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BALANCING ENVIRONMENTAL RULES WITH THE FUTURE OF OIL AND GAS

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ABSTRACT

The oil and gas industry plays a pivotal role in the global economy but poses significant environmental risks through pollution and climate impacts during exploration and production. Nations have enhanced their energy sector operations to balance economic growth with environmental conservation.

This study examines global regulatory frameworks governing oil and gas exploration and production (E&P), focusing on environmental concerns. It analyzes policies and decision-making processes of key international organizations like the UNFCCC, OPEC, and IEA, emphasizing sustainability in resource extraction.

Challenges in implementing international agreements include weak enforcement, varying national regulations, data transparency issues, and inadequate monitoring systems. The study concludes that achieving sustainability requires collaborative efforts, standardized practices, enhanced monitoring, and increased financial support. A sustainable future in energy E&P depends on global cooperation and shared responsibility.

Keywords: Exploration and Production, International Organizations, Environmental Challenges, Global Cooperation, Shared Responsibility

1. INTRODUCTION

Petroleum ranks among the world's most lucrative commodities, essential for producing vital fuels like gasoline, diesel, and jet fuel. However, its extraction and utilization present a dual-edged challenge. On one hand, it drives economic prosperity through refining and burning fossil fuels sourced from deep within the earth and offshore locations. Yet, these activities also entail significant environmental and social repercussions for nearby communities.

Countries hosting oil and petroleum reserves typically establish agreements with companies or contractors, whether on a national or international scale, to extract hydrocarbons[1]. International frameworks such as the United Nations Resolution on Permanent Sovereignty over Natural Resources and declarations on economic rights underscore the importance of maintaining sovereignty over natural resources to avoid compromising national autonomy[2].

[1] Greenfieid and Rooney, 1999
[2] Smith, 1993

Most extraction and production projects are strategically located in remote, resource-rich areas far from urban centers, which are particularly attractive due to their abundant natural resources[3]. The extraction of petroleum is contentious due to its profound impacts on local communities and the environment. Despite pledges of social and environmental responsibility, both corporations and governments often struggle to effectively implement and enforce regulations.

Projects heavily reliant on natural resource extraction, especially in developing nations, profoundly affect indigenous communities. These ventures, characterized by advanced technology and substantial financial resources, frequently operate in pristine environments previously untouched by industrial activities.

In the aftermath of the unprecedented Covid-19 outbreak, global crises have spurred a dual imperative: evaluating immediate impacts and strategizing for a transformed future. Industries worldwide have pursued emission relaxations and increased subsidies to bolster their competitive edge, alongside preparing for imminent carbon adjustments.

Nations have responded by strengthening social and environmental oversight, encompassing the reassessment of policies, regulations, self-regulation frameworks, liability statutes, corporate governance standards, and market dynamics. These initiatives have profoundly shaped industrial operations, particularly those involving hazardous activities[4].

The petroleum industry has significantly boosted global economic growth and raised living standards. However, its development has also had profound adverse effects on the environment[5]. Hydrocarbon exploration faces growing skepticism due to its environmental impacts, particularly concerning global climate change driven by greenhouse gas emissions from fossil fuel use.

International and national regulators must assume a pivotal role in ensuring accountability within their frameworks. Addressing challenges such as the need for high levels of competency and technical expertise in assessing oil company performance extends beyond mere compliance regimes, aiming to address legitimacy concerns effectively.

The research methodology involves a comprehensive review of international agreements and qualitative descriptive analysis of various international organizations, conventions, and treaties. This approach aims to examine how these entities contribute to sustainability within the global oil and gas exploration and production industry.

2. SYSTEMATIC APPROACH

This section provides a thorough exploration of multiple international agreements and collaborative efforts among oil and gas producing and exploration nations. These efforts are designed to encourage and support the implementation of policies aimed at achieving carbon neutrality. The analysis will delve into the successes and proactive measures undertaken by these nations in advancing sustainable development within the oil and gas production and exploration sectors.

2.1. ACHIEVING SUSTAINABILITY THROUGH THE PARIS AGREEMENTS OF 2016

The Paris Agreement[6] stands as a landmark accord aimed at normalizing greenhouse gas (GHG) emissions and reconciling conflicting interests by mandating binding commitments from all nations. Central to its objectives is the ambition to limit the global average temperature increase to below 2 degrees Celsius, ideally 1.5 degrees Celsius, compared to preindustrial levels. This goal is pursued through the establishment of nationally determined contributions (NDCs), which require countries to prepare, communicate, and implement plans for reducing GHG emissions[7].

The agreement achieves its aims by promoting an Enhanced Transparency Framework (ETF)[8]. Under this framework, nations are obligated to report transparently on their actions, progress, and the support they provide or receive regarding climate change mitigation and adaptation measures. International review procedures ensure accountability and facilitate compliance with these reporting obligations.

[3] Symon, 2007
[4] Baram and Lindoe, 2014
[5] Gao, 1998
[6] United Nation Climate Change. 2015
[7] United States Environmental Protection Agency. 2022
[8] Pickbourn, Nkurunziza, and Ndikumana (2022)

The implementation of the Paris Agreement is deemed crucial for both developed and developing countries, emphasizing the need for equitable participation to effectively address the multifaceted global challenge of climate change, while also upholding fundamental human values[9].

Furthermore, industries such as oil and gas are highlighted for their increasingly responsive and environmentally conscientious practices. These sectors have notably advanced their sustainable technologies, enhanced operational efficiency and contributing positively to meeting the agreement's objectives.

The widespread ratification and implementation of the Paris Agreement across diverse sectors and communities underscore its global significance. Such collective action is essential for charting a sustainable course that safeguards the planet for future generations.

2.2. GREEN TRADE AND UNCTAD: A PATH TO CARBON NEUTRALITY FOR OIL & GAS NATIONS

The United Nations Conference on Trade and Development (UNCTAD) plays a crucial role in promoting "Green Trade" for oil and gas producing and exploration nations. Green Trade focuses on facilitating international trade practices that support environmental sustainability. "Green trade" refers to the exchange of environmentally beneficial goods and services produced using sustainable practices and materials, which minimize environmental impact compared to traditional counterparts. This concept is gaining importance amidst urgent global environmental challenges such as climate change, biodiversity loss, and pollution. By promoting the trade of eco-friendly products and services, governments, businesses, and consumers can collectively contribute to a more sustainable and fair future.

UNCTAD, the United Nations Conference on Trade and Development, plays a crucial role in advocating for the interests of developing countries in the global economy. It supports these nations by providing analysis, facilitating consensus-building, and offering technical assistance. UNCTAD aims to help developing countries utilize trade, investment, finance, and technology to achieve inclusive and sustainable development goals.

Under UNCTAD's guidance, there is a notable shift towards promoting green industrial activities as part of developmental strategies. This shift seeks to replace fossil fuel-intensive practices with environmentally friendly alternatives. Recognizing the necessity for knowledge and innovation-driven development strategies in today's global economy, policymakers are emphasizing green industrial practices to foster economic growth while addressing environmental challenges[10]. Moreover, today's development objectives are intricately linked with the global imperative to decarbonize economic activities and combat climate change at an international level. According to the Paris Agreement[11] , aligning national projects and strategies with broader international climate action initiatives is essential. National efforts must effectively contribute to global strategies aimed at promoting low-carbon development.

At the national level, there is an urgent need to reform public policies, revitalize public institutions, and foster social contracts, cooperation, and global leadership. As highlighted in The Trade and Development Report 2019, global strategies must not only mitigate the risks associated with global warming but also address inequalities and vulnerabilities in a financialized global economy[12].

A foundational requirement for mitigating climate change is reducing absolute emissions levels, irrespective of economic growth rates. Carbon dioxide emissions, predominantly stemming from fossil fuel consumption, constitute approximately 70–75% of global carbon dioxide emissions (United States Environmental Protection Agency, 2022). Government policies play a pivotal role in promoting a transition to clean energy through direct public-sector investments and regulatory frameworks or incentives to stimulate private-sector engagement. These measures may encompass carbon pricing mechanisms, emissions caps, or agreements for clean energy deployment with subsidized financing[13].

[9] OPEC Bulletin Commentary, 2016

[10] Trade and Development Report, 2021

[11] Trade and Development Report, 2019

[12] Trade and Development Report, 2021

[13] Sarangi, 2018

In contemporary trade policy, the concept of "Green trade" has assumed paramount importance, particularly in the energy and related sectors, which are significant contributors to environmental challenges such as oil spills, climate change impacts, and potential nuclear incidents. Presently, both exporting and importing countries employ environmental measures regulated through the WTO dispute settlement mechanism to uphold their respective rights (UNCTAD, 2000). The GATT and WTO have addressed notable environmental disputes, particularly in Petroleum and Energy Policies (2000). The United Kingdom, the United States, and Canada, along with their participation in the European Union's flagship policy of integrating trade and climate action, exemplify their commitment to sustainability through initiatives like the Green Deal (European Commission, 2021).

2.3. UNITED NATION FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

Petroleum-exporting nations confront numerous unforeseen environmental and trade challenges. To address and mitigate these challenges, they adhere to environmental measures outlined by the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC, effective since March 1994 and ratified by over 190 countries by September 1999, aims to establish a synergistic relationship between trade and environmental objectives.

Central to the UNFCCC are principles, obligations, and frameworks aimed at stabilizing and reducing emissions of concentrated greenhouse gases emitted primarily by export industries, widely acknowledged as the main drivers of climate change. The convention advocates emissions reduction at levels that safeguard human sustainability against the impacts of climate change. Member states of the Organization for Economic Cooperation and Development (OECD) and countries in Central and Eastern Europe, known as Annex, I Countries, have implemented significant measures and policies to meet specific emission reduction targets set by their domestic regulations.

The UNFCCC serves as a critical framework for reconciling trade and environmental concerns, particularly within energy sectors that significantly impact climate health through their activities. It fosters international cooperation on climate change issues and encourages countries, including those in the exploration and production (E&P) industry, to transition towards low-carbon energy sources and technologies while reducing reliance on fossil fuels.

In addition, negotiations within the UNFCCC involve delegates from member countries who assemble to deliberate and devise policies and strategies aimed at reducing greenhouse gas emissions, adapting to the impacts of climate change, and providing financial and technical assistance to developing nations. A pivotal negotiating body within the UNFCCC is the Conference of the Parties (COP), which convenes annually to assess progress and formulate new strategies for addressing climate challenges. The most recent COP convened in Glasgow, Scotland, in 2021. Therefore, effective implementation of the UNFCCC hinges on cooperation, collaboration, and a willingness among all parties to navigate challenging negotiations and trade-offs in pursuit of shared objectives.

The UNFCCC holds significant implications for the exploration and production (E&P) industry. It mandates the industry to take decisive action to reduce its greenhouse gas emissions and transition towards adopting low-carbon energy sources and technologies.

2.4. KEY ASPECTS OF “CLIMATE CHANGE” IN KYOTO PROTOCOL

The Kyoto Protocol, adopted in Kyoto, japan in 1997 with the consent of the Parties to the Climate Change Convention, introduced pioneering measures in emissions trading and unified accounting sectors[14]. As a legally binding instrument, it stands out as one of the earliest multilateral agreements mandating principles for substantial reductions in carbon emissions. Alongside various mechanisms aimed at achieving emission reduction targets across industries, the protocol also fosters equitable relations between developed and developing countries in emissions trading.

Despite initial delays in implementation, several OECD nations have taken proactive steps, including the introduction of carbon and energy taxes, to independently curb carbon emissions. Annex B countries, as designated under the Kyoto Protocol, are obligated to significantly reduce their carbon emissions and other harmful greenhouse gases (GHGs). Consequently, the fossil fuels market is poised for a transformative shift toward a new equilibrium, given that carbon dioxide emissions are primarily linked to the combustion of fossil fuels.

[14] Aylor et al., 2020

The Paris Agreement introduces a suite of innovative climate change measures aimed at steering society and the energy sector towards effectively mitigating climate impacts. Additionally, the Lima to Paris Action Agenda has catalyzed numerous commitments and initiatives, underscoring substantial efforts to combat climate change in line with the Sustainable Development Agenda (Lima-Paris Action Agenda Primer, 2015).

Embedded within the Agreement are mechanisms designed to curb emissions from deforestation and forest degradation, particularly associated with extractive industries such as logging and mining. Furthermore, it establishes an emissions trading system that facilitates the buying and selling of emission credits between countries. This framework incentivizes extractive industries to adopt emission reduction strategies and invest in cleaner technologies.

The Kyoto Protocol represents a pivotal advancement in addressing climate change and reducing emissions from extractive industries. However, criticisms have surfaced regarding its perceived inadequacies in fully addressing the global climate crisis.

2.5. THE INVOLVEMENT OF THE ORGANIZATION OF PETROLEUM EXPORTING COUNTRIES (OPEC) IN THE EXTRACTIVE INDUSTRIES

OPEC, formed in 1960 by Iran, Iraq, Kuwait, Saudi Arabia, and Venezuela, wields significant influence in the global oil market due to its member countries' substantial production capacities. A notable initiative, the OPEC Special Fund[15], established in 1976, extends financial aid, contributions, loans, and grants to international agencies to support developing countries.

While OPEC member nations maintain subsidies for domestic fossil fuels, they contrast with industrialized nations moving towards phasing out such subsidies. This policy supports their oil and gas industries but has drawn criticism for its environmental implications, particularly concerning climate change. Critics argue OPEC has been slow to adopt sustainable practices in the energy sector.

Despite these criticisms, OPEC has initiated efforts to promote clean technologies and renewable energy sources. These include backing research and development for carbon dioxide separation and disposal, enhancing the efficiency of hydrocarbon production, and diversifying energy exports.

OPEC's overarching objectives prioritize economic and political stability while navigating global expectations to reduce greenhouse gas emissions. This strategic approach underscores their adaptation to evolving international energy dynamics.

2.6. THE NORTH AMERICAN FREE TRADE AGREEMENT (NAFTA): A BALANCING ACT FOR OIL EXPORTERS

The primary objective of NAFTA was to enhance and facilitate foreign trade among Mexico, Canada, and the United States, significantly impacting petroleum exporting countries. This agreement holds particular relevance for countries like Mexico, a major petroleum exporter to the United States, and Canada, a significant supplier to the same market. NAFTA incorporates provisions that address trade relations in conjunction with environmental considerations, marking an important development in its institutional framework. A distinct Agreement on Environmental Cooperation underscores the treaty's commitment to balancing economic interests with environmental impacts.

While NAFTA's environmental provisions lack specific directives targeting sectors such as oil and gas, the agreement prioritizes maintaining equilibrium between trade activities and environmental concerns. This balance assumes critical importance given the potential implications for climate change stemming from petroleum trade. The treaty emphasizes the need for careful management of the trade-environment relationship to mitigate both direct and indirect environmental consequences associated with petroleum trading[16].

Emerging concerns surrounding climate change have underscored the necessity for states involved in petroleum exports to adopt measures that ensure the responsible treatment of trade-environment interactions. This includes mechanisms within NAFTA aimed at addressing disputes related to climate change impacts, reflecting the evolving priorities and challenges facing petroleum exporting nations. Thus, NAFTA stands as a framework striving to harmonize

[15] Shihata, 1980
[16] United Nations Conference on Trade and Development, 2000

trade dynamics with environmental sustainability, particularly in light of the significant implications posed by the petroleum sector on global environmental stability.

3. CONTRACTUAL RIGHTS OF EXPLORATION AND PRODUCTION INDUSTRY UNDER THE PRODUCTION SHARING AGREEMENTS

Production Sharing Agreements (PSAs) are the dominant contractual framework for governments and oil & gas companies in exploring and producing hydrocarbons. These agreements define the rights and obligations of both parties. Some of the key contractual rights for Exploration and Production (E&P) companies under PSAs are

1) Exploration Rights

- **Exclusive Right to Explore:** The PSA grants the E&P company the exclusive right to explore for hydrocarbons within a defined geographic area for a specified period. This right can be subject to fulfilling certain work commitments (e.g., seismic surveys, exploratory drilling).
- **Data Acquisition and Ownership:** The E&P company has the right to acquire and own all data generated during exploration activities. This data is crucial for assessing resource potential and planning future phases of the project.
- **Relinquishment Obligations:** PSAs often require the E&P company to relinquish certain portions of the exploration area if no commercial discovery is made by a specific time. This allows the government to potentially offer those areas to other companies.

2) Development and Production Rights

- **Right of First Refusal:** If a commercially viable hydrocarbon reservoir is discovered, the E&P company typically has the right of first refusal to develop and produce the resource. This gives them an advantage in negotiating the terms for the development phase.
- **Development and Production Plan (D&P Plan):** The E&P company has the right to submit a D&P Plan outlining the technical and commercial strategies for developing and producing the discovered resources. This plan requires government approval before proceeding.
- **Operation and Management:** PSAs often grant the E&P company the right to operate and manage the production activities, with government oversight. This allows them to leverage their technical expertise and experience.

3) Economic Rights

- **Cost Recovery:** The E&P company is entitled to recover all exploration and development costs incurred before any profit sharing with the government begins.
- **Profit Sharing:** After cost recovery, the remaining production is split between the government and the E&P company according to a pre-defined formula. This formula typically involves a "government take" which can be a combination of royalties, production sharing percentages, or other mechanisms.
- **Marketing Rights:** Some PSAs may grant the E&P company marketing rights for a portion of the produced oil and gas. This allows them to participate in the sale and capture some of the market value.

4) Additional Considerations

- **Term of the Agreement:** The duration of the PSA covers the entire exploration, development, and production phases, typically spanning decades.
- **Termination Rights:** Both the government and the E&P company may have the right to terminate the agreement under certain circumstances, such as breaches of contract, force majeure events, or commercial unviability.
- **Dispute Resolution:** PSAs usually include a mechanism for resolving disputes that may arise between the parties through negotiation, arbitration, or other means.

4. BATTLING CLIMATE CHANGE: PRACTICAL ACTION IN THE ENERGY SECTOR

The energy sector is taking concrete steps to combat climate change and minimize its carbon footprint across the entire value chain. This fight is being spearheaded by international and national oil companies. Their policies now prioritize monitoring and reducing carbon emissions, methane leaks, and the development of carbon capture and storage projects (CCS)[17].

However, the fight isn't limited to just oil companies. Initiatives like The Clean Energy Ministerial and Mission Innovation are bringing together public and private organizations, including the oil and gas industry. These initiatives promote a wide range of sustainability themes, including gender diversity in the energy sector, which can contribute to increased efficiency and cleaner hydrocarbon extraction (The Clean Energy Ministerial, 2019).

The World Bank is also playing a part through its Greenhouse Gas Flaring Reduction Partnership. This initiative tackles the issue of gas flaring, a process that wastes resources and creates environmental problems. The partnership helps countries develop specific programs to reduce gas flaring.

These practical actions demonstrate the energy sector's commitment to a more sustainable future. By working collaboratively, governments, companies, and international organizations are paving the way for a cleaner and more efficient energy landscape.

The oil and gas industry is facing a future shaped by two key demands: reducing its carbon footprint and meeting stricter regulations. Carbon capture, utilization, and storage (CCUS) technologies are emerging as crucial tools for decarbonization, allowing the industry to play a role in a sustainable future. The industry recognizes the need for collaboration to achieve sustainability goals. In 2018, key industry organizations like the Society of Petroleum Engineers (SPE) and the International Association of Oil and Gas Producers (IOGP) joined forces to promote social responsibility and develop innovative technologies for public benefit[18]. OPEC member countries are encouraging economic diversification strategies within their nations. This not only strengthens economies but also drives faster adoption of sustainability measures across the oil and gas industry (World Future Energy Submit, 2021).

Freshwater usage is a significant concern in oil and gas production, particularly for processes like fracking. The industry currently recycles a large portion of this water (80-95%). However, there's a growing focus on reducing freshwater use altogether. This is being achieved through improved recycling techniques and exploring alternative water sources for operations.On the other hand the digital revolution is transforming the oil and gas industry. Advanced analytics, automation, reserve replacement strategies, and even artificial intelligence programs are being employed to identify and eliminate operational inefficiencies. This digitalization wave has led to the rise of the "digital oilfield." By leveraging cloud computing and big data, real-time monitoring and analysis of operational data allows for safer and more sustainable decision-making.

Despite the prevalence of Traditional Oil Concession Agreements outlining legal and commercial relationships between oil-producing nations and foreign companies, environmental concerns haven't received adequate attention. This is troubling because oil exploration inherently carries environmental risks, throughout all stages from exploration to extraction. This neglect by governments, exploiting companies, and even industry commentators, the UNCTC (1983) further emphasizes the lack of extensive documentation and global awareness surrounding these issues[19].

Examining traditional concession agreements reveals a concerning silence on environmental aspects. Countries like Thailand, Indonesia, and Brazil have historically shown little regard for the social and ecological impacts of oil extraction through their concession contracts. China, however, stands out as a nation that incorporated substantial environmental protection provisions within its legislation and hybrid contract system (China National Offshore Oil Corporation, 1983).

The mid-1980s witnessed a shift in focus from simply environmental protection to the sustainable use of all environmental resources, including oil and gas. By the 1990s, the concept of sustainable development gained widespread support globally, but the oil and gas industry, at both national and international levels, failed to embrace this principle. This lack of attention is further evidenced by the limited environmental provisions found in many representative oil and

[17] Cahill & Swanson, 2023

[18] Eberspaecher, 2017

[19] Boulos (1990)

gas contracts. A UNDP- sponsored report on environmental law reform in the Seychelles[20] concluded that the country's model petroleum agreement offered minimal contractual protection for the environment.

5. THE INTERNATIONAL RESPONSE TO OIL SPILLS: BALANCING COMPENSATION AND ENVIRONMENTAL PROTECTION

The International Convention on Civil Liability for Oil Pollution Damage (CLC), established in 1969, represents a cornerstone of the international response to oil spills. The CLC defines "pollution damage" as the financial losses incurred due to property damage and economic losses resulting from oil spills. This includes the costs of cleaning up spilled oil, preventative measures taken to minimize the damage, and reasonable efforts to restore the environment (reinstatement). However, the CLC doesn't compensate for the long-term environmental damage itself beyond the cost of cleanup. Additionally, the definition of compensable damages is open to interpretation, leaving some gray areas for courts to address.

The 1969 International Convention on Civil Liability for Oil Pollution Damage (CLC) established a framework for compensating victims of oil spills caused by ships. However, there was a concern that the set limits on liability might not be enough to cover the full extent of damages in some cases. To address this, the 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (1971 Fund) was created. This "Fund" acts as an additional layer of financial support, kicking in when the costs of an oil spill exceed the limits set by the CLC.

The amended versions of both the CLC and the Fund Convention essentially built upon the existing framework for ship-source oil spills. The key difference was the significant increase in compensation limits available. This transformed the system into a two-pronged approach, with both the CLC and the Fund working together under the auspices of the International Maritime Organization (IMO) to provide compensation for oil pollution damages caused by tanker spills, particularly those involving persistent oils[21].

6. THE TIGHTROPE WALK: BALANCING DEVELOPMENT AND ENVIRONMENTAL SUSTAINABILITY

The environment and sustainable development are intricately linked. Sustainability requires collaboration between stakeholders, including local partners, strong change management capabilities, communication and training programs, and effective monitoring using sustainability indicators. This shift from environmental protection to sustainable development necessitates a transition from environmental engineering to development engineering. Integrating sustainability practices strengthens a company's position in a competitive market by contributing to a more environmentally protected and sustainable world.

According to Richard Kozul-Wright, director of UNCTAD's globalization and development strategies division, climate change adaptation and development are inseparable. Effective solutions must acknowledge this connection[22]. He proposes structural economic transformation and reduced dependence on climate-sensitive activities in developing countries as a key strategy for building resilience.

Countries around the world recognize the need to stabilize the climate and advance the Sustainable Development Goals (SDGs). This translates into promoting trade and investment practices aligned with the Paris Agreement and the principle of "common but differentiated responsibilities" (acknowledging the varying roles developed and developing nations play in climate change). However, developing countries, with minimal responsibility for climate issues due to their lower industrial output, face disadvantages in this scenario.

The issue of trade and environment has gained renewed momentum at the World Trade Organization (WTO) since 2020. A group of 23 members, including the European Union, initiated "trade and environmental sustainability structured discussions" (WTO Member Assess MC12 Options for Trade, Environmental Sustainability work, 2012).

Acknowledging the complex relationship between economic growth and environmental sustainability, it emphasizes the need for optimal use of natural resources in a way that safeguards the environment. This requires

[20] Gao, 1994
[21] IMO, 1967
[22] UNCTAD, 2021

balancing protection and development across all sectors, considering the varying needs and concerns of countries at different economic stages. In simpler terms, the agreement calls for responsible economic expansion that prioritizes both environmental well-being and the ability to meet the needs of developing nation[23]. Examples exist of companies taking environmental responsibility seriously. The Abu Dhabi Oil Operating Companies' environmental management plan initiated in 1992 is a case study in identifying and reducing pollution from exploration and production activities[24] .

7. CONCLUSION: BRIDGING THE DIVIDE: TOWARDS A SUSTAINABLE FUTURE

This discussion underscores the paradigm shift in our understanding of the environment and development. They are no longer seen as competing forces, but rather as interdependent. International agreements recognize the environment as a valuable, finite resource requiring protection for present and future generations. Environmental protection is not just a cost, but an investment in a sustainable future that fuels economic growth.

From a corporate perspective, companies that disregard the social and environmental impacts of their operations risk failure. Developing nations, particularly vulnerable to climate change, need to approach adaptation from a development angle. This includes large-scale investments in renewable energy, green technologies, and sustainable agricultural practices that benefit small producers, promote environmental protection, and enhance food security.

The Precautionary Principle, demanding proactive measures to safeguard biodiversity and manage resources, is gaining traction as a key principle for environmental policy and development[25]. Implementing this principle in oil and gas regulations, strengthens environmental protection in resource-extracting countries[26].

Sustainable practices for oil and gas companies also extend to social responsibility. Building strong relationships with local communities and transparently reporting on these efforts in annual reports[27] is crucial . Developing countries should require their oil companies to implement environmental management plans and ensure public access to information regarding resource wealth and beneficiaries[28]. Accountability of governments and companies is essential.

The ultimate goal is a cleaner future that doesn't compromise economic growth or responsible use of public lands. A just transition towards renewable energy sources like solar and wind is necessary to meet energy demands while preserving the environment and communities. Only through a system that balances these needs can energy development be truly sustainable, both environmentally and economically.

7.1. DECLARATION OF CONFLICTS OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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CONFLICT OF INTERESTS

None.

[23] The Marrakesh Agreement (1994)
[24] Drapier et al., 2000
[25] Cooney, 2004
[26] Nliam (2014)
[27] IPIECA UNFCC, 2017
[28] Adeleke, 2017

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