



Oil and Gas Decommissioning Toolkit

Practical Guidance for Governments



The Commonwealth

Oil and Gas Decommissioning Toolkit

Practical Guidance for Governments

'Begin with the end in mind'

Prepared by Naadira Ogeer, Economic Adviser –
Oceans and Natural Resources Division,
Commonwealth Secretariat

This publication has benefitted from research assistance
and support provided by Rebecca Hitchin

Views and opinions expressed in this publication are
the responsibility of the author and should in no way be
attributed to the institutions to which they are affiliated or
to the Commonwealth Secretariat.

© Commonwealth Secretariat 2022

All rights reserved. This publication may be reproduced,
stored in a retrieval system, or transmitted in any form
or by any means, electronic or mechanical, including
photocopying, recording or otherwise provided it is
used only for educational purposes and is not for resale,
and provided full acknowledgement is given to the
Commonwealth Secretariat as the original publisher.

Wherever possible, the Commonwealth Secretariat uses
paper sourced from responsible forests or from sources
that minimise a destructive impact on the environment.

Published by the Commonwealth Secretariat.

ISBN (paperback): 9780850920031

ISBN (e-book): 9780850920048

Contents

Abbreviations and Acronyms	v
Executive Summary	1
1. Introduction	2
2. What is Decommissioning?	3
2.1 Factors that influence the timing of decommissioning	3
2.2 Decommissioning phases	4
2.3 Offshore decommissioning options	5
3. Key Issues and Implications for Governments	8
3.1 Limited country and company experience in decommissioning	8
3.2 Environmental and safety risks	9
3.3 Scale and uncertainty of decommissioning costs	11
3.4 Financial assurance	12
3.5 Socio-economic impacts	15
3.6 Public acceptance of decommissioning options	17
3.7 Weak regulatory and liability frameworks	17
3.8 Energy transition and bankruptcy risks	20
4. Elements of a Robust Regulatory Regime	24
4.1 Principles and policy framework	24
4.2 International and regional obligations and commitments	25
4.3 Clear and coherent legal framework	26
4.4 Well-resourced institutions with access to technical expertise	33
5. Recommendations for Governments	34
6. Appendices	36
Appendix A Types of Financial Assurance Mechanisms	36
Appendix B Decommissioning in International Legal Frameworks	37
Appendix C Checklist for Decommissioning in Legal Framework	42
Appendix D Model Provisions for Decommissioning	49
References	64

Abbreviations and Acronyms

AER	Alberta Energy Regulator
CBD	Convention on Biological Diversity
CoP	cessation of production
DTF	decommissioning trust fund
FDP	field development plan
FID	final investment decision
FPSO	floating production, storage and offloading (infrastructure)
IMO	International Maritime Organization
IOC	international oil company
JMC	Joint Management Committee
LCLP	London Dumping Convention/ London Protocol
LLR	licensee liability rating
M&A	mergers and acquisition
nm	nautical miles
NOC	national oil company
NOGA	Northern Oil & Gas Australia
NORM	naturally occurring radioactive material
OSPAR (Convention)	Oslo and Paris Convention on the Protection of the Marine Environment in the Northeast Atlantic
OWA	Orphan Well Association (Canada)
P&A	plugging and abandonment (of wells)
POD	plan of development
PSC	production sharing contract
RtR	rigs-to-reef
REC	Redwater Energy Corporation
UKCS	UK continental shelf
UKOGA	UK Oil and Gas Authority
UNCLOS	UN Convention on the Law of the Sea




Executive Summary

This Guidance highlights the following key issues associated with decommissioning which have significant implications for governments:

1. Relative to other oil and gas activities, decommissioning is at an infancy stage with limited country and company experience
2. Decommissioning carries significant environmental and safety risks which should be factored across the entirety of a project's life cycle.
3. Decommissioning costs are extremely large and can easily amount to billions of US dollars. Estimates are subject to large uncertainties and can increase significantly closer to the time when decommissioning activity is required.
4. Decommissioning occurs when the asset no longer generates revenues. It is therefore imperative that there are adequate funds available when needed – i.e. an effective financial assurance mechanism is in place.
5. As decommissioning is at a relatively early stage across the world there is limited technical guidance and experience in managing complex social and economic aspects.
6. The local communities and general public are important stakeholders that need to be considered as fields enter the decommissioning phase. Experience has shown that without early engagement, data driven debate and timely communication, there can be resistance and opposition to a selected decommissioning solution.
7. In many jurisdictions the regulatory and liability frameworks for decommissioning is weak – ultimately posing significant risk to the public and the taxpayers.
8. The energy transition and growing bankruptcy rates in the sector are increasing the decommissioning risks to countries.

A summary of the key recommendations to help address key challenges associated with decommissioning is shown below:

Recommendations

 <p>Understand decommissioning risks to the country</p>	<p>In order to deal appropriately with the multi-faceted challenges, urgent early comprehensive assessment is critical on:</p> <ul style="list-style-type: none"> <input type="checkbox"/> The country's decommissioning outlook <input type="checkbox"/> Financial assurance mechanisms <input type="checkbox"/> State's financial exposure for example from: <ul style="list-style-type: none"> - Transfer of assets at end of contracts - National Oil Company decommissioning liabilities <input type="checkbox"/> Decommissioning regulatory regime <input type="checkbox"/> Socio-economic fragility of towns and communities <input type="checkbox"/> Technical expertise required
 <p>Strengthen regulatory regime</p>	<p>Regulatory weaknesses should be remedied in a timely manner to minimize financial, social and environment risks. Adoption of a life-cycle approach is critical i.e. from project design to management of residual risks post-decommissioning.</p>
 <p>Collaborate</p>	<p>Coherent, context appropriate policies, legal requirements and procedures requires adoption of a collaborative approach with</p> <ul style="list-style-type: none"> <input type="checkbox"/> National stakeholders e.g. companies, industry bodies, communities, NGOs <input type="checkbox"/> Policy makers and regulators from other countries

1. Introduction

Decommissioning is the final stage of an oil or gas project. At the end of a field's life, when production has ceased, decommissioning is the process whereby the hydrocarbon reservoirs are isolated and associated infrastructure is removed and disposed of, so that the producing area is left in a safe and environmentally acceptable condition. Decommissioning is a long, costly and complex process, requiring co-operation by the key stakeholders to manage technical, economic, operational, social and environment issues.

As decommissioning is the last set of activities to occur on assets with a lifespan of typically 30–50 years, it is not often an area of great focus until near the end of an asset's lifespan. This poses significant risks to the country and its citizens.

If decommissioning activities are not properly executed, there can be potentially disastrous consequences to the environment, public health and safety, as well as negative impacts on other economic activities. Additionally, decommissioning costs are significant and will be required at a time when there is little or no income from a project. If not planned for appropriately in advance, there may not be sufficient funds available to execute decommissioning activities, which can result in significant cost to taxpayers.

It is therefore important that decommissioning is adequately addressed by the government in its capacity as the regulatory authority for the sector.

Decommissioning must be planned and considered throughout the lifespan of projects, to safeguard the country's interests.

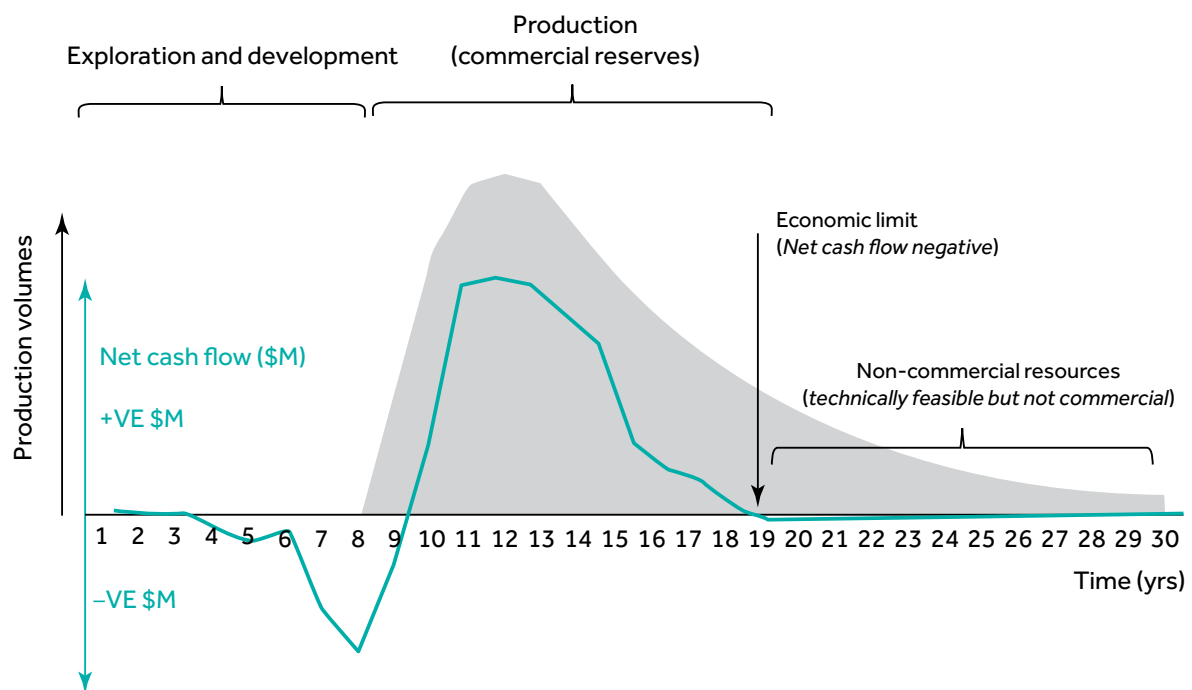
This document seeks to provide guidance to governments on:

1. What decommissioning is, and the factors that can influence the timing and costs.
2. The key issues associated with decommissioning and their implications for governments.
3. What constitutes a robust regulatory framework for oil and gas decommissioning. A checklist is included to assess and identify areas for strengthening in the existing regime (see Appendix C). Illustrative legal provisions are also provided for countries to consider (see Appendix D).
4. Recommendations for effective management of oil and gas decommissioning.

2. What is Decommissioning?

The life cycle of a petroleum project consists of four stages – exploration, development, production and decommissioning. As a field passes its peak production and begins to decline (commonly referred to as a 'mature field'), multiple options are explored to extend the productive life of the asset. When the costs of maintaining or extending production are greater than the associated revenues, the asset is no longer economically viable and has reached its 'economic limit'. While it may be possible to continue production, there is no commercial imperative to do so – as the project's ongoing net cash flows would be negative, as illustrated in Figure 2.1. It is at this point that the operator will cease operations (referred to as 'cessation of production' [CoP]) and take measures to decommission the field.

Figure 2.1 Production and net cash flow over the lifecycle of a petroleum project



Note: grey (as a square): production volumes teal line: net cash flow

2.1 Factors that influence the timing of decommissioning

When the owners of a discovery make a final investment decision (FID) to develop and produce the hydrocarbons in a field, it is underpinned by cash flow analysis based on assumptions on resource size, production rates, prices, costs etc. There is, therefore, a view of when a field will cease production before it is even developed. In countries with robust regulatory regimes, this information is required before approval to develop a project is granted.

There are, however, so many variables that can change post-FID that the actual economic limit for the project may be very different than originally anticipated. Any variable which results in higher-than-expected revenue (resource size, higher prices) or lower costs (for example, drilling, operating) will extend the productive life of the asset. Conversely, variables that lead to lower revenues or higher costs will accelerate the asset's economic limit. Operators continually assess the future cash generating potential of a field and pursue opportunities to extend positive cash flows, such as enhanced recovery methods,¹ satellite

1 Or tertiary production: increasing the amount of hydrocarbon that can be recovered from a reservoir by injecting a substance into a well to increase pressure and reduce the viscosity. For example, steam, gas (natural gas, nitrogen or carbon dioxide) and chemicals.

developments, transportation and processing services to other fields. Other factors that can influence the economic limit are technological advancements (which ultimately result in improved production and/or lower costs), regulatory changes (for example, changes in fiscal terms, additional compliance measures), and the structural integrity of production facilities and associated infrastructure. The weather can also influence cessation of production (CoP), as storms and hurricanes can severely damage the integrity of facilities and/or the cost of repairing may be prohibitive. For example, in the Gulf of Mexico there was increased demand for decommissioning resources following Hurricanes Katrina, Rita and Ike, as several platforms were damaged and destroyed.

With operators pursuing various options to extend the productive life of assets and the advent of new technologies, it is very common for a field to remain operational well beyond its initial design lifespan. For example, the Brent Field in the North Sea had an expected lifespan of 25 years when discovered, but is being decommissioned 40 years after production first started.

2.2 Decommissioning phases

Cessation of production (CoP) occurs when all economically recoverable reserves have been produced. The CoP decision is important to both the investor and the state, and will be made after careful consideration of possibilities to extend the asset's productive life. Although the timing of CoP may be uncertain, decommissioning is the inevitable end of any oil and gas development and involves the following three stages:

- 1. Planning and approval.** All projects should be designed with 'the end in mind', and a preliminary view of decommissioning should be submitted as part of project approval, that is, the field development plan (FDP) also referred to as the plan of development (POD). Naturally, this would be an initial view, which as CoP nears would require rigorous evaluation of the various potential decommissioning options. This would entail a wide range of detailed studies on the technical/engineering aspects, assessing alternative uses of the assets, comparison of environmental impact options, as well as consultations with stakeholders. The technical, economic, HSE (health, safety, environment) and social implications must be carefully considered, in order for the operator to arrive at a recommended decommissioning option.

The government's approval of the preferred decommissioning option will need to be factored into timelines, as well as co-ordination for other regulatory approvals. Not surprisingly, it requires several years to develop a decommissioning plan that is approved by the regulator. As an example, in the North Sea, three to five years is considered a typical timeframe for this stage.² Procurement of various subcontractors and equipment etc. to execute the selected decommissioning option will also have to be included in the operators' planning.

While decommissioning should be carried out as soon possible following CoP, it may be reasonable to defer some or all of the decommissioning operations to a future date in certain circumstances. For example, there may be benefits from conducting decommissioning in a phased manner or through a campaign approach (co-ordinating with other projects). When decommissioning is deferred, there should be arrangements for maintaining the un-decommissioned assets.

- 2. Decommissioning operations.** The specific activities to decommission a field can be described as the reverse of the development phase. To develop a field, whether onshore or offshore, requires the drilling of wells and construction of several types of facilities to collect, process, store and export petroleum and its by-products – which will include platforms, pipelines, gathering stations, storage tanks and loading terminals. Decommissioning activities therefore consist of:
 - Plugging and abandonment (P&A) of wells to safely isolate and disconnect hydrocarbon reservoirs from the surface.

² DECC Document Template – Standard Numbering (publishing.service.gov.uk). See: Department for Business, Energy & Industrial Strategy (2018), Guidance Notes: Decommissioning of Offshore Oil and Gas Installations and Pipelines, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/760560/Decom_Guidance_Notes_November_2018.pdf

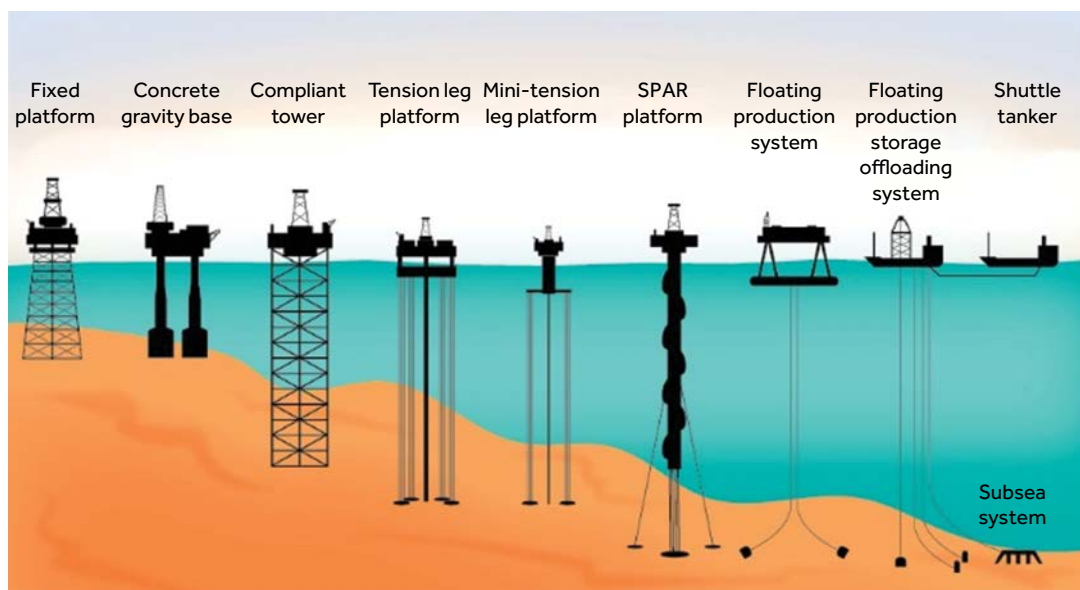
- Cleaning of facilities to remove hydrocarbons and hazardous materials.
- Removal, disposal or otherwise handling of installations. The decommissioning options for dealing with physical structures are either to leave in place (in situ) or to remove (either partial or total) and thereafter either dispose of or recycle, on land or in the sea. The specific decommissioning option chosen will depend on several factors, including the installation's location (onshore, offshore), the type of facilities, alternative uses for the infrastructure, environmental impacts, safety, costs and regulatory requirements. Decommissioning options for offshore developments must factor in additional considerations, which are described in Section 2.3.
- Site restoration for areas disturbed by production operations. This will enable the potential productive use of the area by individuals and the community in the future, such as for agriculture, fishing etc.

3. Post decommissioning. After decommissioning operations have been concluded, ongoing monitoring of structures not removed will be required to detect if there are any leaks or residual toxicity (by monitoring levels of hydrocarbons or other contaminants in wells, pipelines, in situ structures, drill cuttings), the state of the structures left in place and ongoing environmental impacts. The strategy for monitoring and reporting should be covered in the decommissioning plan.

2.3 Offshore decommissioning options

Offshore developments can vary greatly in size, configuration and function. As illustrated in Figure 2.2, these are determined by factors such as water depth, proximity to existing infrastructure, environmental impacts and economics. Options to decommission must therefore consider the structures above water (topsides) and those underwater (substructures), including pipelines, as well as the treatment of waste, in particular drill cuttings.

Figure 2.2 Types of offshore developments

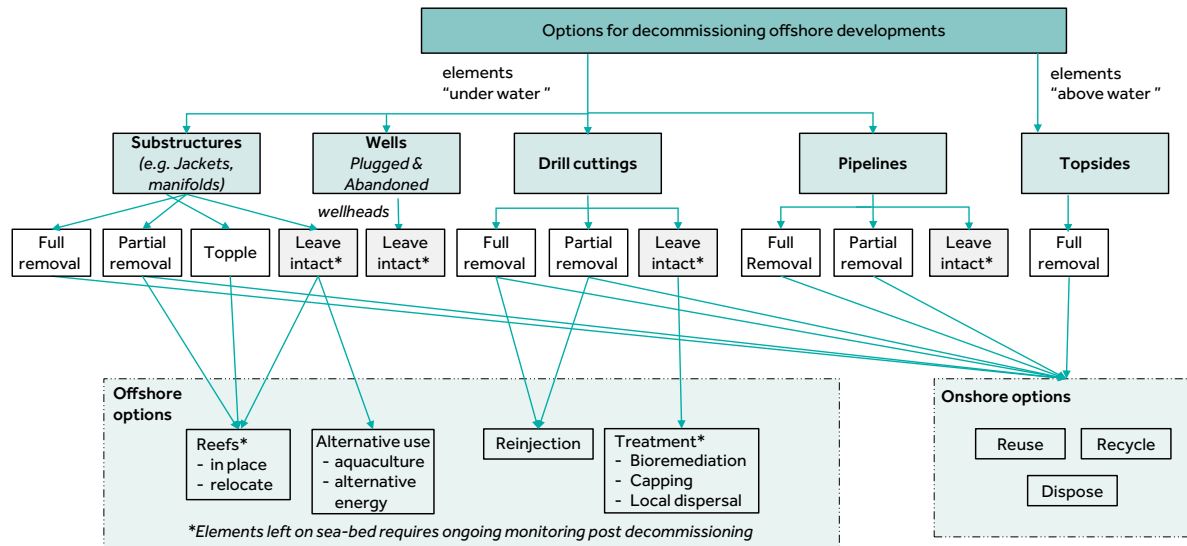


The topsides are typically taken onshore for disposal and/or recycling and reuse. The size of the topsides will determine the complexity of removal operations. Smaller topsides can be removed in a single lift and towed to shore. However, larger installations will require dismantling on-site prior to multiple lifts. Substructures can be left in place, toppled on-site or removed. Removed substructures can either be recycled, reused, disposed of onshore, disposed elsewhere offshore for alternative uses (for example, as an artificial reef to be promoted in diving tourism or as a fish aggregation device for use in fisheries or aquaculture), or left in situ for reuse by other energy industries, such as renewables.³ The options for

³ Recharge (2021), 'World's first offshore green hydrogen project on an oil platform gets go-ahead', available at: <https://www.rechargenews.com/energy-transition/worlds-first-offshore-green-hydrogen-project-on-an-oil-platform-gets-go-ahead/2-1-1043998>

dealing with any drill cuttings pile are to leave in situ or removal (lifted to the surface for treatment, taken onshore for treatment and disposal, or re-injected down new or water injection wells). These options are illustrated in Figure 2.3.

Figure 2.3 Offshore decommissioning scenarios



Rigs-to-reefs (RtR)

Rigs-to-reefs programmes are present in a number of countries, but are most advanced in the US's Gulf of Mexico states, where 11 per cent of decommissioned platforms have been adopted into state artificial reef programmes.⁴ While the Gulf of Mexico contains the majority of current rigs-to-reefs activity and legislation, several Commonwealth countries also have considerable experience of the creation of artificial reefs. Please see Box 2.1.

Whether a decommissioned rig is suitable for use as an artificial reef depends on several criteria, especially the materials used in the rig, the levels of maintenance and monitoring undertaken on the rig during its life, siting of the rig, and the possibility of liability transfers.⁵ Criteria for disposal sites are also numerous, including water depth, oceanographic conditions, water quality, proximity to other users of the sea, marine planning criteria and access to sources of larvae for reef recruitment.⁴

Drill cuttings

'Drill cuttings' are ground up rock fragments recovered during the drilling of wells into oil and gas reservoirs. 'Drilling mud' is the fluid circulated around the well to lubricate the drill bit, transport the cuttings to the surface and keep the hole from collapsing, and to balance the reservoir pressure to prevent uncontrolled release of hydrocarbons. When the drilling mud comes to the surface, the fluid is recovered on the drilling rig and the cuttings are discharged as waste product. The size of the drill cuttings piles on the seabed can be large. In a survey of cuttings piles on the UK continental shelf, Henry et al.⁶ (2017) noted that cuttings piles were sized from 500m to 1200m (radius), while the Brent field cuttings piles were characterised as between 20,047 and 22,444m³ in volume.⁷

- 4 Bull, A and MS Love (2019). 'Worldwide oil and gas platform decommissioning: A review of practices and reefing options', *Ocean & Coastal Management*, Vol 168, 274–306, available at: <https://doi.org/10.1016/j.ocecoaman.2018.10.024>.
- 5 Jagerroos, S and PR Krause (2016). 'Rigs-To-Reef; Impact or Enhancement on Marine Biodiversity', *Journal of Ecosys Ecograph* 6, 187. doi:10.4172/2157-7625.1000187
- 6 Henry, LA, D Harries, P Kingston, JM Roberts (2017). 'Historic scale and persistence of drill cuttings impacts on North Sea benthos', *Marine Environmental Research* Vol 129, 219–228.
- 7 Brent Alpha 20047m³, Brent Bravo 21761m³, Brent Charlie 22,444m³, Brent Delta 21,616m³, estimated volume of OPF-contaminated drill cuttings (Shell 2016 supporting document BDE-F-SUB-BA-5801-00001 to the Brent Field Decommissioning Programme).

The toxicity of these drill cuttings piles depends on the type of mud that was used during drilling operations. Two main types of drilling mud have been used – oil-based (diesel and synthetic) and water-based muds. Oil-based muds and the discharge of oil-based mud contaminated cuttings are now broadly prohibited from use in a number of countries and regions, including the USA, Nigeria, Saudi Arabia and the OSPAR (Oslo and Paris Convention on the Protection of the Marine Environment in the Northeast Atlantic). From a decommissioning perspective, what is important is what fluids were used during drilling activity. As oil-based mud was frequently used in the past, the legacy issue of contaminated cuttings piles persists.

In many cases, the preferred option is to leave the drill cuttings in place and most decommissioning plans are based on minimising disturbance. For example, the use of internal (rather than external) cutting methods used to release jacket legs from their foundations results in smaller volumes of cuttings being displaced. If cuttings are disturbed, there may be consequences to the environment and other users of the sea.⁸

Box 2.1. Commonwealth experience of rigs-to-reefs (RtR)

Malaysia: Of the 300 fixed offshore platforms located in shallow waters, 60 per cent are nearing the end of their production life (Jagerroos and Krause 2016). Three major RtR initiatives have been undertaken in Malaysia to date, with a history back to the 1970s of smaller local reefing initiatives to aid the fisheries industry. Baram-8 was a single well three-legged wellhead and jacket, located 8 nautical miles (nm) off the coast of Miri, Sarawak, that was damaged in a storm in 1975. Decommissioning started in 2001, and the local fisheries department requested that reefing occur; it was placed in 2004 at around 60 feet (ft) offshore from Miri. A 2012 monitoring survey showed that the structure had grown into a functional reef structure, with high abundances of soft corals, sponges and fish.

In 2017, the Dana and D30 platforms were also laid out as artificial reefs in Sarawak.

Brunei Darussalam: Close to 150 installations located within 200 nautical miles of the Brunei coastline are 20 years old or older (Lyons et al. 2013). The Brunei RtR policy was introduced in 1988, and decommissioning policies include the 2009 Guidelines for Decommissioning, Abandonment and Restoration of the Oil and Gas Industry Assets. Two sets of structures were disposed of as artificial reefs near Two Fathom Rocks. The first set of structures (1988) consisted of two platforms, and the second (1994) of five jackets. The oil and gas installations used were based in 16–60m and the jackets weighed between 85 and 165 tonnes.

Australia: Currently, the National Offshore Petroleum Safety and Environmental Management Authority is exploring the possibility of supporting an in situ decommissioning policy. Woodside is currently proposing that an artificial reef is created from the disused Nganhurra long riser turret mooring. This would be placed close to the Ningaloo Coast Reef World Heritage Area.

⁸ See OSPAR, Implementation report on Recommendation 2006/5 on a management regime for offshore cuttings piles <https://www.ospar.org/documents?v=7170>

3. Key Issues and Implications for Governments

3.1 Limited country and company experience in decommissioning

While more than 95 countries have producing oil and gas fields, there is limited experience in decommissioning these fields. The notable exceptions often cited are the United States (Gulf of Mexico) and the North Sea (United Kingdom and Norway). With more than 70 per cent of the world's production⁹ coming from mature fields and flowing through ageing infrastructure, many fields will soon reach their economic limit. Decommissioning is therefore set to become a key issue for the industry.

It is estimated that more than 50,000 offshore wells and 10,000 offshore structures will be decommissioned worldwide, along with hundreds of thousands of onshore wells, facilities and sites.¹⁰ As an illustration of the increasing activity, the offshore decommissioning market alone is expected to grow from US\$2.4 billion in 2015 to US\$13 billion-per-year by 2040.¹¹

When the majority of these ageing fields were initially developed (some as early as the 1970s), decommissioning was not an area of focus and the governing legal instruments were not clear on its treatment, including reporting requirements. Governments therefore may not have a country-wide view of the costs, timing and level of decommissioning activity that is likely to occur. Depending on the regulatory framework in place, there may also be limited information about the inventory of wells, hazardous materials and various facilities.

Given the nascent stage of the decommissioning industry, there will be emerging best practices and learnings in dealing with these legacy issues, as well as in other areas such as technologies, cost estimating and project execution. As companies build experience and expertise, specialist firms are likely to arise with implications on how activities may be planned and executed. For example, outsourcing decommissioning to an independent company, instead of the current model of the oil and gas companies planning and executing activities. Government institutions will also build capacity in dealing with decommissioning as activity increases. Collaboration among regulators and other agencies could be useful in transferring learnings and best practices.

Implications for governments

1. It is important for government to have a national perspective on the timing and scale of decommissioning, to ensure that adequate plans are in place and a coherent approach to the issue is adopted. Depending on the context, a country-wide strategy may yield significant benefits to the companies and country.
2. A critical first step towards developing a national approach is understanding the timing and inventory of all wells, facilities, associated installations, materials etc. that will have to be dealt with during the decommissioning phase. These should ideally be available in FDPs, but this may not be applicable for many mature fields. In such cases, governments should engage with operators to understand CoP, the scope and timing of expected decommissioning activities, and the potential cost for those activities (the decommissioning liabilities).
3. Recognising the nascent stage that decommissioning is at, it is important for the national policy and strategy to promote collaboration among companies to transfer learnings and best practices.
4. Governments should explore opportunities to learn from peers in developing national strategies, strengthening regulatory oversight and effective engagements with operators.

⁹ Halliburton, available at: <https://www.halliburton.com/en-US/ps/solutions/mature-fields/about-mature-fields.html>

¹⁰ Boston Consulting Group (2019), *Oil and Gas Needs Decommissioning Models That Work at Scale*, available at: <https://www.bcg.com/publications/2019/oil-gas-decommissioning-models-work-at-scale>

¹¹ IHS Markit Offshore Decommissioning Study Report (2016).

3.2 Environmental and safety risks

There are large-scale environmental and safety risks associated with decommissioning, which may arise from the hazardous nature of hydrocarbons and decommissioning activities (pollution, oil spills, fires, accidents, explosions etc), as well as the remaining residual risk after decommissioning is completed.

The selected decommissioning option should minimise the impact on the environment, risks to public health and consider the safety of workers and the public. Some of the key areas that need to be addressed are:

- Ensuring that hydrocarbons from reservoirs that were produced through wellbores do not escape or migrate and contaminate freshwater aquifers, surface soils and surface waters.
- Ensuring the appropriate disposal and/or containment of hazardous substances and waste materials. Throughout the productive life of oil and gas assets, significant amounts of contaminants such as mercury, lead, iron sulphides, iron oxides and naturally occurring radioactive material (NORM) would have either been used or generated from the production process. These contaminants may be contained within the facilities (for example, within pipelines, at processing facilities) or stored as waste (for example, drill cuttings) and there will also be trace amounts of hydrocarbons in the system. These contaminants will have to be drained, purged and appropriately dealt with. If not, they will pose a risk to public health, the environment and the reusability of the area (for example, for agriculture, fishing).
- Ensuring the risks and potential effects on the ecosystem are carefully considered in selecting the decommissioning option. For example, loss of biodiversity, destruction of habitats and the release of hazardous materials. For offshore decommissioning, these will also include impacts on fishing, navigation, any marine protected areas the assets sit within, and long-term impacts of remaining structures. Structures left in situ will deteriorate over time and be susceptible to structural failure, which has implications for nearby activity and infrastructure. How these structures may be impacted from natural disasters, such as hurricanes, should also be considered. In addition, installations that have been in place for a very long time (easily 30 years or more) become part of the local ecosystem. Disturbance and/or removal can also have negative environmental and ecological impacts, and the best option will need careful consideration. The concept of 'net environmental benefit' is used to ensure that the overall environmental impact is minimised. For example, offshore drill cuttings generally are left in situ, as the impacts are relatively minor compared to the broader environmental, safety and health risks from returning the site to its pre-disturbed state (removing cuttings from the seabed, transporting ashore, handling and loading onto trucks for disposal in municipal landfill).
- Ensuring that significant environmental and safety risks in performing the actual operations (for example, P&A, dismantling, transporting, disposal) are effectively managed. For example, dismantling operations will generate noise, dust, odour and traffic, in and around the site over a significant period of time. The safety of the personnel conducting the decommissioning activity needs to be considered, as well as the total energy and raw material usage, including carbon emissions.
- Ensuring that there is adequate monitoring by an appropriate institution after decommissioning activities have been completed, to understand the residual risks.

'Residual risk' refers to the ongoing potential pollution and incidents that may arise after decommissioning is completed. For example, if only partial removal of an offshore platform occurs, this means that the remaining structure may take hundreds of years to degrade and therefore continues to pose some risk to the environment and other users of the marine space. In a recent UK decommissioning plan for Brent, it was suggested that the structures below sea level would take up between 500 and 1000 years to disintegrate. Residual risk also exists for wells that have been plugged and abandoned. The failure of barriers could occur at any time in the future and hence the risk of leaks, pollution and associated costs is a perpetual risk. Leaks from abandoned wells have long been recognised as an environmental problem, a health hazard and a public nuisance. They also pose a serious threat to the climate, which researchers and world governments are only now starting to understand. For example, according to the US Environmental Protection Agency, in 2018 more than 3 million abandoned wells emitted 281 kilotons of methane, at least as much environmental

damage as consuming about 16 million barrels of oil.¹² There are also the risks of explosion, soil and water contamination, and release of air pollutants, and fugitive emissions.

It should be obvious that the design, maintenance and monitoring of wells, and all associated facilities and materials, will heavily influence the environmental and safety risks and the selected decommissioning option. A particular challenge for many countries with mature producing fields is that there may not be comprehensive information about the assets, materials used and the integrity of associated infrastructure. Determining the optimal decommissioning solution is therefore very complicated in instances where there are many unknowns concerning the assets; this, in turn, increases the health, safety and the environment risks.

Implications for governments

1. Governments should undertake an industry-wide inventory assessment of all oil and gas assets, to understand the environmental and safety risks they pose and to have a preliminary view of decommissioning options being considered by operators.
2. Governments should ensure that the regulatory framework for the design of oil and gas projects and ongoing petroleum operations includes decommissioning and is based on international principles, such as the precautionary principle and polluter pays principle. The framework should also embed best practice to minimise environmental and safety risks during and after decommissioning. For legacy arrangements that did not contemplate or adequately address decommissioning, the government should seek specialist legal advice.
3. In approving new oil and gas projects (Field Development Plans or Plans of Development), governments should ensure that decommissioning is contemplated appropriately. Governments should consider adopting a policy of full removal as the default expectation for all projects, with any deviation from full removal requiring justification. This would incentivise operators and environmental regulators to proactively determine the data required over the whole life of the asset(s).
4. Government should ensure that appropriate and credible data are available to effectively evaluate the net environmental impact of decommissioning options. This underscores the importance of an environmental impact assessment and access to appropriate baseline, scientific research and ongoing environmental monitoring and reporting to inform selection of the appropriate decommissioning solution at the end of the asset's useful life.
5. Governments should understand what ongoing environmental monitoring is required post-decommissioning (for example, groundwater, presence of hydrocarbons including methane, species abundance and diversity) and how this will be implemented.

¹² Groom, N (2020), 'Special Report: Millions of abandoned oil wells are leaking methane, a climate menace', Reuters, available at: <https://www.reuters.com/article/us-usa-drilling-abandoned-specialreport-idUSKBN23N1NL>

3.3 Scale and uncertainty of decommissioning costs

Decommissioning costs, like development costs, can vary significantly from project to project and can easily amount to billions of US dollars. Estimating decommissioning costs for a particular project requires making assumptions on cessation of production (CoP), when decommissioning operations will occur, how each aspect of the operations will be performed (wells, pipelines, platforms etc.), and estimating how much those costs will be in the future (escalating current estimates for inflation). Credible estimates for decommissioning costs therefore require various technical experts' inputs; this is similar to estimating development costs, but with the added complexity of the uncertainty of timing (several decades into the future). It therefore follows that decommissioning costs will be of the magnitude of development costs (ranging from millions to billions of US dollars), complex and subject to a large uncertainty range.

Benchmarking is often used in the industry for estimating costs, but this depends on the availability and access to comparative data. On a global scale, this is fairly limited for decommissioning, given its relatively small scale (versus exploration or development). The United States (onshore and Gulf of Mexico) and the North Sea are noted areas with a history of decommissioning activity and, as such, tend to be used as benchmarks for estimating costs. While this may be a useful reference, it is important to understand the underlying assumptions that have been used to estimate the costs, as small changes in the assumptions can lead to very large changes in the total cost. Different regulatory requirements will also have cost implications. Regional differences in weather, sea states, water depths and distances from shoreline facilities can also affect decommissioning costs.

The two global frameworks for accounting and financial reporting¹³ require companies to recognise a decommissioning liability at the point of installation of an asset and, thereafter, subsequent material changes. These disclosures have been established for shareholders to understand the impact on a company's future cash flows, given the scale of decommissioning costs. Regulators should, therefore, be well-versed in understanding the different accounting treatments, to understand the implications of what is being reported in the financial statements for developments in their jurisdiction.

In addition to understanding the costs for a particular project, it is also important to understand the decommissioning picture at the country level. This will require clear definitions and a standardised approach to data collection from companies on an ongoing basis. For example, in the UK, each year operators are required to provide estimates for all fields according to standard cost classifications¹⁴ to the regulator – the UK Oil and Gas Authority (UKOGA). Based on data collected, the UK expects to spend over £15 billion on decommissioning activity in the next decade, with a total anticipated spend of around £50bn for all UK continental shelf (UKCS) liabilities¹⁵. The UKOGA has adopted a probabilistic approach in estimating these costs, recognising the uncertainties inherent in cost estimates. As an indication of the uncertainty range, the 2019 estimate ranges from £33bn to £81bn (as shown in Figure 3.1). The UKOGA, in collaboration with the industry, is actively pursuing a strategy to achieve more than 35 per cent cost reduction from the 2017 P50 estimate of £59.7bn – that is, targeting £39bn of costs.

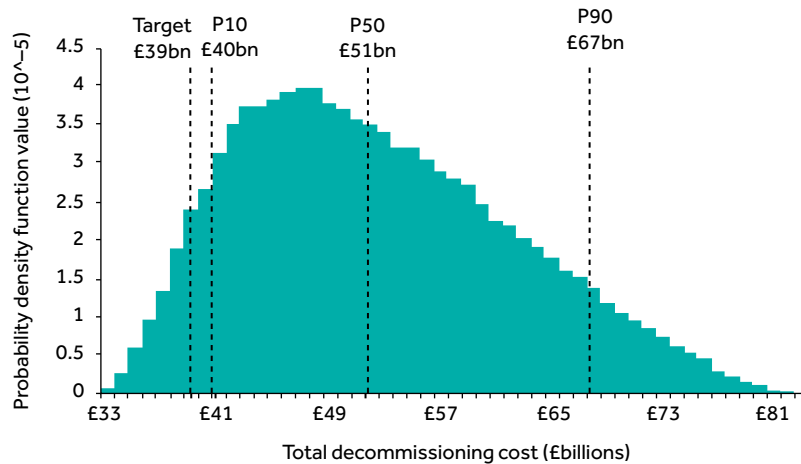
The scale of decommissioning costs has direct implications for the government, as there will be tax implications depending on the fiscal regime. For example, Wood Mackenzie forecasts that in future tax relief in the UK will be around £25 billion (45% of costs) and in Norway around US\$90 billion (78% of costs).

13 International Accounting Standards (IAS16 – Property, Plant and Equipment; IAS37 – Provisions, Contingent Liabilities and Contingent Assets) and the US Generally Accepted Accounting Principles (GAAP).

14 Costs are reported in the following Work Breakdown Structure (WBS) elements: project management, post-CoP running costs, well-decommissioning, facilities and pipelines permanent isolation and cleaning, topsides preparation, topsides removal, substructure removal, topsides and substructure onshore disposal, subsea infrastructure, site remediation, and post-decommissioning monitoring.

15 UK Oil and Gas Authority UKCS Decommissioning Cost Estimate 2021 (July 2021).

Figure 3.1 Decommissioning cost distribution for UKCS



Source: Oil and Gas Authority (2019), UKCS Decommissioning: 2019 Cost Estimate Report, available at: <https://www.ogauthority.co.uk/media/5906/decommissioning-estimate-cost-report-2019.pdf>

Implications for governments

1. Governments should have policies and regulations in place that require licensees to estimate decommissioning costs and update them regularly. Licensees should also be required to update decommissioning costs when changes to the operation of the field are likely to materially affect these costs.
2. Decommissioning cost estimates are uncertain and require regular reassessment during the production phase. Government should understand how decommissioning costs are calculated and what the underlying assumptions are. Assumptions about future events should be supported by sufficient objective evidence. Governments will also have to strike the right balance in the frequency and level of detail required in reforecasting decommissioning costs. Given its nature, detailed reforecasting in the first years of production is likely to yield very little benefit. Likewise, it would be foolhardy to wait until only a few years before cessation of production to look at detailed cost estimates.
3. Encouraging transparency and a collaborative industry approach would be important mechanisms to reduce costs through leveraging economies of scale and learnings. This is of crucial importance to countries where there are significant mature fields and ageing infrastructure.
4. Governments should understand how decommissioning is being treated in companies' financial statements, as this could prove a helpful basis for regulators to understand costs on an ongoing basis. This should only be used as an indicator, rather than the primary information source for regulatory oversight.
5. Regulators working together with the industry can develop a standardised approach and definitions for estimating decommissioning costs and to provide templates to operators. This could greatly aid in ensuring completeness in costs estimation, consistency and comparability among operators. This would enable a regulator to benchmark costs, understand performance of actual costs versus estimations (to inform other forecasts), and to build confidence in estimates as decommissioning activity increases.

3.4 Financial assurance

Decommissioning is a significant cost for a company when there is little or no revenue from a project. Given the magnitude of costs, it is critical that there are mechanisms in place to ensure that there are sufficient funds available to carry out the decommissioning activities. If this is not planned for appropriately, there is

a possibility that the company may not want to fund the activities or may not have the financial resources to complete decommissioning – either because costs are higher than anticipated or the company is in financial distress or bankrupt. If such a situation arises, governments will likely have to undertake and pay for decommissioning, because it is in the public interest and/or because it is required to meet the country's international obligations.

There are different types of financial assurance mechanisms, which range from letters of credit, insurance and bonds to cash being held as dedicated funds for decommissioning purposes. Each option will have associated advantages and disadvantages, which should be considered from both the country and investor perspectives. Please see Appendix A for a summary of key options. Regardless of the type of instrument used, the tax treatment of decommissioning costs should be clear and aligned with national tax policy and laws.

As discussed in Section 3.3, there is a high degree of uncertainty in estimating costs. If it is not reviewed appropriately during the production phase, it is possible for the actual amounts required for decommissioning activities to be significantly higher than anticipated. In addition, there is a wide range of factors that affect the timing of decommissioning (please see Section 2.2) The financial assurance mechanism should be predicated on ongoing review of decommissioning timing and costs to avoid shortfalls in funding. Please see Box 3.1 describing Canada's evolving financial security mechanism.

Box 3.1. Canada's evolving financial security mechanism to deal with its multibillion-dollar 'orphan wells' problem

Alberta, Canada, has a long history of oil and gas production, beginning from the 1900s, and a huge orphan inventory. An 'orphan' is a well, pipeline, facility or associated site that does not have a legally responsible and/or financially viable party to deal with its decommissioning and reclamation responsibilities. To deal with the issue, a not-for-profit organisation, the Orphan Well Association (OWA), was established in the 1990s and primarily funded by the industry (via an orphan fund levy) to decommission these wells and restore the land. In 2020, there were almost 3,000 orphan wells, with fears that many of the more than 95,000 inactive wells might also become orphaned.¹ There were also roughly 300 orphan facilities, 3,800 orphan pipelines and more than 3,000 orphan sites for reclamation. As of 31 March 2021, the total remaining closure cost to deal with the orphan inventory was estimated to range from \$650 million to \$700 million (*OWA 2020/21 Annual Report*).

The introduction of the orphan fund levy by the Alberta Energy Regulator (AER) was to 'prevent closure costs from being borne by Albertans'. The annual levy is set by the AER in consultation with the OWA and industry bodies. The AER also introduced the licensee liability rating (LLR), to reduce the risk of new orphans being created.

The LLR was designed such that as a company's financial situation deteriorates, it would be required to make deposits to cover its clean-up costs. The LLR is assessed monthly and expressed as a ratio of deemed assets (a company's production, multiplied by an industry average netback based on a three-year rolling average of prices) to deemed liabilities (established based on the average cost to abandon a well). If the company's ratio of assets to liabilities is less than one — if it has more liabilities than assets — it must pay a security deposit to the AER. As at March 2020, Alberta's associated liability was ~\$31 billion; however, only \$225 million was held in financial security by the regulator.

The Government of Alberta and the AER have for many years indicated that the LLR is an inadequate measure of licensees' financial health and is currently in the process of replacing it with a 'more comprehensive License Capability Assessment System' and the introduction of minimum annual spending requirements towards clean-up costs.

1 Alberta's looming multibillion-dollar orphan wells problem prompts auditor general probe | CBC News

The financial assurance mechanism adopted must also cater for possible ownership changes during the life of the asset. The typical evolution of operatorship in the industry is for late-life or marginal fields to shift from large companies to smaller companies, whose business models, expertise and lower costs enable them to operate the assets more profitably. As the industry matures, the government should expect increased activity on asset swaps, divestments, mergers, acquisitions and other arrangements that transfer working interests in assets. These transactions have in many cases extended the life of assets; however, if decommissioning is not adequately provided for, there is a risk that these transfers increase the risk that assets will not be properly decommissioned. Smaller companies do not have the same balance sheet strength nor diversified portfolio as larger players. This means that they may not have sufficient financial resources or are more vulnerable to financial distress with adverse changes, which may hamper their ability to effectively discharge their decommissioning obligations in the future. In 2017, the US Bureau of Safety and Environmental Enforcement (BSEE) indicated that more than 20 per cent of active facilities in the Gulf of Mexico were operated by financially at-risk companies (449 of 2,104 facilities).¹⁶ After a series of bankruptcies, the US is in the process of strengthening its financial assurance mechanisms.¹⁷ A number of other countries, after experiencing similar problems, are also reviewing the adequacy of existing financial assurance systems. For example, Australia, Canada and New Zealand.

In addition, with growing awareness of the issue, ambiguity of the decommissioning liabilities has translated to lower transactions in mature basins, as smaller companies seek clarity on the rules and requirements for financial assurance. This was notably the case in the UK's North Sea, where the treatment of decommissioning was cited as a barrier to mergers and acquisition (M&A) activity.¹⁸

The issue of ownership transfers also represents particular challenges in countries with production sharing contracts (PSCs), as the governing legal instruments commonly provide for assets to be assigned to the government, most commonly to a national oil company (NOC). It should be noted that such transfers to the state or an NOC is also done under other types of petroleum agreements (concessions, risk service contracts). The underlying assumption was that these oil and gas assets would remain productive after the PSCs expired and would continue to be a source of revenue. However, many petroleum agreements (PSCs etc.) did not contemplate the funding of decommissioning activities and the level of financial assurance is generally low. This could mean that governments are poised to accept multibillion liabilities (rather than assets) through these transfers, which will have to be funded in the future. This could represent a massive drain on public finances in the future, diverting money that could have been spent on other public services.

Additionally, where the government owns an interest in oil and gas assets (state participation via an NOC or other means), its share of decommissioning costs will need to be funded. Given the large scale of decommissioning costs, the state's share could be significant and may be a source of financial distress – either to the NOC or the government if not planned for appropriately.

Implications for governments

1. Governments should implement appropriate financial assurance mechanisms to avoid taxpayers having to foot the bill for decommissioning costs. It is important that the financial mechanisms are robust, to ensure that the full amount of funds is available when required and can accommodate changes in ownership and transfers of interests.
2. Governments should recognise the importance of tax policy and laws as a key enabler towards effective management of financial exposure from decommissioning.
3. Governments should undertake an industry-wide assessment to understand the scale of decommissioning activity, the associated timeframes, costs, what financial mechanisms are in place and the level of funding gap that may exist. This will be a critical starting point for engagement with

¹⁶ Offshore Technology Conference, data presented as at 21 April 2017.

¹⁷ Bloomberg (2020), 'US Seeks Stricter Funding for Abandoned Offshore Oil Wells', available at: <https://www.bloomberg.com/news/articles/2020-09-17/u-s-seeks-stricter-funding-for-abandoned-offshore-oil-wells>

¹⁸ Norton Rose Fulbright (2017), 'Decommissioning – the key to M&A in the North Sea?', available at: <https://www.nortonrosefulbright.com/en/knowledge/publications/46380d36/decommissioning---the-key-to-ma-in-the-north-sea>

operators and owners on the risks and feasible options to address funding gaps, and to identify opportunities for industry solutions.

4. The state's decommissioning obligations, where it owns interests in oil and gas assets, should be assessed and provided for.
5. The type of financial assurance adopted should provide effective protection in the event of companies experiencing financial distress or bankruptcy. There has been an increasing number of these cases and this trend is likely to continue, given recent price crashes (many firms are struggling financially) and the bleak long-term outlook.
6. Government due diligence prior to approving transfers of working interest should include assessment and verification that the existing owner's responsibility for decommissioning has been met. There should also be adequate assurance that the new owner is able to and has committed to meeting those obligations. In so far as possible, these requirements should be codified within the legal framework. This will help to reduce financial exposure to other owners and the government from unfunded decommissioning liabilities.
7. Given the wide variability of costs and volatility of the sector, the government institutions (for example, the regulator or NOCs) should be resourced to review decommissioning liabilities and companies' financial strength on an ongoing basis. Depending on the type of financial mechanism in place, without sufficient review and subsequent action, the intended protections could be rendered ineffective and result in huge cost to the taxpayer.
8. The financial risk to governments of unfairly bearing decommissioning costs is substantially higher for countries where the legal instruments provide for oil and gas assets being transferred to the state. This is especially so, but not limited to, PSCs and NOCs. Governments should undertake an assessment of the state's exposure to this risk and develop measures to mitigate.

3.5 Socio-economic impacts

Many local, regional and national stakeholders can become heavily dependent on the direct and indirect benefits from oil and gas projects. Over the course of decades, such projects can become the bedrock of a country or region's economy, through its significant contribution to government revenues (royalties, tax, production sharing), employment, corporate social responsibility programmes. It is well documented that petroleum-producing regions tend to be highly dependent on the sector, which results in a very narrow economic base – as there are limited alternative productive sectors of the economy. While employment from the oil and gas industry compared to other sectors is low nationally, at a regional level it can be disproportionately high in producing regions. These jobs are on average higher paying and often induce a high number of indirect jobs. As decommissioning activity begins, the winding down of production operations will inevitably cause significant disruption to livelihoods and regional economies.

Sources of distress may arise from areas such as economic stagnation, large fiscal deficits (from falling revenues), loss of services (transport, health clinics etc.), unemployment and shrinking population as locals migrate to other areas. On the other hand, depending on the scale of the industry and the national skills sets and capacity, entering the decommissioning phase may present new opportunities for employment and business opportunities. For example, analysis suggests that given Scotland's expertise and future decommissioning activity, the estimated gross value add (GVA) from activity over the next decade could be between £8.3 and £11.3 billion, while supporting peak employment of 16,925–22,775.¹⁹

There could also be significant potential to leverage existing oil and gas capabilities to develop expertise along the decommissioning supply chain. To do so effectively will require understanding of the complex nature of the tasks associated with decommissioning, which are illustrated below.

¹⁹ Government of Scotland (2018). Oil & Gas Decommissioning Action Plan, available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/corporate-report/2018/11/oil-and-gas-decommissioning-action-plan/documents/oil-and-gas-decommissioning-action-plan/oil-and-gas-decommissioning-action-plan/govscot%3Adocument/Oil%2Band%2Bgas%2Bdecommissioning%2Baction%2Bplan.pdf>

As decommissioning is at a relatively early stage across the world, there is limited technical guidance and experience in managing these complex social and economic aspects. However, the experience of mine closures may prove instructive.

The characteristics of mining decommissioning and remediation are similar – for example, heavy regional economic dependence, multibillion decommissioning projects and large dislocation of a highly paid workforce. The socio-economic repercussions of mine closures can be severe because mining, like petroleum, often results in 'mono-industry' towns and communities. Experience with coal closures has shown that if not adequately planned for, many coal-dependent regions continue to lag socially and economically decades later after a mine has shut down. These downturns have proved to be particularly difficult for women due to several factors, for example, increased gender-based violence, higher burden of care as social services collapse, lower re-employment and limited access to capital or land.²⁰

The successful management of economic transition requires a package of measures under a broader structural policy approach. This includes economic diversification or stimulation to ensure long-term sustainability. See Box 3.2 for Germany's experience with the closure of coal mines.

Box 3.2 Germany's closure of coal mines

At the height of the coal industry, in 1957, Germany produced 150 million tonnes of black coal and employed 607,000 miners. Through the second half of the twentieth century, profitability and output declined dramatically, and increased commitments were made to international instruments looking towards limiting climate change. The Ruhr region underwent two phases of reorganisation, using long-term planning and the commitment to a 'Just Transition'. Pits were closed progressively across the region, with no forced job losses. The miners agreed to forgo a pay increase, while supportive policies, economic diversification and social support allowed workers to be either transferred within the industry, offered retraining into environmental technology and renewable energy positions or, if they were over 50, offered voluntary payouts. Large-scale investments were put into infrastructure development, education, technology and innovation. The miners had a significant role in shaping an agreement that guaranteed a socially responsible closure process.

The last mine was closed in 2018, and the area is now a world heritage site.

Implications for governments

- 1 Governments will need to have a strategic approach for the winding down of the sector. Dealing with the socio-economic aspects of COP and decommissioning requires long-term planning, to minimise disruptions and create other sources of revenue and employment. Governments should seek to understand best practices that can be applied to local contexts. Significant research and case studies have been done on coal mine closures, from which lessons and best practices have been identified and can prove helpful.
- 2 Decommissioning planning should include measures to mitigate the impacts on people and communities from CoP.
- 3 The involvement of stakeholders at the local community, towns and regional levels is important for identifying vulnerabilities from CoP and decommissioning activity, as well as developing and implementing strategies to mitigate associated effects. Meaningful and timely participation would enable locally adapted solutions and higher acceptance by affected stakeholders.

²⁰ Sesele, Kentse (2020), Women and Mining Decline in the Free State Goldfields.

3.6 Public acceptance of decommissioning options

Local communities and the public are important stakeholders that need to be considered as fields enter the decommissioning phase. There is likely to be very little awareness of the complexity and technical issues surrounding decommissioning, as well as the safety and environmental risks. In many countries, the image of the industry is low and the level of mistrust is high. This applies both to the relationship between the public and operating companies and the relationship between the public and government. It should not be a surprise if the prevailing public perception is the companies' preferred decommissioning solution and to leave structures in place, because it saves money but they do not consider the environmental consequences. Several non-governmental organisations (NGOs) have argued that this is the case with the concept of 'rigs-to-reef' in the United States and the United Kingdom. This, coupled with the narrative that companies are avoiding their responsibility after having made millions or billions from an asset, could prove politically damaging. This could also prove to be the case if costly tax relief plans or subsidies are provided for activities to be carried out.

Without early engagement, data-driven debate and timely communication, public resistance could be very possible. This may have significant implications, as was the case with the North Sea's Brent Spar decommissioning in the mid-1990s.

The disposal options for Brent Spar were the subject of negotiations between the operator, Shell, and the UK government for more than three years. The preferred solution, which was evaluated against criteria covering technical feasibility, safety, cost and environmental impacts, was determined to be deep-water disposal. However, there was very limited national consultation, and significant opposition and public outcry surrounded the perceived environmental risks. Both Shell and the government defended the plan as the environmentally safest option, based on scientific and technical analysis. Shell eventually changed the disposal option (with the structure reused to form the base of a new ferry quay) after inaccuracies in media reporting (particularly around the quantity of pollutants), Greenpeace occupying the facility for over a month, a boycott of Shell's products, the difficult political environment (opposition parties were not supportive of the proposal), international pressure and significant negative reputational and financial impacts.

Implications for governments

1. Governments and companies should anticipate a growing interest by stakeholders in decommissioning and ensure that consultation and effective communication is a key element of a decommissioning plan. Stakeholder mapping and an engagement plan should be developed as part of the planning phase.
2. Decommissioning planning must include measures to mitigate the impacts on people and communities. Effective and ongoing engagement and communication with stakeholders will be critical to successful measures.
3. Governments and companies should recognise the importance of transparency of data and reports to enable proactive fact-based dialogue with stakeholders, including NGOs, local communities and the general public.

3.7 Weak regulatory and liability frameworks

Decommissioning was not an area of focus when the majority of mature fields were initially developed, hence the governing legal framework is typically silent or unclear on the treatment of decommissioning. In addition to this legacy issue, regulation and guidance on decommissioning requirements have yet to be fully developed in many countries.²¹ For example, there are often simple provisions leaving the substantive elements to be negotiated at a later date; 'abandonment' and 'decommissioning' are used interchangeably and are poorly defined; financial assurance is weak (or non-existent); there is a lack of clarity on the

21 O&G Decommissioning Subsea Engineering Opportunity International Market Insights Report Series (2018), 25,26 Gilbert, S (2021), 'Decommissioning assets in the Middle East: the regulatory landscape', available at: <https://www.vysusgroup.com/articles/decommissioning-assets-in-the-middle-east-the-regulatory-landscape>

treatment of temporary closure; there are limited technical specifications; and the triggering event for addressing decommissioning in many contracts is five years prior to CoP. Given the issues described above (Sections 3.1 to 3.6), these measures are woefully inadequate and represent significant risk to the taxpayer, the environment and the public. This means that there is a weak regulatory framework for most of the world's existing oil and gas assets.

The experience in onshore United States and Canada serves as an illustration of the problems that can arise from poor regulatory oversight. In both countries, the industry has been in existence for more than 50 years; onshore activity is regulated at the local level and decommissioning was not a priority during the production phase. This has led to a huge inventory of orphan wells, a situation where the original owners are no longer around, and the liability for abandoning the wells and remediating the land is unclear. In Alberta, Canada, there are more than 95,000 inactive wells, with many not officially abandoned and none yet decommissioned. This represents significant safety and environmental risks and the land has been rendered unsuitable for alternative uses. A similar situation exists in many states in the USA, with thousands of wells left without decommissioning or removal. This situation is, however, not limited to the onshore industry, as there is also a significant number of suspended wells offshore in the Gulf of Mexico. The regulators in each country are adopting various measures to remedy the situation, which serves as a cautionary tale.

In many regimes, it is also not clear who the responsible party is for decommissioning liabilities. This is a glaring lacuna in the legal framework and means that the potential for disputes is high. Box 3.3 highlights the exposure surrounding one such area, transfers of ownership to the state. Furthermore, the regime is often silent on the treatment of residual risks and, given that most companies are unlikely to exist after decommissioning activities have been completed, it is important that the regulatory framework specifically addresses this gap. This weakness stems from the common practice of structuring ownership of assets through limited liability subsidiary companies and joint ventures, which means that once the governing petroleum agreement or licence has been relinquished, these entities would in effect cease to exist.

In contrast, modern legal frameworks for decommissioning adopt a lifecycle approach – with decommissioning being considered as part of the approval process for new projects (with a preliminary view included in the FDP submission to government). This is complemented by ongoing review of timing and costs over the production phase, to ensure that the gamut of environmental, financial and social issues can be adequately addressed at the end of the asset's productive life. Without such a robust regulatory framework, the taxpayer and the public face substantial risks (financial, environmental, health etc.) that decommissioning will not be appropriately dealt with. Recent experience in Australia and New Zealand has prompted reforms to address gaps in the regulatory framework. See Box 3.4.

Effective regimes are also coherent across national regulations and approvals. For example, there are multiple intersection points with the waste management industry and naturally occurring radioactive material (NORM) is a known challenge. Co-ordination across various government regulators is important to safeguard the country's interests and provide clarity to operators on what is required.

Additionally, robust regulations would ensure that countries' obligations under international conventions and treaties flow through to the operators. Without such measures, the country bears the risk for non-compliance. This is of particular concern with offshore developments, where there are several international and regional obligations. See Section 4 for a summary of key international and regional frameworks and Appendix B for further details on Commonwealth countries.

A particular issue for developing countries to bear in mind is 'regulatory capture'. This refers to a situation where the positions taken, and decisions made, by regulatory authorities are unduly influenced by the industry they are charged with regulating. The result is that an agency, charged with acting in the public interest, instead acts in ways that benefit incumbent firms in the industry it is supposed to be regulating. This could be due to several factors, including corruption, lack of information or expertise, and the inability of government institutions to carry out tasks effectively (for example, due to insufficient resources – in terms of funds or staff). As described earlier, decommissioning is a fairly new area and the highly technical nature of the operations means that asymmetries between the government and companies will be very pronounced. This represents a high risk of regulatory capture.

Box 3.3 Dispute on footing decommissioning bill for transfer of field to Thailand's NOC

The offshore Erawan gas field accounts for around 25 per cent of Thailand's gas supply and has been operated by Chevron for nearly 50 years. When Chevron's concessions expire in April 2022, it is due to cede control to the national oil company, PTT Exploration & Production (PTTEP). There is an ongoing dispute about who should pay decommissioning costs, estimated to be around US\$2.5 billion, once the field eventually stops producing in the early 2030s – Chevron or Thailand's Department of Mineral Fuels (DMF).

The disagreement stems from the retroactive enforcement of a law passed in 2016, which requires operators to pay the cost of decommissioning assets they have installed, including those transferred to the next operator, including to PTTEP. Chevron says the law should not affect a contract it made earlier with the state, which did not require it to pay for the costs. The company argues that, under the terms of its initial contracts from 1971, it is only liable for infrastructure that is no longer deemed usable, and the transferred assets are the responsibility of the new operator.

Source: Reuters (2019), 'Chevron says no arbitration for now over Thai energy dispute', available at: <https://www.reuters.com/article/us-thailand-chevron-idUSKBN1WA2NR>

Box 3.4 Hundreds of millions cost to taxpayers triggers reforms in Australia and New Zealand

In 2019, the Australian government was forced to assume responsibility for the Laminaria-Corallina oil fields, and the associated Northern Endeavor floating production, storage and offloading (FPSO) infrastructure, when its owner, Northern Oil & Gas Australia (NOGA) went into liquidation. NOGA was incorporated in August 2015 and acquired full ownership of the oil fields and FPSO in 2016 from Woodside Energy and Talisman. Production began in 1999 and the prior owners envisioned that the economic limit would be reached by the end of 2016.

The event prompted an independent review, which found that 'none of the regulatory controls anticipates the circumstances of a titleholder liquidation. This is a serious concern, as such events could be repeated as Australia's offshore industry matures and late-life assets are likely to be passed from established major oil companies to smaller, less-substantial titleholders'. A number of recommendations were made, and reforms are currently underway to strengthen the regulatory framework. This includes the controversial imposition of a levy from July 2021, to cover the costs to decommission NOGA's assets, which appears to be over US\$200 million.

New Zealand is also facing a similar problem with the Tui oil field and Umuroa FPSO after the operator, Tamarind Taranaki (which assumed control in 2017) went into liquidation in November 2019. The initial estimated cost to taxpayers was US\$155 million; however, this has more than doubled to US\$394 million, as the initial estimate was based on a 2015 study which proved to be inaccurate. This is the country's first offshore decommissioning project and has prompted review and revision of the laws governing decommissioning (the Crown Minerals Decommissioning and Other Matters Bill, introduced on 23 June 2021).

Implications for governments

1. Lacunas in the decommissioning regulatory regime represent a significant risk to the country. It is critical that the government takes a detailed diagnostic review to understand weaknesses and work collaboratively with the industry to remedy issues as soon as practically possible. If this isn't done, the 'polluter pays principle' is likely to be violated, with the costs being borne by taxpayers and the public, rather than the oil and gas companies.

2. Governments should pay particular attention to their financial exposure across both the NOC, as well as other forms of state participation. Decommissioning liability may arise either from ownership interests or the transfer of assets at the end of petroleum agreements (PSCs, licensees etc.).
3. To reduce the exposure of the public and taxpayer, the legal framework should clearly establish who bears the responsibility for decommissioning liability, including residual risks. A government would need to consider the advantages and disadvantages of the different approaches available, to determine which is most appropriate. For example, liability in perpetuity is common for all infrastructure in all North Sea regulatory regimes, except for plugged wells in the Netherlands – where the operator’s liability ends once a well is plugged and abandoned. The Norwegian Petroleum Act 1996 allows for the licensees and the field owners to make alternative liability agreements with the state. This can allow for future maintenance, responsibility and liability to be taken over by the state, based on an agreed financial compensation. New Zealand is currently in the process of designing an industry-wide funding mechanism as part of reform efforts.²²
4. Numerous situations lead companies to temporarily shut down activities and these should be considered in the provisions made for decommissioning and closure. For example, regulations should clearly establish processes and timelines for companies to deal with suspended or inactive wells.
5. Given the relatively nascent stage of decommissioning, the legislative requirements need to provide flexibility to accommodate changes in context, technological developments or stakeholder priorities, which may require adjustments in the final decommissioning plan.
6. Governments needs to build capacity in decommissioning, in order to formulate effective strategies and laws etc. and to enforce compliance with those requirements.

3.8 Energy transition and bankruptcy risks

As the global momentum towards decarbonisation builds, the long-term outlook for oil and gas assets has changed considerably. This has significantly increased governments’ exposure to decommissioning risks, due to the anticipated higher incidence of accelerated decommissioning, mothballed assets (temporary suspension of production) and bankruptcies.

A bearish pricing outlook, lower anticipated sector returns and the higher cost of capital for companies mean the economic limit for old, marginal and carbon-intensive assets could be significantly earlier than expected. As discussed earlier, in the absence of adequate financial security, there is the potential risk that governments may be saddled with dealing with decommissioning such assets. Given the immense sums needed to decommission and the fact that many companies will be cash constrained after the recent precipitous price crash, operators are likely to temporarily suspend activity rather than permanently cease operations. For example, some operators will try to defer plugging and abandonment for as long as possible in a low pricing environment, as this accounts for nearly 50 per cent of decommissioning costs. If adequate regulatory controls are not in place, the growing inventory of suspended and temporarily shut-in assets could morph into an orphan problem. For example, the UKOGA has forecast that the number of suspended wells in the UK North Sea will almost double within five years to more than 1,550²³ (compared to 758 suspended wells in 2021).

The number of bankruptcies is also likely to increase in the face of challenging operating environments. For example, the number of oil and gas bankruptcies in the United States and Canada rose 50 per cent to 42 in 2019 and increased by another 62 per cent in 2020.²⁴ In 2020, the bankruptcy debt across the North American industry passed US\$100bn for the first time. According to the Boston Consulting Group, the

22 Government of New Zealand, Ministry of Business, Innovation & Employment (2021), ‘Residual liability for petroleum wells and infrastructure following decommissioning’, available at: <https://www.mbie.govt.nz/dmsdocument/14681-residual-liability-for-petroleum-wells-and-infrastructure-following-decommissioning>

23 Thomas, A (2021a), ‘OGA crackdown as number of suspended North Sea wells to double to 1,500, News for the Energy Sector, Energy Voice, available at: <https://www.energyvoice.com/oilandgas/north-sea/decom/321556/north-sea-suspended-wells/>

24 Bloomberg (2020), ‘US Seeks Stricter Funding for Abandoned Offshore Oil Wells’.

decommissioning costs of oil and gas firms that have recently gone bankrupt or are in financial distress is near US\$15 billion.²⁵ Analysts expect this trend to continue, given the implications of the pandemic-related slide in energy prices.²⁶

The industry trend of smaller less experienced companies acquiring mature assets further increases bankruptcy risk. As discussed in Section 3.4, it is common for ownership of late-life or marginal fields to transfer from large companies to smaller companies, whose business models, expertise and lower costs enable them to operate the assets more profitably. The energy transition is likely to result in an increase in these types of transactions, as international oil companies (IOCs) divest mature high-carbon assets to lower the carbon intensity of their portfolio. In comparison to IOCs, the smaller companies tend to have a small asset base, less cash flow and weaker balance sheets, and consequently are not as resilient to downturns and shocks. For example, given the scale of decommissioning costs, significant increases could conceivably trigger insolvency in a smaller company, whereas an IOC would likely be able to survive.

With an increasing number of asset transfers and insolvencies expected, this increases the risk associated with funding decommissioning. This risk materialised in 2019 in New Zealand's first decommissioning project, Tui oil field, where the government had limited ability to regulate an asset transfer and the company subsequently went into liquidation. See Box 3.5 for more details.

Box 3.5 Government's exposure to decommissioning via asset transfers

In 2017, Tamarind Taranaki assumed control of Tui by acquiring all the shares of the participants holding the petroleum permit. The transaction, which represented a 'change of control', did not require prior ministerial approval, only notification after the event.

At the time of the sale, the base case for decommissioning was 2019; however, Tamarind intended to extend the life of the field by drilling three new development wells to access 6–8 million barrels. This was expected to push decommissioning out to late 2025, in effect adding five years to the life of the field. However, the drilling campaign was not successful. Failure of the drilling campaign coupled with cost overruns, reduced production, withdrawal of financial support and the low price of crude oil resulted in Tamarind's liquidation. Neither Tamarind nor any of the other owners were able to meet any part of the decommissioning costs. To protect the environment, the government stepped in as the provider of last resort to decommission the assets.

The 2017 Tui transaction highlighted a 'loophole' in the Crown Minerals Act, whereby a company could sidestep the tests that would normally be in place for a new operator of a petroleum permit (by acquiring the shares of existing petroleum permit operators). This did not allow for any assessment of the operator's technical, health and safety, and financial capabilities under new ownership and enabled the tests for transfer and change of operator to be avoided. This loophole closed on 19 February 2019 via the Crown Minerals Amendment Act 2019 (2019 No 2).

Source: Government of New Zealand, MBIE (2020).

In cases such as New Zealand's, the government unfortunately must fund the decommissioning activity; however, there should be recourse to recovering these costs in the bankruptcy process. When a company goes into liquidation, its assets are sold and the proceeds used to pay creditors (the companies and individuals who are owed money). Which creditors get paid and how much is based on the amount of funds available and the 'priority' of claims. Priority debts typically must be paid in full, while those creditors with weaker claims may have to accept partial or no payment. This raises a critical question of where the government's claim for decommissioning costs sits in the prioritisation of claims.

25 Thomas, A (2021b), 'BCG: Distressed or bankrupt oil firms face \$15 billion decommissioning costs', Energy Voice, available at: <https://www.energyvoice.com/oilandgas/north-sea/decom/333865/bcg-decommissioning-costs-oil-firms/>

26 Groom, N (2020), 'Special Report: Millions of abandoned oil wells are leaking methane, a climate menace'.

If it is treated as a priority, the government should be able to recover money. If, however, it is treated as an unsecured claim, it is possible for the government to make zero recovery and the full burden will be borne by taxpayers. Ideally this situation would be addressed within national legislation (for example, in bankruptcy, environmental and petroleum laws), but in instances where the legal position is not clear, this is likely to result in lengthy litigation. This occurred in Alberta, Canada, where there was protracted litigation over the prioritisation of the government's claim in a bankruptcy. This was resolved by the Supreme Court ruling that the companies' decommissioning obligations were outside the bankruptcy priority scheme and must first be met before any creditor claims could be applied (see Box 3.6 for further details).

Furthermore, if there is no proper planning around decommissioning of shared infrastructure (for example, pipelines, processing facilities), this could have a 'domino effect', resulting in accelerated decommissioning of other assets. For example, if two fields share a pipeline export route, the operating costs are not likely to fall significantly if one field is decommissioned. The remaining field would have to bear all the costs, which could lead to it also reaching its economic limit. It is thus important to consider decommissioning on a systems basis across multiple operators. This domino-type event could also be an unintended consequence when companies become insolvent.

Implications for governments

- The energy transition and higher incidence of bankruptcies in the sector are increasing the decommissioning risks to governments.
- The time for decommissioning may be sooner than expected. This underscores the urgent need for governments to understand the environmental, financial and socio-economic risks and put appropriate measures in place to address, manage and mitigate these.
- Governments should ensure there is a process to monitor the financial health of companies operating in the sector.
- Governments should ensure that transfers of ownership interests require prior government approval, which should be granted after rigorous assessment of the company's financial strength and ability to cover decommissioning costs. Lacunas or gaps around change of control should be remedied in the legislation, to ensure prior approval is required; that is, change of control should require the same treatment as change of operator.
- Governments should ensure that the legal framework adequately addresses the risks from inactive wells and mothballed facilities. For example, by specifying the maximum number of years that a well or facility can be temporarily suspended, putting in place maintenance requirements for mothballed facilities, and via ongoing monitoring and inspection of such assets.
- Depending on the portfolio of companies operating within the sector, the government should carefully assess the most appropriate financial assurance mechanism and pace of change to avoid creating unintended consequences. Large changes in extremely short timeframes could lead to companies voluntarily liquidating, and in effect could create the situation the government is trying to avoid. Rigorous assessment of the situation, technical expertise and industry consultation would be required to craft country-appropriate solutions.
- Governments should ensure that decommissioning obligations are legally established as a 'super-priority' over bankruptcy priority schemes, to protect the nation's interests and avoid lengthy litigation.

Box 3.6 Canada's Supreme Court ruling on superiority of decommissioning obligations in bankruptcy

In Alberta, Canada, a company cannot be granted an oil and gas licence unless it assumes what are called 'end-of-life responsibilities' (or reclamation and abandonment obligations) to plug and cap oil wells to prevent leaks, dismantle surface structures and restore the surface to its previous condition to the extent possible. In *Orphan Wells Association v Grant Thornton Ltd*, [2019] 1 S.C.R. 150, the Supreme Court of Canada was asked to decide what happens to these obligations when a licensee (in this case, Redwater Energy Corporation [REC]) becomes bankrupt and its trustee in bankruptcy is tasked to distribute its assets among its creditors in line with the priority scheme established under Canadian bankruptcy legislation (the Bankruptcy and Insolvency Act). There was no law directly addressing the point.

In 2009, REC was granted an oil and gas licence by the Alberta Energy Regulator. In 2013, ATB Financial advanced funds to REC and was granted a security interest in REC's present and future assets. When REC began to have financial difficulties, ATB successfully applied to the court to appoint Grant Thornton Ltd as REC's receiver (2015). The abandonment costs were greater than the expected sale proceeds from the productive wells in REC's portfolio and Grant Thornton informed the regulator that it did not intend to comply with statutory orders to abandon the renounced assets. While the regulator and the receiver were battling to resolve the issue, REC went bankrupt and the receiver was appointed its trustee in bankruptcy. The regulator immediately commenced legal action against the receiver to enforce the abandonment order.

The question before the courts was whether payment of the abandonment costs was subject to the priority scheme established under Canadian bankruptcy law, which specifies the types of creditors that should be paid first. Generally, secured creditors are paid before unsecured creditors. Thus, was the receiver bound to pay other creditors of REC before paying the regulator the abandonment costs and pay the regulator only if there was any money left? The resolution of the question turned in part on whether the abandonment costs were treated as a debt owed by REC to the regulator. If they were treated as a debt, they were then a 'claim provable in bankruptcy' and therefore could be paid only if there was any money left after other creditors had been paid.

Both the trial court and the Alberta Court of Appeal ruled against the regulator. The trial court gave its ruling in May 2016, while the Court of Appeal gave its ruling in April 2017. The regulator appealed to the Supreme Court, which gave its ruling in February 2019.

In resolving the appeal, the Supreme Court drew a distinction between abandonment costs, which Alberta sought to obtain from the receiver, and the debt owed to a creditor. The Court ruled that the abandonment costs were not debts requiring payment and therefore not a 'claim provable in bankruptcy', but were duties owed by REC to the Alberta public (and nearby landowners). As such, the regulator was not a creditor of REC but was merely enforcing a public duty and therefore was not subject to the priority scheme established under Canadian bankruptcy legislation.

4. Elements of a Robust Regulatory Regime

The 'regulatory framework' refers to the combination of policies, laws, regulations and contracts that govern decommissioning. There are several cross-cutting aspects that may be addressed in other sectors' regulatory framework, such as environmental legislation. This section, however, pertains to elements that are typically addressed within petroleum-specific instruments such as petroleum acts, petroleum regulations and petroleum agreements (for example, concessions, production sharing contracts).

Please note: *This section is intended to provide guidance and should not be treated as a substitute for the holistic formulation of laws, regulations and contracts. The following are recommendations for sections of robust regulatory regimes.*

4.1 Principles and policy framework

Given the large budget outlays, significant risks and socio-economic impacts, decommissioning requires clear policy direction to inform the operators' decommissioning plan and strategy. Policy positions should be translated into coherent binding legislation and/or express contractual obligations to ensure compliance. Some important principles that decommissioning legislation should account for are:

- **Polluter-pays principle:** The costs of pollution or damage to the environment should be paid by the responsible party. The responsibility for decommissioning is with the companies who have undertaken petroleum operations and have benefitted from producing hydrocarbons. Companies should thus ensure there are sufficient funds to meet their decommissioning liabilities. The government should establish a financial assurance mechanism that is sufficiently robust to ensure that the owners bear the full cost of decommissioning, and such costs are not borne by third parties, whether the broader industry or the taxpayer. The regulatory agency must also be sufficiently resourced with technical expertise and the financial resources to be able to effectively monitor and ensure compliance.
- **Ecosystems approach:** This refers to strategies that are based on integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It is based on the application of appropriate scientific methodologies focused on levels of biological organisation, which encompass the essential processes, functions and interactions among organisms and their environment. This would inform the operators' key decisions across the asset's lifecycle – in particular, the optimal option for the design and decommissioning.
- **Precautionary principle:** Where there are threats of serious or irreversible harm to society or the environment, the lack of full scientific certainty regarding the extent of that damage should not be used as a reason for not including measures to prevent or minimise such potential adverse effects. This has many implications with respect to decommissioning. For example, the design of oil and gas assets should be done in a manner that minimises residual risk.
- **Good governance, transparency and accountability:** This should provide a strong foundation for sharing of cost information with the government (and among companies) to understand the implications for the economic limits of oil and gas assets. In addition, the industry best practice of full contract disclosure would enable public scrutiny on the decommissioning treatment and could enable fairer negotiated outcomes on the associated issues.
- **Collaborative approach:** This generally recognises the tripartite nature of the petroleum sector among the government, companies and citizens. It also espouses the need for effective engagement with the public and vulnerable groups, such as indigenous peoples and women. This will be important when considering the socio-economic impacts of decommissioning and requirements for consultative processes with stakeholders to determine the most appropriate decommissioning solution.

- **Best international practice, best available techniques (BAT) and best environmental practice (BEP):** At a minimum, most policies clearly establish the government's expectation that the industry is developed in accordance with best international practice (there is similar reference to 'good oilfield practice' in older legislation) including, where appropriate, clean technology, in their efforts to prevent and eliminate pollution. Some may also refer to best available techniques (BAT) or Best environmental practice (BEP). As defined in the OPSAR Convention BAT 'means the latest stage of development (state of the art) of processes, of facilities or of methods of operation which indicate the practical suitability of a particular measure for limiting discharges, emissions and waste'. BEP is defined as 'the application of the most appropriate combination of environmental control measures and strategies'.

Although decommissioning is a multifaceted and complex issue, the above principles could provide a basis for governments to consider and resolve any regulatory deficiencies. This does not preclude the government from specifically looking at the issue in general or against different principles. For example, in determining the most appropriate option for dealing with residual risk, New Zealand evaluated options on effectiveness (the extent to which the option contributes to the desired policy outcomes), proportionality (the extent to which the costs/risks of implementing the option are proportional to the expected benefits), regulatory certainty (the extent to which the option provides clarity of regulatory requirements and predictability of regulatory outcomes) and practicality (the extent to which the option reduces any implementation risks).²⁷

Given that the legislative reform process generally takes a number of years, it would be prudent for government to provide guidance to operators, as soon as possible, on areas such as:

- Full removal or in-situ options for each asset type – pipelines, platforms, processing facilities and other associated infrastructure (for example, storage, loading). For example, adopting a policy position of full removal with exemptions on a case-by-case basis.
- Establishment of multistakeholder bodies, comprising relevant government institutions, industry, universities, NGOs etc., to assess and develop a national approach to areas such as:
 - Scientific research and data collection efforts to inform decommissioning decisions. For example, for offshore projects requirements or conditions that would need to be considered for the acceptability of in-situ options, such as rig-to-reefs and alternative uses.
 - Financial assurance mechanisms.
 - Mitigating social and economic impacts.

4.2 International and regional obligations and commitments

The regulatory framework should ensure that countries' obligations under international and regional conventions and treaties flow through to the operators. This is of particular concern with offshore developments, where there are several such obligations. For example:

- The United Nations Convention on the Law of the Sea 1982 (UNCLOS), which states:

*Any installations or structures which are abandoned or disused shall be removed to ensure safety of navigation, taking into account any **generally accepted international standards** established in this regard by the competent international organization. Such removal shall also have due regard to fishing, the protection of the marine environment and the rights and duties of other States. Appropriate publicity shall be given to the depth, position and dimensions of any installations of structures not entirely removed.*

- The International Maritime Organization (IMO) Guidelines and Standards, which constitute the 'generally accepted international standards' referred to above. They impose a general requirement for removal, except in particular circumstances determined on a case-by-case basis. Standards require complete

²⁷ Government of New Zealand, Ministry of Business, Innovation & Employment (2021), Residual liability for petroleum wells and infrastructure following decommissioning.

removal of all structures weighing less than 4,000 tonnes, when located in 75m or less, and in 100m or less if emplaced on the seabed after January 1998. If a structure is only partially removed, a minimum of 55m of clear water must be present for the safety of navigation.

- Regional agreements such as the Oslo and Paris Convention on the Protection of the Marine Environment in the Northeast Atlantic (the OSPAR Convention), which has more detailed and stringent regulations.
- The Basel Convention, which regulate the international shipment and disposal of hazardous wastes, along with regional agreements, such as the Bamako Convention (Africa) and the Waigani Convention (South Pacific). Naturally occurring radioactive materials (NORM) waste is not specifically dealt with under the Basel Convention and has not always been considered comprehensively in international standards and legislation.

See Appendix B for further details, other conventions and applicability to Commonwealth countries.

4.3 Clear and coherent legal framework

The legal framework consists of the laws, regulations and contracts that govern decommissioning. A robust legal framework should address decommissioning across the entire lifecycle of an oil and gas project. It should include the following:

General

- Is there a clear definition of decommissioning?
 - Does it enable distinction to be made between mothballing and temporary shut-ins versus permanent termination of activities?
 - Is the definition consistent with international best practice?
 - Does it use language that is consistent with understanding environmental impact in the appropriate national / regional policy / regulation?

Please note: There is no singular international definition for 'decommissioning'. Older legislation often refers to 'abandonment', which is only one aspect of decommissioning. Clarity should be given to treatment of the full range of decommissioning activities, as described in Section 2.2. The definition adopted would have to take into account the definition of the other lifecycle stages (for example, exploration, development, production).

- Is there a requirement that decommissioning must be carried out according to an approved decommissioning plan? And timeframe?
- Is there a duty for all operators to decommission in a safe and prudent manner, in line with international best practice?

Please note that other terminologies such as 'good oilfield practice' could also be used in this context. It is important that the definition is sufficiently comprehensive, includes principles (for example, prudence, safety) and allows for evolving practice and technology.

- Does failure to fulfil decommissioning obligations attract penalties, depending on the circumstances?

In some jurisdictions, imposition of criminal penalties is viewed as reflective of the high level of public interest involved, and the potential health and safety and environmental risks that are associated. See recent New Zealand legislation.

- Are the circumstances under which an operator is released from its decommissioning obligations clear? In such event,
 - Is the treatment of funding decommissioning activity and clearly established?
 - Is the responsibility party for the residual liability clear?

- Are the government's obligations under international and regional laws, treaties, conventions etc. passed through to the industry?
- Is there consistency and coherence with other national laws and regional policy? For example:
 - Environmental laws: environmental and social impact assessments, environmental permitting, waste management laws, anti-dumping, etc?
 - Bankruptcy laws: is decommissioning given priority prior to any creditor claims being drawn on the company's assets? (*Please refer to Section 3.8, the Alberta case for context.*)
- Does the legal framework provide the minister/regulator with powers to request information as it relates to the administration of the Act? This will apply to all aspects of decommissioning over a project's lifecycle.

Licensing regime and approval processes

The legal framework should ensure that decommissioning is a key consideration across a project's lifecycle and the broader approach to the development of the sector. It should thus feature as part of the criteria being considered across all key approval and decision points of a project.

- Is a decommissioning plan required for approval of a field development plan/plan of development?
 - Does it include estimated economic limit and year for cessation of production (COP)?
 - Does it include estimated costs?
- Are all oil and gas assets covered by a decommissioning plan and requirements for a financial assurance mechanism?

Depending on the permitting regime in place, associated infrastructure (for example, pipelines, onshore processing facility) may not be included in a field development plan/plan of development and may be subject to separate licensing requirements. All related assets and infrastructure should have a similar robust legal framework. In addition, depending on the integration of facilities and regulations for third party access, not all assets may require decommissioning at the same time.

- Is the regulator's or ministerial *prior* approval required for any transfers and assignments? This includes direct or indirect change of control (for example, transactions involving share purchases of companies holding petroleum rights).

This is a feature of all modern legislation and would enable the review and assurance that decommissioning is adequately addressed. This includes due diligence on the transferee, as well as the current standing of decommissioning plan and the status of the financial assurance mechanism.

- Are the duties on termination or transfers of a petroleum licence/agreement clear?
- Is there a requirement for the operator to conduct decommissioning operations as per the approved decommissioning plan?
- Given the multifaceted nature of decommissioning, does approval of a decommissioning plan require consultation with other relevant agencies, such as a Department of Environment?
- Is there an approval process and requirements for temporary suspension or mothballing of assets?
 - Are there accompanying effective regulatory monitoring and enforcement measures in place?
 - Is there a maximum time /period after which assets must be permanently plugged, abandoned and decommissioned?
- Is there clear process around declaration of cessation of production?
- Is there a clear and explicit process and approval for decommissioning of oil and gas assets, including:

- permanent plugging and abandonment of wells?
- platforms and other facilities?
- shared infrastructure and land?

Establishing requirements according to regulations provides the government with a reasonable approach to develop technical regulations to guide these activities in the future.

- Is there a clear obligation to perform decommissioning activities prior to relinquishment or termination of contract/licence? In the case of termination, what security is in place (bonds and guarantees, for example).

Adequate financial assurance

A financial mechanism should be put in place to ensure that sufficient money is available to fully fund all decommissioning activities and to avoid the taxpayer footing the bill. There are different approaches, each with advantages and disadvantages, which are summarised in Appendix A. Careful consideration should be given to the type of risk profile the assurance mechanism represents. Please note that the financial assurance mechanism should be independent of the economic performance of the asset. Any measure which links funding to the success or failure of the asset would substantially increase the risks of inadequate funding, especially in the event of fall in prices, production or bankruptcy. These mechanisms must also be reviewed and updated regularly, as rising costs may render them obsolete.

- Is there a requirement for financial assurance mechanism to ensure that decommissioning costs are fully funded?
- Is it clear how financial contributions are deductible for production sharing and/or tax purposes? Is it based on a cash or accrual basis?
- Is there a requirement for operators to develop credible, auditable estimates of decommissioning costs?
- Are preliminary decommissioning estimates of costs and timing of cessation of production included as part of the requirements for project approvals – in field development plans or the plan of development?
- Is there a process for reviewing and updating the estimated cost and timing of decommissioning, to ensure that the liability is adequately funded? If so, is it clear what level of detail is required and the timeframe for providing updates?

Ensuring that there is a credible estimate of the decommissioning costs and timing for cessation of production are critical requirements to minimise risks of funding the liability. The regulator should ensure that decommissioning forms part of the annual reporting by the operator. This reporting requirement should recognise that there are likely to be very little changes during the early phase of a project.

- Is there a mechanism to evaluate the sufficiency of the financial assurance (the quality of the cost estimate)? Is there a mechanism to have a third party audit?
- Are qualified/approved institutions in place to secure, hold, manage, report on and administer the financial assurance?
- Is there a clear framework, including criteria, for the release of the financial assurance after completion of activities?
- Is decommissioning funding assessed **prior** to granting any changes in ownership, control or transfer/assignment of rights?
 - Have the funding requirements of the transferor been satisfactorily met?
 - Is the treatment of any tax credits clear between the transferor and transferee?

- Has due diligence been undertaken on the transferee to ensure a) there is not a high risk of bankruptcy, and b) it can meet the financial obligations to satisfactorily execute decommissioning activities at the end of the asset's life?
- Is there clarity on treatment of decommissioning liability in the event of bankruptcy?

Achieving appropriate protections to the government on the matter of oil and gas companies' insolvency, requires alignment of the legal provisions on decommissioning with the country's bankruptcy and insolvency laws. For example:

- Are decommissioning obligations treated as a debt owed to the government?
- Does the legal framework establish this debt as a priority over the claims of other creditors?
- Is there legal protection to ensure that funds set aside for meeting decommissioning obligations are not available to the general body of creditors of the insolvent company?
- Is there effective monitoring of the decommissioning liabilities and the financial security?

A company's financial position can change, and it is important for the regulator to ensure there is ongoing effective monitoring to understand the current or emerging risks with a particular company, as well as the industry as a whole, and also to understand what precautionary actions are warranted to safeguard the country's interests.

Decommissioning fund

Where a cash trust fund is established, the legal framework should address the following key issues.

- Are the rules governing the establishment of the decommissioning fund in line with best practice, to minimise corruption and ensure independent, prudent management by competent persons?
 - Is the fund ring-fenced and established for the sole purpose of funding decommissioning activities?
 - Is the management of the fund performed by a committee/board that includes representation by the owner of the petroleum rights (e.g., the operator)?
 - Is there transparency in the selection process and composition of the committee/board?
 - Is there a transparent, robust process, including predetermined selection criteria and due diligence, for the fund's investment manager/ financial institution?
 - Is there a process for ongoing monitoring/an oversight mechanism for the fund manager and replacement in the event of certain circumstances?
 - What level of fees are being charged and how are they treated?
 - Is it clear what investment strategy and allocation across investment classes are permissible?
 - Is there regular reporting, at a minimum on an annual basis, on fund investment strategy, portfolio of assets and performance etc.?
- Is the basis for deposits to the fund by companies clear?
 - Are contributions based on volumes produced? Or a fixed fee?
 - Is the frequency of deposits clear? Are they quarterly or annually?
 - How is the adequacy of contributions relative to the estimated decommissioning costs assessed?
 - How often is this done? Is there a requirement for the operator to indicate if there are material changes that will impact funding contributions?

- Is the tax treatment related to the fund clear?
 - Are contributions to the fund deductible for production sharing and/or tax purposes?
 - Is the tax treatment of income earned held by the fund clear?
 - If there is a surplus, at the end of decommissioning, is it clear how it will be treated for tax purposes?
- Is the process for withdrawals from the fund clear?
- If there is a surplus in the fund after all decommissioning activities are completed, is it clear on how it will be treated? Will it be returned to contributors or held by the state?
- If the fund is in deficit, is the timing and mechanism for dealing with the shortfall clear?

Decommissioning plan

The incorporation of a 'decommissioning plan', which can be updated during the asset's lifecycle, provides an ongoing mechanism for engagement for the regulator and a basis for reflection of the latest view of critical factors and risks. Given the long duration of the production phase, it is to be expected that the preliminary view of decommissioning at the development phase may not necessarily be the same as during the decommissioning phase. Changes may arise from detailed planning or incorporation of new information, research, best practice and technology, as more experience is garnered in different operating environments.

- Is a decommissioning plan required for approval of a field development plan/plan of development?
- Is there a robust process in place for ongoing review of the decommissioning plan over the project's lifecycle? There should be early discussions between the operator and the regulator to ensure that the decommissioning process is well understood by both parties, as that would allow the operator to develop a realistic decommissioning plan, including a delivery timescale.
- Are the contents of a decommissioning plan clearly outlined? For example, does it include:
 - A decommissioning strategy?
 - An economic limit/year of cessation of production?
 - Decommissioning costs?
 - An environmental management planning framework?
 - A project plan and risks?
 - Arrangements for ongoing monitoring, required after decommissioning activities have been completed?
- Is it clear what the government's policy is for the treatment of each type of asset to inform the operators' decommissioning plan and strategy? That is, for wells, pipelines, platforms, processing facilities, other associated infrastructure (e.g. storage, loading)?
 - Are there any distinctions for onshore versus offshore?
 - Pipelines?
- Are there measures that the government can take if the decommissioning plan is deemed to be unsatisfactory?
- Is there a requirement to update the decommissioning plan for any material change that will impact decommissioning?
- Is there a clear, transparent and efficient process for the approval of the decommissioning plan?

Social issues

- Is there a mechanism to ensure that closure planning will be aligned with local and national development goals?
- Is there a mechanism for the regulator to ensure that stakeholders are identified and involved? Does it include a meaningful consultation process?
- Is there a mechanism for timely sharing of information with stakeholders?
- Is an assessment of the social impacts of decommissioning required?
 - Is there a requirement for a stakeholder engagement plan?
 - Does it specifically address vulnerable groups, such as women and indigenous peoples?
 - Is there a requirement for a transition strategy to be put in place for local economies and workers, to support the period from operations to decommissioning?
- Are opportunities for the use of local employment and firms considered in the decommissioning plan?

The government should consider whether local capacity exists and, if not, how to begin to build such capacity.

Environmental issues

- Is an assessment of the environmental impacts of decommissioning required?
 - Is there a requirement for an environmental baseline?
 - Is the requirement and timing for scoping exercises clear?
 - Is there a consultation process with stakeholders?
 - Does it include a non-technical summary, including a brief explanation of the main findings and clear, concise conclusions?
- Is there an environmental management planning framework for decommissioning? (Included as part of the decommissioning plan).
- Is there a requirement to evaluate the impact of climate change and commitments towards decarbonisation on the decommissioning strategy and residual risks? E.g. type and frequency of monitoring for in-situ infrastructure, potential for movement in hurricanes etc.
 - Does this consider that history may not reflect the variability and intensity of future events?
- Is it clear what environmental permits/approvals are required for decommissioning activities?
- Are there provisions for ongoing monitoring after decommissioning activities are completed? Is there a mechanism to communicate results from such monitoring to relevant government agencies?

Structures left in place will require ongoing review, to ensure that there is no leakage and/or potential threat to other users of the area – for example, those engaged in fishing.

Technical issues

- Is there a clear classification for wells? For example, shut-in, suspended or inactive, abandoned?
- Are there clear technical requirements for each well classification? Are there guidelines for temporary suspension and permanent abandonment of wells?
- Is it clear the maximum time period that a well can be suspended or inactive before it must be permanently plugged and abandoned? (This is to avoid 'orphan' wells.)

- Is it clear the maximum time period that a facility/installation can be suspended, "mothballed" or inactive before it must be decommissioned? (This is to avoid 'orphan' facilities, pipelines, sites.)
- Are there specifications for dealing with drilling cuttings? And on disposal of other materials?
- When decommissioning is deferred, are there specifications for suitably maintaining facilities?
For example:
 - What maintenance is required?
 - Is there ongoing monitoring and inspection by the regulator?
 - In the event that there are integrity issues, what are the recourse measures?

Liabilities

- Is there joint and several liability for all petroleum operations, including financial obligations, penalties, incidents, decommissioning etc?
- Does the legal framework establish strict liability towards the government for any loss or damage caused, in connection with the decommissioning of the facility or other implementation of the decommissioning plan?
- Is it clear who bears responsibility for residual liabilities?
The government may want to consider provisions for retention of security (potentially for a limited period) after decommissioning activities are completed.

Reporting requirements

- Is there a requirement to provide the regulator and other stakeholders with updates on any significant modifications to the decommissioning plan? For example, changes to estimated costs, reserves, cessation of production.
- Does the legal framework provide for regular receipt of information in a timely manner (to enable agencies sufficient time to consider and act)?
- Is there a standard reporting template for collection of the information?
This would provide clarity to operating companies on what is needed and when. The government, in recognition of limited resourcing, should seek to leverage technology and standardisation to increase efficiency and reduce the administrative burden, so that more time can be spent on analysing the information (versus collecting data).
- Is there requirement for accurate records to be kept on operational issues, which would be required for decommissioning planning and selection of optimal solution. For example, details on drilling materials, location, ongoing environmental monitoring?
These should be safeguarded and considered in transfers and assignments, especially in instances of changes in operatorship. Such records are vital for adequate understanding of what is to be decommissioned and the potential threats to the public and environment during decommissioning operations.
- Is there a requirement for a decommissioning report (also referred to as a 'close out report') to be submitted to the minister/regulator after decommissioning activities are completed?
- Are the contents of the decommissioning (close out) report specified?
- Is there a certificate of completion provided to operators if the minister/regulator is satisfied with the decommissioning (close out) report?
- Is there a provision for penalties for failure to report or keep accurate records?

4.4 Well-resourced institutions with access to technical expertise

Having a robust policy and legal framework is a prerequisite for the effective management of decommissioning risks. However, without strong government institutions to monitor and enforce compliance, the risks are likely to remain. This requires sufficient funding to execute tasks and build capacity across several areas, for example, operational, environmental and financial areas.

For example, the policy and regulatory framework is likely to change in the future, and the policy and regulators should remain abreast of how the issues are changing, how new gaps are identified and innovative solutions to ensure that the national framework remains robust to the changing context.

To avoid the inherent pressures from industry bodies and politicians, it is important that regulatory agencies are independent. The regulator should also be able to effectively perform its monitoring and enforcement duties. One area of particular concern should be the expertise to ensure there is adequate money to fund decommissioning activities. This requires specialists to assess companies' financial viability, and sufficient experience to understand the existing or emerging risks with each asset. This includes understanding how decommissioning costs are formulated, benchmarking (and hence the adequacy of a company's proposed plan), the vulnerabilities of a particular company to changing market outlook (for example, if prices or production falls), the ability to conduct due diligence on transferees etc.

Another area that requires particular attention is the environmental expertise required to first assess the adequacy and completeness of the environmental and social impact assessments (ESIAs) performed for FDP approval and then subsequent monitoring of petroleum operations. Given the complex nature of decommissioning on the ecosystem, this will be of even more importance at the time of approving the operator's preferred decommissioning options.

The government may want to consider outsourcing the review of decommissioning plans to specialist environmental consulting or assurance companies, bearing in mind funding constraints. Options should be explored if such arrangements can be included in the legal framework, such that independent reviews can be funded by the asset but managed by the government (for example, in terms of the selection of the third party).

The government, in recognition of limited resourcing, should seek to leverage technology and standardisation to increase efficiency and reduce the administrative burden, so that more time can be spent on analysing the information (compared to collecting data).

5. Recommendations for Governments

There is growing recognition across the world of the immense health, safety, environmental and financial risks that decommissioning represents. Decommissioning is the inevitable end of all oil and gas projects. Policy-makers and regulators need to bear in mind the issues highlighted in this paper, as they set the rules and guidelines for the development of the resources. If the last part of the field is not adequately dealt with, any benefit derived from its development can easily be negated.

The following are recommendations for Commonwealth countries to deal with this looming area of concern:

1. Urgently and comprehensively assess the decommissioning risks to the country

Governments run the risk of being left with the financial, environment and social costs of decommissioning activities, if appropriate plans are not put in place as soon as possible. Early action is critical to formulating appropriate measures to deal with the multifaceted challenge that decommissioning presents. In order to evaluate the country's risks, a comprehensive assessment should be conducted as soon as possible on:

- **The country's decommissioning outlook**, which should include an inventory of oil and gas assets (wells, platforms, facilities, pipelines etc.) and the associated estimated cessation of production costs and timing. This should also include identification of any orphan assets that exist, as well as assets 'at-risk' of becoming orphans. Particular attention should be placed on understanding the environmental risks posed from mature fields and ageing infrastructure, where there may be limited information.
- **Financial assurance mechanisms** in place for each asset and the potential unfunded decommissioning liabilities that may exist.
- **The state's financial exposure and decommissioning obligations from state participation** (the NOC or other institutions) or from the transfer of assets at the end of petroleum agreements and/or licensees. The NOC should, in particular, have a complete view of its decommissioning position from both areas.
- **The decommissioning regulatory regime**. It is critical that the government takes a detailed diagnostic review to identify lacunas and weaknesses in the existing legal framework and carries out an assessment of options to remedy. Given the regulatory reform process can be very lengthy, it is essential that this is done as soon as possible in order for actions to be taken in a timely manner.
- **The socio-economic fragility of towns and communities**. An early understanding is vital of how local towns and communities will be impacted from CoP and decommissioning of petroleum assets (for example, in terms of loss of jobs, revenues). Given the large socio-economic implications, early identification of vulnerable towns, communities or regions will be an important first step in designing and implementing actions to avoid shocks and minimise the level of distress to lives and livelihoods.
- **The technical expertise required**. The government needs to build capacity in decommissioning in order to formulate effective strategies, laws etc. and ensure compliance. Decommissioning spans several disciplines (for example, operational, legal, economic, social and environmental), but not all are required simultaneously. The government should therefore understand what

types of skills are required and in what timeframes to aid in effecting resourcing. This would help to reduce the risk of regulatory capture and ensure effective regime and regulatory oversight of decommissioning issues.

2. Strengthen decommissioning regulatory regime

The risks from decommissioning are growing and where there is no effective regulatory framework, the taxpayers and citizens will bear the brunt of health, environmental and financial costs – potentially for several generations. It is important that to avoid such a situation, regulatory weaknesses are remedied in a timely manner. The legal framework should be clear, predictable and preferably codified to avoid being subject to negotiations and having different approaches across projects. Incorporating best practice of 'begin with the end in mind' (where decommissioning is contemplated in designing projects), and a lifecycle approach to decommissioning for any new projects, will help address known difficulties. Given the relatively nascent stage of the decommissioning industry, the legislative requirements need to enable the flexibility to accommodate changes in context, technological developments or stakeholder priorities that may require adjustments in the final decommissioning plan.

In recognition of government's limited resourcing, efforts should be made to learn from other countries' experiences in regulatory reform. In addition, adoption of standardised electronic reporting can increase efficiency and reduce the administrative burden to both companies and government agencies.

3. Work collaboratively with industry and communities to develop a national decommissioning strategy, particularly for socio-economically fragile towns and communities

Decommissioning requires clear policy direction, supported by a long-term action plan – especially with respect to minimising social and economic distress in local towns and communities. Effective and ongoing engagement and a communication strategy with stakeholders is critical to successful handling of decommissioning.

As with any other aspect of petroleum operations, effective management of issues is usually underpinned by a recognition of the multipartite characteristic of the industry, with meaningful measures to engage with stakeholders. This will also hold true for decommissioning and, as it will be a new area for many countries, it is important that sufficient attention is given to understanding the various stakeholder concerns, especially in the first project (to avoid disastrous outcomes, such as the Brent Spar decommissioning).

Governments and companies should anticipate a growing interest by stakeholders in decommissioning and ensure that meaningful consultation and communication is a key element of decommissioning plans. This should be underpinned by transparency of data and reports to enable fact-based dialogue with stakeholders, including NGOs, local communities and the general public.

Collaboration among governments and companies to transfer learning and best practice will also be an important way to reduce decommissioning costs and deliver benefits to both companies and the country. Establishing a constructive dialogue with industry bodies will be important to understanding risks and identifying opportunities for industry-wide solutions and co-operation. As technology and practices evolve, it will be important for flexibility to be incorporated by both the companies and regulators, particularly in terms of the assessments of net environmental benefit.

Another area for collaboration that governments should seek to leverage is among policy-makers and regulators across countries. This could be an invaluable mechanism for government officials to learn from each other, expediting the timeframes within which weaknesses in policies, laws, procedures etc. can be addressed.

6. Appendices

Appendix A Types of Financial Assurance Mechanisms

Selecting an appropriate financial assurance mechanism is a complex and critical undertaking for governments, which requires careful assessment and consultation. The effectiveness of any mechanism will depend on how robust the governing provisions are, as well as the capacity of the regulator to perform requisite tasks for monitoring and compliance. The table below provides a brief overview of some of the options available.

Mechanism	Advantages	Disadvantages
<p>'Soft options', such as self-funding (decommissioning costs met from cash flows from other projects) and parent company guarantee (the parent company guarantees it will fulfil the decommissioning obligation of the subsidiary company).</p>	<ul style="list-style-type: none"> No direct costs. Feasible option for companies with large, diversified portfolios and strong balance sheets. 	<ul style="list-style-type: none"> High risk to government. Future events can result in no monies being available and the government may have to fully fund all the decommissioning costs. May not be feasible for small independent companies.
<p>Third party guarantees. For example, bank guarantee, letter of credit, surety bonds.</p> <p>A third party (e.g. bank, insurance company) provides a guarantee to the government to provide a certain amount of funds under certain circumstances.</p> <p>The amount of funds and timing depends on the specifics of the arrangement. For example, the value of the guarantee is based on an estimated amount for decommissioning costs, which could increase significantly thereafter.</p>	<ul style="list-style-type: none"> Does not require company to set aside a significant amount of its cash flow. There will be associated fees and charges, but relatively inexpensive to establish. Backed by financial institutions. Provides flexibility to cover different types of companies (large, small). Depending on structure, not very high administrative burden for either company or government. 	<ul style="list-style-type: none"> Requires strong regulatory institution for ongoing oversight on effectiveness. For example, validity depends on payment of annual premium; or a surety bond issued for a specific time period, and may require renewing. Depending on the structure, some funds may be required to be held in deposit, impacting the company's availability of cash flow.
<p>Decommissioning trust funds (DTF). This is a trust fund established for the sole purpose of funding decommissioning activities. Cash payments are made into an escrow account on a predetermined basis (e.g., annually, based on revenue or production) over a specific period of time, before the decommissioning phase. Contributions to the DTF accumulate, so that at the end of asset's life sufficient funds are available for decommissioning activities. The management and performance of the DTF should be subject to periodic review.</p>	<ul style="list-style-type: none"> High degree of funding security, as cash held in escrow. Government as a beneficiary of the DTF reduces risks from ownership changes during the life of the asset. DTF contributions being structured as a series of payments over the asset's life enables the cost to be spread over the asset's productive life, when it is generating positive cash flows. 	<ul style="list-style-type: none"> Can be rendered ineffective if not well designed and monitored on an ongoing basis. For example, regarding the financial stability of the institution holding the cash in the escrow account. May contain insufficient funds in the event of premature closure. For example, if there is a natural disaster. DTF payments will impact the company's cash flow.

Appendix B Decommissioning in International Legal Frameworks

Summary of key international and regional frameworks with specific mentions of decommissioning.

Convention on the Continental Shelf (international)	<ul style="list-style-type: none"> • 1958 Geneva Convention on the Continental Shelf, Article 5(5) provides that '<i>any installations which are abandoned or disused must be entirely removed</i>'.
UNCLOS (international)	<ul style="list-style-type: none"> • The United Nations Convention on the Law of the Sea (UNCLOS) defines the rights and responsibilities of all nations in their use of the world's oceans, including the protection of the marine environment and the exploitation and management of the offshore living and non-living natural resources. It is the main international regulatory regime for offshore E&P activities. • Article 60(3) of UNCLOS specifies international obligation towards decommissioning: <i>'Any installations or structures which are abandoned or disused shall be removed to ensure safety of navigation, taking into account any generally accepted international standards* established in this regard by the competent international organization. Such removal shall also have due regard to fishing, the protection of the marine environment and the rights and duties of other States. Appropriate publicity shall be given to the depth, position and dimensions of any installations of structures not entirely removed.'</i> • Article 80 of the LOS Convention states that Article 60 applies <i>mutatis mutandis</i> to artificial islands, installations and structures on the continental shelf. • <i>Article 60(s) replaced the 1958 Geneva Convention on the Continental Shelf (Article 5.5) which specified complete removal of offshore oil and gas installations</i> <p>*See <i>International Maritime Organization (IMO) Guidelines</i></p>
IMO international	<ul style="list-style-type: none"> • The International Maritime Organization (IMO) is the United Nations specialised agency with responsibility for the safety and security of shipping and the prevention of marine and atmospheric pollution by ships. • In 1989, the IMO published guidelines and standards²⁸ stemming from UNCLOS III Article 60 that address the decommissioning of oil and gas facilities (excluding pipelines). These are influential but non-binding legal principles, unless otherwise given effect by member countries in their national legislation or through some other mechanism (e.g., regional conventions such as OSPAR). Notably, they impose general requirement for removal, except in particular circumstances (determined on a case-by-case basis, related to navigation and position relative to customary traffic lanes, other users of the sea or the marine environment), as soon as reasonably practical after abandonment or permanent disuse. • Standards require complete removal of all structures weighing less than 4,000 tonnes when located in 75m or less, and in 100m or less if emplaced on the seabed after January 1998. If a structure is only partially removed, a minimum of 55m of clear water must be present for the safety of navigation

28 1989 Guidelines and Standards for the removal of offshore installations and structures on the continental shelf and in the exclusive economic zone (IMO Resolution a.672 (16)).

<p>London Dumping Convention / London Protocol (LCLP)</p>	<ul style="list-style-type: none"> • 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter ('London Dumping Convention') Article III includes in its definition of dumping: '<i>any deliberate disposal at sea of vessels, aircraft, platforms or other man-made structures at sea</i>'. Article III (1)(b)(ii) of the Convention (and similar text is found in the Protocol at Article 1(4)(2)(3)) expressly states that: '<i>Placement of matter for a purpose other than the mere disposal thereof</i>' is not included within the definition of 'dumping', although this statement is qualified by the words: '<i>..provided that such placement is not contrary to the aims of this Convention</i>'. • The 1996 London Protocol amended the Convention and classified dumping as: '<i>any abandonment or toppling at site of platforms or other man-made structures at sea, for the sole purpose of deliberate disposal</i>'. • Artificial reef guidelines developed in the 22nd and 23rd Consultative Meetings (2000 and 2001) contained the following elements of policy guidance concerning the placement of matter for a purpose other than the mere disposal thereof: <ul style="list-style-type: none"> ◦ placement should not be used as an excuse for disposal at sea of waste materials; ◦ placement should not be contrary to the aims of the Convention; ◦ information on placement activities by Contracting Parties should be provided to the Secretariat, as available; and ◦ materials used for placement activities should be assessed in accordance with the relevant Specific Guidelines.
<p>OSPAR (regional)</p>	<ul style="list-style-type: none"> • The Oslo and Paris Convention on the Protection of the Marine Environment in the Northeast Atlantic (OSPAR) is the instrument guiding international co-operation on the protection of the marine environment of the North East Atlantic. • Decision 98/3 for the Disposal of Disused Offshore Installation (1999) lays down the general principle that the dumping, and leaving wholly or partly in place, of disused offshore installations is prohibited. Pipelines are excluded from this decision. However, following assessments, permission may be given in the case of: <ul style="list-style-type: none"> ◦ steel installations weighing more than 10,000 tonnes in air; ◦ gravity-based concrete installations; ◦ floating concrete installations; ◦ any concrete anchor-base which results, or is likely to result, in interference with other legitimate uses of the sea. • OSPAR drill cuttings guidance <ul style="list-style-type: none"> ◦ Recommendation 2006/5 – reduction of the impacts of pollution by oil and/or other substances from cuttings piles. ◦ OSPAR Decision 2000/3 – use of Organic-Phase Drilling Fluids (OPF) and the discharge of OPF-Contaminated Cuttings. • OSPAR Guidelines on Artificial Reefs in relation to Living Marine Resources (2012–3) – consequences for the marine environment of the placement of artificial reefs on the seabed. <p>OSPAR has a precedent with regards to its relatively stringent requirements – and is influential on decisions in other maritime jurisdictions.</p>

West Africa (Abidjan Convention)	<p>There is no specific mention in the Abidjan Convention on the decommissioning, but it is covered in the Draft Additional Protocol to the Abidjan Convention on Environmental Norms and Standards for Offshore Oil and Gas Exploration and Exploitation Activities, adopted as the Malabo Protocol in 2019:</p> <ul style="list-style-type: none"> • decommission in accordance with international norms and standards, such as those under the International Maritime Organization; • consider other legitimate uses of the sea, particularly for fishing, safety of navigation, the protection of the marine and coastal environment, as well as the rights and obligations of the other Contracting Parties • also applies to facilities disused or abandoned by any operator whose permit has been withdrawn or suspended; • permit holder or operator, whichever applies, shall maintain an adequate financial provision to execute decommissioning obligations; • removal or disposal of offshore installations, infrastructure, platforms or pipelines.
Mediterranean (Barcelona Convention)	<ul style="list-style-type: none"> • Article 7 imposes an obligation upon the parties to 'take all appropriate measures to prevent, abate, combat and, to the fullest possible extent, eliminate pollution of the Mediterranean Sea Area resulting from exploration and exploitation of the continental shelf, seabed and subsoil'. • The Protocol for the Prevention of the Mediterranean Sea against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil (the Offshore Protocol, 2011) further covers removal of installations, defined as any fixed or floating structure and integral part thereof, that is engaged in activities, including, in particular: <ul style="list-style-type: none"> ◦ fixed or mobile offshore drilling units; ◦ fixed or floating production units including dynamically positioned units; ◦ offshore storage facilities including ships used for this purpose; ◦ offshore loading terminals and transport systems for the extracted products, such as submarine pipelines; and ◦ apparatus attached to it and equipment for the reloading, processing, storage and disposal of substances removed from the seabed or its subsoil. • The Protocol requires operators to: <ul style="list-style-type: none"> ◦ remove abandoned or disused installations to ensure safety of navigation, with particular regard to fishing, protection of the marine environment and rights and duties of other Contracting Parties; ◦ remove or bury pipelines with regard to the same as the above; ◦ also applies to facilities disused or abandoned by any operator whose permit has been withdrawn or suspended; ◦ if operator fails to comply, the competent authority shall undertake (at the operator's expense) action necessary to remedy failure to act. • Separate commitments cover prevention of pollution by dumping, from ships and from land-based sources.

**South Pacific
(Noumea
Convention)**

- The Noumea Dumping Protocol relates to deliberate dumping at sea of platforms or other man-made structures at sea and requires all appropriate measures to prevent, reduce and control pollution by dumping. However, Article 2(b) of the Noumea Convention states that dumping does not include placement of matter for a purpose other than the mere disposal thereof, provided that such placement is not contrary to the aims of the Convention.
- An Amendment to the Protocol for the Prevention of Pollution of the South Pacific Region by Dumping ('Dumping Protocol Amendment') was adopted in 2006, updating the definition of dumping to include 'abandonment or toppling at the site of platforms or other man-made structures at sea, done for the sole purpose of deliberate disposal'.

Commonwealth participants in international and regional frameworks.

	International				Regional					
	UNCLOS / IMO	LCLP	CBD	Basel	Abid-jan	Nairobi	Barce-lona	OSPAR	Noumea	Carta-gena
Indo-Pacific										
Australia	x	x	x	x					x	
Bangladesh	x		x	x						
Brunei Darussalam	x		x	x						
India	x		x	x						
Malaysia	x		x	x						
New Zealand	x	x	x	x					x	
Pakistan	x	x	x	x						
Papua New Guinea	x	x	x	x					x	
Africa										
Cameroon	x		x	x	x					
Ghana	x		x	x	x					
Kenya	x	x	x	x		x				
Mozambique	x		x	x		x				
Namibia	x		x	x						
Nigeria	x	x	x	x	x					
Sierra Leone	x	x	x	x	x					
South Africa	x	x	x	x	x	x				
Tanzania	x	x	x	x		x				
Uganda	x		x	x						
Europe										
Cyprus	x		x	x			x			
United Kingdom	x	x	x	x				x		x
America / Caribbean										
Canada	x	x	x	x						
Barbados	x	x	x	x						x
Belize	x		x	x						x
Guyana	x		x	x						x
Trinidad and Tobago	x		x	x						x

Note: Basel = Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal; CBD = Convention on Biological Diversity

Appendix C Checklist for Decommissioning in Legal Framework

The legal framework consists of the combination of the laws, regulations and contracts that govern operations and interactions in the petroleum sector. While these can be held within sector-specific instruments, that is, a petroleum exploration and production act, regulations and petroleum agreements, it is generally the case that there are many aspects that could also be covered under other non-sector specific legislation, for example, environmental laws, health and safety laws, tax laws and labour, local content laws and regulations.

The mechanism by which petroleum rights are held can be through a licence or a petroleum agreement (whether a concession, production sharing contract, risk service contract etc). Within this document, 'licence' (and 'licensee') is used as the reference for the rights holder; but the term can be read as either agreement or contract/contractor, as it applies to a particular jurisdiction.

A robust legal framework should address decommissioning across the entire lifecycle of an oil and gas project. The checklist below is intended to be used as a guide for ensuring that the key aspects related to decommissioning are adequately addressed in these instruments.

General

- Is there a clear definition of decommissioning?
 - Does it enable distinction to be made between mothballing and temporary shut-ins versus permanent termination of activities?
 - Is the definition consistent with international best practice?
 - Does it use language that is consistent with understanding environmental impact in the appropriate national / regional policy / regulation?

Please note: There is no singular international definition for 'decommissioning'. Older legislation often refers to 'abandonment', which is only one aspect of decommissioning. Clarity should be given to treatment of the full range of decommissioning activities, as described in Section 2.2. The definition adopted would have to take into account the definition of the other lifecycle stages (for example, exploration, development, production).

- Is there a requirement that decommissioning must be carried out according to an approved decommissioning plan? And timeframe?
- Is there a duty for all operators to decommission in a safe and prudent manner, in line with international best practice?

Please note that other terminologies such as 'good oilfield practice' could also be used in this context. It is important that the definition is sufficiently comprehensive, includes principles (for example, prudence, safety) and allows for evolving practice and technology.

- Does failure to fulfil decommissioning obligations attract penalties, depending on the circumstances?

In some jurisdictions, imposition of criminal penalties is viewed as reflective of the high level of public interest involved, and the potential health and safety and environmental risks that are associated. See recent New Zealand legislation.

- Are the circumstances under which an operator is released from its decommissioning obligations clear? In such event,
 - Is the treatment of funding decommissioning activity and clearly established?
 - Is the responsibility party for the residual liability clear?
- Are the government's obligations under international and regional laws, treaties, conventions etc. passed through to the industry?
- Is there consistency and coherence with other national laws and regional policy? For example:

- Environmental laws: environmental and social impact assessments, environmental permitting, waste management laws, anti-dumping, etc?
- Bankruptcy laws: is decommissioning given priority prior to any creditor claims being drawn on the company's assets? (*Please refer to Section 3.8, the Alberta case for context.*)
- Does the legal framework provide the minister/regulator with powers to request information as it relates to the administration of the Act? This will apply to all aspects of decommissioning over a project's lifecycle.

Licensing regime and approval processes

The legal framework should ensure that decommissioning is a key consideration across a project's lifecycle and the broader approach to the development of the sector. It should thus feature as part of the criteria being considered across all key approval and decision points of a project.

- Is a decommissioning plan required for approval of a field development plan/plan of development?
 - Does it include estimated economic limit and year for cessation of production (COP)?
 - Does it include estimated costs?
- Are all oil and gas assets covered by a decommissioning plan and requirements for a financial assurance mechanism?

Depending on the permitting regime in place, associated infrastructure (for example, pipelines, onshore processing facility) may not be included in a field development plan/plan of development and may be subject to separate licensing requirements. All related assets and infrastructure should have a similar robust legal framework. In addition, depending on the integration of facilities and regulations for third party access, not all assets may require decommissioning at the same time.

- Is the regulator's or ministerial *prior* approval required for any transfers and assignments? This includes direct or indirect change of control (for example, transactions involving share purchases of companies holding petroleum rights).

This is a feature of all modern legislation and would enable the review and assurance that decommissioning is adequately addressed. This includes due diligence on the transferee, as well as the current standing of decommissioning plan and the status of the financial assurance mechanism.

- Are the duties on termination or transfers of a petroleum licence/agreement clear?
- Is there a requirement for the operator to conduct decommissioning operations as per the approved decommissioning plan?
- Given the multifaceted nature of decommissioning, does approval of a decommissioning plan require consultation with other relevant agencies, such as a Department of Environment?
- Is there an approval process and requirements for temporary suspension or mothballing of assets?
 - Are there accompanying effective regulatory monitoring and enforcement measures in place?
 - Is there a maximum time /period after which assets must be permanently plugged, abandoned and decommissioned?
- Is there clear process around declaration of cessation of production?
- Is there a clear and explicit process and approval for decommissioning of oil and gas assets, including:
 - permanent plugging and abandonment of wells?
 - platforms and other facilities?
 - shared infrastructure and land?

Establishing requirements according to regulations provides the government with a reasonable approach to develop technical regulations to guide these activities in the future.

- Is there a clear obligation to perform decommissioning activities prior to relinquishment or termination of contract/licence? In the case of termination, what security is in place (bonds and guarantees, for example).

Adequate financial assurance

A financial mechanism should be put in place to ensure that sufficient money is available to fully fund all decommissioning activities and to avoid the taxpayer footing the bill. There are different approaches, each with advantages and disadvantages, which are summarised in Appendix A. Careful consideration should be given to the type of risk profile the assurance mechanism represents. Please note that the financial assurance mechanism should be independent of the economic performance of the asset. Any measure which links funding to the success or failure of the asset would substantially increase the risks of inadequate funding, especially in the event of a fall in prices, production or bankruptcy. These mechanisms must also be reviewed and updated regularly, as rising costs may render them obsolete.

- Is there a requirement for a financial assurance mechanism to ensure that decommissioning costs are fully funded?
- Is it clear how financial contributions are deductible for production sharing and/or tax purposes? Is it based on a cash or accrual basis?
- Is there a requirement for operators to develop credible, auditable estimates of decommissioning costs?
- Are preliminary decommissioning estimates of costs and timing of cessation of production included as part of the requirements for project approvals – in field development plans or the plan of development?
- Is there a process for reviewing and updating the estimated cost and timing of decommissioning, to ensure that the liability is adequately funded? If so, is it clear what level of detail is required and the timeframe for providing updates?

Ensuring that there is a credible estimate of the decommissioning costs and timing for cessation of production are critical requirements to minimise risks of funding the liability. The regulator should ensure that decommissioning forms part of the annual reporting by the operator. This reporting requirement should recognise that there are likely to be very little changes during the early phase of a project.

- Is there a mechanism to evaluate the sufficiency of the financial assurance (the quality of the cost estimate)? Is there a mechanism to have a third party audit?
- Are qualified/approved institutions in place to secure, hold, manage, report on and administer the financial assurance?
- Is there a clear framework, including criteria, for the release of the financial assurance after completion of activities?
- Is decommissioning funding assessed **prior** to granting any changes in ownership, control or transfer/assignment of rights?
 - Have the funding requirements of the transferor been satisfactorily met?
 - Is the treatment of any tax credits clear between the transferor and transferee?
 - Has due diligence been undertaken on the transferee to ensure a) there is not a high risk of bankruptcy, and b) it can meet the financial obligations to satisfactorily execute decommissioning activities at the end of the asset's life?
- Is there clarity on treatment of decommissioning liability in the event of bankruptcy?

Achieving appropriate protections to the government on the matter of oil and gas companies' insolvency, requires alignment of the legal provisions on decommissioning with the country's bankruptcy and insolvency laws. For example:

- Are decommissioning obligations treated as a debt owed to the government?
- Does the legal framework establish this debt as a priority over the claims of other creditors?
- Is there legal protection to ensure that funds set aside for meeting decommissioning obligations are not available to the general body of creditors of the insolvent company?
- Is there effective monitoring of the decommissioning liabilities and the financial security?

A company's financial position can change, and it is important for the regulator to ensure there is ongoing effective monitoring to understand the current or emerging risks with a particular company, as well as the industry as a whole, and also to understand what precautionary actions are warranted to safeguard the country's interests.

Decommissioning fund

Where a cash trust fund is established, the legal framework should address the following key issues.

- Are the rules governing the establishment of the decommissioning fund in line with best practice, to minimise corruption and ensure independent, prudent management by competent persons?
 - Is the fund ring-fenced and established for the sole purpose of funding decommissioning activities?
 - Is the management of the fund performed by a committee/board that includes representation by the owner of the petroleum rights (e.g., the operator)?
 - Is there transparency in the selection process and composition of the committee/board?
 - Is there a transparent, robust process, including predetermined selection criteria and due diligence, for the fund's investment manager/financial institution?
 - Is there a process for ongoing monitoring/an oversight mechanism for the fund manager and replacement in the event of certain circumstances?
 - What level of fees are being charged and how are they treated?
 - Is it clear what investment strategy and allocation across investment classes are permissible?
 - Is there regular reporting, at a minimum on an annual basis, on fund investment strategy, portfolio of assets and performance etc.?
- Is the basis for deposits to the fund by companies clear?
 - Are contributions based on volumes produced? Or a fixed fee?
 - Is the frequency of deposits clear? Are they quarterly or annually?
 - How is the adequacy of contributions relative to the estimated decommissioning costs assessed?
 - How often is this done? Is there a requirement for the operator to indicate if there are material changes that will impact funding contributions?
- Is the tax treatment related to the fund clear?
 - Are contributions to the fund deductible for production sharing and/or tax purposes?
 - Is the tax treatment of income earned held by the fund clear?
 - If there is a surplus, at the end of decommissioning, is it clear how it will be treated for tax purposes?

- Is the process for withdrawals from the fund clear?
- If there is a surplus in the fund after all decommissioning activities are completed, is it clear on how it will be treated? Will it be returned to contributors or held by the state?
- If the fund is in deficit, is the timing and mechanism for dealing with the shortfall clear?

Decommissioning plan

The incorporation of a 'decommissioning plan', which can be updated during the asset's lifecycle, provides an ongoing mechanism for engagement for the regulator and a basis for reflection of the latest view of critical factors and risks. Given the long duration of the production phase, it is to be expected that the preliminary view of decommissioning at the development phase may not necessarily be the same as during the decommissioning phase. Changes may arise from detailed planning or incorporation of new information, research, best practice and technology, as more experience is garnered in different operating environments.

- Is a decommissioning plan required for approval of a field development plan/plan of development?
- Is there a robust process in place for ongoing review of the decommissioning plan over the project's lifecycle? There should be early discussions between the operator and the regulator to ensure that the decommissioning process is well understood by both parties, as that would allow the operator to develop a realistic decommissioning plan, including a delivery timescale.
- Are the contents of a decommissioning plan clearly outlined? For example, does it include:
 - A decommissioning strategy?
 - An economic limit/year of cessation of production?
 - Decommissioning costs?
 - An environmental management planning framework?
 - A project plan and risks?
 - Arrangements for ongoing monitoring, required after decommissioning activities have been completed?
- Is it clear what the government's policy is for the treatment of each type of asset to inform the operators' decommissioning plan and strategy? That is, for wells, pipelines, platforms, processing facilities, other associated infrastructure (e.g. storage, loading)?
 - Are there any distinctions for onshore versus offshore?
 - Pipelines?
- Are there measures that the government can take if the decommissioning plan is deemed to be unsatisfactory?
- Is there a requirement to update the decommissioning plan for any material change that will impact decommissioning?
- Is there a clear, transparent and efficient process for the approval of the decommissioning plan?

Social issues

- Is there a mechanism to ensure that closure planning will be aligned with local and national development goals?
- Is there a mechanism for the regulator to ensure that stakeholders are identified and involved? Does it include a meaningful consultation process?
- Is there a mechanism for timely sharing of information with stakeholders?
- Is an assessment of the social impacts of decommissioning required?

- Is there a requirement for a stakeholder engagement plan?
- Does it specifically address vulnerable groups, such as women and indigenous peoples?
- Is there a requirement for a transition strategy to be put in place for local economies and workers, to support the period from operations to decommissioning?
- Are opportunities for the use of local employment and firms considered in the decommissioning plan?

The government should consider whether local capacity exists and, if not, how to begin to build such capacity.

Environmental issues

- Is an assessment of the environmental impacts of decommissioning required?
 - Is there a requirement for an environmental baseline?
 - Is the requirement and timing for scoping exercises clear?
 - Is there a consultation process with stakeholders?
 - Does it include a non-technical summary, including a brief explanation of the main findings and clear, concise conclusions?
- Is there an environmental management planning framework for decommissioning? (Included as part of the decommissioning plan).
- Is there a requirement to evaluate the impact of climate change and commitments towards decarbonisation on the decommissioning strategy and residual risks? For example, type and frequency of monitoring for in-situ infrastructure, potential for movement in hurricanes etc.
 - Does this consider that history may not reflect the variability and intensity of future events?
- Is it clear what environmental permits/approvals are required for decommissioning activities?
- Are there provisions for ongoing monitoring after decommissioning activities are completed? Is there a mechanism to communicate results from such monitoring to relevant government agencies?

Structures left in place will require ongoing review, to ensure that there is no leakage and/or potential threat to other users of the area – for example, those engaged in fishing.

Technical issues

- Is there a clear classification for wells? For example, shut-in, suspended or inactive, abandoned?
- Are there clear technical requirements for each well classification? Are there guidelines for temporary suspension and permanent abandonment of wells?
- Is it clear the maximum time period that a well can be suspended or inactive before it must be permanently plugged and abandoned? (This is to avoid 'orphan' wells.)
- Is it clear the maximum time period that a facility/installation can be suspended, "mothballed" or inactive before it must be decommissioned? (This is to avoid 'orphan' facilities, pipelines, sites.)
- Are there specifications for dealing with drilling cuttings? And on disposal of other materials?
- When decommissioning is deferred, are there specifications for suitably maintaining facilities? For example:
 - What maintenance is required?
 - Is there ongoing monitoring and inspection by the regulator?
 - In the event that there are integrity issues, what are the recourse measures?

Liabilities

- Is there joint and several liability for all petroleum operations, including financial obligations, penalties, incidents, decommissioning etc?
- Does the legal framework establish strict liability towards the government for any loss or damage caused, in connection with the decommissioning of the facility or other implementation of the decommissioning plan?
- Is it clear who bears responsibility for residual liabilities?

The government may want to consider provisions for retention of security (potentially for a limited period) after decommissioning activities are completed.

Reporting requirements

- Is there a requirement to provide the regulator and other stakeholders with updates on any significant modifications to the decommissioning plan? For example, changes to estimated costs, reserves, cessation of production.
- Does the legal framework provide for regular receipt of information in a timely manner (to enable agencies sufficient time to consider and act)?
- Is there a standard reporting template for collection of the information?

This would provide clarity to operating companies on what is needed and when. The government, in recognition of limited resourcing, should seek to leverage technology and standardisation to increase efficiency and reduce the administrative burden, so that more time can be spent on analysing the information (versus collecting data).

- Is there a requirement for accurate records to be kept on operational issues, which would be required for decommissioning planning and selection of optimal solution. For example, details on drilling materials, location and ongoing environmental monitoring?

These should be safeguarded and considered in transfers and assignments, especially in instances of changes in operatorship. Such records are vital for adequate understanding of what is to be decommissioned and the potential threats to the public and environment during decommissioning operations.

- Is there a requirement for a decommissioning report (also referred to as a 'close out report') to be submitted to the minister/regulator after decommissioning activities are completed?
- Are the contents of the decommissioning (close out) report specified?
- Is there a certificate of completion provided to operators if the minister/regulator is satisfied with the decommissioning (close out) report?
- Is there a provision for penalties for failure to report or keep accurate records?

Appendix D Model Provisions for Decommissioning

Decommissioning Model Provisions (Petroleum Act, Regulations and Petroleum Agreement)

The 'legal framework' refers to the combination of requirements under laws, regulations and contracts that govern decommissioning. There are several cross-cutting aspects that may be addressed in other sectors' regulatory framework. This section pertains to elements that are typically addressed within petroleum-specific instruments such as a petroleum act, petroleum regulations and petroleum agreements (for example, concessions, production sharing contracts).

Please note: *This section is intended to provide guidance and should not be treated as a substitute for the holistic formulation of laws, regulations and contracts. The provisions are not exhaustive.*

It is recommended practice that in so far as practically possible, the requirements related to the decommissioning should be enshrined in legislation (either the petroleum act or regulations), so that this is not a negotiable element of petroleum agreements – thereby providing a robust regulatory framework to ensure the country's interests are protected.

The provisions cited below can be used as a guide to ensure that the key aspects related to decommissioning are adequately addressed in the legal framework.

Please note that the terminology in countries' legal frameworks can differ, as it reflects different systems for the award of petroleum rights (some use licences in addition to having petroleum agreements) and the different institutional arrangements across various jurisdictions (for example, whether there is a national oil company, independent regulator). Within this document:

- 'Contractor' is used as the reference for the holder of petroleum rights (i.e. the company).
- The generic term 'Regulator' is used to represent the government entity with responsibility for administering the petroleum sector. Depending on the particular situation, this could be the Ministry of Petroleum, the Petroleum Commission or the national oil company.

The following colour coding has been used to distinguish the types of provisions that are typically found in law (which usually establishes requirements and principles), regulations (which outline specific details) and the petroleum agreement (which generally refers to the legislation and operationalisation of requirements).

Blue: Provisions typically found in laws

Orange: Provisions typically covered in regulations

Green: Provisions typically covered in petroleum agreements

Grey: Guidance notes, which are intended to provide some context around the particular provision

Legislative Provisions (Petroleum Act or Regulations)

Definitions

- **"Best industry practice"** means such policies, practices, methods, standards, procedures, equipment and material generally accepted and used internationally by prudent, diligent, skilled and experienced operators in petroleum operations, including but not limited to policies, practices, methods, standards, and procedures intended to:
 - conserve petroleum by maximising recovery of petroleum in a technically sound and economically efficient and sustainable manner;
 - promote operational safety and prevention of accidents; and
 - protect the environment by minimising the impact of petroleum operations.

- **Decommissioning operations** means planning and implementation activities to remove, dispose or otherwise deal with wells, structures, facilities, installations and materials used in petroleum operations in connection with the abandonment or cessation of petroleum operations, including site restoration for areas disturbed by way of such operations to clean up, make safe and protect the environment.
- **Decommissioning plan** means the package of measures to be taken to remove or otherwise deal with all wells, installations, equipment, pipelines and other facilities, whether onshore or offshore, used in connection with petroleum operations and to rehabilitate land disturbed by way of such operations.
- **Facility** means any building, structure, installation, equipment or appurtenance over which the Government has jurisdiction and that is connected to or associated with the recovery, development, production, handling, processing, treatment or disposal of hydrocarbon-based resources, including synthetic coal gas and synthetic coal liquid, or any associated substances or wastes or the disposal of captured carbon dioxide, and includes, without limitation, a battery, a processing plant, a gas plant, an oilfield waste management facility, a central processing facility, a compressor, a dehydrator, a separator, a treater, a custom treating plant, a produced water-injection plant, a produced water disposal plant, a miscible flood injection plant, a satellite or any combination of any of them, but does not include a Well, a mine site or processing plant or a mine site or coal processing plant.
- **Operator** means the entity appointed by the contractor or a licensee, with the approval of the REGULATOR, to carry out petroleum operations on its behalf.
- **Production operations** shall include but not be limited to operations and all activities related thereto carried out for petroleum production such as extraction, injection, stimulation, treatment, transportation, storage, lifting, and related operations, but does not include any storage or transportation beyond the measurement point.

General Provisions

1. Prior to relinquishment of any area, the contractor shall perform all necessary clean-up activities to restore the area, as nearly as possible, to the condition existing prior to exploration activities, including the removal of facilities and equipment in accordance with best international petroleum industry practice.
2. The termination of a contract shall not absolve a contractor of its obligations that have arisen before the termination, including performing all necessary clean-up activities to restore the area, as nearly as possible, to the condition existing prior to exploration activities, including the removal of facilities and equipment in accordance with best international petroleum industry practice.
3. A field development plan shall contain at a minimum:
 - a preliminary decommissioning plan;
 - an environmental and social impact assessment; and
 - any additional information as requested by the REGULATOR.

Please note, the legislative requirements for FDPs would be more expansive, the above items are specifically decommissioning related areas which should be included. ESIA is included as it should provide critical baseline information and the basis for ongoing monitoring and assessment of environmental and social impacts from the oil and gas project.

Depending on the permitting regime, the FDP may relate only to the field and a separate licence may be required to install and operate facilities. Depending on the licencing/permitting regime, the Act should ensure that the above provisions apply *mutatis mutandis* to licensees. This is to ensure that the same requirements are required as part of the approval process to develop any associated facilities and infrastructure.

4. Each contractor shall carry out decommissioning at the end of a field life unless the Government expressly releases them from such obligation.

Please note that the Petroleum Act should ensure that this requirement for adequate decommissioning treatment is applied to all associated facilities and infrastructure.

5. Where a contractor is declared bankrupt or is wound up before the fulfilment of any of its decommissioning obligations under its contract, the Government shall recover the costs of fulfilling those obligations from the contractor's trustees in bankruptcy.
6. The costs to fulfil any decommissioning obligations under a petroleum contract shall be treated as a debt owed by the contractor to the Government of **[COUNTRY]** and shall have priority over the claims of other creditors of the contractor whether secured or unsecured notwithstanding anything to the contrary under any other law.
7. An application for approval to assign, encumber or transfer assignments, any contract, or any rights or obligations arising out of a contract, shall be made in writing to the REGULATOR, and shall include:
 - (a) the same information from the prospective transferee as would be required of a new application for a petroleum contract or licence in accordance with regulation;
 - (b) the final terms and conditions of the assignment or transfer;
 - (c) a review of the status of the decommissioning fund and evidence of payments if required to ensure that there is no shortfall in accordance with this Act;
 - (d) an unconditional written undertaking by the assignee or transferee to assume all the obligations assigned and transferred by the assignor or transferor under the contract;
 - (e) evidence of payment prescribed fees; and
 - (f) any such other particulars as the REGULATOR may require.
8. Every contractor shall, in respect of its contract area, keep at its registered office in **[COUNTRY]**, accurate records containing full particulars of the following matters:
 - (a) the drilling operation, deepening, plugging or abandonment of wells;
 - (b) the strata and subsoil through which wells are drilled;
 - (c) the casing inserted in wells and any alteration to such casing;
 - (d) any petroleum, water and other economic minerals encountered;
 - (e) the areas in which any geological or geophysical work has been carried out;
 - (f) accurate geological maps and plans, geophysical records, engineering records, representative geological samples and test results, and all interpretations thereof; and
 - (g) such other matters as may be provided in his contract or as the REGULATOR may reasonably require by notice in writing to the contractor.

Decommissioning – Duty to Abandon & Decommission

Please note the duty to abandon and decommission should apply to the upstream assets which are governed by the petroleum contract/licence as well as any associated infrastructure and facilities which may sit outside of the contract area. This should be addressed within the licencing regime (granting of rights to build and operate such infrastructure/facilities).

9. Upon cessation of production operations, the contractor shall conduct decommissioning operations as per the approved decommissioning plan and in accordance with any other applicable law and in line with best industry practice.
10. A contractor or a licensee who operates a petroleum facility shall, after the termination of production operations restore the affected area and remove the causes of damage or danger to the environment in accordance with the applicable enactments.

11. A contractor or a licensee who is under an obligation to implement an approved decommissioning plan is subject to strict liability towards the Government for any loss or damage caused, in connection with the decommissioning of the facility or other implementation of the decommissioning plan.
12. Each contractor shall carry out decommissioning at the end of a field life unless the Government expressly releases them from such obligation.
13. A decommissioning plan shall cover all petroleum facilities described in the field development plan.
14. The provisions of this section [as well as the provisions of regulations] shall apply *mutatis mutandis* to licensees.

Abandonment

15. An operator shall submit to the REGULATOR, notice of the intention to abandon any well in accordance with regulations.
16. The closure, plugging or abandonment of a well shall be carried out only with the prior written approval of the REGULATOR in accordance with regulations.

Decommissioning Plan

17. (1) Upon cessation of petroleum operations, the contractor or licensee shall conduct decommissioning operations as per the approved decommissioning plan and in accordance with any other applicable law and in line with best industry practice.
- (2) The contractor or licensee shall include a preliminary decommissioning plan and decommissioning statement as part of the field development plan submitted or the application for a facility licence under this Act in the manner and form as prescribed.
- (3) Where a field development plan has been approved, the contractor or licensee shall thereafter submit a decommissioning statement to the REGULATOR no later than [30th March] every year in the form prescribed in regulations.

Please note that in some jurisdictions, a calendar year is adopted and in others the contractual year. The choice will depend on the country practice and ease of administrating.

- (4) The contractor or licensee shall, no later than one year before the estimated date on which [fifty per cent (50%)] of the estimated total recoverable reserves of petroleum would have been produced in accordance with the approved field development plan, submit a proposed decommissioning plan and associated decommissioning statement to the REGULATOR for approval as prescribed.
- (5) The REGULATOR may, in consultation with the Department of Environment and other relevant agencies and ministries, approve the proposed decommissioning plan submitted in accordance with subsection (4) and shall notify the contractor in writing. For the purposes of this Act, such a revised plan shall be deemed the approved decommissioning plan. The REGULATOR may request further information from the contractor or licensee before approving a decommissioning plan or a revision thereof.
- (6) If there are subsequent changes in circumstances that materially impact the approved decommissioning plan, the contractor or licensee shall update the decommissioning plan and decommissioning statement and re-submit for approval. Such circumstances include but are not limited to
 - (a) any additions or substantial changes to the facilities;
 - (b) changes in the assumed method, techniques or costs of decommissioning operations; or
 - (c) material changes in recoverable reserves or the production profile.

- (7) If the REGULATOR considers that the decommissioning plan submitted in accordance with subsection (4) may not adequately address the potential needs or requirements for decommissioning operations, the REGULATOR may direct the contractor to re-evaluate the decommissioning plan and to make appropriate revisions thereto within a specified time. The contractor or licensee shall promptly make such revisions and re-submit the decommissioning plan for approval.
- (8) If a contractor or licensee fails to comply with subsections (4) or (6), the Minister may give notice in writing to review, revise or amend the decommissioning plan in question, within a period specified. If the contractor fails to comply with such notice, the Minister may cause such decommissioning plan to be prepared and shall recover the costs incurred from the contractor. Where the Minister has prepared the decommissioning plan, it shall have the same effect as if it had been submitted by the contractor and approved by the Minister.
- (9) A contractor or licensee shall, on a date no later than five years prior to the estimated date for the commencement of decommissioning operations, or as otherwise agreed with the REGULATOR, submit a revised decommissioning plan to the REGULATOR for approval as prescribed and which shall include:
 - (a) reservoirs and production history and relevant data;
 - (b) particulars for determining the economic threshold for cessation of production;
 - (c) an evaluation of options for continued production;
 - (d) an outline of alternative decommissioning solutions and the preferred option;
 - (e) inventory of dangerous material and chemicals present in the facilities and plans for removal and potential alternative use;
 - (f) plans for conducting an environmental and social impact assessment report;
 - (g) technical information regarding each relevant facility to be decommissioned and disposal alternatives where applicable;
 - (h) detailed budget for the activities under the plan, including particulars of the cost of decommissioning facilities;
 - (i) engineering and feasibility studies necessary to support the proposed plan;
 - (j) a revised decommissioning statement;
 - (k) any other information as required by the REGULATOR.
- (10) A contractor or licensee shall ensure that decommissioning operations are conducted in accordance with the approved decommissioning plan.
- (11) The obligations to decommission under subsection (1) are binding on the contractor or licensee after the expiration of the applicable petroleum agreement or licence.
- (12) If a decommissioning plan is not implemented within the stipulated time limit and in accordance with the terms and conditions of the approval, the Minister, in consultation with the REGULATOR, may take necessary measures for implementing the decommissioning plan for and on behalf of the licensee or contractor responsible for the disposal and on the account and risk of the licensee or contractor, including the engagement of subcontractors for carrying out of the plan.

Contents of a Decommissioning Plan

18. (1) The preliminary decommissioning plan required as part of the field development plan, in accordance with section 17(2) of the Act, shall include:
 - (a) the anticipated date of cessation of production and the estimated date at which decommissioning would occur;
 - (b) overview of measures and techniques for the abandonment and decommissioning of wells, and all associated facilities and infrastructure contained within the field development plan;
 - (c) a preliminary decommissioning statement, which shall include:
 - i the total recoverable reserves, projected annual production profile over the life of the field and cumulative annual production for each year of production;
 - ii the estimated date on which fifty per cent (50%) of the estimated total recoverable reserves of petroleum will have been produced;
 - iii the estimated future total decommissioning costs; and
 - iv the estimated annual payments to the decommissioning fund.
- (2) Pursuant to section 17(4) of the Act, the proposed decommissioning plan to be submitted no later than one year before the estimated date on which fifty per cent (50%) of the estimated total recoverable reserves of petroleum would have been produced in accordance with the approved field development plan, shall include:
 - (a) an overview and particulars of wells, installation, equipment, pipeline and other facilities in the approved field development plan and measures for decommissioning each;
 - (b) the anticipated date of cessation of the use of each facility and the estimated date at which decommissioning would occur;
 - (c) the planned measures to effect the decommissioning of wells, facilities and all other installations, a description of equipment needed, timeframes for execution, and estimated cost of such decommissioning operations;
 - (d) proposed measures for post decommissioning monitoring and maintenance of wells and facilities;
 - (e) a preliminary assessment of environmental and social impact of decommissioning operations; and
 - (f) any other information the REGULATOR may require.
- (3) Pursuant to Section 17(9) of the Act, the contractor shall, on a date no later than five (5) years prior to the estimated date for the commencement of decommissioning operations, submit a revised decommissioning plan, which in addition to the particulars required under sub-regulation (2) shall also include:
 - (a) an overview of the field history, including:
 - i relevant information on reservoirs and production history;
 - ii a description of all wells, including wells already plugged and abandoned;
 - iii plans for plugging and abandonment of all other existing wells in the contract area;
 - iv information on the deposit of drill cuttings and other materials; and
 - v possibilities for continued production;
 - (b) an evaluation of options for continued production;
 - (c) technical information regarding each relevant facility to be decommissioned and disposal alternatives, where applicable;

- (d) particulars for determining the economic threshold for cessation of production;
- (e) an inventory of dangerous material and chemicals present in the facilities and plans for removal and potential alternative use;
- (f) alternative decommissioning measures and techniques considered and the grounds for the preferred option;
- (g) the planned measures to effect the decommissioning of wells, facilities and all other installations, a description of equipment needed, timeframes for execution, and estimated cost of such decommissioning operations;
- (h) plans for conducting an assessment of the environmental and social impacts of decommissioning operations;
- (i) information on applicable mitigating actions to avoid damage or unnecessary inconvenience to third parties and to reduce the negative impact on health, safety, environment, agriculture, fisheries and other affected interests;
- (j) proposed measures to secure clean-up and restore the contract area, adjacent areas and lands;
- (k) plans for post decommissioning monitoring and maintenance and abandoned facilities, if applicable;
- (l) engineering and feasibility studies necessary to support the proposed plan;
- (m) detailed budget for the activities under the plan, including particulars of the cost of decommissioning facilities; and
- (n) any other information the REGULATOR may require.

Decommissioning Statement

19. (1) Where a field development plan has been approved, the contractor shall submit an annual decommissioning statement prepared in accordance with the template in Schedule 1, which shall include information on:
- (a) the initial total recoverable reserves, associated projected annual production profile, cumulative annual production, the estimated date by which fifty per cent (50%) of the estimated total recoverable reserves of petroleum from the production area will have been produced, the estimated future total decommissioning costs as per the approved field development plan and estimated annual payments to the decommissioning fund;
 - (b) current estimates of the total recoverable reserves, production profile (actual and projected), cumulative petroleum produced, date by which fifty per cent (50%) of the estimated total recoverable reserves of petroleum from the production area will have been produced, future total decommissioning costs and estimated annual payments to the decommissioning fund;
 - (c) where applicable, the amount that is in the decommissioning fund at the beginning of that year;
 - (d) where applicable, the amount to be deposited by the contractor into the decommissioning fund in respect of the relevant year, setting out how the amount has been calculated in accordance with regulations;
 - (e) where applicable, the amount actually paid into the decommissioning fund by the contractor in respect of the relevant year;
 - (f) where applicable, the amount of expenditure incurred by the holder of a production licence on actually decommissioning the facilities in the relevant year; and
 - (g) where applicable, the amount of any money received by the contractor in the relevant year from the decommissioning fund.

Decommissioning Fund

20. (1) There shall be established a US Dollar ring-fenced fund to be known as a 'Decommissioning Fund' for each field and facilities operated in relation to a contract under this Act for the sole purpose of meeting the costs related to the implementation of decommissioning operations. The Decommissioning Fund shall be based on the approved field development plan as may be revised and shall be applied to the implementation of activities approved in the decommissioning plan.
- (2) It is the intention of this section to ensure that at cessation of production, the total monies in the decommissioning fund will equal the total cost of conducting decommissioning operations.
- (3) A separate Decommissioning Fund shall be established *mutatis mutandis* in accordance with the provisions of subsection (1) in respect of the decommissioning of facilities in any area outside the contract area where facilities are used in connection with production operations.
- (4) Deposits into the Decommissioning Fund shall:
- (a) be calculated in accordance with a formula based on the levels of production relative to total recoverable reserves as prescribed in regulations;
 - (b) commence from the calendar quarter where production has reached [fifty per cent (50%)] of the aggregate recoverable reserves as determined in an approved field development plan; and
 - (c) thereafter be paid quarterly.
- (5) The amount deposited in the Decommissioning Fund shall be deductible for income tax purposes in the year in which deposits are made.
- (6) Any interest on income earned in the Decommissioning Fund shall be exempt from taxes and used for benefit of the decommissioning fund.
- (7) The trust deeds establishing the Decommissioning Fund shall be approved by the Minister after consultation with the Minister responsible for finance, and shall provide, subject to the provisions of this section, for –
- (a) the appointment of the board of trustees consisting of such equal number of persons, not fewer than four members, as may be determined by mutual agreement between the Minister and the holder of the production licence concerned of which one-half shall be nominated by the Minister and the other half shall be nominated by the holder of the licence concerned; the Minister shall designate from among the members nominated by him or her one member who shall be the chairperson and another such member to be the vice-chairperson of the board of trustees;
 - (b) functions of the board;
 - (c) the winding up of each Decommissioning Fund.
- (8) In the event of an assignment of the petroleum contract or transfer of interest, the Decommissioning Fund must be transferred to the assignee or transferee by the assignor or transferor.

Management of the Decommissioning Fund

21. (1) The Decommissioning Fund shall be managed by a committee consisting of representatives of the Government and the contractor or licensee.

Alternative 1: the committee established as a Board of Trustees

The Decommissioning Fund shall be managed by a board of trustees, which shall consist of

- (a) a chairman and one other person appointed by the Minister; and
- (b) a vice-chairman and one other person appointed by the contractor.

Alternative 2: the committee established under the governing petroleum contract. Please see Joint Management Committee in Petroleum Agreement section.

The Decommissioning Fund shall be managed by the Joint Management Committee established under the petroleum agreement which consists of representatives of the Government and the contractor.

- (2) The Committee shall –
- (a) open in respect of the Decommissioning Fund a secure interest-yielding account in United States Dollars at a reputable financial institution that has a long-term bank deposit rating in a category which is equal to, or the equivalent of, A(-) or above from at least two of the following three institutions –
 - i Fitch;
 - ii Moody's; and
 - iii Standard and Poor's.

and which has been approved by the Minister after consultation with the Minister responsible for finance;

In the event that an institution has different rating across the three agencies, the lowest two shall be used.
 - (b) be responsible for administering the Decommissioning Fund;
 - (c) review the state of the Decommissioning Fund at least once a year;
 - (d) review the credit worthiness of the financial institution at which the Decommissioning Fund is held at least once a year;
 - (e) review the state of the Decommissioning Fund at least once a year;
 - (f) report to the Minister in such form as may be determined by the Minister within 30 days at the end of each calendar year on the state of the Decommissioning Fund.
- (3) The committee shall meet at least once in every calendar year at such place and time as may be determined by the chairperson.
- (4) A simple majority of the members of the committee shall form a quorum for a meeting of the board, provided that both the Government and contractor is represented.
- (5) A decision of a simple majority of the members of the Committee present at a meeting of the board shall be a decision of the committee: provided that in the event of an equality of votes the chairperson shall have a casting vote in addition to his deliberative vote.
- (6) In the event that the annual assessment of the financial institution pursuant to subsection 2(d) indicates that there is either a change or potential change in the financial institution's rating, the Minister shall be notified in writing within fourteen (14) days of the measures to be taken to ensure that the objective of the Decommissioning Fund will be met.
- (7) Prior to any transfer or assignment, a review of the status of Decommissioning Fund shall be conducted to ensure that there is no shortfall in the fund.

Payments from the Decommissioning Fund

22. (1) Payments from the decommissioning fund shall be solely for the purposes of:
- (a) an amount in respect of expenditure in accordance with the decommissioning plan in the area in respect of which the trust fund has been established;
 - (b) the normal costs of the administration of the affairs of the fund such as bank charges.

- (2) No payment referred to in subsection (1) shall be made except with the prior approval of the committee.
- (3) Where the decommissioning fund is not sufficient to cover the implementation of the decommissioning plan, the contractor shall be responsible for meeting the full costs of decommissioning in accordance with the decommissioning plan.
- (4) Where any amount remains in the Decommissioning Fund after decommissioning operations have been completed, such funds shall be distributed to the contractor less any taxes that may be payable.

Payments into the Decommissioning Fund

23. (1) The amount to be paid by the contractor into the Decommissioning Fund shall, with the exception of the last year prior to commencement of decommissioning activities, be calculated in the following manner:

$$A = \left(PP \times \frac{DC}{RR} \right) + NAF$$

where:

A is the amount to be remitted by the contractor to the Decommissioning Fund in respect of the relevant calendar year.

PP is the annual volume of petroleum produced from the field in the calendar year. In the first year that a payment is due, only the incremental volumes above 50% of recoverable reserves shall be used.

DC is the future total cost of decommissioning activities per the approved field development plan.

RR is 50% of the remaining recoverable reserves per the approved field development plan.

NAF represents net adjustments in the decommissioning fund for the calendar year related to payments as per section 22(1) of the Act and valuation adjustments such as interest income accumulated in the year.

- (2) The final payment to the Government for deposit in the decommissioning fund shall be made in the last year prior to commencement of decommissioning activities and shall be equal to the future total decommissioning costs minus the amount of funds in the decommissioning fund.

Removal and Sale of Property

24. (1) Where a contract has expired, or has been surrendered, revoked or relinquished, the REGULATOR shall direct the contractor to:
- (a) remove from the contract area all property brought into that area by any person engaged or concerned in petroleum operations authorised by the contract or to make arrangements to the satisfaction of the REGULATOR with respect to that property;
 - (b) take any action for the conservation and protection of the natural resources and the environment in that area.
- (2) A direction given under subsection (1) shall be consistent with best industry practice, and nothing in this section or in any direction shall be construed as requiring any person serving or having served as the contractor to do anything contrary to best industry practice.
- (3) Where directions given under subsection (1) are not complied with, the REGULATOR may:

- (a) do or cause to be done all or any of the things required by the direction to be done;
 - (b) remove or cause to be removed, in such manner as the REGULATOR thinks fit, all or any of the property from the area concerned; and
 - (c) dispose of, in such manner as the REGULATOR thinks fit, all or any of the property from the area concerned.
- (4) The REGULATOR may sell, or cause to be sold, by public auction or otherwise, all or any of the property referred to in this section, provided that the REGULATOR has first served notice to the person to whom the property belongs.
 - (5) The REGULATOR may deduct from the proceeds of sale of property under subsection (4):
 - (a) the costs and expenses incurred by the REGULATOR in relation to that property; and
 - (b) the fees or amounts due and payable by the person under this Act.
 - (6) The costs and expenses incurred by the REGULATOR under subsection (3) shall be treated as a debt owed by the contractor to the Government and have priority over the claims of other creditors of the contractor whether secured or unsecured notwithstanding anything to the contrary under any other law.
 - (7) No action shall lie in respect of the removal, disposal or sale of property under this section.

Notification of termination of use

- 25. (1) The contractor shall notify the REGULATOR no later than [six (6) months] before the date of an intended termination of use of a facility.
- (2) The contractor or holder of a licence shall submit to the REGULATOR a report on the implementation of its decommissioning plan not later than sixty [60] days after the decommissioning has been completed. The report shall include:
 - (a) how the plugging and abandonment of wells were carried out;
 - (b) the final disposal of petroleum facilities covered by the decommissioning plan;
 - (c) an overview of actual expenditures associated with the implementation of the decommissioning plan and how it compared to budgeted amounts;
 - (d) any other relevant matters the contractor would like the [Regulator] to know.
- (3) The REGULATOR may, on receipt of the report mentioned in subsection (2), request additional information on the decommissioning operations and any monitoring activities that may be required.

Verification Report

- 26. (1) After decommissioning operations are completed, the contractor or licensee shall submit a comprehensive report on the work carried out to the REGULATOR.
- (2) The REGULATOR shall upon receipt of the report referred to in subsection (1), require a verification of the decommissioning operations by an independent body appointed in consultation with the holder of the contract or licence. The cost of any such verification shall be funded from the Decommissioning Fund.
- (3) Where the verification report finds that decommissioning operations were implemented in accordance with the decommissioning plan, all applicable enactments and there is no risk to public health, safety or the environment, the Minister shall issue a decommissioning certificate to the contractor or licensee.

- (4) Where the verification report finds that decommissioning operations were not completed in a satisfactory manner, it shall state the necessary measures that the contractor or licensee must take in order to comply with the decommissioning plan and applicable enactments and the contractor or licensee shall implement such measures promptly.

Liability

27. (1) A contractor or licensee shall be liable for damage or loss arising in connection with the disposal of the facility or other implementation related thereto.
- (2) Where a contractor or licensee abandons a facility, the contractor shall be liable for any damage or loss caused in connection with the abandoned facility.

Alternative

Where the implementation of a decommissioning plan involves the abandonment of the whole or any part of a facility, the contractor concerned shall be liable for any loss or damage caused in connection with the abandoned facility after the termination or expiry of the contract, provided that the Minister may accept compensation from the contractor in advance of any future loss or damage associated with the facilities.

- (3) Where there is more than one party liable under subsection (1) or (2), they shall be held jointly and severally liable for all financial obligations, penalties and/or liabilities associated with the abandonment.
- (4) Where a decision is made to abandon a facility before the end of its useful life or to defer any aspect of the decommissioning, such as by transferring facilities to the Government, it may be agreed between the contractor or licensee and the Government that future maintenance, responsibility and liability be assumed by the Government based on an agreed financial compensation as provided for in accordance with regulations.

Encumbrances

28. (1) Where the Government requires removal of a facility, any lien, charge or encumbrance on the facility shall lapse. This applies also where the Government assumes operation of a facility under this Act.

Schedule 1

Decommissioning Statement
for year ending 20XX

		500 \$USm																						500 \$USm						
		200	200	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12	Yr 13	Yr 14	Yr 15	Yr 16	Yr 17	Yr 18	Yr 19	Yr 20	Yr 21	Yr 22	Yr 23	Yr 24	Yr 25	Total	
		mmbboe																						mmbboe						
Estimated 50% trigger Yr		Yr 7																						Yr 7						
Section (a) Decommissioning Requirements: Field Development Plan																														
Estimated Future Value of Decommissioning Costs																														
50% Recoverable Reserves (Trigger reserves)																														
Estimated 50% trigger Yr																														
Oil Production	mbd	20	75	80	110	110	110	110	110	110	93	79	67	57	49	41	35	30	25	22	18	16	13	11	10	8	7	6	5	400
Gas Production	mmscfd	20	75	80	110	110	110	110	110	110	93	79	67	57	49	41	35	30	25	22	18	16	13	11	10	8	7	6	5	400
Total Production	mboed	20	75	80	110	110	110	110	110	110	93	79	67	57	49	41	35	30	25	22	18	16	13	11	10	8	7	6	5	400
Recoverable Reserves	mmbboe	7	27	29	40	40	40	40	40	40	34	29	25	21	18	15	13	11	9	8	7	6	5	4	3	3	3	2	2	400
Cumulative Reserves	mmbboe	7	35	64	104	144	184	218.3	247	272	292	310	325	338	349	358	366	373	378	383	387	391	394	396	398	398	398	398	398	400
Remaining Rec.Reserves		393	366	336	296	256	216	182	153	129	108	90	75	62	51	42	34	28	22	17	13	9	6	4	2	0	0	0	0	0
% reserves produced	%	2%	9%	16%	26%	36%	46%	55%	62%	68%	73%	77%	81%	84%	87%	89%	91%	93%	95%	96%	97%	98%	98%	99%	99%	100%	100%	100%	100%	100%
Remaining50%	mmbboe							18.1	28.9	25	21	18	15	13	11	9	8	7	6	5	4	3	3	3	3	3	3	2	2	2
Remaining recoverable Reserves		393	366	336	296	256	216	182	153	129	108	90	75	62	51	42	34	28	22	17	13	9	6	4	2	0	0	0	0	0
Payments to DecomFund excl NAF		0	0	0	0	0	0	45	72.1	61	52	44	38	32	27	23	20	17	14	12	10	9	7	6	5	5	5	5	5	500

		500 USD																						500 USD				
		Yr 7	Yr 7	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12	Yr 13	Yr 14	Yr 15	Yr 16	Yr 17	Yr 18	Yr 19	Yr 20	Yr 21	Yr 22	Yr 23	Yr 24	Yr 25
Estimated 50% trigger Yr		Yr 7																						Yr 7				
Current View of Decommissioning Requirements: Estimate as at 20XX																												
Estimated Future Value of Decommissioning Costs																												
Estimated 50% trigger Yr																												
Latest Estimate		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12	Yr 13	Yr 14	Yr 15	Yr 16	Yr 17	Yr 18	Yr 19	Yr 20	Yr 21	Yr 22	Yr 23	Yr 24	Yr 25	410	
Oil Production	mbd	20	75	85	110	100	100	100	90	85	70	60	50	45	40	42	35	20	17	16	15	13	10	8	7	6	5	410
Gas Production	mmscfd	20	75	85	110	100	100	100	90	85	70	60	50	45	40	42	35	20	17	16	15	13	10	8	7	6	5	410
Total Production	mboed	20	75	85	110	100	100	100	90	85	70	60	50	45	40	42	35	20	17	16	15	13	10	8	7	6	5	410
Recoverable Reserves	mmbboe	7	27	31	40	37	37	33	31	26	22	18	16	15	15	13	7	6	6	5	5	4	3	3	2	2	2	410
Cumulative Reserves	mmbboe	7	35	66	106	142	179	212	243	268	290	308	325	339	355	368	375	381	387	392	397	401	404	406	408	410	410	
Remaining Rec.Reserves		403	376	345	304	268	231	199	168	142	120	102	85	71	55	43	35	29	23	18	13	9	7	4	2	0	0	
% reserves produced	%	2%	8%	16%	26%	35%	44%	52%	59%	65%	71%	75%	79%	83%	86%	90%	91%	93%	94%	96%	97%	98%	98%	99%	100%	100%	100%	
Remaining50%	mmbboe							12	31	26	22	18	16	15	15	13	7	6	6	5	5	4	3	3	2	2	2	
Remaining recoverable Reserves		403	376	345	304	268	231	199	168	142	120	102	85	71	55	43	35	29	23	18	13	9	7	4	2	0	0	
Payments to DecomFund		0	0	0	0	0	0	29	78	64	55	46	41	36	38	32	18	16	15	14	12	9	7	6	5	5	5	
variance on DF Contributions		0	0	0	0	0	0	-16	5	3	3	1	3	4	11	9	-1	0	2	2	2	0	0	0	0	0	25	
% change		0%	0%	0%	0%	0%	0%	-36%	8%	4%	5%	3%	9%	14%	41%	38%	-7%	-7%	3%	13%	16%	5%	-2%	1%	2%	0%	5%	

Applicable when Trust Fund Established (yr 7 onwards)

Opening Balance as at Yr 7	0	Calculations for Payments to Decommissioning Trust Fund	
Interest Income	0	A = (PP x DC/RR) + NAF	
Deposits to Trust Fund	45		
Payments from Trust Fund	0	In Yr 7 PP =	Annual Production
Decommissioning activities*	0	= 218- 200	= 28.9
Administration Costs	0	= 18	Assuming interest earned = 0.2m, Administrative costs = 0.1m
Board Members tariffs	0	A = (18 x 500/201) + 0	A = (28.9 x 500/200) + (0.1-0.2)
Closing Balance as at Yr 7	45	= 45 USDm	= 72.1 - 0.1
			= 72.0 USDm

* where monies have been received for performing decommissioning activities, details are to be provided on how funds are spent

PETROLEUM AGREEMENT PROVISIONS

It is common that petroleum agreements (irrespective of whether they are PSCs or Concessions) contain an article establishing a Joint Management Committee (JMC), often no later than thirty (30) days from the Effective Date of the petroleum agreement. In some jurisdictions, JMC is referred to as 'Management Committee' or 'Technical Management Committee'. Membership is composed of representatives from the government and the owners. As part of its functions, the JMC should have oversight and ongoing review of decommissioning issues.

ARTICLE: Joint Management Committee

- Without prejudice to the rights and obligations of the Contractor in relation to the management of its operations, the Joint Management Committee (JMC) shall have the following duties and authorities:
 - to review and recommend to the [Regulator] the approval of any proposed work programme, budgets, reports, application, plans and any amendments thereof to be submitted by the Contractor to the Government, including but not limited to an exploration work programme and budget, appraisal programmes, Field Development Plan, Local Content Plan, Decommissioning Plan;
 - to monitor and evaluate the Contractor's progress with respect to the implementation of any approved programme, plan or other matters as approved by the Minister or [Regulator], including but not limited to the exploration work programme and budget, appraisal programmes, Field Development Plan, Local Content Plan, Decommissioning Plan; and
 - establish the Decommissioning Fund pursuant to *Article on Decommissioning*.

ARTICLE: Decommissioning

1. Prior to the relinquishment of any part of the Contract Area, the Contractor shall prudently perform all necessary Decommissioning Operations to restore the area as nearly as possible, to the condition in which it existed on the Effective Date, including removal of such Facilities, equipment or installations as the [REGULATOR] may instruct, and shall take action necessary to prevent hazards to human life, property and the environment, which may be caused by its wells, Facilities, equipment or installations. In carrying out such Decommissioning activities, the Contractor shall observe Best Industry Practices.
2. The Contractor shall prepare and submit to the JMC for review and endorsement:
 - (a) the Decommissioning Plan and Decommissioning Statement prior to submission to the REGULATOR for approval is in accordance with the Act;
 - (b) the annual Decommissioning Statement in accordance with the Act;
 - (c) the proposed financial institution at which the Decommissioning Fund will be established, prior to submission to the Minister for approval, in accordance with section [*insert reference*] of the Act. The proposal shall be accompanied by an evaluation of the financial creditworthiness of the institution and alternatives considered;
 - (d) a review of the state of the Decommissioning Fund at least once a year; and
 - (e) an annual assessment of the credit-worthiness of the financial institution at which the Decommissioning Fund is held.
3. Upon approval of the financial institution, the Contractor shall promptly open a US Dollar interest-bearing escrow account [in the name of the Minister] to ensure that the first contribution to the Decommissioning Fund is made in the quarter where production has reached [fifty per cent (50%)] of the total ultimate recoverable reserves as determined in an approved Field Development Plan.
4. The Contractor shall deposit monies into the Decommissioning Fund in accordance with *Regulation []*, and such contributions shall be deductible for tax purposes.

- 5 No payment from the Decommissioning Fund shall be made except with the prior approval of the JMC and only for the sole purpose of implementing the approved Decommissioning Plan as approved pursuant to the Act.
- 6 If the Decommissioning Fund is not sufficient to cover the implementation of the Decommissioning Plan, the Contractor shall be responsible for meeting the full costs of Decommissioning Operations.
- 7 Where any amount remains in the Decommissioning Fund after Decommissioning Operations are completed to the satisfaction of the Minister and a verification certificate has been issued in accordance with section [*Verification Report*] of the Act, such funds shall be distributed to the Contractor less any taxes payable.

References

- Asset Integrity Engineering (2017), 'Oil and Gas Decommissioning', available at: <https://www.assetintegrityengineering.com/oil-gas-decommissioning/>
- Boston Consulting Group (2019), 'Oil and Gas Needs Decommissioning Models That Work at Scale, available at: <https://www.bcg.com/publications/2019/oil-gas-decommissioning-models-work-at-scale>
- Bloomberg (2020), 'US Seeks Stricter Funding for Abandoned Offshore Oil Wells', available at: <https://www.bloomberg.com/news/articles/2020-09-17/u-s-seeks-stricter-funding-for-abandoned-offshore-oil-wells>
- Bull, A and MS Love (2019), 'Worldwide oil and gas platform decommissioning: A review of practices and reefing options', *Ocean & Coastal Management*, Vol 168, 274–306, available at: <https://doi.org/10.1016/j.ocecoaman.2018.10.024>.
- Department for Business, Energy & Industrial Strategy (2018), Guidance Notes: Decommissioning of Offshore Oil and Gas Installations and Pipelines, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/760560/Decom_Guidance_Notes_November_2018.pdf
- Department of Trade and Industry (2001), An Overview of Offshore Oil and Gas Exploration and Production Activities, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197799/SD_SEA2EandP.pdf
- Energyst (no date), 'Decommissioning expected of 600+ offshore projects', available at: <https://www.energyst.com/news/decommissioning-forecast/>
- Evans, D (2019), 'Southeast Asia braces for huge wave of decommissioning', Energy Voice, available at: <https://www.energyvoice.com/oilandgas/asia/213619/southeast-asia-braces-for-huge-wave-of-decommissioning/>
- Geographical (2019), 'Dossier: The terrifying cost of scrapping the world's ageing oil and gas rigs', available at: <https://geographical.co.uk/nature/energy/item/3086-dossier-oil-rigs>
- Gilbert, S (2021), 'Decommissioning assets in the Middle East: the regulatory landscape', available at: <https://www.vysusgroup.com/articles/decommissioning-assets-in-the-middle-east-the-regulatory-landscape>
- Government of Brazil, http://www.anp.gov.br/images/Seguranca_Operacional/Descomissionamento/Relatorio_3-Framework_for_Regulation_Final.pdf
- Government of New Zealand, Ministry of Business, Innovation & Employment (2020), 'The Crown's Approach to Decommissioning the Tui Oil Field in Response to Operator Tamarind Liquidation', available at: <https://www.mbie.govt.nz/dmsdocument/11505-the-crowns-approach-to-decommissioning-the-tui-oil-field-in-response-to-operator-tamarind-liquidation-proactiverelease-pdf>
- Government of New Zealand, Ministry of Business, Innovation & Employment (2021), 'Residual liability for petroleum wells and infrastructure following decommissioning', available at: <https://www.mbie.govt.nz/dmsdocument/14681-residual-liability-for-petroleum-wells-and-infrastructure-following-decommissioning>
- Government of Scotland (2018), *Oil & Gas Decommissioning Action Plan*, available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/corporate-report/2018/11/oil-and-gas-decommissioning-action-plan/documents/oil-and-gas-decommissioning-action-plan/oil-and-gas-decommissioning-action-plan/govscot%3Adocument/Oil%2Band%2Bgas%2Bdecommissioning%2Baction%2Bplan.pdf>
- Government of the UK, Health and Safety Executive (2001), *Decommissioning topic strategy*, available at: <https://www.hse.gov.uk/research/otopdf/2001/oto01032.pdf>

Government of Western Australia (2017), 'Petroleum Decommissioning Guideline', available at: <http://www.dmp.wa.gov.au/Documents/Petroleum/PET-DecommissioningGuideline.pdf>

Groom, N (2020), 'Special Report: Millions of abandoned oil wells are leaking methane, a climate menace', Reuters, available at: <https://www.reuters.com/article/us-usa-drilling-abandoned-specialreport-idUSKBN23N1NL>

Harvey, T (2014), 'Guidance Notes for Onshore Oil and Gas Field Development Plans', available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/452754/onshoreogfdpguide_Dec2014.pdf

HM Revenue & Customs (2017), *Annual Report and Accounts*, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/635587/HMRC_Annual_Report_and_Accounts_2016-17_web_.pdf (see p. 171, UK taxpayers bill).

IEA (2018), *Offshore Energy Outlook 2018*, available at: <https://www.iea.org/reports/offshore-energy-outlook-2018>

IMSA Amsterdam (2013), *Worldwide rigs-to-reefs experiences: considerations and motivation for a Living North Sea*, available at: https://ecoeffective.biz/wp-content/uploads/2016/02/LNSF250_Worldwide-rigs-to-reefs-experiences_LiNSI_D02.pdf

Institute for Energy Economics and Financial Analysis (2019), 'Cleaned Out by Bankruptcy: A Primer on Environmental Cleanup Duties in Bankruptcy', available at: https://ieefa.org/wp-content/uploads/2019/12/Cleaned-Out-by-Bankruptcy-Primer_December-2019.pdf

Jagerroos, S and PR Krause (2016), 'Rigs-To-Reef: Impact or Enhancement on Marine Biodiversity', *Journal of Ecosys Ecograph* 6, 187. doi:10.4172/2157-7625.1000187

Lomonaco, N, CEPMLP Annual Review -CAR Volume 16 (2013), How To Finance Decommissioning In The Offshore Petroleum Industry? The Role And Importance Of Decommissioning Funds.

Le, Thi Huyen (2021), 'Comparative Analysis of Financial Assurance Instruments for Oil and Gas Decommissioning and Mine Restoration', *Petrovietnam Journal* Vol 6, 43–54.

Lyons, Y, M. A. Fowler and L. M. Chou (2013). International Workshop on Rigs-to-Reefs: prospects for large artificial reefs in tropical southeast Asia. Proceeding of the Rigs-to-reefs Workshop November 12–13, Is there life after oil? Center for International Law, National University of Singapore (2013). Available at: <https://cil.nus.edu.sg/wp/wp-content/uploads/2015/03/R2RWorkshopReport-Draft1April20151.pdf>

Martin, T (2016), 'Decommissioning of International Petroleum Facilities Evolving Standards and Key Issues', available at: <http://timmartin.ca/wp-content/uploads/2016/02/Decommissioning-of-Int-Petroleum-Facilities-Martin2004.pdf>

Norton Rose Fulbright (2017), 'Decommissioning – the key to M&A in the North Sea?', available at: <https://www.nortonrosefulbright.com/en/knowledge/publications/46380d36/decommissioning---the-key-to-ma-in-the-north-sea>

Offshore (2005), 'The environmental implications of decommissioning in the North Sea', available at: <https://www.offshore-mag.com/field-development/article/16762994/the-environmental-implications-of-decommissioning-in-the-north-sea>

Offshore (2020), 'Offshore decommissioning – challenges and opportunities', available at: <https://www.offshore-mag.com/field-development/article/14168417/offshore-decommissioning-challenges-and-opportunities>

Oil and Gas Authority (2018), *UKCS Decommissioning: 2018 Cost Estimate Report*, available at: <https://www.ogauthority.co.uk/media/4999/decommissioning-a5-2018-pdf-version.pdf>

Oil and Gas Authority (2019), *UKCS Decommissioning: 2019 Cost Estimate Report*, available at: <https://www.ogauthority.co.uk/media/5906/decommissioning-estimate-cost-report-2019.pdf>

Oil, Gas & Energy Law, Decommissioning articles, available at: <https://www.ogel.org/journal-categories-articles.asp?cat=60>

OSPAR Commission (2009) Implementation report on Recommendation 2006/5 on a management regime for offshore cuttings piles available at: <https://www.ospar.org/documents?v=7170>

Recharge (2021), 'World's first offshore green hydrogen project on an oil platform gets go-ahead', available at: <https://www.rechargenews.com/energy-transition/worlds-first-offshore-green-hydrogen-project-on-an-oil-platform-gets-go-ahead/2-1-1043998>

Reuters (2019), 'Chevron says no arbitration for now over Thai energy dispute', available at: <https://www.reuters.com/article/us-thailand-chevron-idUSKBN1WA2NR>

Rystad Energy (2019), 'Global decommissioning set to hit record \$36 billion over the next 3 years', available at: [https://www.rystadenergy.com/newsevents/news/press-releases/Global-decommissioning-set-to-hit-record-\\$36-billion-over-the-next-3-years/](https://www.rystadenergy.com/newsevents/news/press-releases/Global-decommissioning-set-to-hit-record-$36-billion-over-the-next-3-years/)

Sesele, K (2020), Women and Mining Decline in the Free State Goldfields, available at <https://scholar.ufs.ac.za/xmlui/bitstream/handle/11660/10661/SeseleKB.pdf?isAllowed=y&sequence=1>

Shell UK Limited (2016) Brent Field Drill Cuttings Decommissioning Technical Document available at: https://www.shell.co.uk/sustainability/decommissioning/brent-field-decommissioning/brent-field-decommissioning-programme/_jcr_content/par/tabbedcontent/tab_1385449832/textimage.stream/1486493714320/6ae0b974243b2d62a2716b625653008f3b4c3b80/brent-drill-cuttings-td-for-public-consultation-feb2017.pdf

Shell UK Limited (2017), *Brent Field Decommissioning Programmes*, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/590212/Brent_Field_DP.pdf

Stakeholder Democracy Network (SDN) (2015), White Paper on Sustainable Closure and Decommissioning of Oil and Gas Assets in Nigeria, available at: <http://www.stakeholderdemocracy.org/wp-content/uploads/2016/06/Sustainable-Closure-and-Decommissioning-of-Oil-and-Gas-Assets-in-Nigeria.pdf>

Stuff (2021) 'Never again': cost to taxpayers of Tui oilfield clean-up balloons to \$349m available at: <https://www.stuff.co.nz/business/125396859/never-again-cost-to-taxpayers-of-tui-oilfield-cleanup-balloons-to-349m>

Testa, D (2014), 'Dealing With Decommissioning Costs of Offshore Oil and Gas Field Installations: An Appraisal of Existing Regimes', OGEL 1, available at: www.ogel.org and www.ogel.org/article.asp?key=3432

Thomas, A (2021a), 'OGA crackdown as number of suspended North Sea wells to double to 1,500, News for the Energy Sector (energyvoice.com), available at: <https://www.energyvoice.com/oilandgas/north-sea/decom/321556/north-sea-suspended-wells/>

Thomas, A (2021b), 'BCG: Distressed or bankrupt oil firms face \$15billion decommissioning costs', Energy Voice, available at: <https://www.energyvoice.com/oilandgas/north-sea/decom/333865/bcg-decommissioning-costs-oil-firms/>

UN Committee of Experts on International Cooperation in Tax Matters (2015), Guidance Note on the Tax Treatment of Decommissioning for the Extractive Industries available at: https://www.un.org/esa/ffd/wp-content/uploads/2015/10/11STM_CRP2_Attachment4_Decommissioning.pdf

US Energy Information Administration (2016), 'Offshore production nearly 30% of global crude oil output in 2015', available at: <https://www.eia.gov/todayinenergy/detail.php?id=28492>

Whittaker, P, Oudenot E and M Vasquez (2019), 'Oil and Gas Needs Decommissioning Models That Work at Scale', Boston Consulting Group, available at: <https://www.bcg.com/en-gb/publications/2019/oil-gas-decommissioning-models-work-at-scale.aspx>

Wood Mackenzie (2018), 'Decommissioning – will the time ever be right?', available at: <https://www.woodmac.com/news/editorial/are-cost-rises-inevitable-for-global-upstream2/>

World Bank (2010), 'Towards sustainable decommissioning and closure of oil fields and mines: A toolkit to assist government agencies', Multistakeholder Initiative, World Bank, Washington, DC.



Decommissioning is the final stage of any oil or gas project and poses significant technical, economic, social and environmental risks. It is a long, costly, and complex process which if not effectively planned, managed, and executed can have disastrous consequences.

With over 95 producing countries, relatively limited experience to date, increasing risks of stranded assets and weak regulatory frameworks, decommissioning is set to become a critical issue – for the industry, governments and citizens.

This toolkit provides guidance to governments on the key issues associated with oil and gas decommissioning and recommendations for effective management.

ISBN 978-0-85092-003-1



9 780850 920031