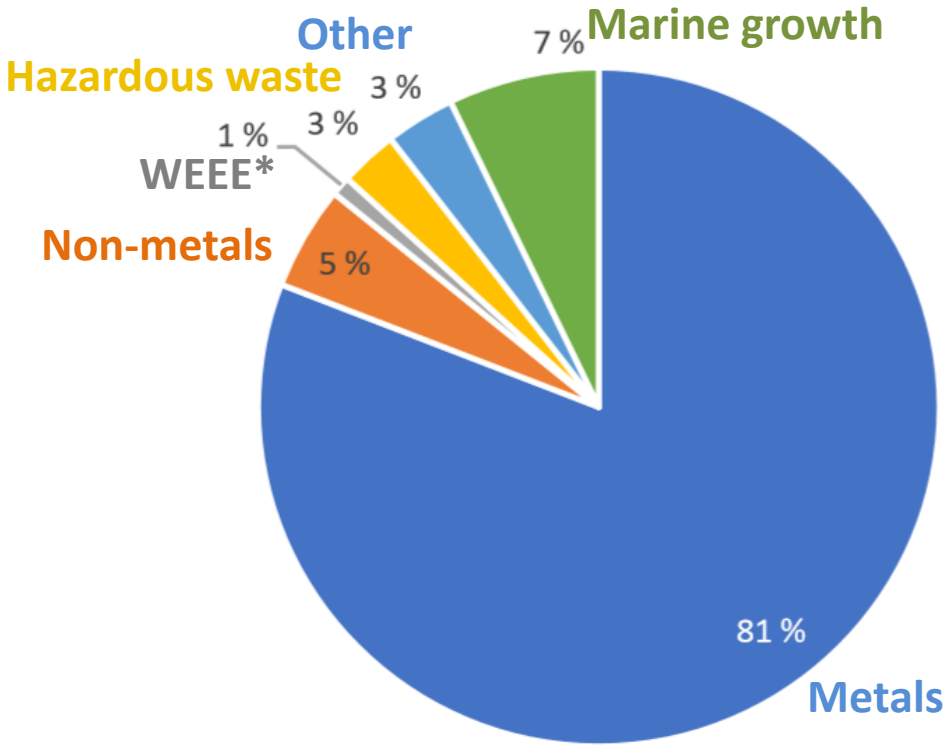
Source: DNV-GL October 2019

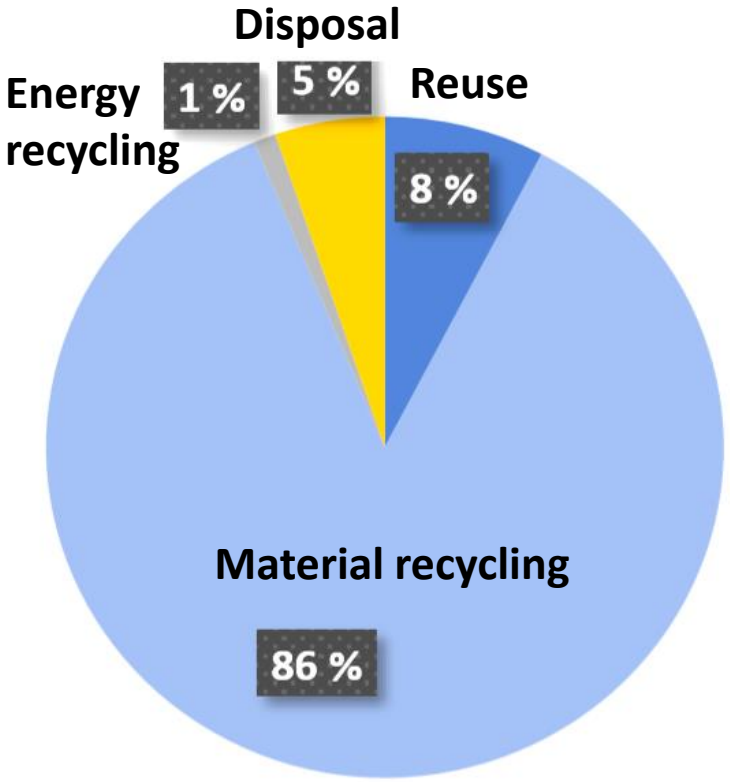
Now what?

Source: https://flowergarden.noaa.gov/about/hi389platform.html (left) https://www.ableuk.com/case-study/bp-north-west-hutton/ (right)

Material composition and disposal solution

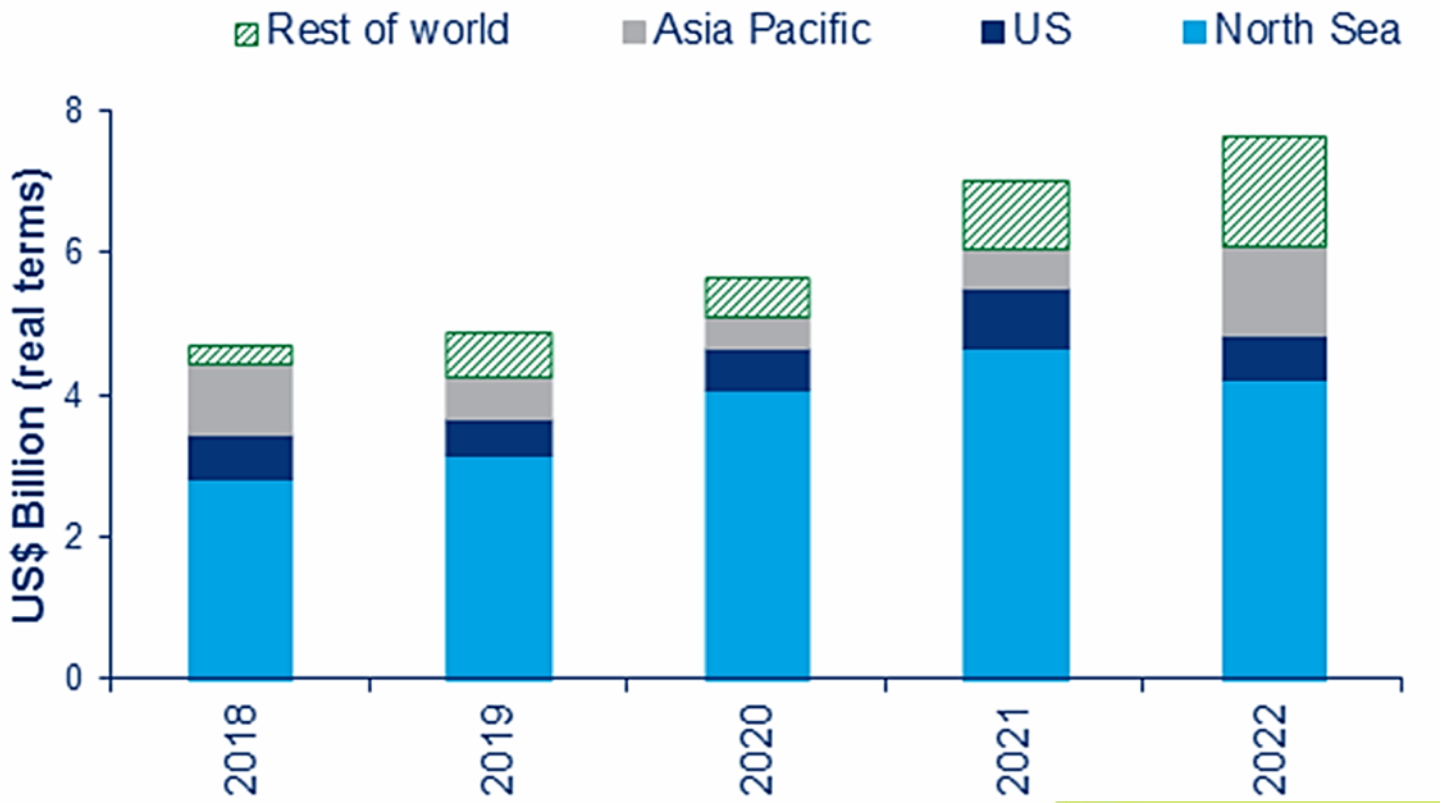
- Material composition of a typical offshore petroleum platform?
- Main disposal solutions:





*WEEE waste electrical & electronic equipment

Offshore decommissioning costs



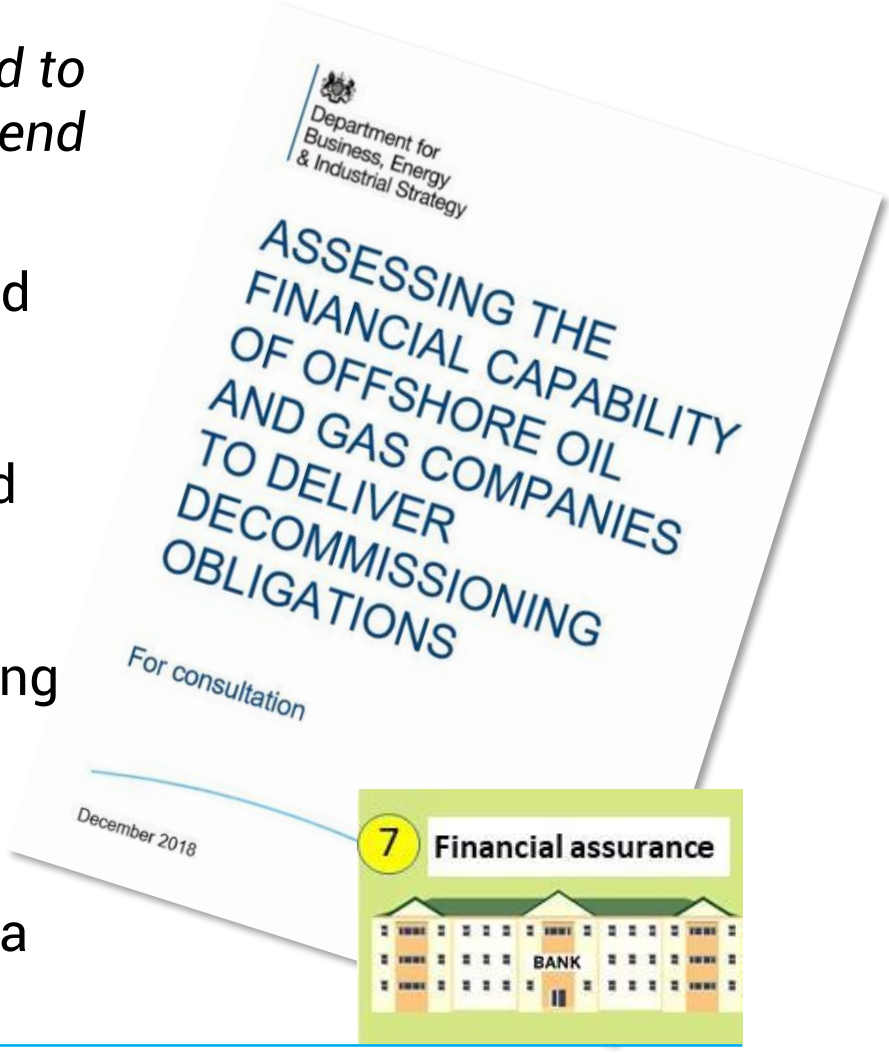
Source: Wood Mackenzie

Decommissioning: ensuring who pays

UK Policy *Operators of oil or gas installations or pipelines are required to decommission infrastructure at the end of a field's economic life.*

UK involves assessment of each field plus wider review of company, including, but not limited to:

- financial check of latest published accounts of company/parent company
- estimated cost of decommissioning the installations and pipelines associated with each field
- net present value of field(s)
- other industry benchmarks or data
- company business plan



Source:

Who pays in the UK?

- The Petroleum Act 1998 ("the Act") (as amended by Energy Act 2008) for offshore (O&G) installations and pipelines seeks to ensure companies which established offshore (O&G) installations /pipelines carry out decommissioning of those facilities and **neither responsibility nor cost should fall to the taxpayer**.
- Guidance note explains steps government takes to **ensure taxpayer is not exposed** to undue risk from companies' defaulting on obligations leaving government/taxpayer with decommissioning responsibilities.
- Government must be confident that each group of companies with an interest in an offshore O&G installation (incl. connected wells) and pipeline **is always capable of meeting their decommissioning liabilities** (regardless of when that liability may be realised).
- Government expects owners of offshore installations, connected wells, and pipelines **to have adequate financial planning arrangements** in place to meet decommissioning liabilities.

Source:

UK: Residual Liability & Legacies: Principles

- Parties who own an installation at time of decommissioning remains owners of any residues/remains after decommissioning.
- In addition, those with a duty to ensure decommissioning programme is carried out will **remain responsible** for complying with any conditions attached to Secretary of State's approval of decommissioning programme.
- Residual liability **remains with owners in perpetuity**, and continued contact will be required as part of close out report and OPRED must be notified of any changes to company structure/domicile.
- OPRED encourages industry to **work collaboratively** to develop mutual management plan to manage ongoing monitoring/legacy of infrastructure remaining *in situ*.
- In cases of potential default where OPRED concerned that current parties may no longer be able to carry out approved programme they may consider using 1998 Act to impose obligation on additional companies to carry out work.

Source: DECC Guidance Notes Decommissioning Programmes https://www.og.decc.gov.uk/regulation/guidance/decomm_guide_v6.pdf

Key messages

- Most of the material from decommissioning can be recycled
- The biggest challenge is finding the appropriate balance between environmental performance and technical & economical availability
- Tools to manage environmental impacts in decommissioning include Multi Criteria Decision Analysis (MCDA), Comparative Assessment (CA) and Best Available Techniques (BAT)
- Decommissioning costs can be very high, especially for large and complex offshore infrastructure, but the expertise and innovation is growing rapidly
- Governments play an important role to ensure companies are always capable of meeting their decommissioning liabilities