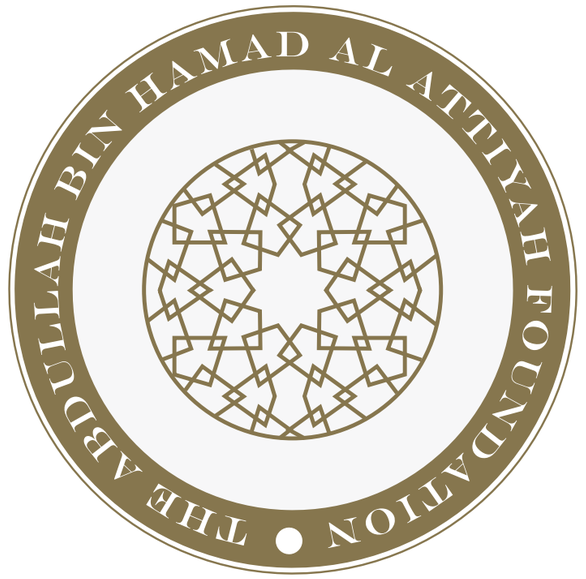
The Impact of Environmental Legislation on the Energy Industry Globally

The Abdullah Bin Hamad Al-Attiyah International Foundation for Energy and Sustainable Development



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Abbreviations

CBDR-RC	Common but Differentiated Responsibilities and Respective Capabilities
CCUS	Carbon Capture, Utilisation and Storage
COP	Conference of the Parties
CSR	Corporate Social Responsibility
EIA	Environmental Impact Assessment
ESG	Environmental, Social, and Governance
EST	Environmentally Sustainable Technology
ET	Emission Trading
EU	European Union
EI	Extractive Industries
EC	European Commission
FDI	Foreign direct investment
FPIC	Free, Prior, and Informed Consent
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GHG	Greenhouse Gas
HC	Host Country
HRIAs	Human Rights Impact Assessments
IEA	International Energy Agency
IOC	International Oil Company
JOA	Joint Operating Agreement
LC	Local Content
LCRs	Local Content Requirements
LNG	Liquefied Natural Gas
NDC	Nationally Determined Contribution
NGOs	Non-Governmental Organizations
OECD	Organization for Economic Cooperation and Development
PPP	Polluter-pays principle
UNFCCC	United Nations Framework Convention on Climate Change
SDGs	United Nations Sustainable Development Goals
UNGPs	United Nations Guiding Principles on Business and Human Rights

FOREWORD

from H.E. Abdullah bin Hamad Al-Attiyah

The energy industry worldwide is currently undergoing significant transformations. The global quest for low carbon energy transition in alignment with the Paris Agreement and the United Nations Sustainable Development Goals (SDGs); recent geopolitical developments in key energy markets; as well as the impact of the novel Coronavirus Disease of 2019 (COVID-19) pandemic on energy pricing, demand and supply are rapidly transforming the outlook of the energy industry globally. In response, the last few years have seen significant legislative and policy developments, such as the European Union's Fit for 55 package and REPowerEU Plan, the Inflation Reduction Act in the United States, Japan's Green Transformation (GX) programme, South Korea's Climate Neutrality Roadmap and Qatar's National Environment and Climate Change Strategy, amongst others. A rapidly evolving net zero transition comes with significant opportunities and risks for the energy industry globally which must be carefully understood by all energy stakeholders.

When I established the Al-Attiyah Foundation, my goal was to provide industry practitioners, policy makers, academia, and other stakeholders with trusted and timely practical information on the latest perspectives and trends that are of critical importance to the energy industry.

I am therefore delighted to announce the release of yet another insightful and informative publication, 'The Impact of Environmental Legislation on the Energy Industry Globally.' Coming at a time of real need, this new publication offers an authoritative account of the latest developments on environmental legislation, as applicable to the energy industry. It provides practical information on how energy industry stakeholders can understand and implement the wide range of environmental legislation, principles and standards that are shaping energy investments in a net zero era.

By analysing the experience of a number of countries, the publication provides comparative best practices and compelling lessons on current and future regulatory developments that will be useful to the energy industry for many years to come.

I am certain the Foundation's members, partners, educators, and other interested parties, will find this publication a reliable and invaluable resource on the prevailing environmental legislation, regulatory requirements and standards underpinning the energy industry globally.

H.E. Abdullah bin Hamad Al-Attiyah
Chairman of the Board of Trustees at the Al-Attiyah Foundation
Former Prime Minister & Minister for Energy and Industry of the State of Qatar

Executive Summary

Energy is essential to all aspects of human life: our abilities to work, live, survive, and execute tasks. Given its crucial importance, the energy industry has been the bedrock of the global economy, catalysing significant economic activity and development in several countries and societies worldwide. The energy industry consists of a wide range of people, companies, financial institutions, trade organisations and national authorities involved in the production, distribution, and sale of energy. The energy industry consists of three key sectors: production (upstream), networks (midstream) and retail (downstream). There are various sub-industries encompassed in each key sector, including the oil industry, natural gas industry; mining industry, electrical power industry; renewable energy industry; drilling, equipment/ service industry; refining/marketing industry amongst others.

Despite the importance of the energy industry, the industry has also been associated with adverse environmental, social, and health impacts in several regions, particularly in scenarios where sound governance and institutional frameworks are lacking. To mitigate such adverse impacts, energy regulators worldwide continue to develop legislation, regulations and industry guidelines aimed at ensuring safe, orderly, and environmentally responsible energy and natural resources development. Furthermore, since the adoption of the Paris Agreement in 2015, achieving net zero, i.e. reducing the anthropogenic (human-induced) emission of greenhouse gases (GHGs) that cause climate change to as close to zero as possible, and removing any residual atmospheric GHG emissions through natural or artificial measures, has become a fundamental policy objective across the world. The increased emphasis on net zero and low carbon transition in environmental legislation globally is resulting in fundamental transformations across the entire energy sector value chain, ranging from new standards relating to project licensing and approval, to operations, reporting and end of lifetime closure.

In line with the strategic mission of the Abdullah Bin Hamad Al-Attiyah International Foundation for Energy and Sustainable Development to advance research and knowledge on sustainable development in the energy industry, this publication introduces readers to the latest developments on environmental legislation as applicable to the energy industry. Covering a wide range of topics, the book also explores participatory and bottom-up strategies through which energy operators worldwide can address the wide range of ESG risks arising from new environmental standards, by promoting efficient, safe, orderly, and environmentally responsible development of energy and natural resources over the entire life cycle of their operations.

While this book offers a scan of the sources and a wide range of underpinning principles of environmental law and policy in key jurisdictions, it is clearly acknowledged that the substantive chapters cannot unpack and analyse every applicable principle, legislation, and instrument in all jurisdictions. The evolution of environmental legislation globally is therefore explored through the lens of emerging legislation and practices in selected frontier energy jurisdictions, namely: Norway, Oman, Nigeria, Qatar, Alberta (Canada), United States of America (Texas), and the United Kingdom. These countries were chosen from more than 75 possible energy producing countries, based on their historically active levels of energy export activity, relative maturity, and accessibility of their governance instruments. Specifically, Oman, Qatar and Nigeria were selected to provide examples from an oil and gas producing developing countries. On the other hand, the United States (Texas), United Kingdom, Canada (Alberta), and Norway all represent developed countries with very strong records of environmental protection in the energy sector. This comparative mix of developing and developed country examples made it possible for robust and informed conclusions to be reached on what represents 'international best practices on environmental legislation in the energy industry.'

> Overall, the book aims to: (i) provide a concise assessment and analysis of the emerging environmental laws and policies of major energy consuming and producing nations across the world; (ii) analyse the implications of such environmental legislation on developments in the energy industry; and (iii) highlight how energy companies, policy leaders, and the academic and research communities could navigate the widening maze of regulations, guidelines, standards, and the requirements of government institutions in a manner that reduces environment, social and governance (ESG) risks.

CHAPTER #1

Introduction: Mapping Emerging Environmental Laws and Policies in Frontier Energy Jurisdictions

Background and context

This chapter provides a concise assessment and analysis of the emerging environmental laws and policies of major energy consuming and producing nations across the world. The global energy landscape, in the face of the 21st century, is experiencing fundamental shifts from a focus on environmental protection and resource conservation to an ambitious goal of achieving net zero emissions. With the adoption of both, the United Nations Sustainable Development Goals (SDGs) and the Paris Climate Change Agreement, in 2015, the last years have seen a significant rise in policies and projects aimed at achieving two mutually reinforcing objectives. The first is to address the climate change emergency and its associated impacts on health, livelihood, and societies across the world. In response to the climate change emergency, countries representing more than 70 percent of the world economy have announced their commitments and plans to reach net zero carbon emissions by 2050. Many major corporations from numerous sectors have also announced their aspirations and strategies to reach this ambitious target. The second related objective is to address the energy poverty emergency (defined as the inability of households to access electricity and modern energy services at an affordable cost) facing many parts of the world. More than 13 percent of the world's population (more than 1 billion people) still lack access to modern energy services, especially electricity, while rising energy prices mean that several households are unable to keep cooking, heating or cooling systems on, when needed. Furthermore, a recent report of the International Energy Agency (IEA) indicates that due to the impact of the Coronavirus 2019 (COVID-19) pandemic, '70 million people who recently gained access to electricity will likely lose the ability to afford that access – and 100 million people may no longer be able to cook with clean fuels, returning to unhealthy and unsafe means of cooking', describing energy poverty as a global tragedy and crisis. Consequently, advancing net zero, while also transitioning to cleaner, affordable, accessible and reliable modern energy systems have therefore become the organising focus of energy law and policies worldwide.

As part of efforts to tackle the climate change and energy poverty emergencies in a balanced and coherent manner, energy regulators worldwide are integrating targeted measures in their environmental legislation, national strategies, and industry guidelines. The result has been a proliferation of environmental laws and regulations in the energy industry globally. Failure to understand and comply with emerging ESG requirements in the fast-evolving legislation may expose energy enterprises and practitioners to legal and compliance risks. Yet, the plenitude of sources and the rapid pace of legislative changes, make the task of keeping abreast of the latest developments in environmental legislation in the energy industry globally to be daunting, especially for energy companies with operations in a wide range of jurisdictions. This publication aims to simplify this task.

Environment and the Energy Industry

The environment consists of water, air, land, plants, animals, humans, and other living organisms that make up the ecosystem. Environmental law therefore provides the legal framework for the efficient, safe, orderly, and environmentally responsible development of energy and natural resources in a manner that safeguards all elements of the ecosystem. Generally, environmental legislation in the energy industry is shaped by four principal sources: international environ¬mental law, regional laws, domestic law, and judicial decisions and scholarly publications. As indicated in Table 1, at the international level, several multilateral environmental agreements and declarations have been adopted which establish the need for national authorities, business enterprises and other stakeholders to limit the degradation of the environment and ensure the conservation and sustainable use of the environment and its resources.

Table 1: **Core Multilateral Environmental Agreements Applicable to the Energy Industry**

International treaty	Key provisions
UN Framework Convention on Climate Change 1992	The ultimate aim of the Convention, as set out in Article 2, is to reduce the emission of GHGs that cause climate change. It encourages countries to reduce the emission of GHGs that cause climate change.
Paris Agreement, 2015	Sets the aim of limiting global warming to well below 2 degrees Celsius, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. It emphasises the need for countries to transition towards sustainable, low-carbon and renewable energy sources, in other the limit GHG emissions.
Convention on Biological Diversity (CBD) 1992	The CBD is the principal multilateral environmental agreement that seeks to protect and conserve biodiversity. It calls on countries to implement environmental impact assessment and other measures to prevent adverse impacts of economic activities, including energy development, on flora, fauna, and other aspects of the ecosystem.
UN Convention on the Law of the Sea (UNCLOS) 1982	UNCLOS aims to ensure the conservation, preservation, and protection of the marine environment (oceans and seas). It outlines the obligations of countries to address all sources of pollution including oil spillage from oil platforms and ships and unsustainable decommissioning of installations.
The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention)	The London Convention aims to prevent pollution of the sea resulting from dumping of wastes and other economic activities. The Convention calls on countries to address pollution from key sectors and sources, especially "dumping and discharges through the atmosphere, rivers, estuaries, outfalls and pipelines"
The International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (MARPOL 73/78)	MARPOL 73/78 is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. It regulates pollution from oil tankers and other ships, which are vital for the global energy trade.
International Convention on Civil Liability for Oil Pollution Damages (CLC)	The CLC places a liability on owners of oil carrying ships for any oil spills, pollution or environmental damages resulting from such ships.
International Convention on establishing an international fund for Compensation of Oil Pollution Damages (The FUND Convention)	The FUND Convention aims to provide compensation for victims of oil pollution damage resulting from spills from oil tankers.
Vienna Convention on the Protection of the Ozone Layer of 1985; the Montreal Protocol on Substances that Deplete the Ozone Layer 1987 and amendments thereof	The Vienna Convention and its protocols aim to prevent the emission of substances that deplete the ozone layer (ODS). It sets timelines for countries to eliminate the use of ODSs in key sectors, including certain refrigerants and chemicals used in the energy sector.
Convention on International Trade in Endangered Species (CITES), 1973	The CITES regulates trade in plants or animals that are at the risk of extinction. It also regulates activities that might endanger wildlife, such as the construction of pipelines or infrastructure in sensitive areas.
Basel Convention on Hazardous Materials and Trans-border Movement thereof, 1989.	The Basel Convention controls the transboundary movement of hazardous wastes and their disposal. The scope of hazardous wastes covered include toxic chemicals used in/or generated from oil, gas, and geothermal energy activities.

The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 1998 (Rotterdam PIC Convention)	The Rotterdam PIC Convention establishes a prior informed consent procedure which countries must comply when moving hazardous chemicals to other countries.
Stockholm Convention on Persistent Organic Pollutants (POPs), 2001	The Stockholm POP Convention aims to eliminate the production and use of toxic organic pollutants several of which are byproducts of energy production processes such as incineration of wastes.
United Nations Convention to Combat Desertification (UNCCD) 1994	The UNCCD aims to combat desertification and mitigate the effects of land degradation, desertification, and droughts resulting from various factors. These include energy generation activities, particularly renewable sources such as biofuel plantations and solar farms.
Convention Concerning the Protection of the World Cultural and Natural Heritage (The World Heritage Convention).	The World Heritage Convention is aimed at the protection of natural and cultural heritage of outstanding universal value. It includes an obligation for all activities and projects to respect and protect heritage sites, including the siting of energy projects.
Non-binding international declarations and guidelines	
United Nations Sustainable Development Goals (SDGs), 2015	Adopted by the UN General Assembly, the SDGs are a set of 17 goals and 169 targets designed to protect the planet from degradation, through sustainable consumption and production, sustainable resource governance, and climate change mitigation and adaptation. SDG 7 (Affordable and Clean Energy), and SDG 13 (Climate Change) are of crucial importance to the energy industry.
United Nations Guiding Principles on Business and Human Rights (UNGPs), 2011	Adopted by the UN Human Rights Council in 2011, the UNGPs is the authoritative, globally agreed standard for preventing and addressing adverse human rights impacts linked to all economic activities, including the energy sector. It contains wide-ranging requirements on responsible business practices, ESG and environmental protection in the energy sector.
UN Resolution (A/76/L.75) on the human right to a clean, healthy and sustainable environment, 2022	Adopted by the UN General Assembly, this resolution affirms the human right to a clean, healthy, and sustainable environment and calls on all countries to respect, protect and fulfil it in all economic sectors and activities.

Notwithstanding the rapid development of international environmental law, environmental legislation and regulatory requirements in the energy sector are not uniform across the globe. Different regions, with their unique socio-political and economic contexts, respond differently to this paradigm shift.

In this situation, and in order to map and unpack the guiding principles of emerging environmental legislation in the energy industry globally in the context of net zero and energy transition, this study generated a questionnaire that could help different stakeholders to conduct their own assessment following a common methodology. The questionnaire uses a set of environmental law criteria to describe and assess the latest and emerging environmental standards and broader ESG requirements in the energy sector over the life cycle of an energy project: approval of the project, construction and operations, and closure or decommissioning. Each component is summarised in the table below.

By providing a framework for self-assessment to different energy stakeholders, with diverse priorities, technological capacities, and resources, we sought to improve a common understanding amongst industry stakeholders on the crosscutting regulatory themes, offering insights into how key energy jurisdictions are navigating the shifting geopolitical landscape and the impact on multilateralism.

Table 2: **Elements of a Holistic Environmental Management Framework in the Energy Sector Value Chain**

Project Stage	Key considerations
Licensing and Approval This is the stage in which regulatory authorities grant permission for energy operations. The permitting process could be open, competitive, or closed, depending on the location, size, scope, and jurisdiction of the project. The increased legislative focus on net zero in the energy sector is resulting in the introduction of a wide range of ESG scrutiny and requirements in the permitting process for energy investments and projects. Energy stakeholders must carefully evaluate such requirements to avoid legal liability, risks and/or delays.	Any specific requirement in applicable laws that set limits on the exploration and production of extractive resources, particularly the exploration and development of new frontiers? Is an environmental impact assessment (EIA), including GHG emission reduction plan, required for project approval? What is the average length of time for large-scale oil and gas projects (greater than 30,000 bpd) to receive approval (within the last five years)? Are there requirements for the public to review and comment on EIAs
Construction and Operations The construction phase is when the necessary infrastructure required for energy operations are put in place by licensees. When the required physical and associated infrastructure is in place, energy operations (whether exploration, production, processing, or distribution) commence as approved. The increased legislative focus on net zero in the energy sector is resulting in increased emphasis on efficiency standards and deployment of climate-smart technologies and infrastructure in energy operations. Legal obligations on sustainability reporting and ESG disclosures are also increasingly emphasised. Energy stakeholders must carefully evaluate such requirements to avoid risks relating greenwashing.	Is there a requirement for licensees and operators to release and/or publish statements, disclosures or statistics on climate-related risks, opportunities, and sustainability strategies? Are there guidelines for the publication of net zero and sustainability reports, in terms of language, scope and content? Are there consequences for non-compliance with GHG reduction obligations (and what are they: fines, shut in, and/or imprisonment?) Is there a specific requirement for operators to invest in, or support clean technology programs, training, and capacity development? Are renewals on environmental regulatory permits required? For what and how often are renewals required? Is an Operations Environmental Management Plan required to be submitted and approved by the regulatory authority? Is environmental monitoring and reporting required during operations?

Decommissioning and Closure The last stage is associated with shutting down energy facilities at the end of the production lifetime and decommissioning the physical and associated infrastructure. As net zero targets increase in scale and ambition worldwide,	Are decommissioning and closure plans required? If yes, when are they required? Are there requirements relating to repurposing oil, gas and coal infrastructure or submitting post operations GHG inventories? Is there regulation mandated remediation and reclamation at facility end of life? Are there prescribed remediation and reclamation thresholds or standards? Are there financial assurance requirements against end-of-life facility liability? Are there requirements for post-approval monitoring of GHG, facility license renewals, cumulative effects, and closure planning? Is long-term monitoring required past the end of the life of the facility?

As seen in Table 2, to effectively manage the cumulative ESG risks of energy operations, comprehensive and holistic risk management frameworks should be put in place to ensure compliance with a wide range of environmental obligations during the project approval operations, and decommissioning phases of the energy sector value chain. A holistic risk management framework in a net zero era moves beyond simply complying with legislative requirements, but increasingly includes ensuring a responsible investment approach that prevents and reduces the environmental footprints of energy operations on societies and communities, while advancing positive outcomes such as improved human development, social inclusion and the broad-based participation of all members of the public concerned in decision-making across the entire energy value chain.

Case Studies

The increased legislative focus on net zero in the energy sector globally is resulting in increased emphasis on ESG requirements and the deployment of climate-smart technologies and infrastructure in energy operations. To evaluate the scope of legislative changes that integrate the considerations in Table 2, this book examines developments in seven frontier energy jurisdictions – the United States of America, the United Kingdom, Norway, Alberta (Canada), Nigeria, Oman and Qatar. Environmental legislation and requirements in the energy sectors of these countries is carefully analysed and presented in Appendix 1.

As seen in Appendix 1, all the surveyed countries now have environmental legislation that introduce substantive and disclosure requirements relating to net zero. The comparison shows that while all the surveyed countries have integrated emission reduction policies and sustainability guidelines that are applicable to the energy sector, the level of ambition, implementation and enforcement vary. For example, Norway's NDC (2020) reflects a target to reduce GHG emissions by at least 50% and towards 55% by 2030 compared to 1990 levels. Norway also sets a target to become a low-emission society by 2050 by achieving 90-95% GHG emission reduction by 2050 compared to 1990 levels. Similarly, Nigeria has enacted the Climate Change Act 2021 which prescribes climate mitigation and adaptation obligations for all sectors including the energy sector, including a commitment to reduce greenhouse gas emissions by 20% unconditionally and 45% with international support by 2030.

The country has also announced a National Energy Transition Plan aimed at incorporating a broader spectrum of energy sources to meet increasing demands over the next few years. Similarly, in addition to climate change mitigation and adaptation measures, countries such as Norway and Oman are already implementing renewable energy and green hydrogen projects, aimed at promoting energy diversification and a clean energy future. Qatar presents another example of both climate change and energy diversification objectives. The Qatar National Vision 2030 articulates a commitment to sustainable development and environmental preservation. The country has also initiated measures to diversify its energy mix, with solar power taking center stage in its renewable energy strategy. In fact, the state has embarked on ambitious solar projects to diversify its energy sources and reduce carbon emissions, although natural gas will likely remain a significant part of its energy mix in the near future. Qatar has also adopted the National Environment and Climate Change Strategy, demonstrating a strategic commitment to reducing the carbon intensity of upstream petroleum operations by 25% by 2030. As part of its regulatory efforts, Qatar is integrating a Carbon Capture and Storage (CCS) facility in Ras Laffan into the North Field expansion, further solidifying the country's intent to advance climate mitigation in line with international environmental best practices.

> In summary, the net zero transition is reconfiguring the dynamics of energy investment and is resulting in heightened ESG standards that energy stakeholders must comply with. These changes also have wide-ranging implications for multilateralism and energy trade.

Shifting Geopolitical Landscape and the Impact on Multilateralism

The implementation of net zero transition policies in the energy sectors globally has wide ranging implication for energy cooperation, particularly energy trade. As seen in Appendix 1, Norway, Canada, and the United States have already introduced legislative requirements that constrain the development of new oil and gas fields. Similarly, financial institutions are already announcing plans to divest from, and stop financing new fossil fuel investments, which may significantly alter current and future demand patterns for non-renewable energy resources, especially oil, natural gas, and coal. Concerns over stranded assets, divestments, bankruptcies, massive job losses, unemployment, supply chain disruptions and escalation of energy poverty that may result from the net zero transition process are already resulting in calls for a just and equitable energy transition that addresses justice risks associated with net zero, and leaves no one behind.

The United Nations has already set up working groups and expert panels aimed at clarifying how energy stakeholders can achieve just transition - i.e., "a transition to a green and climate-neutral economy which is fair, inclusive, creates decent working opportunities, upholds the human rights of Indigenous Peoples and affected communities through social dialogue and stakeholder engagement, respects the sovereignty of peoples over natural resources, and leaves no one behind." As net zero goals increase in scale and ambition, international solidarity and multilateralism will be required to bridge the huge energy infrastructure financing gap, associated energy poverty and reduced economic opportunities that net zero efforts are already creating in poor and already vulnerable communities across the world. Furthermore, given the important roles that natural gas will play as an environmentally preferable transition fuel to address the energy poverty emergency, there is a need for energy industry stakeholders to continue to address environmental impacts across the entire value chain through sustained investment in environmentally sustainable technologies and production methods.

There is therefore an urgent imperative for energy stakeholders worldwide to design and implement effective strategies to mitigate and address the justice risks related to net zero programs. This will require integrating core norms of environmental justice, international solidarity, and multilateral cooperation into the design and implementation of net zero programs and projects, including energy sector procurement practices.

The next chapter examines these core principles of environmental law and how they can shape the design and implementation of energy operations in a net zero era.

Scope and Structure

After this introductory chapter, Chapter 2 unpacks the values and principles that shape environmental law in the net zero era, including the 'Do No Harm' principle, the precautionary and preventative principles, the 'Polluter Pays' principle, the principle of cooperation, the principle of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC), and the emerging importance of just transitions and environmental justice.

Chapter 3 will then analyse the implications of these environmental legislations on the developments in the energy industry. The discussion will extend to the impact on project planning processes, transboundary trade in goods and services, and the diverse spectrum of ESG risks - direct, structural, transition, and disclosure risks.

In Chapter 4, we shall propose strategies for managing ESG risks that arise from increasing legislation. The need for a nexus governance approach, incorporating ESG considerations in risk management policies, conducting environmental and human rights due diligence, establishing stakeholder engagement strategies, proactive information disclosure, and capacity development and training on environmental risks will be explored.

Finally, Chapter 5 provides concluding thoughts and synthesis of the key emergent environmental laws and policies, their effect on the energy industry, and the effective strategies for risk management. This comprehensive exploration should provide a nuanced understanding of the evolving environmental legal frameworks and their geopolitical implications in an era marked by rapid energy transitions.

CHAPTER #2

Values and Principles of Environmental Law in A Net Zero Era

Introduction

As countries, regulators, financing parties and other stakeholders scale up legislative and policy efforts to achieve net zero goals, there is an urgent need for stakeholders in the energy industry worldwide to design and implement effective risk management strategies, including investment in environmentally sustainable technologies, that comply with such evolving regulatory requirements. Such risk anticipation and management strategies will need to be guided by legal principles and ethical values on safe, responsible, and sustainable energy development that are fast evolving in a net zero era.

This chapter examines key environmental law principles that have emerged, alongside the development of core multilateral environmental agreements, treaties, and conventions, which form the foundation upon which risk-averse energy development should occur in a net zero era. These seven principles include the 'Do No Harm' principle, the precautionary and prevention principles, the 'Polluter Pays' principle, the principle of cooperation, the CBDR-RC principle, and the emerging importance of just transition which have been increasingly canvassed in international law.

Legal and Ethical Principles Relating to Net Zero

Do-No-Harm Principle

International law recognises an obligation of states, businesses, and other actors to 'prevent, reduce, and control significant environmental harm to other countries' that may result from energy development activities or operations in their own jurisdiction. This is the Do-No-Harm principle. Based on this principle, when licensing energy operations, countries seek to ensure that activities that could cause environmental harm in other countries are identified, assessed, and properly managed by licensees or energy operators. The Do-No-Harm principle has always been highly important in the energy sector, most especially due to shared water and land resources that could easily be contaminated across borders in the event of oil spillage, gas flaring, or transboundary air pollution that may result from the construction of large energy infrastructure such as power plants or nuclear projects.

To ensure compliance, energy contracts typically specify the obligation of licensees to carry out all operations in accordance with environmental best practices and to be responsible for any resulting environmental pollution. For example, Article 6 of Qatar's Law No. 30 of 2002 on the Law on the Environment requires all public and private bodies to include environmental protection and pollution control clauses in all local and international agreements and contracts to prevent harm to the environment, and that such agreements and contracts shall 'include penalties conditions and undertaking to bear the expenses of removing the environmental destruction and damages therefrom.' Article 4 also requires all authorities to prioritise environmental considerations in all phases of planning and to make environmental planning an integral part of all industrial activities.

In the context of climate change and net zero, the Do-No-Harm principle places an obligation on stakeholders in the energy industry to prioritise emission reduction and pollution control programs across the entire value chain of energy operations in line with the Paris Agreement. The last few years have therefore seen the rise of climate litigation across the world, in which NGOs are increasingly holding energy operators accountable in courts for GHG emissions arising from their operations or as a result of failing to adopt GHG mitigation plans. The rising spate of climate litigation across the world shows a clear need, in terms of risk and reputation management, for energy industry stakeholders to make the Do-No-Harm principle the basis of their project scenario and risk planning.

As countries put in place net zero standards and legislative requirements, Do-No-Harm requirements are already covered in umbrella clauses in energy contracts that mandate operators to comply with all environmental laws, including international environmental treaties such as the Paris Agreement that the host country may be party to. So even when a contract is silent on the subject of net zero, the overall obligation to comply with all environmental laws and international best practices and to Do-No-Harm requires energy operators to implement strict environmental management and monitoring systems, including best industry pollution control technologies to ensure any activities that could exacerbate climate change or result in transboundary environmental pollution are identified, assessed, and properly managed. In cases of water, air or other pollution that may have transboundary impact, is essential to proactively notify, consult and cooperate with other countries potentially affected by such operations, providing them with up-to-date information on environmental risks associated with current projects. This means taking a proactive role in minimising any environmental impact and engaging in open and transparent dialogue with stakeholders.

Principle of Prevention

The principle of prevention stresses the importance of taking proactive steps as early as possible to avert the occurrence of environmental pollution or harm. It is predicated on the idea that prevention is more effective and less costly than remediation, especially given that many forms of environmental damage may be irreversible or prohibitively expensive to repair. For example, the loss of human lives due to environmental pollution, the extinction of rare species of fauna or flora, the loss of mangroves due to oil spillage, the development of the ozone hole, and the dumping of long-lived pollutants into a country cannot be fully remedied. Even in cases where the damage may be reparable, the costs of rehabilitation are often more

prohibitive. The prevention principle therefore prioritises proactive measures to mitigate environmental harm before it occurs. The prevention principle has been integrated into environmental laws and policies globally, and in domestic laws. It has also been recognised in regional agreements such as the Kuwait Convention, in particular the Kuwait Convention's 1989 Protocol concerning Marine Pollution resulting from Exploration and Exploitation of the Continental Shelf, Article II, which sets forth that 'states shall require that all appropriate measures are taken to prevent, abate and control marine pollution from offshore operations'. Additionally, the General Regulations of Environment in the GCC States, Article 1(6) provides that 'protection of the environment against pollution and deterioration is less costly, easier to implement and more feasible than rectifying damage after it happens'.

To prevent environmental harm, international law emphasises the need for anticipatory measures such as conducting environmental impact assessments (EIA) studies, preparing decommissioning and waste management plans for development activities and projects, providing financial mechanisms for land reclamation and restoration, and enhancing technical training and capacity development on best environmental practices for field workers, prior to the commencement of energy operations. For example, Article 10 of Qatar's Environmental Protection Law (Law No. 30 of 2002) requires competent authorities to 'take the necessary measures to avoid, pre¬vent or mitigate the harm likely to happen to the Environment to the minimum possible level'. Also, pursuant to Article 4 of Qatar's Preservation of Petroleum Wealth Law, a contractor must adopt all required safety precautions and procedures 'to prevent waste, damage or risk caused by such operations and that might inflict harm to, inter alia, human life, public health, property, natural wealth'. Similar provisions are contained in Article 10 of Oman's Royal Decree No. (114/ 2001) which places an obligation on owners and operators to take necessary steps and adopt the state-of-the-art techniques to minimise and prevent environmental pollution from its source.

Preventive actions and steps must be maintained throughout all the stages of energy operations, including at the closure and decommissioning stages. For example, ensuring compliance with the approved decommissioning plan to avoid contamination of land and water resources. Failure to take the necessary steps to prevent environmental harm may result in fines and regulatory actions against defaulting parties.

Precautionary Principle

The precautionary principle is based on the notion that even when scientific evidence is not yet available to establish the potential danger of a project or activity, it is better to act in anticipation of potential harm than to react after the harm has already occurred. This principle places an obligation on licensees and operators to take reasonable and effective measures to mitigate the adverse effect of a project or activity when there are reasonable threats of serious or irreversible damage from the activity, even when there is no conclusive evidence of the environmental harm.

Precaution is an approach to environmental management that emphasises caution, predicting and avoiding potential environmental harm in the face of scientific uncertainty. A good example is the debate as to whether climate change is real. The precau¬tionary principle postulates that in such cases where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be a reason for postponing measures to prevent environmental degradation.

The precautionary principle has been around in some form since the 1970s, reflected in Swedish and German pollution laws. However, its most well-known iteration is in international environmental law as articulated during the Earth Summit in Rio de Janeiro, Brazil, in 1992. This principle is essential because it prompts action in the face of uncertainty to prevent potential harm, instead of waiting for conclusive scientific evidence, which may arrive too late. This is particularly critical for environmental issues, which often involve complex, poorly understood, or unpredictable systems where damage can be extensive and irreversible.

The precautionary principle has been incorporated into numerous international and domestic legal and policy instruments worldwide. Notably, it is integrated within various environmental laws and strategies such as Qatar's Environmental Protection Law, among others. Additionally, it is a guiding principle in international environmental treaties like the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD).

Precaution must be maintained throughout all the stages of energy operations, including at the closure and decommissioning stages. This is often implemented by requiring EIAs, social assessments, human rights due diligence and waste management plans. These assessments serve to identify, evaluate, and mitigate the potential risks posed by energy activities, particularly now in the net zero era. Failure to take the necessary steps to prevent environmental harm may result in fines and regulatory actions against defaulting parties.

The Polluter-Pays Principle (PPP)

The polluter-pays principle (PPP) states that the costs associated with preventing, controlling, and reducing pollution should be borne by those who cause the pollution. It is based on the idea that everyone should be responsible for cleaning up their own mess. This principle not only requires polluters to bear the costs associated with controlling pollution but also mandates them to pay for the remediation of the harm they cause, compensate victims, and restore the environment to its original state.

The PPP assigns responsibility for the cleanup of pollution, mitigation of its effects, and compensation for damage caused to the polluter. This deters potential polluters by making them financially accountable for their actions, thus promoting more sustainable and environmentally friendly practices.

The PPP was first propagated in 1972 by the Organization for Economic Cooperation and Development (OECD). The European Commission (EC) adopted the principle in 1973. It was also extensively discussed during the United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil, in June 1992. The PPP has since been applied in numerous other countries, including several in the Arab region. For instance, it forms part of the legislation in Qatar and Oman. It is also applied in various sectors and industries, such as construction, oil and gas, and the maritime industry.

The PPP is typically implemented through domestic environmental laws that provide for the recovery of cleanup costs, damages, and compensation from those responsible for pollution. These laws may be complemented by industry regulations, liability systems, and enforcement mechanisms, such as environmental police in the case of Kuwait. Some countries, like Oman, even go so far as to place strict liability for pollution cleanup costs on the polluter, regardless of intent or fault.

Principle of Cooperation

The goals of addressing environmental pollution, combating climate change, and advancing net zero cannot be achieved alone by any country or company. The principle of cooperation therefore highlights the responsibility of all stakeholders – locally, nationally, and internationally – to cooperate with other actors to address environmental problems. In the context of an international energy company, this principle not only entails adhering to regulations within the countries of operation but also involves actively participating in global efforts to mitigate environmental pollution and to enhance disaster response in case of catastrophic pollution events. As reaffirmed in the 1982 World Charter for Nature and Principle 24 of the Stockholm Declaration, there is a need for all stakeholders to play their part in information exchange, consultation, and undertaking joint activities that contribute to global environmental conservation. In the context of climate change, Article 3(5) of the United Nations Framework Convention on Climate Change (UNFCCC) calls on all stakeholders to 'cooperate to promote a supportive and open international economic system' that enables them to achieve sustainable development and to address the problems of climate change. Similarly, Goal 17 of the UNSDGs recognises the importance of multilateral partnerships as a way to achieve several of the SDGs, especially those related to clean and affordable energy (SDG 7) and climate change mitigation (SDG 13). For example, global cooperation in energy distribution and supply is required to develop transportation and storage infrastructure that connects energy markets, so as to address energy poverty in several countries and regions. Similarly, cooperation in technology development, exchange and deployment will ensure that developing country markets can access cleaner and environmentally sustainable

technologies that can reduce fugitive emissions in energy production processes.

In the context of net zero, the principle of cooperation requires energy companies and operators to cooperate in solidarity with all other stakeholders such as countries, financial institutions, education institutions and other relevant actors to address climate change and its associated impacts. This means not just meeting legal and regulatory requirements but going beyond them to participate in voluntary initiatives and partnerships that advance net zero and sustainable energy goals. It includes sharing information and best practices, contributing to policy debates, and jointly undertaking projects with other energy companies, government agencies, non-governmental organisations, local communities, and other relevant stakeholders. It also encompasses a wide range of collaborative and voluntary corporate social responsibility (CSR) efforts such as providing financial assistance, technology and knowledge transfer and support for training and capacity development especially to support developing country markets to enhance pollution control and climate mitigation efforts.

By working cooperatively and in solidarity with other stakeholders, energy companies can gain a better understanding of environmental issues, identify innovative solutions, and implement more effective strategies for managing their environmental impacts. They can also build stronger relationships with stakeholders, enhance their social license to operate, and improve their reputation. Cooperation can also lead to improved regulation and policy frameworks that better align with the company's strategic goals and the broader sustainability agenda. Moreover, it can stimulate innovation by enabling companies to share knowledge and resources, reducing the costs and risks associated with environmental management, and fostering a culture of continuous improvement.

Common but Differentiated Responsibilities and Respective Capabilities Principle (CBDR-RC)

While international law expects all countries and stakeholders to cooperate in addressing global environmental problems, it also recognises that the difference in historical contributions and capabilities of countries must be taken into account in the interest of fairness and equity. This is the CBDR-RC principle. It acknowledges industries and developed countries, due to their larger historical contribution to environmental problems and greater technological and financial resources to tackle it, are to take the lead in all climate change efforts. The CBDR-RC principle has been widely acknowledged since the 1992 Rio Conference. The principle was enshrined in Principle 7 of the Rio Declaration and similarly embedded in Article 3 (1) of the United Nations Framework Convention on Climate Change (UNFCCC) which calls on countries to "protect the climate system . . .on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities." Furthermore, Article 4(1) of the Paris Agreement emphasises the need to achieve the long-term temperature goal on 'the basis of equity, and in the context of sustainable development and efforts to eradicate poverty'. Though not legally binding, Article 4(4) of the UNESCO Declaration on the Ethical Principles in Relation to Climate Change, also calls on all pertinent actors to facilitate knowledge, capacity, and resources to tackle climate change 'in a timely manner taking into account the differentiated needs and access to resources of the most vulnerable.'

The CBDR-RC principle has become a key foundation for increasing demands for a just and equitable transition that does not unduly worsen energy poverty levels of developing countries, several of which had little or no historical contributions to climate change in the first place. As net zero efforts increase in scale and ambition, multilateralism will be required to address the justice dimensions of the zero transition, especially concerns relating to risk of stranded assets revenue decline, inadequate access to technologies and reduced funding for energy infrastructure projects need to address energy poverty, associated with an accelerated net zero transition. For example, the Oman Net Zero Plan recognises the need for an orderly transition that includes a phased approach that focuses on using existing resources as levers to achieve green hydrogen and other cleaner energy sources. Energy industry stakeholders have key roles to play in proposing a smart mix of legal and financial measures such as clean energy financing, eco-entrepreneurship, technology transfer, absorption and capacity building support for developing countries, that should accompany net zero efforts in order to reduce their socio-economic and sustainability impacts on the poorest and most vulnerable.

Just Transition and Environmental Justice

Environmental justice refers to the fair and equitable treatment of all people, regardless of their status, ethnicity, race, color, national origin, or income, in the design and implementation of development projects, laws, regulations and policies. It promotes broad participation, fairness, and equity when devising solutions to environmental issues, particularly by acknowledging the situations of vulnerable individuals, groups, and communities who often bear an unequal burden of environmental degradation and development projects.

The concept of environmental justice originated from early calls in many parts of the United States to address concerns of intentional targeting of poor minority communities as locations for high polluting factories. This led to protests for a more equitable distribution of environmental risks and benefits, resulting in the growth of environmental justice, climate justice, and energy justice movements across the world. With the adoption of the UN Guiding Principles of Business and Human Rights in 2011, and the rise in business and human rights legislation and policies at domestic laws, the obligations of business enterprises to address all human rights and ESG risks across their entire operations is now a central part of environmental justice.

Environmental justice has taken a more significant dimension in the context of net zero. Without a justice perspective, environmental planning and response measures, such as net zero and clean energy transition programs may result in significant job losses, unemployment, societal exclusion and may worsen the socio-economic conditions of already poor and vulnerable communities, especially workers in the energy sector. The Paris Agreement therefore expressly recognises the 'imperatives of a just transition of the workforce,' and the need for all Parties to 'respect, promote and consider their respective obligations on human rights' when taking action to address climate change.

As stakeholders in the energy sector take steps to decarbonise and advance net zero, just transition, as part of environmental justice, requires a more equitable and inclusive distribution of the risks and benefits of the clean energy transition such that no one group, community or country bears disproportionate burden of climate change mitigation and adaptation programs , especially at-risk groups such as women, youth, Indigenous peoples, and workers in emissions-intensive sectors. For example, just transition requires that net zero efforts should not worsen the vulnerabilities of developing countries, especially by ensuring that net zero programs should be accompanied by financing and technologies to promote energy security, entrepreneurship and green growth in such vulnerable countries and communities, such that no person is left behind. Just transition also advocates the need to ensure fair and equitable opportunities for women to take part in all aspects of the energy industry including in net zero and energy transition programs.

The core principle of environmental justice and just transition includes access to information, participation, and importantly, access to justice. An environmental justice approach requires the holistic and widespread implementation of five core elements (the PANEL elements) — Public participation, Accountability, Non-discrimination and equality; Empowerment and Accountability; Legality and access to justice — in the design and implementation of energy policies, projects and programs.

Public participation: Ensuring all members of the public have opportunities to take part in and influence environmental decision-making is essential for sustainable resource use and environmental protection. For example, in planning an energy activity or project, members of the local communities that may be impacted by the project should be consulted and engaged in reviewing such impacts and proposing innovative solutions. By incorporating the perspectives and input of stakeholders, particularly those affected by the company's projects, a company can enhance project outcomes, build public trust, and contribute to long-term success.

Accountability: Companies are accountable for adhering to legislation and industry rules and standards in their operations. Implementing robust project monitoring, internal codes of conduct, and compliance teams will help ensure environmental compliance, mitigate risks, and safeguard the company's reputation and long-term sustainability.

Non-discrimination and equality: Promoting equal opportunities for all stakeholders,

including typically marginalised groups such as women, youth and racial minorities is essential for environmental justice and a just transition. For example, local content requirements (LCRs) should measure how many women have benefitted and have been able to attain executive positions in the energy industry. By considering diverse perspectives, incorporating clear guidelines, and conducting vulnerability assessments, a company can foster inclusivity, mitigate adverse impacts, and enhance the company's reputation and stakeholder relationships.

Empowerment and access to information: Providing clear and accessible information to the public is essential for environmental justice. Proactive, timely and accurate disclosure of project information, maximising access to information, and promoting public education and awareness will build trust, engage stakeholders, and address concerns, contributing to the company's long-term success. The emphasis here is the need to avoid greenwashing or deceptive information that exaggerates a company's environmental achievements, especially in a net zero era.

Legality and access to justice: Ensuring compliance with laws and providing accessible mechanisms for seeking remedies is vital for environmental justice. By operating within legal frameworks, establishing clear processes for addressing harm, and embracing the principles of the United Nations Guiding Principles on Business and Human Rights, the CEO can demonstrate responsible corporate behavior, mitigate risks, and enhance the company's reputation as a socially responsible energy leader.

Conclusion

The obligations of business enterprises to address all human rights and ESG risks across their entire operations is now a central part of international environmental law. This obligation is underpinned by legal and ethical principles that emphasise the importance of anticipating and redressing environmental harm associated with energy development activities.

Global targets on net zero have triggered a rise in climate litigation with courts and tribunals increasingly holding companies accountable for compliance with human rights and environmental requirements, including claims relating to failure to reduce GHG emission, as well as releasing fraudulent or misleading net zero claims (green washing). It is crucial for lawyers to advise these companies to prioritise compliance with such norms from the outset of investments and projects. Engaging in proper consultations with local communities and respecting their rights can foster a more favorable relationship between the companies and host communities, ultimately contributing to sustainable and successful business endeavors. By proactively embracing environmental justice principles, energy companies can demonstrate their commitment to responsible practices and mitigate conflicts arising from environmental harm.

The next chapter explores how energy industry stakeholders can better anticipate and address the diverse spectrum of ESG risks that are resulting from increased regulation in the energy industry.

CHAPTER #3

Implications of Environmental Legislation on Developments in the Energy Industry

Introduction

The transformational shifts in the legal and ethical principles governing the energy industry in light of net zero targets come with significant opportunities and risks for the design and implementation of projects across the entire energy industry value chain. Environmental legislation has wide-ranging implications for the energy industry, affecting everything from project planning to transboundary trade and ESG risk management.

The introduction of more stringent environmental regulations, such as requirements for comprehensive EIAs, GHG emission reduction plans, and public review, increases the complexity and duration of the planning process. Energy operators therefore need to consider not only the technical feasibility and economic viability of projects, but also their environmental impacts and social acceptability. Consequently, early-stage planning might require more time and resources, but it can also lead to projects that are more sustainable and less likely to face opposition or costly delays.

This chapter examines how the energy industry can better anticipate and address the diverse spectrum of ESG risks that are resulting from increased regulation in the energy industry. What are the key changes to expect in the licensing, approval, construction, and operations, as well as decommissioning and closure of energy operations, as well as in international energy trade? How can energy industry stakeholders adjust their operations and risks management strategies in response to such changes? This chapter examines these fundamental themes with a view to provide a guide for energy stakeholders at each stage of the value chain, outlining some ways they might address and implement the below listed considerations.

Implications of Environmental Legislation for the Energy Industry Value Chain

Licensing and Approval

With a few exceptions of Canada and the United States where private resource ownership remains recognised, extractive resources such as petroleum, natural gas and minerals worldwide are often under the ownership and control of the State. To develop and implement any energy project therefore, the very first step is to seek and obtain a license or permit from the State. Such licenses are often issued after a competitive bidding process and after certain preconditions have been met. Generally, during the licensing stage, environmental law stipulates minimum environmental requirements, standards and key technologies that must be in place prior to the commencement of energy operations and as a precondition for obtaining operational licenses and permits. The aim is to ensure that energy operations do not result in pollution of air, land, water, and natural habitats, as well as the loss of biodiversity.

First, when seeking licenses and permits, stakeholders should have a comprehensive understanding of the national regulations regarding net zero targets and EIA requirements. In a net zero era, EIA processes worldwide are reflecting more stringent requirements on pollution control, emission reduction, sustainability, and net zero goals. EIAs and GHG reduction plans are increasingly mandated to varying extents around the globe. For instance, Norway's legislation is quite robust, with the Climate Change Act 2017 and Greenhouse Gas Emission Trading Act 2004 explicitly setting out frameworks for emission measurement, reduction, reporting, and trading across the entire value chain of energy operations. Under section 11 of Norway's Pollution Control Act, energy operators must seek a permit to emit GHGs. Similarly, EIA reports for energy projects are required to incorporate climate change mitigation and adaptation plans and programs across their entire operations. Furthermore, in Nigeria, Canada, the United States, and the United Kingdom, a variety of acts and plans have been implemented to regulate greenhouse gas emissions and facilitate the transition to low-carbon energy sources. For example, Nigeria's Climate Change Act, 2021, outlines the obligations of business entities to reduce GHG emissions, to report their emission programs, while the National Energy Transition Plan, 2023, outlines Nigeria's commitment to achieve carbon neutrality by 2060. Nigeria's Environmental Impact Assessment Act 1992 also necessitates an EIA for substantial industrial and infrastructural projects. In the USA, the Bureau of Ocean Energy Management (BOEM) manages the development of offshore energy resources, including oil and gas, and establishes standards for offshore exploration and development in compliance with NEPA. State-specific regulations, like Texas' requisite for EIAs via its own Commission on Environmental Quality (TCEQ), are also compulsory. In Qatar, environmental permits and EIAs are part of the regulatory framework for energy projects as stipulated by Law No. 30 of 2002 and Executive by-Law No. 11 of 2005.

Secondly, the rise in net zero efforts is resulting in limits, or in some cases outright bans, on the development of new oil and gas fields in some parts of the world. Six countries, France, Spain, Ireland, Denmark, Colombia, Belize, and Greenland have set dates for complete phase-out of oil and gas production. Similarly, Norway's Petroleum Activities Act 1996, as amended in 2020, provides guidelines for exploration and production and allows for the limitation of production rates to ensure efficient resource extraction. Furthermore, in countries like Canada, the United States, the United Kingdom, Qatar, and Oman, there are rigorous processes in place that require environmental assessments for major resource extraction projects and to regulate GHG emissions from oil and gas activities. Oman and Qatar have also adopted national visions and policies to move away from hydrocarbon to knowledge-based economies through economic diversification entrepreneurship programs.

On the other hand, and in an effort to promote energy security, Nigeria's new Petroleum Industry Act 2021 actually aims to boost investment in the development of new oil and gas fields. The law provides that 30 percent of the profits made by the national oil company (NNPC Ltd.) shall be used to finance exploration in new basins in the country, while 10% of rents on prospecting licenses and mining leases are also assigned to finance frontier exploration. Nigeria has

however put in place additional regulations that mandate the submission of detailed EIAs, prior to the commencement of petroleum exploration and production activities, and to ensure that oil and gas activities are conducted in accordance with good international petroleum industry practice. In addition to legislative developments, a number of financial institutions are announcing plans to stop financing new oil and gas fields. These developments raise the need for energy industry stakeholders to carefully evaluate the risks associated with petroleum exploration activities in a net zero era.

Third, to promote environmental justice, environmental legislation across the world is emphasising the need for public participation and access to information in EIA processes. For example, in Norway, public consultation during the EIA process is required under the Planning and Building Act 2008. Nigeria's Environmental Impact Assessment Act 1992 requires public participation in the EIA process. Similarly, in Canada, the Impact Assessment Act 2019 allows the public to participate meaningfully in impact assessments. Moreover, both the United States and the United Kingdom provide opportunities for the public to review and comment on draft EIAs under their respective EIA regulations.

This global legislative landscape indicates a shift towards more public and restrictive project approval processes. Stakeholders in the energy industry must anticipate and navigate these complexities ensuring thorough evaluation and disclosure of GHG mitigation and pollution control plans to avoid project rejections and legal consequences.

Key takeaways:

- During the licensing and approval stage, energy stakeholders should be well-informed about any legal requirements that set limits on the exploration and production of resources. This might require engaging with legal and environmental experts to ensure compliance.
- The EIA is a crucial part of the approval process. Energy industry stakeholders should consider engaging with independent consultants to ensure their EIA, including a robust GHG emission reduction plan, meets all necessary requirements.
- To meet the requirements for public review and comment, stakeholders could provide online access to their EIAs and host public consultation sessions.

Construction and Operations

After obtaining the license to commence operations, environmental law requires stakeholders to implement the highest possible environmental efficiency standards and the use of best available environmentally sustainable technologies (ESTs) throughout the operations. This includes using efficient construction materials in setting up platforms and installations, using climate-smart and energy-efficient equipment such as water and energy saving materials, and ensuring safe disposal of wastes generated during the operations to prevent the contamination of land, air, water, and natural habitats.

First, across all jurisdictions, there are regulations prescribing discharge limitations and necessitating environmental monitoring and reporting. These requirements are detailed in various environmental permits, laws, or regulations specific to the region or country. In most regions, continuous monitoring is a requirement for certain types of operations, though this can depend on specific regulations and permit conditions. For example, Norway has published a list of priority substances whose emission are prohibited in all sectors. Canada, Nigeria, Qatar, United States, and the United Kingdom have also established GHG reduction obligations that must be complied with in energy operations. Non-compliance with waste or GHG reduction obligations can result in sanctions including fines and license revocations across all mentioned jurisdictions.

Second, environmental law mandates the use of best available ESTs in the entire energy industry value chain to reduce pollution. In a net zero era, this includes the use of modern technologies to reduce GHG emissions from energy operations. For example, 150 countries including United States, Norway, Qatar, Oman, Nigeria, and the United Kingdom have joined the Global Methane Pledge which aims to reduce global methane emissions by at least 30 percent from 2020 levels by the year 2030. Achieving such a level of methane reduction is projected to eliminate over 0.2C warming by 2050. Similarly, an alliance of major oil and gas corporations, including QatarEnergy, Exxon Mobil, Total, Shell, BP, and ENI amongst others, have signed the Guiding Principles on Reducing Methane Emissions across the Natural Gas Value Chain. Since natural gas contains methane, one of the potent GHGs that contribute to climate change, the document acknowledges that 'the transition to a low carbon future will be influenced by the extent to which the oil and gas industry reduces its methane emissions.' The signatory companies

agree to systematically monitor and reduce methane emissions in their operations, assets and projects using the best available technologies. The commitment to reduce GHG emissions from energy operations is expected to increase as net zero targets scale up over the next years. Energy industry operators should therefore take steps to invest in ESTs and production processes that significantly reduce their level of GHG emissions.

Third, environmental legislations worldwide are increasingly introducing self-reporting and disclosure requirements on efforts to reduce GHG emissions, halt biodiversity loss and address all forms of pollution in energy operations. For example, in Nigeria, companies with more than 50 employees are mandated to submit climate and sustainability reports by the Climate Change Act. In Alberta, a Jurisdictional ESG Framework is used for assessing ESG performance, while in Canada, the US, and the UK, public companies, including IOCs, are subject to disclosure requirements under securities regulations. The need to ensure the accuracy, reliability, and transparency of sustainability reports to avoid liability relating to greenwashing is very important in a net zero era. A number of countries have enacted legislation aimed at addressing greenwashing. Furthermore, the use of misleading environmental or sustainability labels or logos on products, such as petroleum oils or lubricants has been a subject of recent litigation which emphasise disclosure risks that may arise from greenwashing. To avoid legal risks relating to environmental and sustainability reporting, companies should have clear and transparent mechanisms for publishing data on climate-related risks, opportunities, and sustainability strategies. They should also remain aware of potential consequences for non-compliance with GHG reduction obligations, which can range from financial penalties to operational shutdowns or even imprisonment.

Key takeaways:

- Energy industry investors and stakeholders should understand the consequences of non-compliance with pollution reduction obligations during energy operations, and should invest in effective emission tracking and reduction technologies and strategies.
- Licensees and operators could develop robust internal processes for tracking and reporting climate-related risks, opportunities, and sustainability strategies. This might include an annual sustainability report and regular updates on their company website.
- Any requirement for operators to invest in clean technology programs, training, and capacity development could be addressed through partnerships with technology providers and educational institutions.
- Stakeholders should consider maintaining a calendar of when and what renewals are required to ensure they remain compliant.
- The preparation and submission of an Operations Environmental Management Plan should be an integral part of any project, demonstrating the company's commitment to environmental management.
- Environmental monitoring and reporting should be built into operational procedures and systems, ensuring compliance and proactive management of environmental impacts.

Decommissioning and Closure

At the stage of decommissioning and closure, energy companies are required to carefully implement their decommissioning and closure plans to avoid the contamination of air, water, land, and natural habitats. Such closure plans should emphasise the 3Rs - rehabilitation, reclamation, and remediation of land to a similar environmental condition prior to the commencement of operations. For example, decommissioning and closure plans are mandatory in Norway under the Petroleum Act, as well as in Nigeria as per the PIA 2021, and Alberta during the AER's well licensing and approval process. In Qatar and Oman, licensees are also required to submit decommissioning plans prior to the commencement of petroleum operations. Similarly, in Texas, the Railroad Commission requires operators to plug a well when it's inactive. These legislations highlight the rehabilitation, clean-up and treatment of disturbed lands and ecosystems at the end of energy operations and activities. Such closure plans can also be progressive and do not have to wait until the entire operations are concluded. For example, areas that are no longer active can be rehabilitated in a progressive and phased manner.

Secondly, in addition to decommissioning, a number of countries emphasise the need for remediation and reclamation programs aimed at returning an area to its original state post-operations. For example, Norwegian law, under the Petroleum Act Section 5-3, mandates facility removal post-operations, barring any different decision by the regulatory authority. Additionally, Oman's law for the Protection of the Environment and Prevention of Pollution similarly requires the return of an area to its original state post-operations. Qatar's Environment Protection Law 2002 makes environmental clean-up obligatory. Nigeria mandates restoration, remediation, or reclamation post-operations, as do Alberta, Texas, and other regions under varying federal or state regulations. In Texas, the TCEQ can enforce site remediation under the Texas Risk Reduction Program. Compliance with reclamation and remediation obligations are often monitored over a period of years, while in some countries are enforced through the issuance of reclamation certificates as evidence of the successful completion of closure and decommissioning requirements. In Norway, Oman, Qatar, Nigeria, Alberta, Texas, and the UK, the decommissioning plans typically include monitoring programs, implying a requirement for long-term monitoring past the facility's life.

Thirdly, the requirement to provide financial assurance mechanism, such as cash or cheque deposits or bonds, are increasingly emphasised for the purpose of guaranteeing the environmental obligations of licensees and to ensure that financial requirements needed for sustainable decommissioning and closure are in place prior to the commencement of operations. For example, In Nigeria, PIA 2021 stipulates that operators provide a performance bond from a Nigerian bank. Nigeria's Upstream Decommissioning and Abandonment Regulations 2023 ensures that decommissioning activities align with good international petroleum industry practice and establishes the framework for a Decommissioning and Abandonment Fund. The AER in Alberta and the Railroad Commission of Texas also require financial security. The Norwegian government may also require financial security for decommissioning offshore installations under the Petroleum Activities Act. While there are no specific provisions in Omani or Qatari law for such security, these might be included in agreements or permits governing operations. Financial assurance mechanisms ensure that government can take over and decommission facilities if an operator defaults. For example, Alberta's Orphan Well Association manages decommissioning and reclamation of orphaned oil facilities. Texas operates the Oil and Gas Regulation and Cleanup program for orphaned wells, while Nigeria's NOSDRA is responsible for monitoring oil spill cleanup and remediation.

Fourth, while designing closure plans, efforts should be made to include repurposing infrastructure for alternative, greener use. The green and circular economy model emphasises eliminating waste accumulation by re- using, re-manufacturing, and recycling materials and resources. While many existing environmental laws do not explicitly contain infrastructure repurposing or reuse obligations, undertaking infrastructure repurposing to advance a circular economy that minimises waste should be viewed as a risk-mitigation strategy to avoid potential liability from increasingly stringent regulatory requirements on what it means to decommission energy infrastructure safely and responsibly. By ensuring the sustainable recycling, recovery, and reuse of energy infrastructure, such as pipelines, rigs and platforms, energy operators can reduce public health impacts associated with unsafe disposal of energy infrastructure while also generating social and economic benefits, such as promoting innovation, economic diversification, entrepreneurship, and green jobs relating to recycling and reuse.

Key takeaways:

- Decommissioning and closure plans are typically required as part of the initial project approval or upon reaching a certain project milestone. They should therefore be developed at the early stages of the project and updated regularly to reflect new realities and integrate new technologies.
- Repurposing of infrastructure and post-operation GHG inventories should be incorporated into the decommissioning and closure plans as a risk-mitigation strategy.
- Remediation and reclamation at the end of facility life should be planned for from the start of the project, ensuring that all activities meet regulatory requirements and standards.
- Financial assurance mechanisms, including insurance, should be in place to ensure that there are sufficient resources to cover end-of-life facility liability.
- Post-approval monitoring of GHG emissions, facility license renewals, cumulative effects, and closure planning could be managed through dedicated teams or external consultants.
- Long-term monitoring past the end of the life of the facility should be planned for, including clear protocols for managing and reporting any findings.

Implications for Transboundary Trade in Goods and Services

Environmental legislation, especially when it differs between countries, can significantly impact transboundary trade in energy goods and services. Countries with strict environmental regulations might limit imports of energy goods from countries with less stringent standards (a form of 'carbon leakage'). Conversely, countries that are ahead in transitioning to green energy might find new export opportunities for their technologies and expertise. Furthermore, multinational energy companies need to navigate the differing regulations in the countries where they operate, which can complicate operations and increase costs.

There is therefore a need for an ESG management strategy, including an ESG competent workforce and board that can ensure that all ESG risks are properly anticipated and addressed when undertaking energy investments and operations in different jurisdictions. The Foundation's previous Guidebook on ESG discusses the wide range of ESG risks and how energy stakeholders can address them in their operations and planning. With the increasing emphasis on sustainability reporting and ESG disclosures, energy operators must ensure timely, transparent, and accurate disclosure of sustainability programs including net zero efforts to avoid reputational damage and potential legal liability from inaccurate or misleading disclosures ('greenwashing').

To mitigate these risks and seize opportunities, energy companies need to actively engage with the legislative process, monitor changes in environmental legislation, and adapt their strategies accordingly. This might involve investing in renewable energy technologies, implementing more sustainable operations, enhancing their ESG reporting, and collaborating with stakeholders to shape a sustainable and socially acceptable energy future.

Conclusion

The unfolding landscape of the energy industry, marked by a shift towards sustainability and escalating ESG scrutiny, signals that traditional due diligence and title review processes may no longer be sufficient in identifying and addressing the multifaceted range of risks. These risks include not just operational and technical concerns, but also those associated with environmental, social, and governance factors. Detecting these risks, which are often deeply embedded within the industry's transformative dynamics, necessitates innovative thinking, foresight, and a proactive stance.

In this shifting scenario, innovation becomes an imperative in risk management approaches. It is vital for the industry to recalibrate risk identification and mitigation strategies to tackle the emerging challenges and opportunities. This goes beyond mere reaction to present conditions and involves strategic planning for the future. By accurately forecasting potential risks, energy companies can build robust strategies to address them in a timely and effective manner, thereby ensuring business continuity and maintaining stakeholders' trust.

Additionally, a proactive approach to risk management should become a fundamental part of every oil and gas company's operations. Rather than simply reacting to risks as they arise, companies should actively understand the complete risk landscape, anticipate potential challenges, and formulate mitigation strategies before these risks become realities. Proactivity also entails identifying opportunities within these challenges, transforming risks into advantages through informed decision-making and efficient operations.

Moreover, the focus on a broader array of technical and operational risks necessitates a more comprehensive approach. Risk management strategies should not be siloed or implemented in isolation. They need to consider the interconnections between different types of risks and potential cascading effects. For instance, a mitigation strategy addressing an environmental risk might inadvertently introduce a new operational risk. This necessitates integrated risk management approaches.

Finally, in the context of the profound transformations reshaping the oil and gas sector, it is vital for companies to not just adapt but to lead the change. This means reframing risk management from a traditional, reactive approach to a more innovative, proactive, and holistic one. Such an approach takes into account the full spectrum of risks, their interrelationships, and the implications of environmental legislation on developments in the energy industry, from project planning to transboundary trade in goods and services, and the management of ESG risks. By doing so, companies will be better equipped to navigate future uncertainties, foster sustainability, and contribute meaningfully to the evolution of the sector.

CHAPTER #4

Managing ESG Risks That Arise From Increasing Environmental Legislation: Recommendations

Introduction

This chapter highlights how stakeholders in the energy industry, including energy companies and policy leaders, could navigate the widening maze of environmental regulations, guidelines, standards, and the requirements of government institutions in a manner that reduces legal risks. The intersections between environment, social and governance (ESG) impacts of energy operations has resulted in increased recognition of the importance of integrated management of ESG risks. ESG is therefore about integrating or harmonising institutions, information sharing, policy and investment decision-making relating to the environment, social and governance impacts of energy investments and activities and responding to them in a coordinated or holistic manner. Responding to the expanding scope of ESG requirements therefore needs a systemic and enterprise-wide risk management approach focused on integrating environmental and human rights due diligence across the entire value chain of energy operations. To ensure long-term sustainability, energy industry players must also strategically re-evaluate and re-orient their ESG practices, with due consideration to the full implications of the reach of environmental legislation. The rapid advancement of environmental legislation provides a fresh opportunity to reform the ESG approaches of the energy industry, catalysing more robust, comprehensive, and effective strategies.

This chapter sheds light on innovative strategies for improving environmental compliance and planning in a net zero era. It discusses the importance of a nexus governance approach that incorporates ESG considerations in risk management policies. It discusses the roles of environmental and human rights due diligence to better anticipate ESG risks and respond in a timely and proactive manner. Additionally, the significance of proactive information disclosure, and the role of capacity development and training in managing environmental risks are examined. The chapter concludes with recommendations to shape the future trajectory of the energy industry towards sustainable development and improved ESG performance.

Nexus or Enterprise-Wide Governance Approach to Environmental Risk Management

The evolving environmental legislation continues to have far-reaching implications for the energy industry, influencing project planning, transboundary trade, and ESG risk management. To effectively navigate this changing landscape, energy stakeholders need to embrace the interconnectivity of Energy, Climate, and Environment within the context of Sustainable Development, through a nexus governance or risk management approach. The nexus governance approach encourages an understanding of the interconnectedness of energy, climate, and environment regulations and the adoption of a holistic perspective. This can equip energy stakeholders to better navigate the shifting regulatory landscape, align their operations with global sustainability targets, and foster greater transparency, accountability, and public engagement.

Understand the Legal and Regulatory Framework

Apart from licensing regime and structure, investors must ensure a proper grasp of the laws relating to the environment, climate change, water, energy, food security, sustainable development and resource efficiency amongst others that are applicable to ongoing activities and investments to avoid running into legal hurdles. Due to the fact that environmental laws and regulations are rapidly changing in many countries, especially due to net zero requirements, failure to understand the latest requirements when negotiating energy contracts may result in higher non-compliance risks or may raise the cost of project compliance. For example, more stringent environmental regulations, such as comprehensive EIAs, human rights impact assessment (HRIAs), disclosure of GHG emission reduction plans, and public review provisions might increase the complexity, cost, and duration of the planning process.

A breach of environmental law is a criminal offence in many countries. In Nigeria for example, an operator, contractor or subcontractor who flares gas or is liable for oil spillage commits an offence and is liable upon conviction to a fine and non-compliance could also result in a cancellation of the license and/or imprisonment. Nigeria's Climate Change Act of 2021 also mandates every private business or entity with more than 50 employees to submit annual carbon emission reduction targets, and to appoint Climate Change Officer or an Environmental Sustainability Officer. Failure to comply will result in a fine. Climate change and the transition to low-carbon energy sources are also being addressed worldwide through diverse legislative measures, from robust legislation in countries like Norway to more indirect approaches in countries like Oman and Qatar. Recognising these variances is critical for stakeholders involved in transboundary energy trade or multi-country operations. The growing landscape of environment and climate change related obligations should lead energy investors to seek early counsel when planning to operate in any jurisdiction, in order to better understand the legal and regulatory regime, the cost of compliance, and the applicable legal risks relating to non-compliance or default. Ensuring that environmental permits are renewed periodically, in accordance with the legal requirements of each permit, is another important step. A well-maintained calendar of when and what renewals are required can be a valuable tool in maintaining compliance.

Incorporate ESG considerations in Risk Management Policies

As ESG factors become increasingly important in the energy industry, it is vital for stakeholders to incorporate ESG considerations into their risk management policies. This can be achieved through a series of strategic steps. First, stakeholders should focus on implementing the highest possible efficiency standards and climate-smart technologies in their construction and operations. This may include utilising energy-efficient equipment, adopting renewable energy sources, or leveraging carbon capture, use, and storage (CCUS) technologies.

Second, to address legal obligations on sustainability reporting, stakeholders should establish transparent mechanisms for publishing data on climate-related risks, opportunities, and sustainability strategies. Developing robust internal processes for tracking and reporting such data, such as an annual sustainability report and regular updates on their company website, can

help meet these obligations. Stakeholders should invest in effective emission tracking and reduction strategies to avoid penalties relating to greenwashing or inaccurate disclosures. Stakeholders should explore these opportunities, possibly through partnerships with technology providers and educational institutions.

Third, incorporating environmental monitoring and reporting into operational procedures and systems can ensure compliance and proactive management of environmental impacts. As many regions define environmental monitoring criteria and thresholds through regulations, it is essential that stakeholders align their internal project screening and monitoring practices with these established guidelines and standards. Incorporating ESG considerations into risk management policies is not only a crucial step towards compliance with legal and regulatory requirements but also a strategic move towards more sustainable and socially acceptable operations. It showcases the commitment of a company to sustainable development and can improve its standing with shareholders, regulators, and the public.

Conduct In-depth Environmental and Human Rights Due Diligence

Given the heightened risks associated with environmental and social factors, energy investors should conduct thorough environmental and human rights due diligence. Traditional due diligence and review processes need to be extended to identify and address the full spectrum of ESG risks. This will require innovative thinking and foresight and will enable companies to anticipate challenges and formulate mitigation strategies proactively.

First, comprehensively understand and assess the potential environmental and human rights impacts arising from the operations of your organisation. This should incorporate an evaluation of potential direct and indirect ESG risks associated with all activities. Examples may include environmental hazards like flooding and pollution, social consequences like mass displacement or spread of diseases, and even broader impacts on resources like drinking water or arable farmland. Second, holistically identify those, or likely to be, adversely affected by enterprise's energy operations. This involves paying special attention to vulnerable and at-risk groups that are typically impacted, such as women, youth, indigenous groups amongst others. Crucially, a human rights due diligence process should carefully understand how energy operations may impact the rights to water, land, food, housing, environment, forests and other resources that are of great importance to such groups, and how such concerns are to be comprehensively addressed before any project commences.

Third, energy investors should strictly monitor adherence to all relevant legislation, industry guidelines, and codes. These are not only tied to environmental factors, but also social implications such as social inclusion, gender justice, inclusivity, and compliance with labour standards.

Implement Stakeholder Engagement Strategies and Guidelines

Energy investors should establish clear stakeholder engagement strategies and guidelines. As earlier discussed, international law emphasises the importance of free, prior, informed consent and engagement with all members of the public that may be impacted by energy projects and operations. This includes setting up inclusive decision-making processes and encouraging participation of all stakeholders, especially marginalised or vulnerable actors. By doing so, energy operators can foster trust, enhance transparency, and promote inclusive growth.

To start, the energy investors should implement a comprehensive stakeholder engagement plan. This should include clear strategies for engaging all stakeholders—ranging from local communities, indigenous groups, to First Nations—who are directly impacted by energy operations. Next, outline clear processes for regular stakeholder interaction. This should encompass all stages of engagement, from the initial consultation to decision-making stages. Open, honest communication is key to building relationships that respect and promote stakeholder interests.

Lastly, promote transparency and foster trust with stakeholders by maintaining open lines of communication. This allows for clear information sharing about the operations of a company, potential impacts, and mitigation strategies, leading to increased stakeholder trust and more sustainable operations.

Establish Channels for Transparent Data Collection and Proactive Information Disclosure

Transparency is key to managing ESG risks. Through transparent data collection, benchmarking and monitoring energy operators can monitor their GHG emission levels and take steps to align their operations with environmental law requirements. To avoid non-compliance risks, energy operators should invest in data collection technologies and benchmarking tools, such as remote sensing technologies to better detect, monitor, and measure GHG emissions and progress on net zero.

Secondly, energy operators should establish channels for proactive information disclosure. This will entail making publicly available information on steps taken by the firms to comply with environmental legislation, manage ESG risks, and to address any violations. By doing so, firms will foster accountability and ensure regulatory compliance. The first step in this regard is to construct a robust disclosure framework. The framework should have clearly defined procedures that ensure the proactive disclosure of all relevant information, including details about company assets, liabilities, and investment strategies, all in compliance with legislative requirements.

Next is to guarantee information accessibility. This involves making company reports and disclosures readily available and easily understandable to stakeholders. Information should be translated into local languages, simplified to remove excessive technical jargon, and disseminated through easily accessible platforms, including the internet.

Lastly, regular updates to information disclosures are crucial. This ensures that stakeholders are always privy to timely, recent, and relevant information about the organisation.

Implement Capacity Development and Training on Environmental Risks

Lastly, energy investors should invest in capacity development and training for employees, particularly frontline field operators and workers, on ESG risks. Such initiatives will enhance understanding of ESG risks, promote effective risk management, and ensure business continuity. Furthermore, it will empower employees and stakeholders to identify opportunities within these challenges, transforming risks into advantages through informed decision-making and efficient operations.

First, this process can be implemented by organising regular in-house training sessions that increase staff understanding and awareness of environmental and social risks associated with the operations of an organisation. Next, it is crucial to incorporate ESG risk management into the culture of an organisation as well as its standard operating procedures. This involves encouraging employees at all levels to proactively understand and manage ESG risks.

Thirdly, training should comprehensively cover both direct and indirect ESG risks. This includes potential disruptions due to climate change and environmental hazards, changes resulting from transitions to low-carbon systems, and requirements for environmental and climate risk disclosures.

Lastly, energy investors would benefit from collaborating with higher education institutions to understand latest research innovation and knowledge on environmentally sustainable technologies and production processes. This could involve engaging academic experts and professionals to provide internal training or capacity building in specialised or technical areas related to environmental and social risk management. This ensures that all staff, even those in highly specialised roles, are adequately equipped to handle environmental and social risks.

CHAPTER #5

Conclusion

If underpinned by comprehensive environmental safeguards, energy development is crucial to unlocking economic productivity and sustainable development. To ensure that energy licensees and operators adopt sound environmental practices in their activities, a wide range of environmental law principles and standards have emerged across the world, especially in major energy consuming and producing nations, that highlight the need for safe, orderly, and responsible development of energy resources that reduce adverse environmental impacts.

The need to halt the climate emergency places additional responsibilities on energy sector stakeholders to lower the emission of GHGs that cause climate change. As countries are combatting climate change impacts, they are also concerned with energy poverty impacts including leveraging transition fuels such as natural gas to advance energy security, while lowering emission levels through cleaner technologies and production processes. Environmental law principles advocate anticipatory measures to prevent pollution in energy development and production activities through best available ESTs and efficient production processes. When pollution occurs, environmental law advocates timely and comprehensive clean-up, remediation, and restoration efforts, including compensation to affected communities and peoples. Failure to comply with environmental standards and requirements, especially those relating to ESG, GHG emission reduction and investment in climate-smart infrastructure and ESTs, could result in significant legal liability, regulatory fines and/or loss of license. Furthermore, as seen in the Appendix, in a net zero era, doing no harm alone is no longer enough. There is a growing expectation on energy operators to not only avoid causing environmental harm, but to also do good, by integrating respect for human rights, social inclusion, stakeholder engagement and responsible business conduct at the heart of their operations. The growing emphasis on just transition specifically places a responsibility on energy sector operators to ensure that net zero programs do not exacerbate energy poverty or result in disproportionate burdens on vulnerable and at-risk groups.

Ensuring compliance and managing the wide range of ESG related risks flowing from the widening maze of regulations, guidelines, standards, and industry requirements will require comprehensive internal risk management frameworks that integrate the environmental principles discussed in this book. Anticipatory and effective risk management frameworks should coherently align energy operations with international treaty norms on climate change, trade, investment, gender, environment, human rights, and sustainable development. There is also a need for training, capacity development and knowledge exchange programs that provide resources for front line officers and staff to anticipate and reduce ESG risks across the entire value chain. As environmental factors change, the guiding principles of environmental law are expected to change across the world to prescribe new standards and update EST requirements.

To keep pace with the latest developments of environmental law, especially those relating to net zero, climate technologies and ESTs, energy sector operators would benefit significantly from collaborating with higher education institutions to implement tailored training programs for frontline officers and management. Such knowledge development programs would enable officers and staff to acquire the skillsets needed to meet contractual obligations relating to transparent data collection, reporting, and disclosure.

Appendix
Survey of Key Environmental Legislation in Frontier Energy Jurisdictions

	Norway	Oman	Qatar	Nigeria	Canada (Alberta)	US (Federal and Texas)	United Kingdom
Is the country a signatory to the Paris Climate Agreement?	Yes, Norway ratified the Paris Agreement on June 20, 2016. (Source: UNFCCC)	Yes, Oman ratified the Paris Agreement on June 22, 2017. (Source: UNFCCC)	Yes, Qatar ratified the Paris Agreement on June 23, 2017. (Source: UNFCCC)	Yes, Nigeria ratified the Paris Agreement on May 16, 2017. (Source: UNFCCC)	Yes, Canada ratified the Paris Agreement on December 4, 1992. (Source: UNFCCC)	Yes, the US ratified the Paris Agreement on October 15, 1992. (Source: UNFCCC)	Yes, the UK ratified the Paris Agreement on December 8, 1993. (Source: UNFCCC)
Is there a specific law or regulation on climate change and transition to low carbon energy sources?	The Climate Change Act 2017 establishes a framework for climate change policy. (Source: Norwegian Ministry of Climate and Environment) Greenhouse Gas Emission Trading Act 2004 regulates greenhouse gas emissions, facilitating the transition to low-carbon energy sources. (Source: Norwegian Environment Agency)	No, as of September, 2023, Oman does not have a specific overarching law or regulation on climate change. However, the country's National Strategy for an Orderly Transition to Net Zero, 2022, and the Vision 2040 strategy emphasize 2050 as a target to achieve net zero emissions.	No, as of September, 2023, Qatar does not have a specific law on climate change. However, the Qatar National Vision 2030 and the National Environment and Climate Change Strategy, include commitments to transition to lower GHG emissions by 25% by 2030 and to transition to a knowledge economy. QatarEnergy has also announced plans to lower GHG emissions by 25% by 2030.	Climate Change Act, 2021 outlines the obligations of business entities to reduce GHG emissions, to report their emission programs, and appoint climate change officers National Energy Transition Plan, 2023 outlines Nigeria's commitment to achieve carbon neutrality by 2060.	• The Canadian Net-Zero Emissions Accountability Act, which became law on June 29, 2021, enshrines in legislation Canada's commitment to achieve net-zero emissions by 2050. • Under the Canadian Environmental Protection Act (CEPA), 1999, the Canadian government has the authority to regulate greenhouse gas emissions. • Pan-Canadian Framework on Clean Growth and Climate Change 2016, outlines a comprehensive approach to reducing emissions, adapting to climate change, and transitioning to a low-carbon economy. • Greenhouse Gas Pollution Pricing Act 2018, established a national carbon pricing system to reduce greenhouse gas emissions. Alberta: • Alberta has recently issued a new Alberta emissions reduction and energy development plan.[1] There are no specific limits, but companies must obtain licenses and approvals for exploration and production activities from the Alberta Energy Regulator (AER) under the Oil and Gas Conservation Act[2] and the Environmental Protection and Enhancement Act. Conservation Act and the Environmental Protection and Enhancement Act.[3]	The Clean Air Act 1963 is the first US federal law aimed specifically to control air pollution from all sources. It has been recently ammended as the The Inflation Reduction Act (IRA) 2022. The IRA aims to accelerate climate change and clean energy transition programs, including electric vehicle incentives, in the US. Clean Power Plan 2015, this plan aimed to reduce carbon dioxide emissions from power plants.	Climate Change Act 2008, established a long-term framework for reducing greenhouse gas emissions in the UK. The Act created the Committee on Climate Change, an independent body responsible for advising the government on emissions targets and climate change adaptation. Energy Act 2013, introduced several measures to promote low-carbon energy sources, including reforms to the electricity market and the establishment of the Contracts for Difference (CfD) scheme, which supports the development of renewable energy projects.

1. The province of Alberta and the industry have led through early investment and leadership in CCUS, methane emissions reductions, elimination of coal-fired electricity generation in 2023, a comprehensive plan for the oil sands to reach net zero emissions from operations through the Pathways Initiative, a hydrogen roadmap, leadership in a circular economy, bitumen beyond combustion and more. See: Government of Alberta. Alberta emissions reduction and energy development plan. April 2023. https://open.alberta.ca/dataset/7483e660-cd1a-4ded-a09d-82112c2fc6e7/resource/75eec73f-8ba9-40cc-b7f4-cdf335a1bd30/download/epa-emissions-reduction-and-energy-development-plan.pdf
2. Updated March 1, 2023, according to the King's Printer. https://open.alberta.ca/publications/o06#detailed
3. Updated April 1, 2023, according to the King's Printer. https://open.alberta.ca/publications/e12

	Norway	Oman	Qatar	Nigeria	Canada (Alberta)	US (Federal and Texas)	United Kingdom
Key obligations							
PROJECT STAGE: APPROVALS							
Any specific requirement in applicable laws that set limits on the exploration and production of extractive resources, particularly the exploration and development of new frontiers?	The Petroleum Activities Act 1996, amended 2020, sets guidelines for exploration and production. The Norwegian Petroleum Directorate can limit production rates to ensure efficient resource extraction.	No	No	Petroleum Industry Act (PIA) 2021 empowers the Commission to make regulations which will give meaning and intent to the spirit of the Act New regulations issued in 2023: i. The Nigeria Upstream Petroleum Measurement Regulations, 2023; ii. Production Curtailment and Domestic Crude Oil Supply Obligation Regulations, 2023; iii. Frontier Basins Exploration Fund Administration Regulations, 2023; iv. Nigeria Upstream Decommissioning and Abandonment Regulations 2023; v. Significant Crude Oil and Gas Discovery Regulations, 2023; vi. Gas Flaring, Venting and Methane Emission (Prevention of Waste and Pollution) Regulations, 2023; and the vii. Nigeria Upstream Petroleum Unitization Regulations, 2023. Five regulations were issued in 2022. i. Petroleum Licensing Round Regulations 2022; ii. Petroleum Royalty Regulations 2022; iii. Domestic Gas Delivery Obligations Regulations 2022; iv. Conversion and Renewal (Licences and Lease); and the v. Nigeria Upstream Petroleum Host Communities Development Regulations 2022.	Canadian Environmental Assessment Act, 2012 (CEAA): requires environmental assessments for designated projects, including major resource extraction projects, to determine their potential impacts on the environment. Provincial regulations: The Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) and the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) regulate offshore oil and gas activities in their respective regions, including exploration, development, and production.	National Environmental Policy Act (NEPA) 1970: requires federal agencies to assess the environmental impacts of their actions, including permits for exploration and development of extractive resources on federal lands and waters. Bureau of Ocean Energy Management (BOEM), created in 2010. Regulations: manage the development of offshore energy resources, including oil and gas, and set safety, environmental, and performance standards for offshore exploration and development. Bureau of Land Management (BLM), established 1946. Regulations: manage the exploration and development of oil, gas, and minerals on federal lands, covering leasing, drilling, production, and reclamation. Texas: While there are no limits set on the exploration and production of extractive resources in Texas, activities such as drilling for oil and gas do require permits from the Railroad Commission of Texas (RRC), which can enforce regulations on these activities under the Texas Natural Resources Code.[4] The Texas Commission on Environmental Quality (TCEQ) also plays an important role in the areas of air quality, surface water management, water quality, and waste management.	Petroleum Act 1998: (requires operators to obtain licenses and permits for exploration, development, and production of oil and gas, and comply with safety, environmental, and performance standards that can limit the extent of extractive activities in new frontiers.) Offshore regulations: The Oil and Gas Authority (OGA) imposes strict safety, environmental, and performance standards for offshore activities, which can limit the exploration and development of new offshore frontiers. Onshore regulations: The Environment Agency (EA) and other devolved environmental regulators impose permit requirements and regulations on onshore oil and gas activities, which can influence the extent of exploration and development of new onshore frontiers.

4. See Texas Commission on Environmental Quality. https://www.tceq.texas.gov/assistance/industry/oil-and-gas ; see Texas Natural Resources Code. https://statutes.capitol.texas.gov/Docs/SDocs/NATURALRESOURCESCODE.pdf

	Norway	Oman	Qatar	Nigeria	Canada (Alberta)	US (Federal and Texas)	United Kingdom
Is an environmental impact assessment (EIA), including GHG reduction plan, required for project approval?	Yes, the Pollution Control Act and the Petroleum Activities Act require an EIA for petroleum activities. Norway's commitments under the Paris Agreement require consideration of GHG emissions.	Yes, as per the Basic Law of the State and the Law for the Protection of Environment and Prevention of Pollution, an EIA is generally required for significant projects, which would likely include major oil and gas developments.	Yes, Law No. 30 of 2002 on the Environment Protection requires an EIA for certain activities. Major oil and gas projects would typically fall under this requirement.	Yes, the Environmental Impact Assessment Act 1992 mandates an EIA for major industrial and infrastructural projects.	Yes, the Canadian Environmental Assessment Act, 2012 (CEAA): Requires environmental assessments for designated projects, including major resource extraction projects, which typically include an evaluation of potential GHG emissions.[5] The EIA process includes a public review and comment period. Alberta: Large-scale projects likely to have a significant environmental impact require an EIA under Alberta's Environmental Protection and Enhancement Act. The EIA process does not specifically require a GHG reduction plan, but it does require an assessment of the project's potential environmental effects, which may include GHG emissions.	Yes, the National Environmental Policy Act (NEPA): Requires federal agencies to conduct an environmental impact assessment (EIA) for projects that could significantly affect the environment, including greenhouse gas (GHG) emissions. Texas: The TCEQ requires an EIA for certain projects, depending on the type and scale of the project. While the EIA process may not specifically require a GHG reduction plan, it does address potential environmental impacts, including air emissions.[6]	UK EIA Regulations: Environmental Impact Assessments (EIAs) are required for certain projects under the Town and Country Planning (Environmental Impact Assessment) Regulations in England and equivalent regulations in Scotland, Wales, and Northern Ireland. EIAs must consider the potential environmental impacts of a project, including GHG emissions. A GHG reduction plan may be required as part of the EIA or as a separate requirement, depending on the specific project and regulatory authority.
Are there opportunities for the public to review and comment on EIAs	Yes, the Planning and Building Act 2008 requires public consultation during the EIA process.	No, there is no defined public consultation process for EIAs.	No, there is no specific legislation requiring public consultation on EIAs, but the practice may vary.	Yes, the Environmental Impact Assessment Act 1992 requires public participation in the EIA process.	Yes, under the Impact Assessment Act 2019 the corresponding framework is intended to provide the public with information about how the Agency provides the public with the opportunity to meaningfully participate in impact assessments, regional assessments and strategic assessments. The Canadian Net-Zero Emissions Accountability Act 2021 requires public participation and independent advice to guide the Government of Canada's efforts. Alberta: Alberta's EIA process includes a period for public review and comment.	Yes, under the National Environmental Policy Act (NEPA), there are opportunities for the public to review and comment on draft EIAs. Texas: At the state level, the TCEQ provides opportunities for public comment on proposed permits and other actions.	Yes, under the UK EIA Regulations, there are opportunities for the public to review and comment on draft EIAs.

5. On April 6, 2022, the Minister of Environment and Climate Change announced that new oil and gas projects that are subject to a federal impact assessment under the Impact Assessment Act (IAA) should have best-in-class greenhouse gas (GHG) emissions performance throughout their lifetime. See: Government of Canada. 'Draft guidance for best-in-class GHG emissions performance by oil and gas projects'. https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/oil-gas-emissions-cap/best-class-draft-guidance.html
6. Texas Commission on Environmental Quality (TCEQ). Office of Compliance and Enforcement. https://www.tceq.texas.gov/agency/organization/oce.html

	Norway	Oman	Qatar	Nigeria	Canada (Alberta)	US (Federal and Texas)	United Kingdom
PROJECT STAGE: OPERATIONS							
Is there a requirement for licensees and operators to release and/or publish statements, disclosures or statistics on climate-related risks, opportunities, and sustainability strategies?	Yes, Norway requires businesses to include sustainability reports in their annual reports.	No, there are no specific regulations requiring climate-related disclosures.	No, there are no specific regulations requiring climate-related disclosures.	Yes, Nigeria's Climate Change Act 2021 requires companies to report on sustainability and ESG factors.	Yes, the Canadian Securities Administrators (CSA) has issued guidance for public companies to consider climate-related risks and opportunities in their financial disclosures. They are currently finalizing binding climate disclosure rules on proposed National Instrument 51-107 Disclosure of Climate Related Matters, in view of US and international standards (ISSB).	Yes, the Securities and Exchange Commission (SEC) has issued guidance for public companies to consider climate-related risks and opportunities in their financial disclosures.	Yes, the Financial Conduct Authority (FCA) has implemented regulations for certain public companies to disclose climate-related risks and opportunities in their financial disclosures.
Are there guidelines for the publication of net-zero and sustainabilityreports, in terms of language, scope and content?	Yes, Norway recommends businesses follow the Global Reporting Initiative (GRI) for sustainability reporting.	No specific guidelines were available.	No specific guidelines were available.	Yes, the Climate Change Act, 2021 provides guidance on sustainability reporting for listed companies.	The Canadian Net-Zero Emissions Accountability Act 2021 establishes a legally binding process to set five-year national emissions-reduction targets as well as develop credible, science-based emissions-reduction plans to achieve each target. Each target will require credible, science-based emissions reduction plans to achieve it. International standards like the Global Reporting Initiative (GRI) or Sustainability Accounting Standards Board (SASB) provide guidance.	There are no specific federal guidelines for net-zero and sustainability reports. However, companies often follow international reporting frameworks, such as the Global Reporting Initiative (GRI), the Task Force on Climate-related Financial Disclosures (TCFD), or the Sustainability Accounting Standards Board (SASB), which provide guidance on language, scope, and content.	There are no specific federal guidelines for net-zero and sustainability reports. However, companies often follow international reporting frameworks, such as the Global Reporting Initiative (GRI), the Task Force on Climate-related Financial Disclosures (TCFD), or the Sustainability Accounting Standards Board (SASB), which provide guidance on language, scope, and content.

	Norway	Oman	Qatar	Nigeria	Canada (Alberta)	US (Federal and Texas)	United Kingdom
Are there consequences for non-compliance with GHG reduction obligations (and what are they: fines, shut in, and/or imprisonment?)	Yes, non-compliance can result in sanctions including fines and revocation of licenses.	Yes, non-compliance can result in sanctions including fines and revocation of licenses.	Yes, non-compliance can result in sanctions including fines and revocation of licenses.	Yes, non-compliance can result in penalties, including fines and imprisonment.	The federal government's approach to reducing greenhouse gas emissions includes setting regulations for key sectors and imposing a price on carbon pollution. There is a regulatory charge on fossil fuels, and a performance-based system for industries.[7] Consequences may include fines, penalties, or enforcement actions. Enforcement actions can be taken by federal or provincial environmental authorities. Alberta: Alberta's Technology Innovation and Emissions Reduction (TIER) regulation imposes emissions intensity reduction requirements on large industrial facilities. Facilities that don't meet their targets must pay into a fund or earn or purchase emission offsets.[8]	Consequences may include fines, penalties, or enforcement actions. Enforcement actions can be taken by the Environmental Protection Agency (EPA) or other relevant authorities. Texas: Non-compliance with environmental permits can result in enforcement actions by TCEQ, including administrative penalties, civil penalties, and criminal penalties depending on the violation's seriousness.	Consequences may include fines, penalties, or enforcement actions. Enforcement actions can be taken by the Environment Agency or other relevant authorities.
Is there a specific requirement for operators to invest in, or support clean technology programs, training, and capacity development?	No, there is no specific requirement, but government programs and incentives encourage investment in clean technology.	There is no specific legislative requirement, but petroleum contracts, government programs and incentives encourage investment in clean technology. For example, a Contractor is required to: use best available technology to control the pollution and prevent environmental deterioration including climate change.	There is no specific legislative requirement, but petroleum contracts, government programs and incentives encourage investment in clean technology. For example, under the Environmental Protection Law, a Contractor is required to: use best available technology to control the pollution and prevent environmental deterioration including climate change.	There is no specific legislative requirement, but petroleum contracts, government programs and incentives encourage investment in clean technology. For example, the Nigerian Oil and Gas Industry Content Development (NOGICD) Act emphasizes training and local capacity development in the oil and gas sector, including training relating to clean technology development and use in the industry.	There is no specific legislative requirement, but government programs and incentives encourage investment in clean technology, such as grants, tax incentives or subsidies. There is a federal carbon pollution pricing benchmark, with key changes for 2023-2030, including common scope and coverage, clear price signals.[9] Alberta does have incentive programs like the Emissions Reduction and Energy Development Plan to encourage such investment.[10]	There is no specific requirement, but government programs and incentives encourage investment in clean technology. Texas: Texas has incentive programs such as the Texas Emissions Reduction Plan (TERP) which offers grants to eligible individuals, businesses, or local governments to reduce emissions from polluting vehicles and equipment.[11]	There is no specific requirement, but government programs and incentives encourage investment in clean technology

7. https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work.html
8. https://www.alberta.ca/technology-innovation-and-emissions-reduction-regulation.aspx
9. https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/carbon-pollution-pricing-federal-benchmark-information.html
10. https://www.alberta.ca/emissions-reduction-and-energy-development-plan.aspx
11. https://www.tceq.texas.gov/airquality/terp/programs

	Norway	Oman	Qatar	Nigeria	Canada (Alberta)	US (Federal and Texas)	United Kingdom
PROJECT STAGE: OPERATIONS							
Are renewals on environmental regulatory permits required?	Yes, environmental permits must be renewed periodically.	Yes, environmental permits must be renewed.	Yes, environmental permits require renewal.	Yes, environmental permits require renewal.	Yes, environmental permits require renewal.	Yes, environmental permits require renewal. Texas: Permits such as those for air quality issued by the TCEQ require renewals.	Yes, environmental permits require renewal.
For what and how often are renewals required?	The frequency depends on the specifics of the permit.	The frequency depends on the type of permit.	The frequency depends on the specifics of the permit.	The frequency depends on the type of permit.	Yes, renewals are generally required for many types of environmental permits, depending on the specific federal, provincial, or territorial regulation. There are varying renewal periods depending on the specific license.	Yes, renewals are generally required for many types of environmental permits. There are varying renewal periods depending on the specific license, but generally 5 years.	Yes, renewals are generally required for many types of environmental permits. There are varying renewal periods depending on the specific license.
Are discharge limitations prescribed?	Yes, the Pollution Control Act prescribes discharge limitations.	Yes, discharge limitations are part of Oman's environmental regulations.	Yes, the Law No. 30 of 2002 on the Environment Protection includes discharge limitations.	Yes, discharge limits are established by the EGASPIN and other environmental regulations.	Yes, discharge limitations can be prescribed under federal, provincial, or territorial regulations. Alberta: Yes, these are often detailed in environmental permits, and Alberta's EPEA contains provisions regarding the release of substances.	Yes, discharge limitations are prescribed under the National Pollutant Discharge Elimination System (NPDES) permits. Texas: Texas Pollutant Discharge Elimination System (TPDES) permits are administered by TCEQ.	Yes, discharge limitations can be prescribed under the Environmental Permitting (England and Wales) Regulations 2016.

	Norway	Oman	Qatar	Nigeria	Canada (Alberta)	US (Federal and Texas)	United Kingdom
Are there self-reporting requirements on the IOC for ESG issues	Yes, Norway has disclosure requirements on ESG issues. According to the Norwegian Accounting Act, large enterprises are required to report on how they integrate considerations for human rights, labor rights, social issues, environment, and anti-corruption in their business strategies, daily operations, and relations with stakeholders. Operators must self-report on ESG issues, submit an Operations Environmental Management Plan, and conduct environmental monitoring during operations.	As of September, 2023, Oman does not have a specific requirement for IOCs to self-report on ESG issues. However, there's a general expectation in the National Strategy for an Orderly Transition to Net Zero, 2022, for businesses to conform to best practices, and ensure an orderly energy transition process.	As of September, 2023, there is no specific requirement for IOCs to self-report on ESG issues in Qatar. Companies, however, may opt to do so in line with international best practices.	Yes, the Nigerian Climate Change Act of 2021 requires companies with more 50 employees to submit sustainability reports, which will include many oil and gas companies.	There are no specific self-reporting requirements for international oil companies (IOCs) related to ESG issues at the federal level. However, public companies, including IOCs, are subject to disclosure requirements under securities regulations, which may include ESG-related risks and opportunities. Alberta: At the provincial level, a Jurisdictional ESG Framework has been developed by the Executive Council which provides an objective basis for assessing and comparing ESG performance within and between sovereign and sub-sovereign regions.[12]	There are no specific self-reporting requirements for IOCs related to ESG issues at the federal level. However, public companies, including IOCs, are subject to disclosure requirements under securities regulations by the Securities and Exchange Commission (SEC), which may include ESG-related risks and opportunities.	There are no specific self-reporting requirements for IOCs related to ESG issues at the federal level. However, public companies, including IOCs, are subject to disclosure requirements under the Companies Act 2006 and the UK Corporate Governance Code, which may include ESG-related risks and opportunities.
Is environmental monitoring and reporting required during operations?	Yes, according to the Activities Regulations, companies must continuously monitor and report on their emissions and produced water discharges.	Yes, Oman's Law for Protection of Environment and Prevention of Pollution mandates monitoring and control of environmental pollution. The specifics of monitoring and reporting requirements are typically outlined in the conditions of the environmental permits issued for operations.	Yes, the Environment Protection Law mandates companies to take necessary measures to protect the environment and report any incidents causing pollution.	According to the Environmental Impact Assessment (EIA) Act, companies must provide an EIA report, which includes a detailed description of the project, its environmental impact, and the mitigation measures in place. Regular reporting is typically required under the issued permits.	Yes, environmental monitoring and reporting may be required during operations, depending on the specific federal, provincial, or territorial regulations and permit conditions. Provincial regulations may also require monitoring and reporting related to air and water emissions.	Yes, environmental monitoring and reporting may be required during operations, depending on the specific federal or state regulations and permit conditions. Additionally, air quality permits under the Clean Air Act may require monitoring and reporting of emissions.	Yes, environmental monitoring and reporting may be required during operations, depending on the specific regulations and permit conditions. Permits may include monitoring and reporting requirements to ensure compliance with environmental standards.

12.https://open.alberta.ca/publications/jurisdictional-esg-framework#summary

	Norway	Oman	Qatar	Nigeria	Canada (Alberta)	US (Federal and Texas)	United Kingdom
Is an Operations Environmental Management Plan required to be submitted and approved by the regulatory authority?	Yes, according to the Management Regulations, an environmental risk analysis and an emergency preparedness analysis need to be conducted, both part of a broader Management Plan.	While the laws do not explicitly mention an Operations Environmental Management Plan, approval from the Ministry of Environment and Climate Affairs is required for activities with potential environmental impact, and this would typically involve submitting an EIA report detailing how environmental impacts will be managed.	Similar to Oman, Qatar doesn't explicitly mention an Operations Environmental Management Plan, but projects with potential environmental impact do require an EIA report, which includes plans for managing environmental impacts.	Yes, according to the EIA Act, companies must submit an EIA, which includes an Environmental Management Plan outlining the strategies, actions, costs, responsibilities and timeline for mitigating environmental impacts.	Yes, an Environmental Management Plan (EMP) or similar document may be required to be submitted and approved by the regulatory authority, depending on the specific federal, provincial, or territorial regulations and the nature of the project.	Yes, an Environmental Management Plan (EMP) or similar document may be required to be submitted and approved by the regulatory authority, depending on the specific federal or state regulations and the nature of the project.	Yes, an Environmental Management Plan (EMP) or similar document may be required to be submitted and approved by the regulatory authority, depending on the specific regulations and the nature of the project.
Are cumulative effects monitored? e.g. air quality (NOx, SOx).	Yes, under the Norwegian Pollution Control Act 1981, polluters are required to monitor and report the effects of their pollution. This would include cumulative effects such as air quality.	Yes, the Environmental Legislation requires the prediction and assessment of cumulative impacts of projects.	Yes, the Environmental Protection Law and the Executive by-Law require the prediction and assessment of cumulative impacts of projects.	Yes, the Environmental Impact Assessment Act requires the prediction and assessment of cumulative impacts of projects.	Yes, considered and monitored in environmental assessments and regulatory processes, depending on the specific federal, provincial, or territorial regulations. Alberta: Alberta's Land-use Framework and regional plans aim to manage cumulative environmental effects. Individual project approvals may also include monitoring requirements.[13]	Yes, considered and monitored in environmental assessments and regulatory processes, depending on the specific federal or state regulations. Additionally, air quality permits under the Clean Air Act may include monitoring requirements related to cumulative effects on air quality.	Yes, considered and monitored in environmental assessments and regulatory processes, depending on the specific regulations. Additionally, the UK Environmental Impact Assessment (EIA) process may require the assessment of cumulative effects.
Are there requirements for continuous monitoring?	Yes, Norway requires continuous monitoring for certain types of operations, under regulations such as the Activities Regulations.	In part: Oman's Law for the Protection of Environment and Prevention of Pollution requires monitoring of certain activities, though it doesn't specify continuous monitoring.	In part: Certain activities may require monitoring under the Environmental Protection Law, but continuous monitoring is not specifically mandated.	Yes, the EIA Act and the PIA 2021 require monitoring of environmental performance for certain operations.	Yes, depending on the statute. Under the Fisheries Act, water licenses may require continuous monitoring of discharges).	Yes, there may be requirements for continuous monitoring, depending on the specific federal or state regulations and permit conditions.	Yes, depending on the specific regulations and permit conditions.

13. https://landuse.alberta.ca/PlanforAlberta/LanduseFramework/Pages/default.aspx

	Norway	Oman	Qatar	Nigeria	Canada (Alberta)	US (Federal and Texas)	United Kingdom
Are environmental monitoring criteria and thresholds defined through regulations?	Yes, specific criteria and thresholds are often defined in the permits issued under regulations such as the Activities Regulations and the Pollution Control Act 1981.	Yes, specific regulations and standards define monitoring criteria and thresholds.	Yes, the Executive By-Law in its Annexes includes emission limits and threholds.	Yes, criteria and thresholds for environmental monitoring are defined in EGASPIN and other environmental regulations and standards.	Yes, environmental monitoring criteria and thresholds are often defined through federal, provincial, or territorial regulations.	Environmental monitoring criteria and thresholds are often defined through federal or state regulations.	Often defined through regulations.
If environmental monitoring criteria and thresholds are defined, please describe	The Norwegian Environment Agency provides guidelines for monitoring of offshore petroleum activities and the NorwegianStandards (NS), with NS 9410:2009 focusing on environmental monitoring for petroleum activities on the Norwegian continental shelf.	Oman's Ministry of Environment and Climate Affairs (MECA) oversees Environmental Impact Assessments (EIAs) and sets guidelines for them.	Qatar's Ministry of Environment and Climate Change (MoECC) is responsible for setting out environmental standards and guidelines.	The Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (EGASPIN) is a real document published by Nigeria's Department of Petroleum Resources.	In Canada, criteria and thresholds are often defined at federal, provincial, or territorial levels. Provinces and territories may also have their own guidelines and standards, which can be more stringent than the CCME guidelines.	In the United States, criteria and thresholds are often defined at federal or state levels. For air pollutants, the Environmental Protection Agency (EPA) establishes National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants. These criteria provide guidance for states and tribes to establish water quality standards that protect aquatic life and human health.	In the United Kingdom, criteria and thresholds are often defined through regulations and guidelines. For water pollutants, the UK Environment Agency establishes Environmental Quality Standards (EQS) for various substances. For air pollutants, air quality objectives and limits are set under the UK Air Quality Strategy. These objectives and limits are based on European Union air quality directives and World Health Organization guidelines.
PROJECT STAGE: OPERATIONS							
Are decommissioning and closure plans required?	Yes, under the Petroleum Act, the licensee must submit a decommissioning plan to the Ministry of Petroleum and Energy between 2 and 5 years before production ceases.	Yes, a decommissioning plan must be submitted for approval prior to the commencement of petroleum operations.	Yes, a decommissioning plan must be submitted for approval prior to the commencement of petroleum operations.	Yes, the PIA 2021 require oil and gas operators to submit a decommissioning plan for approval by the Department of Petroleum Resources.	Typically required for projects in extractive industries, depending on the specific federal, provincial, or territorial regulations. Alberta: Yes, these are typically required as part of the AER's well licensing and approval process.	Generally required for projects in extractive industries, depending on the specific federal or state regulations. Texas: For oil and gas operations, the Railroad Commission of Texas requires an operator to plug a well when it's inactive.	Generally required for projects in extractive industries, depending on the specific regulations.
If yes, when are they required?	Between 2 and 5 years before production ceases, according to the Petroleum Act.	Prior to the commencement of petroleum operations.	Prior to the commencement of petroleum operations. Article 6 of the Preservation of Petroleum Wealth Law requires a contractor to submit to QP, before commencing any petroleum operations, a detailed description of the proposed operations, including all plans, project location, production capacity, operational modalities, engineering data, and cost estimates amongst others.	Prior to the commencement of petroleum operations. Nigeria Upstream Decommissioning and Abandonment Regulations 2023 seeks to ensure that decommissioning and abandonment activities are conducted in accordance with good international petroleum industry practice. The regulations also set the framework for the establishment and administration of a Decommissioning and Abandonment Fund.	Decommissioning and closure plans are typically required during the project approval process or prior to the commencement of operations, depending on the specific federal, provincial, or territorial regulations. Provincial regulations may also require closure plans for mines and other extractive operations at various stages of project development. Alberta: Decommissioning of oil and gas wells, pipelines, and facilities is regulated under AER's Directive 020.[14]	Decommissioning and closure plans are typically required during the project approval process or prior to the commencement of operations, depending on the specific federal or state regulations. State regulations may also require closure plans for mines and other extractive operations at various stages of project development. Texas: These would be defined in the environmental permit. Texas has regulations around the decommissioning of oil and gas wells, including plugging and site reclamation under the Texas Administrative Code.	Decommissioning and closure plans are typically required during the project approval process or prior to the commencement of operations, depending on the specific regulations. Additionally, the UK Oil and Gas Authority requires decommissioning plans for offshore oil and gas installations, which must be submitted and approved prior to the cessation of production.
Are there decommissioning requirementsrelating to repurposing of oil and coal infrastructure, or submitting post operations GHG inventories?	While there is no specific requirement to repurpose infrastructure, the decision to decommission must take into account other potential uses. No specific provision was found about post operations GHG inventories.	No specific requirement.	No specific requirement	No specific requirement	There are no specific federal regulations that require repurposing of oil and coal infrastructure or submitting post-operations GHG inventories. However, the government of Alberta has eliminated coal-fired electricity generation as of 2023, and there is increased interest in the province in repurposing oil facilities for geothermal energy development.[15]	There are no specific federal regulations that require repurposing of oil and coal infrastructure or submitting post-operations GHG inventories.	There are no specific federal regulations that require repurposing of oil and coal infrastructure or submitting post-operations GHG inventories.

14. AER. Directive 020: Well Abandonment. Updated October 19, 2022. https://www.aer.ca/regulating-development/rules-and-directives/directives/directive-020
15. Government of Alberta. Alberta emissions reduction and energy development plan. April 2023, p. 36. https://open.alberta.ca/dataset/7483e660-cd1a-4ded-a09d-82112c2fc6e7/resource/75eec73f-8ba9-40cc-b7f4-cdf335a1bd30/download/epa-emissions-reduction-and-energy-development-plan.pdf

	Norway	Oman	Qatar	Nigeria	Canada (Alberta)	US (Federal and Texas)	United Kingdom
Is there regulatory mandated remediation and reclamation at facility end of life?	Yes, Norwegian law requires site clearance and remediation at the end of operations. The Norwegian Petroleum Act Section 5-3 mandates that the licensee is obligated to remove any facility that is no longer in use unless the King (which, in practical terms, means the regulatory authority) has made a different decision. Further, according to the Pollution Control Act, the operator has a general duty to implement measures to prevent pollution, including at the end of the operations.	Yes, the law requires that an area be returned to its original state after operations cease. Although there may not be specific legislation for the oil and gas industry, the Oman Law for the Protection of the Environment and Prevention of Pollution requires the remediation of polluted areas, and it is expected that such laws would be applicable at the end of a facility's life.	Yes, the law requires remediation to avoid environmental damage, but it's unclear how this is applied at facility end of life. The Environment Protection Law 2002, places a general obligation on organizations to clean up environmental pollution, which would apply when a facility reaches the end of its life.	Yes, the law requires restoration, remediation, or reclamation of the environment at the end of oil and gas operations.	Yes, remediation and reclamation are typically required at the end of a facility's life, depending on the specific federal, provincial, or territorial regulations, such as the EPEA.	Yes, remediation and reclamation are typically required at the end of a facility's life, depending on the specific federal or state regulations. Texas: TCEQ can enforce site remediation under the Texas Risk Reduction Program	Yes, remediation and reclamation are typically required at the end of a facility's life, depending on the specific regulations.
Are reclamation certificates issued by the government?	Norway does not issue reclamation certificates per se but requires compliance with decommissioning obligations.	As of 2023, information on reclamation certificates in Oman are not readily available.	As of 2023, information on reclamation certificates in Qatar are not readily available.	Nigeria does not issue reclamation certificates, but compliance with environmental obligations is monitored.	Yes, reclamation certificates are issued by provincial or territorial governments, depending on the specific regulations in each jurisdiction. Alberta: Yes, the AER issues reclamation certificates following the successful reclamation of a site.	Yes, reclamation certificates or similar documents are issued by federal or state governments, depending on the specific regulations in each jurisdiction.	While there is no specific "reclamation certificate" issued in the UK, the regulatory authorities oversee the remediation and reclamation process and ensure that the requirements have been met.
Are there bond or financial security requirements against end-of-life facility liability?	Yes, according to the Petroleum Activities Act, the Norwegian government may require financial security for the decommissioning of offshore installations.	While there is no specific provision in Omani law for bonds or financial security against end-of-life facility liability as of 2023, it is recommended to consult the respective agreements or permits that govern the particular operations as they might include such provisions.	Qatar does not have specific provisions for bonds or financial security against end-of-life facility liability. However, like Oman, such provisions might be included in the agreements or permits that govern particular operations.	The Nigerian Oil and Gas Industry Content Development (NOGICD) Act stipulates that operators should provide a performance bond from a Nigerian bank guaranteeing performance of an operator's obligation.	Canada has bond or financial security requirements for certain facilities, depending on the specific federal, provincial, or territorial regulations. Alberta: The AER requires financial security for oil and gas wells, facilities, and pipelines under the Liability Management Framework.[16]	United States has bond or financial security requirements for certain facilities, depending on the specific federal or state regulations. Texas: The Railroad Commission of Texas requires financial assurance for wells to ensure proper plugging and site reclamation.	United Kingdom has bond or financial security requirements for certain facilities, depending on the specific regulations.

16. https://ablawg.ca/2023/03/22/updates-to-the-oil-and-gas-liability-management-framework-the-new-closure-nomination-and-the-renamed-closure-quotas/

	Norway	Oman	Qatar	Nigeria	Canada (Alberta)	US (Federal and Texas)	United Kingdom
Is there a government-run programme that can be implemented to remediate and reclaim orphaned facilities and oil wells in cases where a company defaults?	Yes, under the Petroleum Activities Act, the Norwegian government has the right to take over and decommission facilities if an operator defaults.	There is no specific government-run program for the remediation and reclamation of orphaned facilities or oil wells.	There is no specific government-run program for the remediation and reclamation of orphaned facilities or oil wells.	There is no specific government-run program for orphaned facilities, but the National Oil Spill Detection and Response Agency (NOSDRA) has responsibilities regarding oil spill cleanup and remediation.	Through its provincial or territorial agencies, has programs to remediate and reclaim orphaned facilities and oil wells in cases where a company defaults. Alberta: The Orphan Well Association manages the decommissioning and reclamation of orphaned oil.[17]	There is no specific federal program to address orphaned facilities and oil wells, but state governments often have programs to manage these sites in cases where a company defaults. Texas: The Railroad Commission of Texas operates the Oil and Gas Regulation and Cleanup program which handles the remediation and reclamation of orphaned wells.	There is no specific government-run program to remediate and reclaim orphaned facilities and oil wells.
Are there requirements for post-approval monitoring of GHG, facility licence renewals, cumulative effects, and closure planning?	Yes, under the Norwegian Environment Agency and the Petroleum Safety Authority, there are guidelines and requirements for post-approval monitoring of emissions and discharges, including GHG. The Activities Regulations also require follow-up to ensure that activities are carried out in compliance with the law.	Yes, Oman's Ministry of Environment and Climate Affairs (MECA) has regulatory oversight over environmental issues in Oman. Monitoring requirements would be set out in the respective environmental permits.	Yes, QatarEnergy has guidelines pertaining to post-approval environmental monitoring.	The Nigerian Upstream Regulatory Commission has post-approval monitoring responsibilities for oil and gas operations, including aspects such as GHG emissions and facility license renewals.	Requirements for post-approval monitoring of GHG, facility license renewals, cumulative effects, and closure planning, depending on the specific federal, provincial, or territorial regulations.	Requirements for post-approval monitoring of GHG, facility license renewals, cumulative effects, and closure planning, depending on the specific federal or state regulations.	Requirements for post-approval monitoring of GHG, facility license renewals, cumulative effects, and closure planning, depending on the specific regulations.
Is long-term monitoring required past the end of the life of the facility?	Yes, the decommissioning plan should include monitoring programs, indicating that long-term monitoring is required.	Yes, the decommissioning plan should include monitoring programs.	Yes, the decommissioning plan should include monitoring programs.	Yes, the decommissioning plan should include monitoring programs. Nigeria Upstream Decommissioning and Abandonment Regulations 2023 seeks to ensure that decommissioning and abandonment activities are conducted in accordance with good international petroleum industry practice. The regulations also set the framework for the establishment and administration of a Decommissioning and Abandonment Fund.	Yes, long-term monitoring may be required past the end of the life of a facility, depending on the specific federal, provincial, or territorial regulations.	Long-term monitoring may be required past the end of the life of a facility, depending on the specific federal or state regulations.	Long-term monitoring may be required past the end of the life of a facility, depending on the specific regulations.

17.https://www.aer.ca/regulating-development/project-closure/liability-management-programs-and-processes/orphan-well-association

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