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Discussion Paper

Assessing ESG Impact in the Oil and Gas Industry

A Multi-Criteria Approach

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About KAPSARC

KAPSARC is an advisory think tank within global energy economics and sustainability providing advisory services to entities and authorities in the Saudi energy sector to advance Saudi Arabia's energy sector and inform global policies through evidence-based advice and applied research.

This publication is also available in Arabic.

Legal Notice

List of Abbreviations

API	American Petroleum Institute
CABs	Climate awareness bonds
CCE	Circular carbon economy
CCUS	Carbon capture, utilization, and storage
CDP	Carbon Disclosure Project
CDSB	Climate Disclosure Standards Board
CIS	Credit Impact Score
CSRD	Corporate sustainability reporting directive
DAC	Direct air capture
EDGAR	Emissions Database for Global Atmospheric Research
EIB	European Investment Bank
EPA	Environmental Protection Agency
ERM	SustainAbility Institute by Environmental Resources Management
ESG	Environmental, social, and governance
ESRS	European Sustainability Reporting Standards
GRI	Global Reporting Initiative
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IOCs	International oil companies
IOGP	International Association of Oil & Gas Producers
IPIECA	International Petroleum Industry Environmental Conservation Association
IPS	Issuer Profile Score
ISSB	International Sustainability Standards Board
JVs	Joint ventures
KSA	Kingdom of Saudi Arabia
LSEG	London Stock Exchange Group
NGFS	Network for Greening the Financial System
NOCs	National oil companies
NZDPU	Net-zero data public utility
O&G	Oil and gas
OSHA	Occupational Safety and Health Administration
SASB	Sustainability Accounting Standards Board
SBTi	Science-Based Targets initiative
SDGs	Sustainable development goals
SEC	Securities and Exchange Commission
SFDR	Sustainable Finance Disclosure Regulation
SLO	Social license to operate
SMEs	Small and medium-sized enterprises
TCFD	Task Force on Climate-related Financial Disclosures
UNEP	United Nations Environment Programme
WACC	Weighted average cost of capital
WBCSD	World Business Council for Sustainable Development
WEC	World Energy Council
WRI	World Resources Institute

1. Introduction: ESG and the Oil and Gas Industry

Environmental, social and governance (ESG) considerations have long been pivotal in the oil and gas (O&G) industry. Only relatively recently has the term ESG been given mainstream attention in the context of climate policy. As drilling for hydrocarbons often impacted communities, the so-called "social license to operate" (SLO) has been a long-standing guiding pillar in the industry. Oil and gas companies are operating in many countries, some of which feature less developed regulatory systems guarding against corruption or other systemic challenges. Governance has therefore been another long-standing focus for the industry. Despite the perception that environmental concerns are disproportionally represented in the industry's current ESG reporting, the S and G components have long been integral to oil and gas companies' strategies. Environmental reporting presents a current challenge within a fast-evolving climate change mitigation landscape. Investors and lenders are increasingly focused on how oil and gas companies manage both physical and transition risks related to climate change, making the industry's most critical ESG issue the "energy trilemma."[1]

As the industry navigates a transition to more sustainable practices, ESG principles serve as a framework for aligning business operations with the broader expectations of society and the investment community. The ramifications of ESG principles are far reaching, influencing not only oil and gas companies but also the entire ecosystem of associated entities, including financial institutions, insurance companies, and investors. The industry has witnessed a paradigm shift where ESG compliance has become a business necessity, not just a moral imperative. The withdrawal of financial and insurance services from projects not aligned with ESG criteria exemplifies the growing influence of ESG principles on corporate strategies and the capital allocation decisions of financial institutions.

Given the complexity of the O&G industry, capturing relevant disclosures and the many data points across the value chain takes an enormous effort. Disclosure differs across the industry value chain as well as the supply chain. To increase investor confidence in these risk assessment metrics, especially at a time when institutional investors are reconsidering investing in fossil fuel assets due to climate change

concerns, third-party firms have emerged that provide ESG ratings and rankings. These firms are subject to highly individualized and commercialized methodologies.

This discussion paper reviews current developments in the ESG reporting and ratings landscape, both for general application and specific to the oil and gas industry. It seeks to identify and assess the most relevant risks related to widely adopted and increasingly integrated frameworks. Risks are assessed for their impact and probability using a multi-criteria-analysis methodology, and recommendations are derived for policymakers and industry participants to take advantage of ESG opportunities.

In this context, the paper uses the Kingdom of Saudi Arabia (KSA) as a particularly poignant case study. As the second biggest oil producer globally, it is currently implementing a rapid and vast economic diversification. The Kingdom offers particularly relevant insights for the oil and gas industry, not only as a major producer but also at a time when corporate ESG reporting guidance is being drafted and anticipated at the highest national level, paving the way for localization, international integration, and potential ESG financing opportunities.

2. ESG Disclosures and Ratings

2.1 Main Disclosure Frameworks in the Oil and Gas Industry

The development of international ESG frameworks has evolved over the past decades to address increasing global concerns about sustainability, climate change, and corporate responsibility. High-quality reporting enhances business value, clarifies purpose, improves operations, strengthens stakeholder relationships, boosts credibility, and facilitates better access to capital. Among the key reporting frameworks are the Global Reporting Initiative (GRI), the Carbon Disclosure Project (CDP), the Climate Disclosure Standards Board (CDSB), and the Task Force on Climate-related Financial Disclosures (TCFD).

These frameworks differ in scope and focus: the GRI covers a wide range of ESG factors, while the CDP, CDSB, and TCFD are more climate-focused, each emphasizing different aspects of environmental and financial risk. The International Sustainability Standards Board (ISSB) was initiated in 2021 by the International Financial Reporting Standards (IFRS) Foundation to address this diversity of standards. It aims to create a global baseline for sustainability reporting, integrating and consolidating existing ESG frameworks to provide consistent, comparable, and transparent sustainability disclosures globally.

In the O&G industry, several ESG frameworks dominate due to their relevance in managing complex risks and alignment with stakeholder expectations. The Global Reporting Initiative (GRI) is widely used, as it offers sector-specific standards for environmental and social disclosures. The Sustainability Accounting Standards Board (SASB) is also prevalent, focusing on financially material ESG factors relevant to investors. The Task Force on Climate-Related Financial Disclosures (TCFD) has gained traction due to the increasing pressure for climate risk reporting and scenario analysis.

Moreover, the United Nations' Sustainable Development Goals (SDGs) guide companies in aligning their operations with broader societal objectives, while the CDP (formerly the Carbon Disclosure Project) provides essential reporting of carbon emissions and climate strategies. The International Petroleum Industry Environmental Conservation Association (IPIECA) further references the UN Global Compact and the UN Guiding Principles on Business and Human Rights, as they are widely used in the industry (IPIECA, API, and IOGP 2020). The IPIECA, in cooperation with the American Petroleum Institute (API) and the International Association of Oil & Gas Producers (IOGP), have authored an ESG reporting framework, discussing materiality issues and reporting requirements specific to the industry (IPIECA, API, and IOGP 2020). The adoption of any or all of these frameworks is driven by regulatory realities, investor demand, and the need for transparency in environmental stewardship, governance,

and community engagement, as the industry faces mounting expectations to balance energy production with sustainable practices.

In Saudi Arabia, Aramco has been using a variety of frameworks to report on ESG issues, which have evolved since its partial stock market listing in 2019. In 2021, the company followed IPIECA guidelines for ESG disclosures, GRI guidelines for developing and reporting a materiality matrix, World Business Council for Sustainable Development (WBCSD) and World Resources Institute's (WRI) Greenhouse Gas Protocols for measuring and reporting on carbon emissions, and Occupational Safety and Health Administration (OSHA) standards and the API's recommended practices for developing and reporting health and safety performance metrics (Saudi Aramco 2021). In 2023, Aramco referenced the energy-trilemma framework developed by the World Energy Council (WEC) in its Sustainability Report and Scenario Analysis, the UN SDGs and the Greenhouse Gas Protocol, and a number of more specific biodiversity frameworks (Saudi Aramco 2023a). In addition, the company is listed on the Saudi Stock Exchange, Tadawul, which introduced its own ESG disclosure guidance for listed companies in 2018 (Saudi Exchange 2018). Adding to the complexity, national corporate ESG guidelines are currently under development (Belahmidi et al. 2024), which will also impact Aramco.

2.2 Critical ESG Topics for Oil and Gas

Figure 1 highlights the most critical ESG topics in the oil and gas industry, underlining the overlap between the E, S, and G categories. The most important environmental topics for the O&G industry include managing emissions such as greenhouse gases and methane, improving energy efficiency, and transitioning to low-carbon technologies. Water usage, discharge, biodiversity protection, responsible materials management, monitoring air emissions, preventing spills, and planning for decommissioning activities are also critical topics. On the social side, ensuring workforce health, safety, and engagement is essential, with a focus on injury prevention and transport safety. Human rights, due diligence, security risk management, and fostering workforce diversity and inclusion are equally important. Companies must also address community impacts through effective engagement, grievance mechanisms, and supporting local procurement and hiring practices. Governance also plays a key role, with strong frameworks required to prevent corruption, promote transparency, and ensure ethical management. Public advocacy and lobbying activities must align with global governance standards to meet stakeholder expectations and enhance trust.

Figure 1. ESG topics in the oil and gas industry.

Source: IPIECA, API, and IOGP (2020).

ESG topics vary across segments of the oil and gas value chain due to their distinct environmental and operational impacts. Boundaries between upstream and downstream activities need to be clearly defined as they often have completely different value chains and processes. Key concerns in upstream activities (exploration and production) include methane emissions, water management, biodiversity, and community engagement. Midstream activities (transportation and storage) focus on pipeline safety, spill prevention, and energy efficiency. Downstream activities (refining and distribution) emphasize air emissions, product stewardship, and worker safety. Governance issues such as transparency and anti-corruption are relevant throughout the value chain. They gain prominence at the corporate level where operations interact with governments and communities. Each segment requires tailored ESG strategies to address its specific risks and stakeholder expectations. These strategies should also cover ESG-related risks and opportunities in joint venture (JV) operations, where material, as partnerships in the O&G industry are commonplace to mitigate high geological, financial, and political risks.

ESG topics further vary across business models and levels of corporate integration. Private and hybrid oil companies have shown themselves to be more successful in implementing ESG topics, as their business models provide more flexibility in implementing business programs, and because international oil companies (IOCs) are more susceptible to public (and investor) pressure (Arboleda and Belahmidi 2024). National oil companies (NOCs) operate under different priorities and rigid structures that do not allow them to nimbly pivot into activities other than those initially mandated for them by their respective governments. Given this public role, the S component plays a much bigger role than the E and G dimensions in local hydrocarbon industries. Saudi Aramco, in its “Sustainability Report 2023” (Saudi Aramco 2023b), highlights national content, community and society, as well as economic contribution, as ESG topics of specific interest to the company.

2.3 Ratings Agencies and Methodologies

ESG ratings and rankings have become essential benchmarks for evaluating corporate sustainability, particularly in high-impact industries like oil and gas (Balabat et al. 2012). These ratings, offered by agencies such as MSCI, the CDP, Moody’s, Sustainalytics, and S&P Global, assess companies’ environmental impacts, social practices, and governance structures. However, their methodologies differ significantly. Some agencies prioritize climate-related risks, while others focus on governance transparency or social responsibility. This variance in approach creates inconsistencies, leading companies to receive disparate scores across different providers.

ESG ratings directly influence oil and gas firms’ reputations, stakeholder relationships, and – most crucially – their cost of capital[2] (Chowdury et al. 2018; Yoon, Lee, and Byun 2018). Investors are increasingly channeling capital toward sustainable ventures, and financial institutions now incorporate ESG metrics into their risk assessments. Companies with low ESG scores face higher borrowing costs as lenders and bondholders demand risk premiums. Conversely, strong ESG performers may be able to raise capital through green bonds or attract lower interest rates. Additionally, firms with poor ESG rankings risk exclusion from sustainability-linked investment funds, reducing the size of their capital pool. For oil and gas companies particularly – often under scrutiny for emissions and environmental risks – achieving favorable ESG scores is essential for mitigating financial risk and maintaining competitiveness in a rapidly decarbonizing world. Ultimately, ESG ratings now play a pivotal role in shaping capital flows within the sector. Efforts to quantify the impact of ESG ratings on the cost of capital have produced diverse results, but they suggest that the current effect is relatively modest. A quantified example is provided in Table 10 in Section 5, discussing prioritized risk.

3. Trends and Developments

3.1 More Stringent Disclosure Requirements

While ESG disclosure has been widely adopted on a voluntary basis to meet investor demand, regulations mandating reporting are becoming increasingly stringent across jurisdictions in a push for greater transparency and accountability in corporate sustainability practices. Both the European Sustainability Reporting Standards (ESRS) and the United States (U.S.) Securities and Exchange Commission (SEC) climate disclosure rules – leading frameworks for legally mandated reporting – represent phased approaches to comprehensive sustainability disclosures, targeting different types of companies in their implementation timelines.

The European Union (EU) has significantly tightened its disclosure requirements. The ESRS, under the European Union's Corporate Sustainability Reporting Directive (CSRD), began this year (EFRAG 2023). Its first phase includes large public-interest entities with more than 500 employees, which were already subject to the previous Non-Financial Reporting Directive (NFRD). By 2025, its scope will expand to include large companies (with more than 250 employees and a net turnover exceeding €40 million) that were not previously covered. In 2026, listed small and medium-sized enterprises (SMEs), as well as other non-EU companies with significant activities in Europe (generating at least €150 million in turnover in the EU), will also be required to report.

The ESRS sets comprehensive sustainability standards, including ESG factors. Large companies and listed small and medium enterprises (SMEs) are required to report on sustainability issues in line with the EU taxonomy for sustainable activities.[3] This ensures that disclosures are standardized and comprehensive across member states. The Sustainable Finance Disclosure Regulation (SFDR), which applies to financial institutions, further complements and reinforces the EU taxonomy by mandating clear reporting on ESG-related risks and impacts.

The SEC's climate disclosure rules in the U.S. follow a similar approach, initially targeting large, publicly listed companies. They require companies to report on direct (Scope 1) and indirect (Scope 2) greenhouse gas emissions in absolute and intensity terms (SEC 2024), aligning with TCFD guidance. Larger firms will need to comply first, followed by smaller companies in subsequent years, making these disclosures progressively more rigorous. Industry pushback has prevented Scope 3 emissions from being included in the final version of the rules and has thereby curtailed the scope of the SEC climate disclosure rules for the time being. The SEC adopted the disclosure rules in March 2024, only for a federal appellate court to impose a temporary stay pending a judicial review.

Meanwhile, in Asia, countries like Japan and China are advancing their ESG disclosure frameworks, with Japan's

Corporate Governance Code encouraging greater transparency and China's Environmental Information Disclosure Law pushing companies to report their environmental data. The United Kingdom has introduced mandatory climate-related financial disclosures in line with the TCFD recommendations for large companies and financial institutions. In 2023, New Zealand became the first country to mandate climate-related disclosures for financial institutions and large publicly listed companies.

Increasingly stringent and mandatory ESG reporting rules require corporations to invest in data collection, reporting systems, and compliance infrastructure. Technologies to track and manage data can help to ensure the information collected from these sources is up to standard. This can increase companies' operational costs but also enhance their transparency, improve stakeholder trust, and potentially provide access to sustainable financing. Non-compliance risks include reputational damage, legal penalties, and restricted market access.

Incoming standards, especially the ESRS and ISSB, aim to have further reach than earlier frameworks. The ESRS will be applicable to non-EU companies doing significant[4] business in the EU from 2030 onward. As large international companies, Saudi Aramco and SABIC will be impacted by this. This EU directive mandates that companies must adhere to the same reporting boundaries for sustainability as in their financial statements. Therefore, a parent company is obliged to include all its subsidiaries in its sustainability reporting, consistent with its financial reporting. Beyond Europe, about 20[5] jurisdictions have already decided to use or are taking steps to introduce ISSB standards in their legal or regulatory frameworks.

3.2 Focus on Framework Consolidation: Materiality and Interoperability

Materiality, a core concept in ESG reporting, refers to the identification of issues that are most relevant or 'material' to stakeholders. Its interpretation is a point of divergence in emerging sustainability standards. The two primary approaches are single materiality, which focuses on financial impacts relevant to investors, and double materiality, which includes both financial impacts and the broader societal and environmental effects of corporate actions. The lack of standardization between these approaches has the potential to create significant complications in global interoperability.

The ISSB launched its standards in 2024 and is spearheading efforts to establish a single global standard for sustainability disclosures based on single materiality. It focuses on the financial implications of sustainability issues, aligning closely with investors' needs. The standards were developed under the oversight of the IFRS Foundation,[6] positioning them as likely candidates for broad adoption, especially in markets with an investor-centric focus, such as the U.S. and Asia. The ISSB will work with jurisdictions and companies to support the adoption of the standards, and the Transition Implementation Group will support companies applying the standards. Capacity building initiatives will also be launched to support their effective implementation. The ISSB aims to provide a consolidated global baseline for sustainability disclosures, with many countries endorsing its standards for mandatory reporting.

However, the distinct philosophical differences between single and double materiality pose challenges to creating a unified global standard. As a result, companies might face challenges in reporting to different frameworks, especially when operating across regions with varied regulatory requirements.

The challenges related to double materiality reporting include the increased complexity and scope of disclosures, as companies must assess not only how sustainability issues affect their financial performance but also their broader societal and environmental impacts. This requires significant resources, data collection, and cross-functional collaboration, raising costs for companies. Moreover, measuring and quantifying societal impacts is inherently more difficult than assessing financial risks.

Despite these challenges, double materiality has a strong chance of effectively becoming the leading standard, especially in regions like the EU where regulators and stakeholders demand greater corporate accountability. The EU's influence on global trade and finance could pressure multinational companies to align with double materiality standards to access European markets.

However, the adoption of single materiality by key markets such as the U.S. may hinder double materiality's global dominance. This suggests that a dual-track approach may persist for the foreseeable future, with companies needing to comply with different standards depending on their jurisdiction.

Interoperability is particularly crucial for oil and gas companies, which often operate across jurisdictional borders. Interoperability guidelines between the ISSB and the ESRS are currently under development, with final publication anticipated soon. These guidelines were developed by the ISSB and focus on aligning reporting requirements between the ISSB and the GRI, which includes the GRI's requirement for corporations to report double materiality and Scope 3 emissions. In light of new emerging standards from the ESRS, ISSB, and SEC, the GRI has been coordinating with other sustainability standards governing bodies to draft interoperability reports. Notably, two separate interoperability reports were released by the ISSB: one focusing on the ISSB-ESRS alignment and the other on the ISSB-GRI alignment. A draft copy of the interoperability guidelines between the GRI and ESRS was released in August 2023.

While these guidelines facilitate some alignment on reporting, they do not offer a comprehensive emissions assessment. Notably, while both the ISSB and GRI require the reporting of Scope 1, 2, and 3 GHG emissions, the ISSB mandates an adherence to the GHG Protocol for emissions accounting, whereas GRI only recommends an adherence. Corporations currently reporting to the GRI may incur additional reporting obligations from jurisdictions mandating the upcoming disclosure standards (i.e., the ESRS, ISSB, SEC, etc.). While the various reporting standards are cumbersome to navigate, the cost implications for companies depend on their size, with costs increasing inversely proportional to their size.

Table 1. Comparative highlights of selected disclosure standards.

Dimensions	ISSB	EU's ESRS	SEC Proposal
Scope	• Determined by jurisdictions (30+ countries, including 16 G20 countries and the IOSCO have endorsed them) • Targets information for investors	• Listed and private EU companies, and non-EU companies with significant operations in the EU • Targets information for all stakeholders	• US SEC registrants • Targets information for investors
Applicability	Voluntary	Mandatory	Mandatory
Effective Date	Effective on or after Jan 1, 2024. However, jurisdictions to decide when requirements would apply	Phased introduction	Announced, but no effective date
Materiality	Single (financial only)	Double (financial and impact materiality)	Single (financial only)
Disclosures	• Based on 77 SASB industry-specific standards	• 2 general mandatory standards • 10 ESG materiality-based standards • EU plans to include industry-specific disclosures in future • 1,100+ mandatory and material data points	• Based on recommendations by TCFD framework
GHG Emissions	Scope 1, 2, and 3	Scope 1, 2, and 3	Scope 1 and 2

Table 1. (continued)

Dimensions	ISSB	EU's ESRS	SEC Proposal
GHG Targets	• **Total emission reduction targets** • Absolute gross emissions with no time limit • Net emissions optional • Disclosure of intended use of carbon offsets to reach targets if utilized • **Net-zero targets** • No limits on removals toward net-zero targets	• **Total emission reduction targets** • Disclosure of gross emissions only • Net emissions not allowed • Disclosure of removals and storage from own operations and supported value chain in TCO_2e • Disclosure of removals purchased in carbon credits in TCO_2e • **Net-zero targets** • Limits neutralization through GHG removals (including CCUS, carbon credits) to 5%-10%	• **Total emission reduction targets** • Absolute gross emissions with no time limit • Disclose intended use of carbon offsets to reach targets if utilized • **Net-zero targets** • No limits on removals toward net-zero targets

Source: Adapted from Kearney (2024).

Note: IOSCO = International Organization of Securities Commissions.

In Saudi Arabia, international frameworks are considered integral in shaping local ESG reporting guidelines, with the SASB expected to receive formal endorsement from the Kingdom. Concurrently, domestic entities such as Tadawul have developed proprietary ESG reporting mechanisms, which will necessitate revisions and updates when a Saudi-specific national framework is introduced. This process enables the Kingdom to analyze and incorporate elements from various existing frameworks, each emphasizing distinct areas, to create ESG disclosure standards that are aligned with local priorities, notably with a significant emphasis on the oil and gas sector.

While the extent of data collection in Saudi Arabia has not yet reached the levels observed in other regions, the Kingdom is positioned to leverage recent technological advancements to enhance its capacity for comprehensive data capture. Such advancements are expected to facilitate a more efficient implementation process once the new guidelines are formalized. Although digitalization is prioritized as a strategic objective, an initial reliance on external reviews and third-party assurances will be critical to ensure the accuracy, quality, and relevance of the data collected.

3.3 Mandatory Scope 3 Emissions Reporting

Scope 3 reporting, which involves disclosing indirect greenhouse gas (GHG) emissions from a company's entire value chain, is increasingly becoming a focus in ESG reporting. Unlike Scope 1 (direct emissions from owned operations) and Scope 2 (indirect emissions from purchased energy), Scope 3 covers emissions from a wide array of sources, including suppliers, product use, waste disposal, and transportation. This makes Scope 3 reporting more complex than Scope 1 and 2, but

it is essential for a comprehensive understanding of a company's carbon footprint.

In some jurisdictions, Scope 3 reporting is either mandatory or in the process of becoming so. The EU's CSRD mandates Scope 3 emissions disclosure for certain companies starting in 2024. Additionally, New Zealand has also mandated climate-related disclosures, including Scope 3 emissions, for financial institutions and large companies. However, Scope 3 reporting has met significant resistance in certain regions, particularly in the U.S. The initial inclusion of Scope 3 in the SEC's climate disclosure rules has faced opposition from business groups and politicians. As of August 2024, the final ruling does not mention Scope 3 reporting requirements.

This precedent is especially noteworthy for the oil and gas industry, as Scope 3 emissions for hydrocarbon companies tend to be high, constituting about 89% of their total GHG emissions on average (FTSE Russell 2024). Over the past five years, several international oil and gas companies have started to report on their Scope 3 emissions, and it is expected that Saudi companies could follow to avoid or reduce reputational risk. A preliminary estimate of Aramco's Scope 3 emissions was found to be between 2.1 billion tons of CO_2 equivalent ($btCO_2e$) to 2.3 $btCO_2e$ (Kearney 2024). If confirmed, this could be the highest Scope 3 emissions of any company in the oil and gas industry, underlining the sensitivities surrounding Scope 3 reporting.

The main argument against mandatory Scope 3 reporting is the difficulty of measuring and verifying emissions across an extensive and often global supply chain, which is particularly the case for the oil and gas industry. Small suppliers may lack the resources or expertise to provide accurate data, and the potential for reporting errors is high. Additionally, companies fear legal liabilities if the reported data is inaccurate. From a business perspective, the challenges include the need for robust data collection systems, collaborations with supply chain partners, significant investments in technology, and the expertise to accurately assess Scope 3 emissions. This adds complexity and costs, particularly for smaller companies or those with complex, global supply chains.

For investors, Scope 3 emissions are crucial for assessing a company's full environmental impact, but the lack of standardization and reliability of data presents additional layers of risk. Inconsistent or inaccurate reporting can hinder a comparison between companies and sectors, making it difficult for investors to make informed decisions based on ESG criteria. Despite these challenges, pressure from stakeholders and regulators suggests that Scope 3 reporting is likely to become a standard component of ESG disclosures globally.

3.4 Gross Emissions and Limitations on Removals

Reporting gross GHG emissions versus net GHG emissions has significant implications for corporate transparency, accountability, and sustainability strategies. Gross GHG emissions represent the total emissions a company produces without accounting for any carbon offsets or removals. Reporting gross emissions provides a clearer picture of a company's direct environmental impact, offering stakeholders, including investors and regulators, an unfiltered assessment of a company's sustainability efforts and challenges. It encourages companies to focus on actual emission reductions rather than relying on offsets to meet environmental goals.

In contrast, net GHG emissions account for carbon removals, such as reforestation projects or carbon capture technologies. While net reporting can portray progress toward carbon neutrality, it may mask the true level of emissions a company generates. This could lead to "greenwashing," where businesses appear more sustainable than they are by offsetting emissions instead of reducing them. Thus, gross emissions reporting is often seen as more rigorous and essential for driving systemic decarbonization efforts.

The ESRS and the Science-Based Targets initiative (SBTi) both limit the proportion of carbon removals that companies can count toward their net-zero targets. This means that companies are expected to prioritize emission reductions at the source rather than relying heavily on removal technologies like carbon capture, utilization, and storage (CCUS) or direct air capture (DAC) to meet their net-zero goals.

The rationale behind these limitations is to encourage companies to focus on reducing emissions directly within their operation and value chains to achieve absolute emission reductions rather than offsetting. By restricting the use of removals, these standards aim to avoid scenarios where companies might invest in carbon

removal technologies as an easier, less transformative solution, without making meaningful changes to their core business practices that would lower overall emissions.

For removal technologies like CCUS and DAC, these restrictions present both opportunities and challenges. On the one hand, they emphasize the importance of direct emissions reduction, which could limit the market demand for these technologies in corporate net-zero strategies. On the other hand, CCUS and DAC could become essential components in addressing the residual emissions that are difficult or impossible to eliminate, particularly in hard-to-abate sectors like heavy industry, aviation, and cement production. Sector-specific limitations on removals might be a more efficient way of reaching overall climate goals sooner.

The implications are that these removal technologies will likely play a complementary rather than a central role in achieving net zero, and companies investing in them will need to carefully align with regulatory expectations. Additionally, limiting the use of removals incentivizes further innovation and investment in emission reduction methods across various industries, creating pressure for more sustainable business transformations.

Removal technologies are critical for the oil and gas industry generally, and Saudi Arabia specifically. Given its expertise in capturing emissions and redirecting them into depleted reservoirs, the oil and gas industry is in a prime position to leverage existing technology for large-scale CCUS projects. CCUS has been identified as one of the cornerstones of Saudi Arabia's Circular Carbon Economy (CCE) strategy. However, CCUS technologies are currently not reflected in ESG reporting requirements and, therefore, ratings, diminishing their emissions reduction potential and investment incentives.

4. Methodology for Identifying Risks and Opportunities

This paper uses a three-step approach in the analysis of risks and opportunities related to the previously identified trends. The first step involved the development of a framework to identify risks and opportunities related to ESG reporting and ratings.[7] This structure was adapted from the leading transition risk evaluation frameworks, for example, the Network for Greening the Financial System (NGFS) (2023), the TCFD (ClimateWise 2019), the SASB (SASB 2023), the European Investment Bank (EIB) (2021), and the International Monetary Fund (IMF) (Adrian et al. 2022). In the second step, the framework was used to identify risks and opportunities resulting from each previously discussed trend. This resulted in the identification of 20 risks and eight opportunities. The third step quantified the prioritized risks and opportunities. These were then consolidated into two prioritization matrices: one for risks and the other for opportunities. Subsequently, one risk and one opportunity with high impacts and high probabilities of materialization were identified for further assessment.

4.1 Development of Risks and Opportunities Identification Framework

A risks and opportunities identification framework[8] tailored to the oil and gas industry was formulated through an investigation of the existing frameworks of leading entities within the climate risk assessment landscape. Each entity covers specific aspects within its framework as follows:

- The TCFD provides a comprehensive framework for the classification of risks and opportunities at the corporate level.
- The NGFS has developed a methodology that classifies climate risks. It assesses both micro- and macroeconomic transmission channels to evaluate financial risk, utilizing the Basel framework used by banks for risk assessment.
- The UNEP uses a framework for managing risks to physical and financial assets, and financial portfolios, resulting from carbon risk factors.

- The SASB has created a framework for risk classification (high-level) and impact assessment at the corporate level, including the development of industry-specific risk guidelines.
- The IMF has formulated an approach for analyzing climate risks in the financial sector, building on the risk classification system of the NGFS.

Building on this foundation, a tailored framework was developed, specifically designed to meet the unique requirements and objectives of this project.

In the following tailored analytical framework, potential risks to and opportunities for the oil and gas sector are categorized across four primary areas: policy and legal, technology, market, and reputation. It includes guiding questions to identify opportunities, such as the potential for innovation, favorable shifts in demand, access to new markets, and improved community perception. Additionally, it highlights risks like adverse impacts on corporate policies, challenges in financing for non-green projects, and negative shifts in customer perception. Key impact metrics considered are ESG ratings, capital costs, CCUS impact, and economic diversification, with specific implications for industry revenues, costs, and the reputation of both the general oil and gas industry and Saudi Arabia's oil and gas sector specifically. Table 2 illustrates the framework used for screening risks and opportunities.

Table 2. Framework for assessing ESG-related risks and opportunities in the oil and gas industry.

		IMPACT CATEGORIES	Impact on O&G	Impact on KSA O&G
		MEASUREMENT METRICS (WHEREVER APPLICABLE)	Industry revenues/ costs	ESG ratings
			ESG ratings	CCUS Impact
			Capital costs	Economic diversification
			CCUS Impact	
RISK CATEGORIES	**Questions to identify opportunities**	**Questions to identify risks**		
Policy & legal	- Positive impact on corporations, national policies and litigation exposure?	- Negative impact on corporations, national policies and litigation exposure?		
Technology	- Opp. To innovate new technologies? - Increase ability to attract financing for existing and new projects?	- Disfavoring of existing (esp. non-green) technologies? - Decrease in ability to attract financing for existing and new projects?		
Market	- Favorable shift in demand/ supply? - Favorable conditions to access to additional markets?	- Unfavorable shift in demand/ supply? - Unfavorable conditions in access to existing markets?		
Reputation	- Positive shift in customer / community perception? - Opp. To be seen as good corporate citizen and leading climate change player?	- Negative shift in customer / community perception?		

Source: Adapted from Kearney (2024).

4.2 Development of Prioritization Methodology

To prioritize the risks and opportunities identified through the framework above, a methodology was developed to evaluate high-level impacts for the oil and gas industry and the probabilities of each risk and opportunity materializing. The evaluation of both dimensions was plotted on a heat map to identify high-impact and high-probability risks and opportunities and conduct in-depth analyses on each.

To expand the definition of these two dimensions, matrices were utilized to capture both qualitative and quantitative impacts resulting from the identified impact metrics. This approach allowed for a comprehensive assessment of the risks and opportunities.[9]

5. Disclosures

5.1 Disclosure Risks and Opportunities Screening

In the following section, risks and opportunities from ESG disclosure frameworks have been identified and listed. They are plotted on the ESG Assessment Framework presented in Table 2 as well as the heat map in Figure 2. The aim is to identify the risks and opportunities with the highest potential impact on the oil and gas sector.

Table 3. Consolidated disclosure risks.[10]

GRI	
1.1a	O&G[11] corporations reporting to the GRI could face additional reporting obligations from jurisdictions mandating new disclosure standards like the ESRS, ISSB, SEC, etc.
ISSB	
1.2a	Potential cost increases for O&G corporations not yet reporting Scope 3 emissions due to higher reporting burdens.
1.2b	Reputational risk to O&G corporations required to report Scope 3 emissions in comparison to their peers.
1.2c	O&G corporations might see lower demand if buyers consider GHG emissions and compare them to firms reporting Scope 3 emissions.
1.2d	O&G corporations may face market access risk in areas mandating disclosure standards as strict as or stricter than the ISSB's if they do not meet the reporting requirements.
TCFD	
	No significant risks were identified with the TCFD disclosure framework.
CDP	
	No significant risks were identified with CDP disclosures.
ESRS	
1.5a	O&G corporations reporting to the GRI could face additional reporting obligations from jurisdictions mandating new disclosure standards like the ESRS, ISSB, and SEC's, etc.
1.5b	If a 5%-10% removal limit becomes the global standard for net zero, it could set KSA corporations' net-zero strategies at risk.

Table 3. (continued)

1.5c	Potential cost increases for O&G corporations not yet reporting Scope 3 emissions due to higher reporting burdens.
1.5d	Reputational risk to O&G corporations required to report Scope 3 emissions in comparison to their peers.
1.5e	O&G corporations might see lower demand if buyers consider GHG emissions and compare them to firms reporting Scope 3 emissions.
1.5f	O&G corporations' market access to the EU could be impacted if they do not adhere to the ESRS reporting standards, potentially affecting the KSA's market position in the EU.
SEC	
1.6a	Potential risk to O&G corporations that are U.S. listed and will be subject to reporting costs.
1.6b	O&G corporations' market access to the U.S. could be impacted if they do not comply with the SEC's reporting requirements.

Table 4. Consolidated disclosure opportunities.

GRI	
	No significant opportunities were identified with GRI disclosures.
ISSB	
1.2e	Potential opportunity for corporations to reduce their cost of capital by aligning their disclosure standards with the new global baseline standard.
TCDF	
1.3a	Potential for O&G corporations to improve their ESG ratings through disclosing with TCFD standards, with the potential to improve their cost of capital.
CDP	
1.4a	Potential opportunity for O&G companies to improve their cost of capital by voluntarily disclosing through CDP, and/or responding to their questionnaire
1.4b	Potential opportunity for O&G corporations to position themselves as climate leaders by voluntarily disclosing through CDP standards with complete information, as required per the CDP's questionnaire.
ESRS	
	No significant opportunities were identified with the ESRS disclosure standards.
SEC	
	No significant opportunities were identified with the SEC's proposed disclosure requirements.

Table 5. Consolidated disclosure risks and opportunities by impact and risk category.

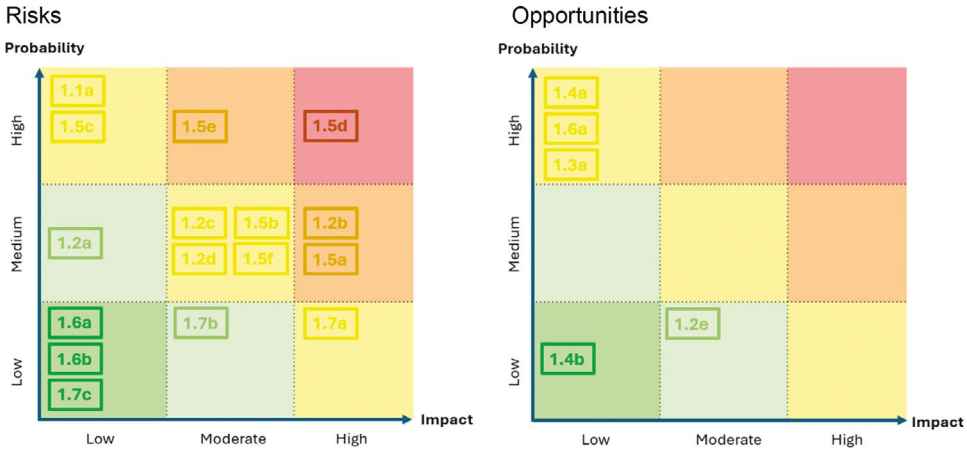
		Impact categories	Impact on corporate performance	Impact on climate ambition	
		Measurement metrics (wherever applicable)	Revenues/costs	CCUS impact	
			ESG ratings	Net-zero strategy implementation	
			Cost of capital	Economic diversification	
Risk categories	**Questions to identify opportunities**	**Questions to identify risks**			
Policy & legal	- Positive impact on corporations, national policies and litigation exposure?	- Negative impact on corporations, national policies and litigation exposure?	**1.1a 1.5c 1.2a 1.6a**		
Technology	- Opportunity to innovate new technologies? - Increase ability to attract financing for new and existing projects?	- Unfavorable conditions for existing (esp. non-green) or transition technologies? - Decrease in ability to attract financing for new and existing projects?		**1.5b**	
Market	- Favorable shift in demand/supply? - Favorable conditions to access to additional markets?	- Unfavorable shift in demand/supply? - Unfavorable conditions for accessing existing markets?	**1.2c 1.5f 1.2d 1.6b 1.5e**		
Reputation	- Positive shift in customer/community perception? - Opportunity to be seen as good corporate citizen and leading climate change player?	- Unfavorable shift in customer/community perception?	**1.2e 1.3a 1.4a**	**1.2b 1.5a 1.5b 1.5d**	**1.4b**

Source: Kearney (2024).

5.2 Disclosure Risks and Opportunities Prioritization

An analysis of all the risks and opportunities from disclosure trends resulted in the prioritization heat maps shown below.

Figure 2. ESG disclosure risks and opportunities heat map.[12]



Source: Adapted from Kearney (2024).

Based on the heat maps, one risk was prioritized for deeper analysis (extracted from Table 3): 1.5d Reputational risk to O&G corporations required to report Scope 3 emissions in comparison to their peers.

5.3 Prioritized Disclosure Risk Assessment

Disclosure Requirements for the Oil and Gas Industry (1.5d)

Upcoming mandates to disclose Scope 3 emissions, especially under the ESRS and ISSB standards, may pose certain risks for oil and gas companies, including those in Saudi Arabia, where 67% of fiscal revenues come from the hydrocarbon sector (Statista 2024). Organizations that have not previously reported Scope 3 emissions could face increased costs related to data collection, assurance processes, and potential premiums paid to suppliers already disclosing Scope 3 emissions. Additionally, companies with higher Scope 3 emissions than their peers may encounter reputational risks, as they could be criticized for being significant polluters, potentially leading to reduced demand for their products.

Disclosure standards now include industry-specific requirements outlined in sector-specific frameworks. For instance, the ISSB has introduced three distinct disclosure categories for the oil and gas sector, covering exploration and production, midstream activities, and refining and marketing operations. This separation aids the largely divergent emission profiles of these distinct business segments, which helps with measurement and data capture. It also reflects the reality that while the largest oil and gas players are integrated along the value chain, many hydrocarbon companies specialize in more than one of these sector segments.

An overview of the current disclosures reported by some of the integrated international oil majors, including Aramco, is helpful in assessing the current state of disclosures with respect to these standards from a "best-in-class" perspective. Table 6 summarizes the findings below.

Table 6. Selective oil majors' disclosure status.[13]

Standard type	Categories	Metric	Disggregaion	Aramco	Chevron	Shell	Equinor
Cross-sector	Gross greenhouse gas emissions	Scope 1	Consolidated accounting group	Operational control	Operational and equity based	Operational and equity based	Operational and equity based
			Investees	-	-	-	-
		Scope 2	Location-based	Disclosed	-	Disclosed	Disclosed
			Market-based	Disclosed	Disclosed	Disclosed	Disclosed
		Scope 3	By category	-	Category 11	Category, 1,3,9,11	Category 6 and 11
	Climate-related transition risks	Amount of assets		Only description of risks		Only description of risks	Total financial impact reported
		% of assets					
	Climate-related physical risks	Amount of assets				Only description of risks	Total financial impact reported
		% of assets					
	Climate-related opportunities	Amount of assets				Only description of opportunities	Total financial impact reported
		% of assets					
	Capital deployment towards climate-related risks and opportunities			Invetments in GHG reduction technologies reported		Cost of addressing risks	Cost of addressing risks and opportunities reported
	Internal Carbon price						Disclosed
	Executive remuneration linked to climate related considerations			KPIs tied to executive remuneration reported		KPIs tied to executive remuneration reported	KPIs tied to executive remuneration reported

Table 6. (continued)

Industry-based: Oil & Gas (Consolidated metrics from Exploration & Production, Midstream, and Refining & Marketing Standards)	Greenhouse gas emissions - Scope 1	Gross emissions for 7 GHG			CO2,CH4, others	CO2,CH4,N2O,H	CO2, CH4
		Methane emissions as % of GHG emissions		Total and Methane intensity	Disclosed	Disclosed	Disclosed
		% GHG under emissions-limiting regulation					Disclosed
		Flared hydrocarbons		Disclosed	Disclosed	Disclosed	Disclosed
		Other combustion		-			Reported
		Process emissions		-			
		Other vented emissions				Disclosed	
		Fugitive emissions				Disclosed	
		Long and short-term plan to manage scope 1 emissions and emissions reduction targets		Short-term plan declared	Short-term & long-term plan declared	Disclosed	Reported
	Water management	Total water withdrawn		Disclosed	Disclosed	Disclosed	Disclosed
		Total water consumed		Disclosed	Disclosed	Disclosed	Disclosed
		Volume of produced water				Disclosed	
		Volume of flowback generated				Disclosed	
		Percentage of hydraulically fractured wells for which there is public disclosure of all fracturing fluid chemicals used					
		Percentage of hydraulic fracturing sites where ground or surface water quality deteriorated compared to a baseline					
	Reserves valuation and capital expendicture	Sensitivity of hydrocarbon reserve levels to future price projection scenarios that account for a price on carbon emissions			Disclosed		
		Estimated carbon dioxide emissions embedded in proved hydrocarbon reserves					
		Amount invested in renewable energy, revenue generated by renewable energy sales		Disclosed	Disclosed	Disclosed	Disclosed
		Discussion of how price and demand for hydrocarbons or climate regulation influence the capital expenditure strategy for exploration, acquisition and development of assets			Disclosed		Disclosed
	Product Specifications & Clean Fuel Blends	Total addressable market and share of market for advanced biofuels and associated infrastructure			View on global market	Shell's biofuel ambition	
		Volumes of renewable fuels for fuel blending: (1) net amount produced, (2) net amount purchased				Disclosed	

Source: Kearney (2024).

Note: KPIs = key performance indicators.

Table 7. Voluntary CCUS disclosure.

Standard type	Metrics	Aramco	Chevron	Shell	Equinor
CCUS	Amount of CO2 stored / sequestered (mtCO2)		Disclosed	Disclosed	Disclosed
	CO2 transferred in and out of the organization			Disclosed	Disclosed
	% of CO2 stored for long term (>10,000 years)			Disclosed	Disclosed
	CO2 leakage during injection (mtCO2)			Disclosed	Disclosed
	Year in which injection began			Disclosed	Disclosed
	Cumulative CO2 stored			Disclosed	Disclosed
	Ongoing leakage (average estimated % of stored CO2 per year)			Disclosed	Disclosed
	tion of process of monitoring leakage and any long-term storage			Disclosed	Disclosed

Source: Kearney (2024).

Industry participants generally comply with GHG emissions standard requirements and recognize climate-related risks and opportunities. However, they fall short in quantifying assets vulnerable to climate risks, though they do report capital expenditures on renewable energy projects. Equinor is the only major oil and gas company that currently quantifies and discloses its total financial impact from the physical and climate-related risks and opportunities. Areas for improvement in the industry include reserve valuation and capital expenditure reporting, as companies do not consistently disclose the sensitivity of hydrocarbon reserves to carbon pricing or the estimated carbon dioxide embedded in these reserves. While capital expenditures might be reported for renewable energy projects, other types of low-carbon investments are typically not disclosed with the same level of detail.

While the ISSB standards do not yet mandate specific metrics for CCUS operations, some companies have begun reporting certain metrics voluntarily, as shown in Table 7. CCUS plays a pivotal role in oil and gas companies' net-zero strategies. However, it is not adequately reflected in current ESG frameworks, partly because global emission reduction policies prioritize direct reduction over mitigation efforts. Additionally, carbon accounting for CCUS is complex, involving a value chain with uncertainties regarding the allocation of removal credits across different segments. Although integrated oil and gas companies possess the technical expertise and long-standing reservoir experience to develop and operate CCUS projects successfully, their commercialization remains a significant challenge. This is primarily due to the absence of well-established business models that cover the entire CCUS chain – from capture to transport and storage – creating uncertainty among investors.

Impact of Scope 3 Disclosure for Oil and Gas Companies

Estimation of Scope 3 Reporting Costs

The SEC explored the financial impact of GHG emissions reporting on companies in preparation for issuing mandatory disclosure standards. In its proposal for climate-related disclosure rules, the SEC (2022) estimated that the initial cost for companies to report Scope 1, 2, and 3 emissions would range from $25,000 to $125,000, with the expectation that these costs would decrease over time as processes become more streamlined. While specific data pertaining to the oil and gas industry is not available, the estimates in Table 8 provide a general indication of Scope 3 reporting costs.

In addition to general reporting expenses, the SEC found that GHG emissions assurance costs vary by company type. Limited assurance costs range from $30,000 to $145,000, while reasonable assurance[14] costs range between $50,000 and $235,000. Table 9, below, provides detailed assurance cost estimates from the SEC.

In 2022, a wider disclosure cost burden survey was conducted by the SustainAbility Institute by ERM (ERM 2022). The 39 companies included in the survey jointly represent over $3.8 trillion in combined market capitalization, with specific respondents' market capitalization ranging from less than $1 billion to over $200 billion. The companies' employee counts ranged from less than 1,000 to over 250,000.

The survey found that companies spend an average of $237,000 annually on GHG analysis and disclosures. All participants reported Scope 1 and 2 emissions, while 74% also disclosed Scope 3 emissions. Table 10 outlines the average spending across categories in the survey. Only two of the 39 respondents identified as oil, gas, and energy industry participants. ESG cost profiles in other energy industry segments, such as utilities, differ significantly from those in the oil and gas industry. Table 3 suggests that oil and gas majors conduct most of the assessment, disclosure and risk management activities listed in Table 6, which could translate into total annual costs for ESG disclosures of up to $831,000 on average. These are U.S.-based cost estimates, and though they serve as a reference, they should be treated as indicative only, especially in different jurisdictional contexts.

Table 8. Proposed climate-related disclosures for investors, exemplary submissions from industry participants.

Submitter 1
• First year (Scope 1, 2, and 3) – $75,000 to $125,000 • Subsequent years (Scope 1 and 2) – $45,000 • Subsequent years (Scope 1 and 2, changes to Scope 3) – $75,000 to $125,000
Submitter 2
• First year (Scope 1 and 2), low maturity firm – $45,000 • First year (Scope 1, 2, and 3), low maturity firm – $80,000 • First year (Scope 1 and 2), high maturity firm – $25,000 • First year (Scope 1, 2, and 3), high maturity firm – $25,000

Source: SEC (2022).

Table 9. Published assurance cost estimates.

	Limited assurance (USD)	Reasonable assurance (USD)
Accelerated filer	30,000-60,000	50,000-100,000
Large accelerated filer	75,000-45,000	115,000-235,000

Source: SEC (2022).

Table 10. ESG costs survey.

Category	Average spend (USD)	Number of issuers reporting in the category (out of 39)
GHG analysis and/or disclosures	$237,000	39
Climate scenario analysis and/or disclosures	$154,000	31
Additional climate-related analysis and/or disclosures	$130,000	30
Internal climate risk management controls	$148,000	27
Proxy responses to climate-related proposals	$80,000	19
Assurance/audits related to climate	$82,000	28

Source: ERM (2022).

Estimation of Scope 3 Emissions in the Oil and Gas Industry

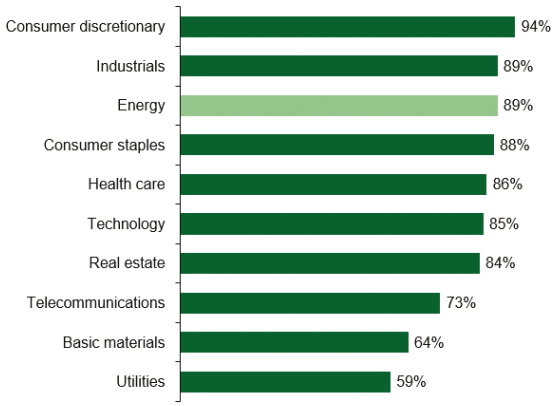
Scope 3 emissions account for 89% of total greenhouse gas (GHG) emissions in the energy sector, according to data from FTSE All-World Index constituents (FTSE Russell 2024). This positions the energy sector among the highest contributors to Scope 3 emissions (Figure 3). A considerable driver of this is the contribution from Category 11 – "use of sold products" – to the oil and gas industry. This sector is distinctive because the primary application of its products involves combustion, which directly results in additional emissions. As reported in the CDP database, approximately 91% of oil and gas companies' Scope 3 emissions originate from Category 11 activities (Figure 4).

Should Scope 3 emissions reporting become mandatory on a wider scale, the public and regulatory burden on oil and gas companies to estimate and disclose their Scope 3 emissions would likely increase. The ESRS already requires companies to report on all 15 Scope 3 categories, which extends to foreign companies doing significant business within the EU's jurisdiction. The ISSB standards, which are mandated to become the global baseline for ESG disclosures, also require Scope 3 disclosure across all categories. However, it acknowledges the complexity of measuring supply chain emissions, especially for smaller, less well-resourced enterprises. In this context, the ISSB standards offer comprehensive guidance on how to measure and report Scope 3 emission sand reporting reliefs, essentially equating to a phased-in reporting approach to allow companies to set up appropriate systems. As the ISSB standards are being adopted worldwide, Saudi Arabia is also considering them as a domestic umbrella framework. One country of note that is contesting the need for Scope 3 emissions is the U.S., where the recently finalized SEC rules have excluded initial proposals to report on them after substantial industrial opposition.

To get a sense of the scale of Scope 3 emissions in the oil and gas sector, it is useful to consider the world's largest hydrocarbon companies' Scope 3 disclosures. In fact, the five international oil companies (IOCs), including ExxonMobil, Chevron, BP, Shell, and Total are already reporting Scope 3 emissions. Even though these companies acknowledge that the emissions associated with suppliers or consumers (Scope 3) are not under their complete control, they still represent a source of potential business risk. For example, a low-cost oil producer that captured all the emissions from its operations may still find the market for its main product shrinking or even vanishing as consumers shift to electric vehicles. Hence, reporting expectations go hand-in-hand with regulator and investor expectations to set lower Scope 3 targets and be proactive in positively influencing supply chains, where possible.

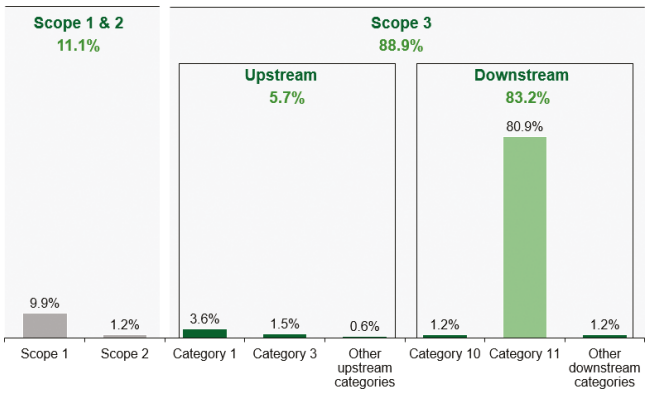
Reported IOC Category 11 emissions range from 307 million tons of CO_2 equivalent ($MtCO_2e$) to 910 $MtCO_2e$. Surprisingly, we see a wide range of disclosed figures. Shell, one of the European IOCs

Figure 3. Share of Scope 3 among total GHG emissions by sector (FTSE All-World Index Constituents).



Source: FTSE Russell (2024).

Figure 4. Breakdown of GHG emissions in the oil and gas sector.



Source: CDP (2022).

Table 11. Calculation of average (Category 11 emissions)/barrel of oil equivalent (boe) from benchmarks.

Company	Shell	BP	Total	ExxonMobil	Chevron
Category 11 – Use of sold products ($MtCO_2e$)	910	307	389	720	668
Maximum of product transfer in the value chain (kboe/day)	2,817	2,963	3,891	5,347	2,999
Category 11 emissions/boe ($MtCO_2e$/[kboe/day])	0.32	0.10	0.10	0.13	0.22
Average Category 11 emissions/boe ($MtCO_2e$/[kboe/day])	0.17				

Source: Publicly available corporate sustainability reports.

Note: kboe = Thousand barrels of oil equivalent.

that has been driving decarbonization strategies more aggressively than its American peers, has the highest Category 11 emissions. Table 12 summarizes the IOCs' disclosed emissions and calculates an average Scope 3 factor for the group that could be theoretically applied to or by other companies in the industry with similar corporate and segment profiles. Of note, this group of diversified, integrated oil and gas companies features a much lower average carbon dioxide emissions factor of 0.17 than the U.S. Environmental Protection Agency's (EPA 2024) assumed theoretical carbon dioxide emissions factor of 0.41 tons of CO_2 per barrel of crude oil (tCO_2/b).

In Saudi Arabia, Aramco does not currently report Scope 3 emissions. However, Aramco's Scope 3 risk profile arguably cannot be compared to the above group of hydrocarbon producers. Saudi crudes are generally light in nature and feature a much lower carbon intensity than their substitutes elsewhere (Masnadi et al. 2018). Moreover, Aramco's production levels are more than double those of the next largest producer (Chevron), highlighting the fact that Scope 3 measurement across complex supply chains is exponentially more complicated and resource intensive. Finally, actual Scope 3 emissions depend on many factors, not least end-user emissions management in the consumption jurisdiction, and might therefore vary significantly.

One indicative example of the level of variance in emission estimations can be found in Gasim et al. (2024), which assesses Saudi Arabia's methane emissions in the oil and gas industry through employing satellite imagery. The study finds that methane emission estimates from the oil and gas sector in Saudi Arabia are considerably lower than the estimates from the International Energy Agency (IEA) and the European Commission's Emissions Database for Global Atmospheric Research (EDGAR). Saudi Arabia (and the United Arab Emirates) in fact stand out for their oil and gas production having the lowest methane emission intensities (kilograms of methane per barrel of oil equivalent). Innovation and improvements in Scope 3 emissions measurement and accounting will ultimately also improve the accuracy of such metrics, especially for the oil and gas industry.

6. ESG Ratings

6.1 ESG Rating Risks and Opportunities Screening

In the following, the risks and opportunities associated with ESG ratings have been identified and listed in order to plot them on the ESG Assessment Framework presented in Table 2 and on the heat map in Figure 7. The aim is to identify those risks and opportunities that could have the greatest impact on the oil and gas sector.

Table 12. Consolidated ESG rating risks.[15]

S&P ESG ratings	
2.1a	Potential risk to upstream or integrated corporations with high GHG emissions (Scope 1, 2, and 3 emissions).
2.1b	Potential risk to upstream or integrated corporations relying on fossil fuels as their main revenue source could be disadvantaged by S&P ESG scores.
CDP	
	No significant risks were identified with the CDP's ESG ratings.
Sustainalytics	
2.3b	Potential risk to KSA corporations relying on fossil fuels as their main revenue source could be disadvantaged by Sustainalytics ESG scores.
Moody's ESG rating	
2.4a	Potential risk to conventional ratings of KSA companies and corporations with lower ESG ratings.

Table 13. Consolidated ESG rating opportunities.[16]

S&P ESG ratings	
2.1c	Potential opportunity for O&G companies to improve their S&P ESG ratings through complete reporting of disclosures
CDP	
	No significant risks were identified with the CDP's ESG ratings.
2.2a	Potential opportunity for O&G corporations to position themselves as climate leaders and improve their sustainability image to investors by ensuring they respond to the CDP's questionnaire when requested and provide complete information.
Sustainalytics	
2.3a	Potential opportunity for O&G companies to improve their ESG ratings through improvements in disclosing their management of identified risks.
Moody's ESG Rating	**No significant opportunities were identified with Moody's ESG ratings.**

Table 14. Consolidated ESG ratings risks and opportunities by impact and risk category.

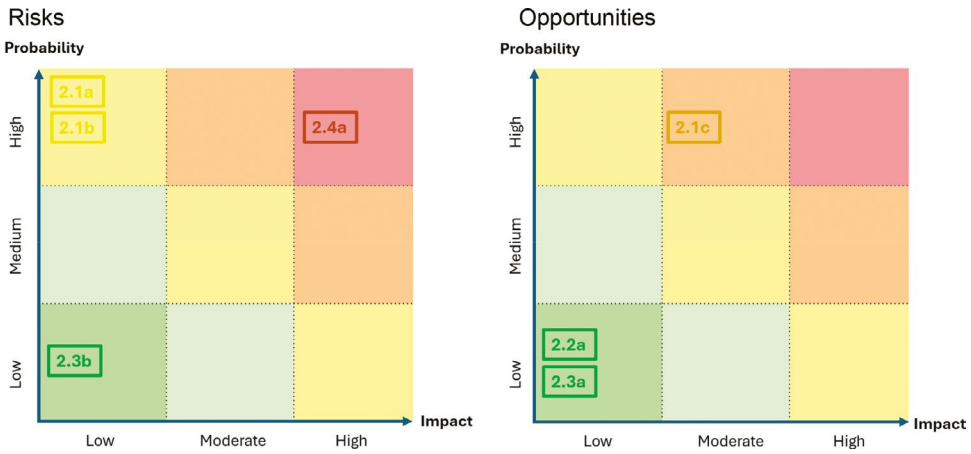
		Impact categories	**Impact on corporate performance**	**Impact on climate ambition**	
		Measurement metrics (wherever applicable)	Revenues/costs	CCUS impact	
			ESG ratings	Net-zero strategy implementation	
			Cost of capital	Economic diversification	
Risk categories	**Questions to identify opportunities**	**Questions to identify risks**			
Policy & legal	- Positive impact on corporations, national policies and litigation exposure?	- Negative impact on corporations, national policies and litigation exposure?	**2.1c**		
Technology	- Opportunity to innovate new technologies? - Increase ability to attract financing for new and existing projects?	- Unfavorable conditions for existing (esp. non-green) or transition technologies? - Decrease in ability to attract financing for existing and new projects?			
Market	- Favorable shift in demand/supply? - Favorable conditions to access to additional markets?	- Negative shift in demand/supply? - Unfavorable conditions for accessing new and existing markets?	**2.1b** **2.3a** **2.3b** **2.4a**	**2.3a**	**2.3b**
Reputation	- Positive shift in customer/community perception? - Opportunity to be seen as good corporate citizen and leading climate change player?	- Negative shift in customer/community perception?		**2.1a**	**2.2a**

Source: Adapted from Kearney (2024).

6.2 ESG Ratings Risks and Opportunities Prioritization

An analysis of all the risks and opportunities from ESG rating trends resulted in the prioritization heat maps, as shown in Figure 5.

Figure 5. ESG ratings risks and opportunities heat map.[17]



Source: Adapted from Kearney (2024).

Based on the heat maps, one risk was prioritized for deeper analysis (extracted from Table 16): 2.4a Potential risk to conventional ratings of KSA companies and corporations with lower ESG ratings.

6.3 Prioritized ESG Rating Risk Assessment

Impact of ESG Ratings on Credit Rating (2.4a)

Oil and gas companies face the potential future risk of receiving lower credit ratings due to heightened exposure to carbon transition risks, as assessed by rating agencies. These risks encompass several factors, such as the dependence on GHG-intensive products, production losses driven by regulatory and policy measures, and shifting market demand toward low-carbon products or alternative energy sources. Rating methodologies, like Moody's "General Principles for Assessing Environmental, Social, and Governance (ESG) Risks Methodology Supplement – Enterprises" (Moody's Investors Service 2021) highlight these transition risks as significant to their credit assessments.

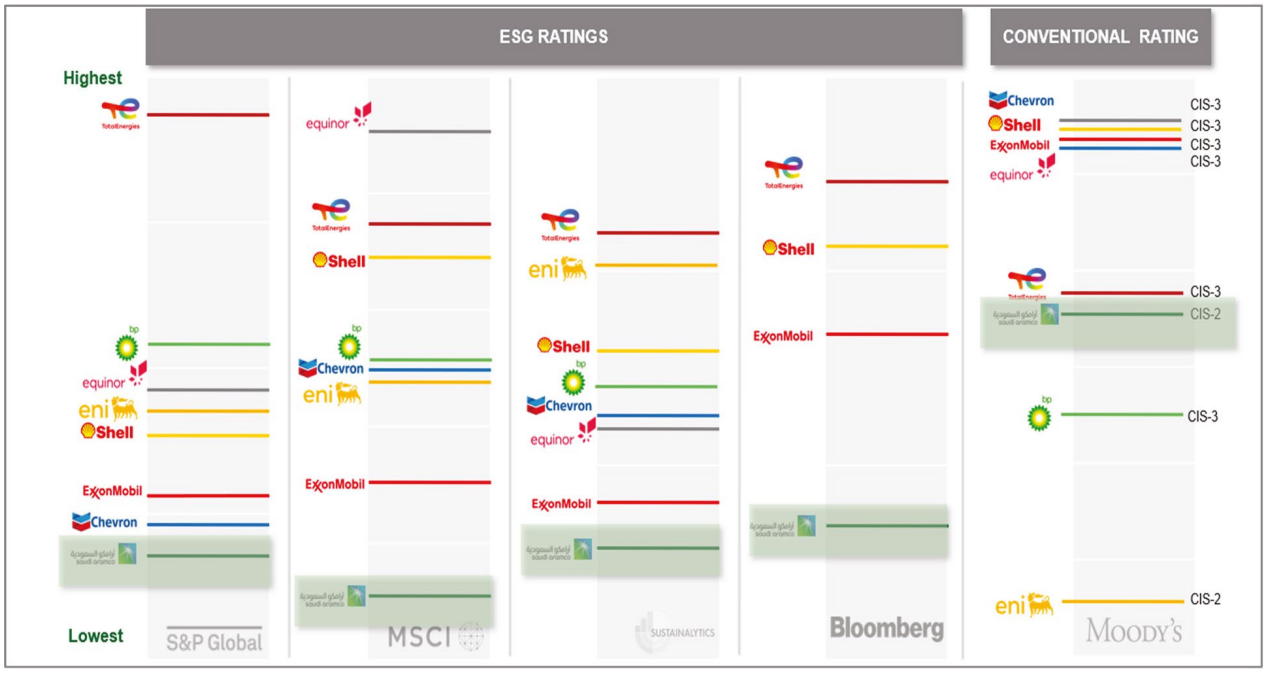
Qualitative and Quantitative Assessment of ESG Ratings

Qualitative and quantitative assessments reveal that, for now, ESG ratings have minimal financial impact on oil and gas corporations. However, future risks may arise as regulatory frameworks on GHG emissions and demand for carbon-intensive products become stricter. Lower ESG ratings could also pose reputational risks, particularly among green investors. Hydrocarbon companies have an opportunity to proactively enhance their ESG scores, positioning themselves favorably before ESG factors potentially affect their access to financing and investor interest in their future.

To perform qualitative and quantitative analyses of the impact of ESG ratings on the cost of capital, and investors' perception of sustainability, the two largest public Saudi hydrocarbon companies (Aramco – upstream/integrated; SABIC – downstream/petrochemicals) were selected to gain a perspective of how they compared against their global industry peers.

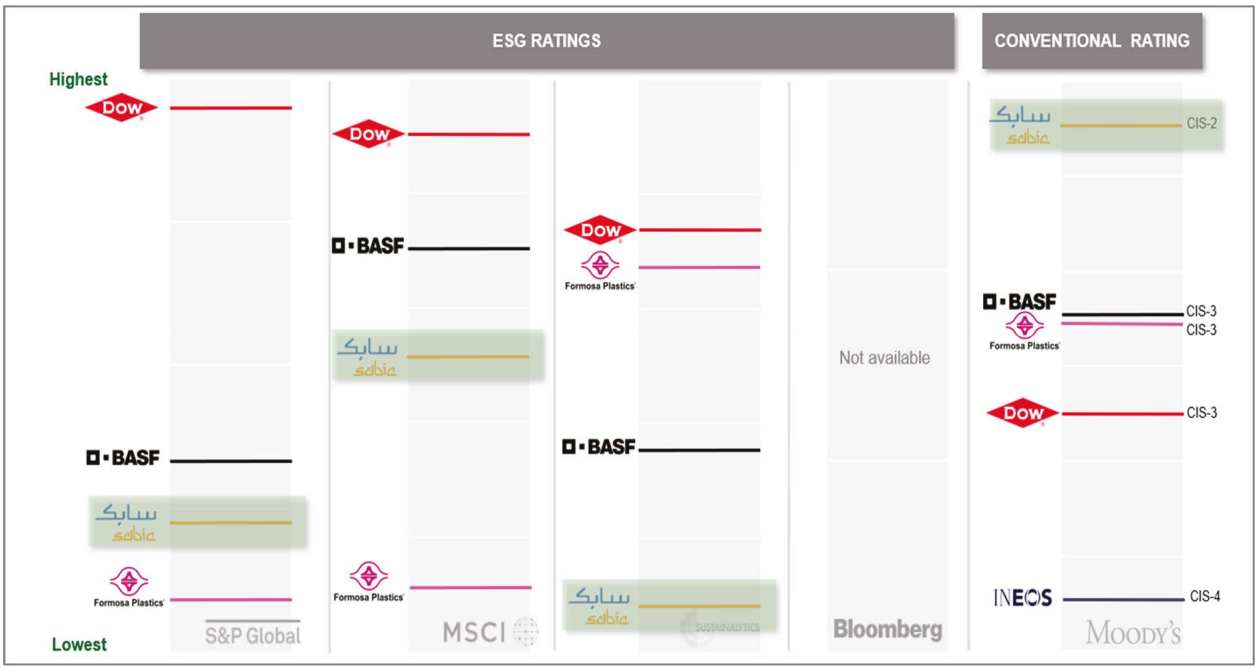
On a qualitative level, there was a minimal correlation between Aramco's and SABIC's ESG ratings and their conventional credit ratings. As shown in figures 8 and 9, both companies generally have lower ESG ratings than their peers. However, their conventional credit ratings are still in the higher percentiles, even though Moody's ratings integrate ESG factors. For companies with a heightened carbon transition risk, Moody's assigns an issuer profile score (IPS) or credit impact score (CIS) of 4 or 5 (Moody's Investors Service 2021).

Figure 6. Peer ESG ratings versus conventional credit ratings – upstream/integrated companies.



Source: Kearney (2024).

Figure 7. Peer ESG ratings versus conventional credit ratings – downstream companies.



Source: Kearney (2024).

The limited literature available suggests that ESG ratings have a minimal effect on the cost of capital. Three different approaches were employed to analyze this impact, but each exhibited limitations, leading to varying outcomes in the results.

As an illustrative example, the potential impact on Aramco's (low MSCI ESG scoring) cost of capital could range from $36 million to $212 million.

1. MSCI's (2020) analysis of the impact of its own ESG ratings on the cost of capital concludes that there is a 0.59% difference between companies in the highest and lowest quantiles of ESG scores in the energy sector.[18] Using this figure to calculate the potential change in Aramco's borrowing cost, the 0.59% can be multiplied by Aramco's net borrowing in 2023[19] to give Aramco's potential cost savings of $212 million if it ranked high in ESG ratings. The limitations of this data lie in the limited availability of historical data for Aramco's cost of capital (only available from 2015-2019).
2. An expert call with an ESG, sustainability and climate investment advisor concluded that the impact of ESG ratings on Aramco's cost of capital is minimal, at about $90.2 million savings. While this is an estimate only, the expert pointed out that ESG factors are becoming more prominent in investment decisions.
3. Analysis conducted by the consulting firm Kearney on the so-called "greenium effect" of Climate Awareness Bonds (CABs) issued by the European Investment Bank (EIB) showed five of the 11 bonds indicated a "greenium effect," with a difference of 0.1% to 0.4% in their yields when compared to vanilla bonds (Kearney 2024). This resulted in a potential impact (i.e., higher cost) of $36 million to $144 million on Aramco's cost of borrowing. However, the assessment of EIB-issued CABs does not show a clear correlation either and no clear consensus is found in the literature on the "greenium effect."

None of the available data established a conclusive relationship between ESG ratings and the cost of capital, either in general or for the oil and gas sector specifically. A number of factors influence the quantification of this relationship, such as gaps in publicly available data and its reliability, as well as a multitude of ESG rating methodologies with diverging impacts on a given company's potential rating, complicating comparisons. The connection between these variables will be explored and analyzed further in a follow-up study on the impact of ESG ratings on the weighted average cost of capital in the oil and gas industry.

Policy and Reputational Risk

Oil and gas companies face growing policy and reputational risks related to ESG factors, particularly as regulatory landscapes evolve to address carbon emissions and the transition to cleaner energy sources. ESG factors are increasingly integrated into the methodologies of rating agencies as new regulations emerge across different jurisdictions. For companies heavily reliant on fossil fuels, such as Aramco, future ESG-related policies could pose financial and reputational challenges as the global energy landscape shifts.

While Aramco's robust financial performance helps it offset some of the immediate impacts of ESG factors on its cost of capital, smaller entities associated with Aramco, such as joint ventures and subsidiaries, may not be as insulated. These affiliates are more susceptible to reputational risk, especially as investor perceptions shift in response to Aramco's overall ESG profile. This reputational risk could translate into higher financing costs, as lenders and investors become more cautious about environmental considerations associated with fossil fuel companies.

Currently, Aramco's ESG ratings do not significantly affect its ability to raise capital. However, as ESG considerations become increasingly critical in the issuance of green financial instruments, this could eventually influence Aramco's future financing strategies. Issuing green bonds, for instance, may present reputational challenges for Aramco, as potential investors could demand higher premiums to offset perceived environmental risks. Such dynamics could impact Aramco's access to sustainable finance markets, especially as Saudi Arabia advances its sustainable finance goals as part of its broader economic diversification efforts. By bolstering its ESG performance and transparency, Aramco can mitigate its reputational risks and support Saudi Arabia's stated policy goal to be a leader in sustainable finance on the world stage.

6.4 Opportunities and Recommendations

Disclosing

Overall, ESG reporting compliance has the potential to lower or stabilize the cost of capital in the oil and gas industry. Concerns over the risk of "stranded" assets[20] have grown over the past decade as governments implement their Paris Agreement commitments. Improved disclosures translate into improved ESG ratings, and thereby a more manageable (i.e., lower) risk for investors. Contrary to common belief, ESG ratings do not necessarily assess the actual performance of a corporation, especially in the environmental realm. Instead, they reflect the level of disclosure and transparency a company commits to in order to facilitate investment decisions from capital providers.

The main opportunity therefore lies in enhancing ESG scores by providing thorough and comprehensive disclosures. Oil and gas companies can strengthen their transparency by aligning their disclosures with established national reporting standards such as those issued by the ESRS and ISSB. Furthermore, a deep understanding of the methodologies used by various rating agencies enables these companies to ensure that the criteria evaluated by ESG assessors are both met and clearly addressed within their sustainability reports.

Reporting Scope 3 emissions poses a considerable challenge for oil and gas companies, as these emissions – especially from the "use of sold products" (Category 11) – can account for as much as 89% of their total emissions. The complexity of this reporting increases with the size of the company, but smaller companies with less to report also often lack the resources necessary for comprehensive ESG reporting. However, smaller oil and gas firms typically focused on specific segments of the value chain, such as upstream operations, may face a more defined reporting burden. This focus can somewhat mitigate the complexity associated with value chain reporting.

Oil and gas companies are advised to begin by reporting Category 11 emissions using IPIECA guidelines, which estimate emissions based on the volume of products sold at key value chain points. Major companies like ExxonMobil and BP follow this approach, emphasizing its relevance and accuracy. Prioritizing Category 11 emissions ensures transparency and mitigates the risks of underreporting or greenwashing. Saudi oil companies can gradually expand to other Scope 3 categories while aligning with international reporting principles and avoiding reputational risks vis-à-vis their peers.

Saudi Arabia could support Saudi companies, especially SMEs, by providing financial and technical assistance during the initial one to two years of reporting to reduce the associated cost burdens. This support could include

issuing sector-specific GHG reporting guidelines, consulting services, data warehousing, and financing for SMEs. However, as a first step, the country would benefit from finalizing its own national ESG disclosure standards and participating in the international push to align such standards, not least through increased representation and influence in climate-related alliances, especially financial alliances.

ESG Ratings

ESG ratings are essential for raising green capital and ensuring corporations maintain their social licenses to operate. However, current ESG rating methodologies must account better for the role of removal technologies such as CCUS, especially in the oil and gas sector. CCUS plays a critical role in reducing emissions from fossil fuel use and should be recognized as a key component of the energy transition within ESG assessments. Including CCUS initiatives more explicitly in ESG ratings would provide a fairer evaluation of oil and gas companies' contributions to achieving decarbonization goals.

For national oil companies (NOCs) like Aramco, the social aspect of ESG ratings deserves greater weight in commercial methodologies. These companies play a significant role in national economies, providing employment, supporting infrastructure, and contributing to social stability. Given their broader socio-economic responsibilities, ESG frameworks should reflect the impact of their contributions to employment, local development, and national economic growth. An enhanced emphasis on the social dimension would ensure that NOCs were not unfairly penalized in commercial ratings, offering a more comprehensive evaluation of their long-term sustainability efforts alongside environmental and governance factors.

Finally, ESG ratings can unlock access to sustainable finance markets for oil and gas companies by linking the cost of capital to achieving specific ESG-related key performance indicators (KPIs). Meeting these KPIs can facilitate capital raises via green bonds, sustainability-linked loans, and other low-cost financing options, enabling companies to diversify their funding sources while aligning themselves with global sustainability goals. A follow-up KAPSARC study will further explore the sustainable and green finance instruments available to the oil and gas industry.

Endnotes

[1] Three key challenges must be addressed when investing in energy and managing demand, each requiring trade-offs between competing priorities. These challenges form the energy trilemma: energy security, energy sustainability, and energy affordability. Balancing these elements is essential, as prioritizing one often comes at the expense of another.

[2] A follow-up paper is intended to dive deeper into how ESG compliance impacts business resilience and access to capital in the oil and gas industry.

[3] The EU taxonomy for sustainable activities is a classification system created to identify which economic activities are considered environmentally sustainable within the framework of the European Green Deal. Its goal is to prevent greenwashing and assist investors in making informed choices about sustainable investments.

[4] Non-EU companies with more than €150 million in annual revenue and having at least one EU subsidiary classified as "large" fall into this category. A "large" company is defined as an EU company meeting one of the following three conditions: 1. Annual revenue greater than €40 million, 2. Assets greater than €20 million, and 3. More than 250 employees (European Parliament 2022).

[5] Australia, Brazil, Canada, China, India, Japan, Hong Kong, Malaysia, New Zealand, Nigeria, the Philippines, Pakistan, Singapore, South Africa, South Korea, Taiwan, Türkiye, the EU, Uganda and the United Kingdom (IFRS 2024).

[6] The IFRS Foundation and the International Accounting Standards Board were established in 2001, replacing the International Accounting Standards Committee (IASC), which was set up in 1973. The Monitoring Board was established in 2009. The IFRS provides the leading international accounting standards outside of the U.S., where the SEC sets the accounting rules.

[7] A broader analysis extended the review to other categories, including alliances, carbon pricing and fiscal policies, and taxonomies. A discussion of these categories is intended to be the subject of a future paper.

[8] Adapted from Kearney (2024).

[9] See Appendix 1.

[10] For a more comprehensive review of disclosure risks and opportunities, see appendices 2 and 3.

[11] O&G = oil and gas.

[12] See Appendix 1 for more comprehensive impact and materialization probability evaluation matrices.

[13] For an explanation of emission categories, see Greenhouse Gas Protocol (2013).

[14] The difference between limited assurance and reasonable assurance lies mostly in the depth of procedures performed by auditors.

[15] For a more comprehensive review of ESG rating risks and opportunities, see appendices 4 and 5.

[16] For a more comprehensive review of ESG rating risks and opportunities, see appendices 4 and 5.

[17] See Appendix 1 for more comprehensive impact and materialization probability evaluation matrices.

[18] The energy segment in MSCI's study includes utilities.

[19] Aramco, "Consolidated Statement of Cash Flows 2023." https://www.aramco.com/-/media/publications/corporate-reports/reports-and-presentations/2023/fy/saudi-aramco-fy-2023-full-financials-english.pdf.

[20] A stranded asset is an asset that loses its value or becomes unusable in a sudden or unexpected way. Hydrocarbon assets can become uneconomic due to more stringent climate-change mitigation policies and increased levies.

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Appendix

Appendix 1: Impact and Materialization Probability Evaluation Matrices

Table A1. High-level impact evaluation matrix for prioritization – risks.

Risk categories	Low	Moderate	High
Policy and legal	Potential for profit margin reduction of 0%-5%.	Potential for profit margin reduction of 5%-10%.	Potential for profit margin reduction of 10%-15%.
Technology	Loss of revenue of 0%-5%.	Loss of revenue of 5%-10%.	Loss of revenue of 10%-15%.
Market	Increase in cost of capital or loss of market share by 0%-5%.	Increase in cost of capital or loss of market share by 5%-10%.	Increase in cost of capital or loss of market share by 10%-15%.
Reputation	Increase in cost of capital or change in ESG ratings by 0%-5%.	Increase in cost of capital or change in ESG rating by 5%-10%.	Increase in cost of capital or change in ESG rating by 10%-15%.

Source: Adapted from Kearney (2024).

Table A2. High-level impact evaluation matrix for prioritization – opportunities.

Risk categories	Low	Moderate	High
Policy and legal	Potential for profit margin increase of 0%-5%.	Potential for profit margin increase of 5%-10%.	Potential for profit margin increase of 10%-15%.
Technology	Increase in revenue of 0%-5%.	Increase in revenue of 5%-10%.	Increase in revenue of 10%-15%.
Market	Decrease in cost of capital or gain of market share by 0%-5%.	Decrease in cost of capital or gain of market share by 5%-10%.	Decrease in cost of capital or gain of market share by 10%-15%.
Reputation	Decrease in cost of capital or improvement in ESG ratings by 0%-5%.	Decrease in cost of capital or improvement in ESG rating by 5%-10%.	Decrease in cost of capital or improvement in ESG rating by 10%-15%.

Source: Adapted from Kearney (2024).

Table A3. Maturity evaluation matrix for prioritization – risks and opportunities (all categories).

Low	Medium	High
Trend has been initiated but is still under development.	Trend has been fully developed but not implemented.	Trend is fully developed, is effective, and is in use.

Maturity is defined as the level of development of the "trend" behind the risk or opportunity. For example, for risks and opportunities related to disclosure standards, the maturity refers to the development of the standard (e.g., ESRS standards will be classified as "high" because they are fully developed, effective and implemented in the EU; ISSB standards will be classified as "medium" because they have been released but have not yet been fully implemented, while the SEC's rules will be classified as "low" because they are currently in the process of being finalized).

Appendix 2: Initial Screening of Disclosure Risks and Opportunities

Table A4. GRI.

No.	Identified risk or opportunity	Probability	Impact
Trend: The GRI requires corporations to report double materiality and Scope 3 emissions			
1.1a	*Risk:* Potential risk to oil and gas corporations that are currently reporting to the GRI and may be subject to additional reporting obligations in jurisdictions that mandate reporting according to upcoming disclosure standards (i.e., ESRS, ISSB, SEC, etc.).	High	Low
No significant opportunities were identified with GRI disclosures.			

Table A5. ISSB.

No.	Identified risk or opportunity	Probability	Impact
Trend: Requirement to report operational and value chain gross Scope 3 emissions			
1.2a	*Risk:* Potential impact on oil and gas corporations that are not already reporting Scope 3 emissions, due to increased reporting costs. This includes additional expenses for data collection, possible cost premiums from suppliers reporting Scope 3 emissions, and the need for assurances on Scope 3 emissions if required by the jurisdiction enforcing ISSB standards.	Medium	Low
1.2b	*Risk:* Potential reputational impact for oil and gas corporations compared to peers already reporting Scope 3 emissions. For example, if Aramco reports Scope 3 emissions, it could face reputational risk due to potential criticism for being high polluters, which could lead to a drop in its ESG ratings relative to other oil majors.	Medium	High

Table A5. (Continued)

No.	Identified risk or opportunity	Probability	Impact
1.2c	*Risk:* Oil and gas corporations could face lower demand for their products compared to industries already reporting Scope 3 emissions if GHG emissions are factored into buyers' purchasing criteria. For instance, Aramco's competitive position could be jeopardized by other oil majors with lower GHG emissions, as oil and gas buyers increasingly prioritize emissions in their purchasing decisions.	Medium	High
Trend: Jurisdictions that will mandate ISSB standards, or equivalent or more stringent standards, nationally could impact market access.			
1.2d	*Risk:* Potential risk to market access in jurisdictions that are mandating national disclosure standards equal to (or more stringent) than the ISSB's if oil and gas corporations do not comply with the jurisdictions' reporting requirements.	Medium	Moderate
Trend: Aligning with ISSB standards could improve corporate ESG ratings.			
1.2e	*Opportunity:* Potential opportunity for corporations to reduce their cost of capital by aligning their disclosure standards to the standards gaining wider global acceptance and becoming the new global baseline.	Low	Moderate

Table A6. TCFD.

No.	Identified risk or opportunity	Probability	Impact
Trend: The TCFD has been a leading framework for climate-related disclosures since 2017, providing guidelines for climate risk-related reporting on governance, strategy, risk management, and metrics and targets. Its guidelines for reporting climate-related disclosures have been incorporated into the ISSB, ESRS, SEC, and GRI standards, etc.			
1.3a	*Opportunity:* Potential opportunity for oil and gas corporations to improve their ESG ratings through disclosing in accordance with TCFD standards, with the potential to improve their cost of capital.	High	Low
No significant risks were identified with the TCFD disclosure framework.			

Table A7. CDP.

No.	Identified risk or opportunity	Probability	Impact
Trend: Investors and other stakeholders or third parties request disclosure information through the CDP's sector specific disclosure platform.			
1.4a	*Opportunity:* Potential opportunity for oil and gas companies to improve their cost of capital by voluntarily disclosing through the CDP, and/or responding to their questionnaire when requested.	High	Low

Table A7. (Continued)

No.	Identified risk or opportunity	Probability	Impact
	Trend: CDP has partnered with the Net-Zero Data Public Utility (NZDPU) to provide information to track progress on GHG emission reductions and targets.		
	NZDPU will be a centralized repository (is currently a 'proof of concept') of global company-level GHG emissions data that will be publicly available, providing information on Scope 1, 2, and 3 emissions and tracking progress toward net zero, with data provided by the CDP.		
1.4b	*Opportunity:* Potential opportunity for oil and gas corporations to position themselves as climate leaders by voluntarily disclosing through the CDP and disclosing complete information as required per the CDP's questionnaire.	Low	Low
	No significant risks were identified with CDP disclosures.		

Table A8. ESRS.

No.	Identified risk or opportunity	Probability	Impact
	Trend: Requirement to limit the neutralization of GHG emissions toward net zero to 10%. ESRS E1 clause 57: "In the case where the undertaking discloses a net-zero target in addition to the gross GHG emission reduction targets (as required by Disclosure Requirement E1-4, paragraph 32), it shall explain the scope, methodologies and frameworks applied and how the residual GHG emissions (after approximately 90-95% of GHG emission reduction) are intended to be neutralised by GHG removals in its own operations and value chain".		
1.5a	*Risk:* Potential impact on oil and gas corporations that rely heavily on hydrocarbons as their main revenue source, affecting their competitive positioning and global perception of sustainability. For example, if Aramco does not comply with the net-zero definition under ESRS, it could be perceived as failing to meet its net-zero targets, potentially damaging its sustainability credentials and ESG ratings compared to other oil and gas majors.	Medium	High
1.5b	*Risk:* Potential risk to oil and gas corporations' net-zero pathway strategies if the 5%-10% limitation to removals becomes globally accepted as the science-based net-zero methodology for all industries. This could impact oil and gas companies' ESG ratings due to rating agencies factoring in the impact of existing and emerging environmental regulations and policies into their methodologies (e.g., Moody's). They could also be impacted by ESG rating agencies that consider science-based net-zero targets and their progress toward net zero.	Medium	Moderate
	Trend: Requirement to report operational and value chain gross Scope 3 emissions		
1.5c	*Risk:* The potential impact on oil and gas corporations that are not already reporting Scope 3 emissions due to an increase in the cost of reporting includes an increased cost burden to comply with Scope 3 reporting, which involves additional data collection, potential cost premiums from already compliant suppliers, and required assurances.	High	Low

Table A8. (Continued)

No.	Identified risk or opportunity	Probability	Impact
1.5d	*Risk:* The potential impact on the reputation of oil and gas corporations in comparison to other global leaders who are already reporting Scope 3 emissions, particularly if oil and gas corporations have higher Scope 3 emissions than similar entities in other industries, such as Aramco, which, if they report their Scope 3 emissions, could be exposed to reputational risk due to the potential criticism of being high polluters, leading to a potentially increased drop in their ESG ratings compared to other oil majors.	High	High
1.5e	*Risk:* Oil and gas corporations could experience lower demand for their products than other global leaders who are already reporting Scope 3 emissions if GHG emissions are factored into buyers' purchasing criteria, meaning Aramco's competitive positioning versus other oil majors with lower GHG emissions could be threatened due to lower demand from oil and gas buyers who factor GHG emissions into their purchasing decisions.	High	Moderate
Trend: Requirement for non-EU companies to report under the ESRS from 2030 (delayed from 2028, announced January 25, 2024).			
1.5f	*Risk*: International oil and gas sales to the EU could be impacted if non-EU oil and gas corporations do not comply with the ESRS reporting requirements, potentially affecting foreign companies' market position in the EU.	Medium	Moderate
No significant opportunities were identified with the ESRS disclosure standards.			

Table A9. SEC.

No.	Identified risk or opportunity	Probability	Impact
Trend: Costs of reporting by corporations listed in SEC-regulated U.S. market.			
1.6a	*Risk:* Potential risk to oil and gas corporations that are U.S. listed and will be subject to the costs of reporting.	Low	Low
Trend: Requirement for oil and gas companies listed in the U.S. to report ESG metrics under the SEC rules (publication of finalized requirements postponed to 2025).			
1.6b	*Risk:* Market access to the U.S. could be impacted if oil and gas corporations do not comply with SEC reporting requirements.	Low	Low
No significant opportunities were identified with the proposed SEC disclosure requirements.			

Source: Kearney (2024).

Appendix 3: Justifications for Disclosure Probability and Impact Levels

Table A10. GRI.

No.	Maturity justification	Impact justification
1.1a	*High* – The GRI has been active since 2000, with its first global standard released in 2016. The standard is still active and used by some 10,000 corporations today.	*Low impact* – Some negative impact on the profit margins of oil and gas corporations currently reporting to the GRI and would be subject to ESRS or ISSB reporting.

Table A11. ISSB.

No.	Maturity justification	Impact justification
1.2a	*Medium* – The ISSB has published its standards, with an effective date of January 1, 2024. However, although some jurisdictions have incorporated ISSB standards into their national standards, no jurisdiction has announced ISSB to be fully operative.	*Low impact* – Some negative impact on profit margins in jurisdictions enforcing ISSB standards.
1.2b	*Medium* – The ISSB has published its standards, with an effective date of January 1, 2024. However, although some jurisdictions have incorporated ISSB standards into their national standards, no jurisdiction has announced ISSB to be fully operative.	*High impact* – Potential impact on the ESG ratings of corporations that have higher Scope 3 emissions than their peers, as GHG emissions are used as an environmental metric in some ESG rating agencies. However, the weighting of this factor is unknown.
1.2c	*Medium* – The ISSB has published its standards, with an effective date of January 1, 2024. However, although some jurisdictions have incorporated ISSB standards into their national standards, no jurisdiction has announced ISSB to be fully operative.	*Moderate impact* – Loss of market access to jurisdictions enforcing ISSB standards. The impact of this could be high. However, there is the potential for oil and gas companies to redirect their sales to other regions if GHG emissions do not factor into purchasing criteria.
1.2d	*Medium* – The ISSB has published its standards, with an effective date of January 1, 2024. However, although some jurisdictions have incorporated ISSB standards into their national standards, no jurisdiction has announced ISSB to be fully operative.	*Moderate impact* – Loss of market access to jurisdictions enforcing ISSB standards. The impact of this could be high. However, there is the potential for oil and gas companies to redirect their sales to other regions if GHG emissions do not factor into purchasing criteria.
1.2e	*Low* – Saudi Arabia has not announced an alignment with the ISSB standards. However, it is working on aligning its national standards with the ISSB's.	*Moderate impact* – Potential to improve ESG ratings by 5%-10% if oil and gas corporations are mandated to report to ISSB standards. For example, if Aramco discloses its management of transition risk, this could reduce the "unmanaged risk," as per Sustainalytics, and mitigate risk according to Moody's.

Table A12. TCSD.

No.	Maturity justification	Impact justification
1.3a	*High* – The TCFD has been active since 2017. However, it was disbanded in November 2023 following the release of the ISSB standards. Its climate-risk reporting recommendations will remain open for reference but will not be updated as an independent standard.	*Low impact* – Potential improvement in ESG ratings.

Table A13. CDP.

No.	Maturity justification	Impact justification
1.4a	*High* – The CDP questionnaire is actively used to disclose sustainability matters.	*Low impact* – potential decrease in cost of capital for oil and gas corporations.
1.4b	*Very low* – The NZDPU is still in development and is currently a proof of concept. No announcement on whether this platform will materialize and if the NZDPU would be a functioning platform available for public use.	*Low impact* – potential decrease in cost of capital for oil and gas corporations and improvement to climate ambition image.

Table A14. ESRS.

No.	Probability justification	Impact justification
1.5a	*Medium* – An oil and gas industry-specific statement has been issued in the ESRS and accepted by the CSRD. However, it is still unclear how this statement will be enforced.	*High impact* – Given the oil and gas industry's high emitter status, reducing the application of mitigation technologies will significantly impact these companies' ability to meet their net-zero targets.
1.5b	*Medium* – An oil and gas industry-specific statement has been issued and accepted by the CSRD. However, it is still unclear how this statement will be enforced.	*Medium impact* – This statement aligns with the SBTi's definition of net zero. If the SBTi's science-based methodology becomes the globally accepted definition of net zero for oil and gas companies, this could potentially impact oil and gas corporations' perception of sustainability if they proceed with their current pathways of meeting net zero with removals >10%. This could lower these companies' ESG ratings, as they would either not be setting a science-based net-zero target and/or not progressing toward net-zero.
1.5c	*High* – The CSRD has adopted ESRS standards, and Scope 3 emissions have been reported and disclosed by some EU corporations.	*Low impact* – Some negative impact on profit margins.
1.5d	*High* – The CSRD has adopted ESRS standards, and Scope 3 emissions have been reported and disclosed by some EU corporations.	*High impact* – Potential negative impact on the ESG ratings of corporations with higher Scope 3 emissions than their peers, as GHG emissions are used as an environmental metric in some ESG rating agencies. However, the weighting of this factor is unknown.

Table A14. (Continued)

No.	Probability justification	Impact justification
1.5e	*High* – The CSRD has adopted ESRS standards, and Scope 3 emissions have been reported and disclosed by some EU corporations.	*Moderate impact* – Loss of market access to the EU, the impact of which could be high. However, oil and gas companies could redirect their sales to other regions if GHG emissions do not factor into purchasing criteria.
1.5f	*Medium* – The CSRD has adopted ESRS standards but has delayed the reporting to 2030 (it is not being implemented until 2030).	*Moderate impact* – Loss of market access to the EU, the impact of which could be high. However, oil and gas companies could redirect their sales to other regions if GHG emissions do not factor into purchasing criteria.

Table A15. SEC.

No.	Maturity justification	Impact justification
1.6a	*Low* – The SEC has delayed its final publication of its mandatory regulatory reporting requirements, and it has yet to publish an official effective date.	*Low impact* – Some negative impact on the profit margins of oil and gas corporations listed in the U.S. or that are third-party contractors to U.S. companies required to report Scope 3 emissions under SEC rules.
1.6b	*Low* – The SEC has delayed its final publication of its mandatory regulatory reporting requirements, and it has yet to publish an official effective date.	*Low impact* – 20%-40% loss of exports to U.S. The impact could be higher. However, oil and gas companies could redirect their sales to other regions if GHG emissions do not factor into purchasing criteria.

Source: Kearney (2024).

Appendix 4: Initial Screening of ESG Rating Risks and Opportunities

Table A16. S&P ESG ratings.

No.	Identified risk or opportunity	Probability	Impact
	Trend: S&P ESG scores assign a weight of 40% to the environmental element in their scoring of the upstream oil and gas sector. S&P's Corporate Sustainability Assessment (CSA) is the basis for S&P ESG scores. For the "Oil & Gas Upstream & Integrated" sector, S&P CSA assigns a weight of 40% to the environmental dimension (26% for social, and 34% for governance). Of the 40% environmental weighting, 7% is for emissions (Scope 1, 2 and 3), 8% is for energy mix, and 8% is for climate strategy (third party verified climate strategy targets, e.g., SBTi net-zero targets).		
2.1a	*Risk:* Potential risk to upstream or integrated corporations with high GHG emissions (Scope 1, 2 and 3). Potential risk of Aramco having higher Scope 3 emissions than its peers.	High	Low

Table A16. (Continued)

No.	Identified risk or opportunity	Probability	Impact
2.1b	*Risk:* Potential risk to upstream or integrated corporations relying on fossil fuels as their main revenue source. They could disadvantaged by S&P ESG scores. Potential risk that Aramco could have a higher risk score for energy mix (renewables) than its peers that are transitioning much faster.	High	Low
Trend: S&P ESG scores use publicly available disclosures as inputs to the S&P's CSA survey for companies that do not respond to or complete it. S&P analysts will answer on behalf of companies that do not respond to the S&P's survey and that have publicly available disclosures. S&P gives a score of 0 to questions with no responses or to those companies that do not have publicly available information for S&P analysts to use in place of a direct response from the company, penalizing companies that do not report.			
2.1c	Opportunity: Potential opportunity for oil and gas companies to improve their S&P ESG ratings through reporting disclosures comprehensively (a potential opportunity to improve their sustainability image when benchmarked against their peers).	High	Moderate

Table A17. CDP.

No.	Identified risk or opportunity	Probability	Impact
Trend: Investors and other stakeholders or third parties request information through the CDP's sector-specific disclosure platform. CDP ESG ratings are assessed based on inputs from the CDP's sector-specific disclosure questionnaire, which evaluates how a corporation responds using a weighted average system. A score is given from A to F in one of the 3 categories: Climate Change, Water Security or Forest. An F will be given if a company was requested to disclose data through the CDP and failed to do so or failed to provide sufficient information for the CDP to evaluate. To receive an A, a company must choose to disclose their response publicly and, at a minimum, disclose a particular set of information. Criteria for an A in climate change include the following: 1. Verification of 100% Scope 1 and 2 emissions and 70% or more of at least one Scope 3 emissions category (individually) 2. Disclose Scope 1 and 2 emissions for the reporting year. 3. Report transition plan, including 1.5 °C alignment, publicly available information, board level oversight and management responsibility, and a feedback mechanism must be in place or plans to implement a mechanism for the next two years must exist. 4. Indicate engagement with suppliers. 5. Report near-term emission targets validated by the SBTi or provide company-wide coverage, coverage of 95% of Scope 1 and 2 base year emissions and target year within 5-10 years of the year the target is set.			
2.2a	*Opportunity:* Potential opportunity for oil and gas corporations to position themselves as climate leaders and improve their sustainability image to investors by ensuring they respond to the CDP questionnaire when requested and provide complete information.	High	Low
No significant risks were identified with the CDP's ESG rating.			

Table 18. Sustainalytics.

No	Identified risk or opportunity	Probability	Impact
Trend: Sustainalytics scores assess unmanageable risks within the same industry; scores are adjusted based on individual companies' management of risks. Sustainalytics scores a company's ESG rating by assessing its unmanaged risk in comparison to its peers within the same sector. It assesses the unmanaged risks faced by the corporation. (There is a possibility that some risks are unmanageable within a sector, and this therefore would be incorporated into the assessment of all applicable companies within that sector).			
2.3a	*Opportunity:* Potential opportunity for oil and gas companies to improve their ESG ratings by improving the disclosure of their management of identified risks. As Sustainalytics assesses corporations across an industry, the "unmanageable risks" (e.g., regulations or policies on the phase-out of fossil fuels, stranded assets, etc.) would remain the same across the sector. There is therefore an opportunity for hydrocarbon producers like Aramco to improve their scores when benchmarked against their peers.	High	Low
Trend: Sustainalytics scores corporations in the oil and gas sector as high risk.			
2.3b	*Risk:* Corporations relying on fossil fuels as their main revenue source could be disadvantaged by Sustainalytics' ESG scores. Potential risk to Aramco of having a higher risk score for energy mix (renewables) than its peers that are transitioning faster.	High	Low

Table 19. Moody's ESG rating.

No	Identified risk or opportunity	Probability	Impact
Trend: Moody's provides a generic overview of how ESG factors are incorporated into their Issuer Profile Scores (IPS) and Credit Impact Scores (CIS), but no weighting is disclosed. However, Moody's groups environmental impacts into two categories: risks or opportunities from regulations and policies, and risks or opportunities from physical factors that could impact creditors. IPS scores are based on factors across ESG dimensions and CIS scores are qualitative assessments based on Moody's analysis of ESG impacts on credit ratings (Moody's assigns a letter grade to an issuer or a transaction). IPS scores range from 1 to 5, in each of the E, S, and G dimensions (with a 1 indicating a benefit/opportunity, and a 5 indicating a high risk). CIS scores range from 1 to 5, with a 1 indicating a positive ESG impact on an entity's associated credit rating (meaning the entity has a higher credit rating than it would have had in the absence of its ESG score) and a 5 indicating a negative ESG impact on an entity's associated credit rating (meaning the entity would have had a higher credit rating without its ESG score).			
2.4a	*Risk:* Oil and gas companies could be at a disadvantage compared to other sectors. Companies could have lower Moody's credit ratings due to their exposure to having a higher carbon transition risk, as assessed by Moody's (Moody's provides an IPS and CIS score of 4 or 5 for companies with higher exposures to carbon transition risk). Carbon transition risks include metrics like business reliance on carbon-intensive/GHG-intensive products; loss of production due to regulatory and policy initiatives; increased demand for low-carbon-intensive products, alternative sources of energy or raw materials.	High	Low
No significant opportunities were identified with Moody's ESG rating.			

Source: Kearney (2024).

Appendix 5: Justifications for ESG Ratings Probability and Impact Levels

Table 20. S&P ESG rankings.

No.	Probability justification	Impact justification
2.1a	*High* – S&P ESG ratings are developed and in use, with over 10,000 companies scored (of these, only 2,200 corporations responded to the S&P's CSA survey in 2022).	*Low impact* – Oil and gas corporations are subject to low ESG ratings in the environmental category due to their potentially high Scope 3 emissions and/or potentially receiving a lower score for not disclosing Scope 3 emissions (with a potential increase in their cost of capital).
2.1b	*High* – S&P ESG ratings are developed and in use, with over 10,000 companies scored (of these, only 2,200 corporations responded to the S&P's CSA survey in 2022).	*Low impact* – Potential increase in cost of capital.
2.1c	*High* – S&P ESG ratings are developed and in use, with over 10,000 companies scored (of these, only 2,200 corporations responded to the S&P's CSA survey in 2022).	*Moderate impact* – Potential decrease in cost of capital.

Table 21. CDP.

No.	Maturity justification	Impact justification
2.2a	*High* – The CDP has disclosed sustainability matters through its questionnaire.	*Low impact* – Potential decrease in cost of capital for oil and gas corporations.

Table 22. Sustainalytics.

No.	Maturity justification	Impact justification
2.3a	*High* – Sustainalytics is an active ESG ratings agency.	*Low impact* – Potential decrease in the cost of capital for oil and gas corporations when benchmarked against companies in the same industry.
2.3b	*High* – Sustainalytics is an active ESG ratings agency.	*Low impact* – Potential increase in the cost of capital for oil and gas corporations when benchmarked against companies across all industries.

Table 23. Moody's ESG rating.

No.	Maturity justification	Impact justification
2.4a	*High* – Moody's launched their IPS and CIS scores in January 2021, providing their assessments of ESG impacts on their conventional (lettered) credit ratings.	*High impact* – Potential increase in the cost of capital for oil and gas corporations based on Moody's credit ratings.

Source: Kearney (2024).

About the Authors

Claudia Belahmidi is a Senior Fellow in KAPSARC's Oil and Gas program, with a focus on the impact of ESG topics and climate finance on the hydrocarbon industry. Claudia has more than 13 years of research and industry experience analyzing energy markets, policies, and companies. Before joining KAPSARC, Claudia worked at S&P Global as an Equity and Strategy Analyst in the Commodity Insights Team, providing flagship and bespoke insights and analysis on a number of integrated oil companies as well as European independent producers. Previously, Claudia spent three years as an Energy Research Analyst (Northern Europe and North America) with IHS. She holds a B.A. in Political Science and an M.A. in International Affairs from the Fletcher School, Tufts University.

About the Project

In the context of net-zero ambitions and increasing investor awareness of ESG-related risks, especially since COP28 concluded to “transition away” from fossil fuels, hydrocarbon projects have been challenged with securing financing at competitive rates. This challenge poses a dilemma given the wide consensus that hydrocarbon demand is expected to grow further out to 2045 (OPEC World Oil Outlook 2045) while exploration for new reserves will become more costly to finance. Increasingly comprehensive reporting on ESG metrics aims to make the potential for stranded assets more transparent to investors and address both perceived and real threats. While adding costs to the industry’s reporting regimen, increased ESG transparency has become a vital instrument in retaining investor confidence in oil and gas projects. This project will help identify short- and medium-term ESG risks and opportunities, both globally and within the local context of the Kingdom of Saudi Arabia. It will assess the capital costs associated with these risks, and make recommendations as to how sustainability finance can be utilized by the Kingdom to narrow the cost of capital gap with less carbon-intensive industries.

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