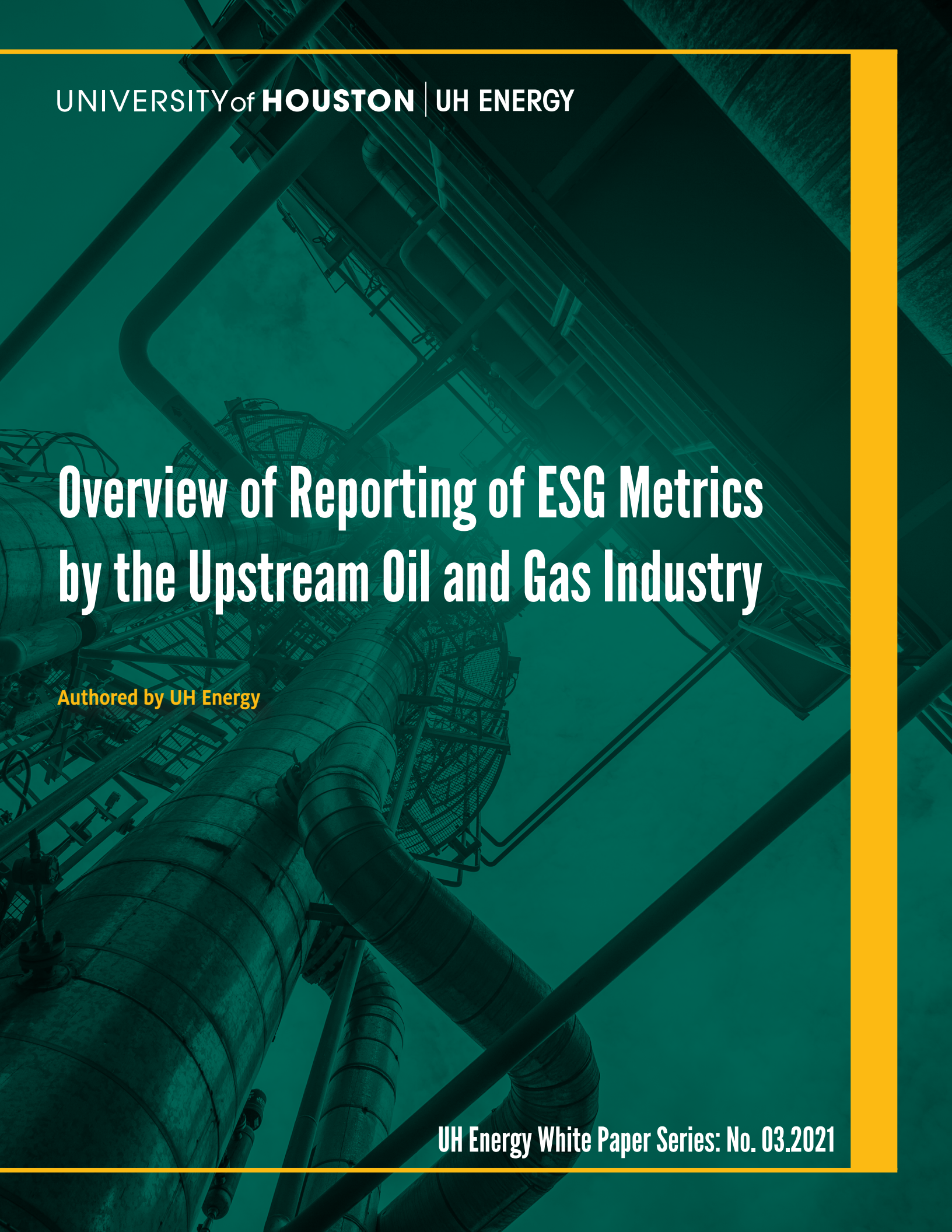

UNIVERSITY of HOUSTON | UH ENERGY

Overview of Reporting of ESG Metrics by the Upstream Oil and Gas Industry

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Executive Summary

The importance of measuring, reporting, and managing Environmental, Social, and Governance (ESG) metrics has gained greater momentum with the ongoing energy transition. In the hydrocarbon energy sector, upstream oil and gas majors have taken the lead and have been reporting and managing many aspects of ESG for the past several years; however, given the lack of a common methodology, organizations tend to include the metrics that are most material to them, those required by regulation, and those related to conventional measures of Health, Safety, and Environment (HSE).

The spotlight caused by the energy transition has highlighted the need to evolve to more comprehensive, robust, advanced, and transparent metrics for ESG. As a result, several industry groups are actively working on developing common methodologies on what is included in ESG, what needs to be measured, reported, and managed. Their efforts indicate that managing GHG emissions, emerging social risks, and transparency of corporate governance are the greatest near-term challenges. Debottlenecking these challenges requires developing an industry-wide platform for ESG data wherein a union of items from the three leading standards or frameworks, *i.e.,* SASB, GRI, and IPIECA, is included as guidance for measurable and continued progress on an array of ESG factors, standardized reporting, and the active engagement of all stakeholders.

A. Introduction

The energy transition is impacting the oil and gas (O&G) value chain and transforming exploration and production, refining, supply and demand, legal and regulatory obligations, and the industry's social license to operate. Moreover, new and growing physical and financial risks from climate change and highlighting of social risks are compounding the industry's volatility.

The industry will be among the most exposed to a variety of such risks (see Figure 1) and will require a sustainable, low-carbon, and equitable strategy to navigate through the energy transition (S&P Global, 2019e). Measuring, reporting, and managing a comprehensive, robust, advanced, and transparent array of ESG metrics are critical for developing a deeper understanding of the opportunities and challenges in this dynamic landscape and ensuring reliable, affordable, and sustainable energy for all. Effective ESG reporting has rapidly grown to be a determinant of market and societal preferences and a dominant marker of global leadership.

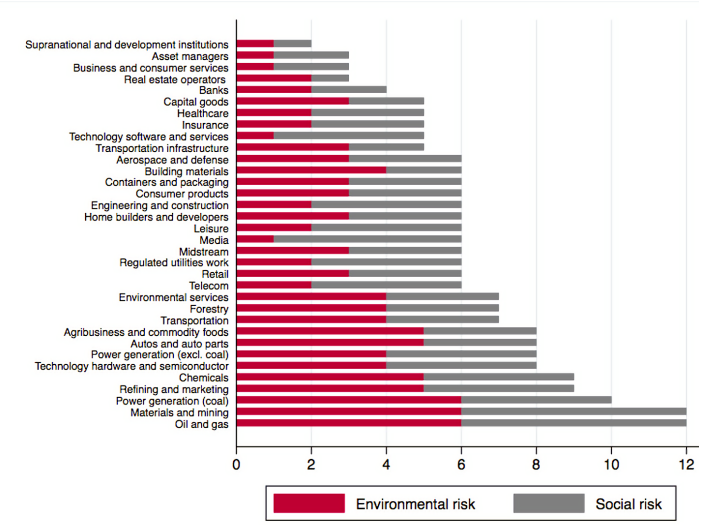


Figure 1. ESG Risk Atlas. Adapted from S&P Global (2019).

S&P uses an ESG Risk Atlas to calibrate the relative ranking of sectors, which combines a sector's exposure to environmental and social risks, scoring it on a scale of 1 to 6. A score closer to 1 represents low sector-wide exposure, while 6 indicates high sector-wide exposure to environmental and social risk factors (S&P Global, 2019e). For Governance risks, the Risk Atlas states, "While governance is best measured at the company level, we see the oil and gas exploration and production sector as having above-average exposure. This results from the strong compliance and oversight needed because of the sensitivities around bidding for and corruption relating to natural resources, particularly in emerging markets. Government ownership can exacerbate the sector's lack of transparency. Furthermore, the high severity of safety incidents also means board oversight and understanding of risk management and company culture have high importance.

I. Environmental Stewardship

The O&G industry has historically included many aspects of environmental stewardship and social responsibility as part of its operations. Many of the environmental considerations, such as criteria contaminants, are regulated and compliance is mandatory for continued operations.

Over the last several years, the relationship between emissions from the O&G value chain and anthropogenic climate change has been examined, documented, debated, and agreed upon. While technology and policy solutions for emissions reduction exist, their adoption increases costs and/or involves different business models and associated risks.

Additionally, there is global concern about how the physical impacts of climate change, like coastal flooding, frequent storms, wildfires, etc., can affect business operations. While mitigation solutions are being explored, the uncertainty associated with how quickly they can be scaled up worldwide and whether the financial investment, multistakeholder partnerships and policy support required for at-scale mitigation can be successfully organized have increased organizations' risks.

II. Social Responsibility

Most leading international O&G companies, especially those operating in resource-rich countries have performed their social responsibilities in measurable and effective ways as part of their license to operate. However, the scope of an organization's social responsibility efforts and metrics vary based on their location and the communities they operate in.

A growing focus on diversity, inclusion, equity, and social justice is driving decision-making and prioritization around how organizations are handling these issues and managing the risks posed to their long-term performance. Effective strategies to address these societal drivers especially environmental justice and energy equity in quantifiable ways are becoming increasingly important, especially for organizations operating in the U.S.

III. Governance

Unlike traditional business risk, the impacts of social and environmental risks manifest over a longer period than the typical business cycle. These risks affect operations in multiple areas and are often outside the direct influence of the organization. Managing social and environmental risks, therefore, requires connecting them to the business model and developing adaptive strategies to mitigate all forms of risks. The Governance component of ESG includes how an organization manages the above challenges, builds, and maintains trust among all stakeholders, and sustains its long-term viability.

IV. Measuring ESG Performance-Standards and Reporting Frameworks

Given the broad scope of ESG, several industry groups are working on defining reporting frameworks and standardizing appropriate metrics and methodologies. Individual organizations, as part of these groups, have shared their best practices and feedback in the development of these guidelines. Figure 2 provides a list of these industry groups and what they offer.

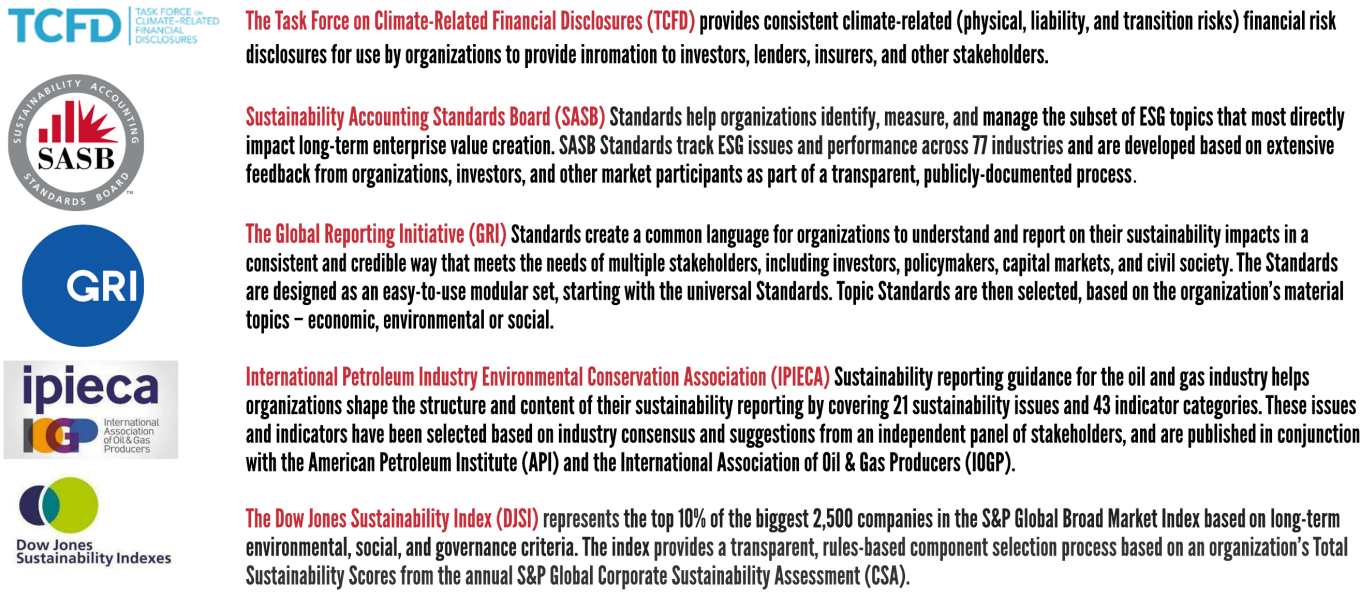


Figure 2. Reporting frameworks and standards developed for ESG across a broad arena of industry.

While the overarching priorities and motivations for reporting within these frameworks are comparable, differences occur in the specifics. These industry organizations are not enforcement agencies and as such their outputs provide guidelines. The detailed comparison of the three leading and most referred to frameworks, i.e., Sustainability Accounting Standards Board (SASB), Global Reporting Initiative (GRI), and IPIECA, is included in Section F (Sustainability Accounting Standards Board, 2018) (GRI Standards, 2020) (IPEICA, 2021).

The O&G industry is yet to adopt a commonly accepted methodology based on these standards that can map ESG metrics, risks, and their impact on an organization's overall performance onto a single framework. To address this challenge, the U.S. Securities and Exchange Commission (SEC) is evaluating options that can provide a common set of guidelines for organizations to report their ESG metrics (U.S. SEC, 2021).

As compared to the federal agency's recent interest in mainstreaming and standardizing ESG measurement and reporting, institutional and individual investors have always guided investment decisions and evaluated the performance of an organization based on its ability to manage risks. Shared practices on traditional business risks, how to quantify them in financial terms, and manage and mitigate them are well-established in the industry.

However, the lack of a commonly accepted methodology for assessing ESG risks makes it challenging for investors to incorporate a comprehensive assessment, which includes ESG metrics, as part of their evaluation of an organization. To fill this gap, several organizations offer ESG performance scores and rank companies through commercial products and services (see Figure 3).

- Organizations like GRI, SASB, Task Force on Climate-related Financial Disclosures (TCFD), and IPIECA provide frameworks for disclosure and do not evaluate companies.
- Organizations like Bloomberg and Morgan Stanley Capital International (MSCI) passively pull information from sustainability reports, aggregate data, and add ratings.
- Organizations like Carbon Disclosure Project (CDP) and Just Capital actively request information, aggregate data, and add ratings.
- Organizations like the Sustainable Brand Index and the Civic 50 purchase data and ratings from other raters and add rankings.

However, many of these products and services are proprietary and their methodologies are not publicly available. This hinders transparency, comparative assessments between organizations, and knowledge sharing and transfer within the industry.

B. Materiality for O&G Operators and Service Companies

Historically, large international O&G operators, international service companies, some mid-sized and a few independent O&G companies have been tracking their performance on several ESG metrics. In the industry, these efforts are also known as Corporate Social Responsibility (CSR). These measurement and reporting activities have been mostly driven by the organization's regulatory obligations, including environmental regulations, as part of their

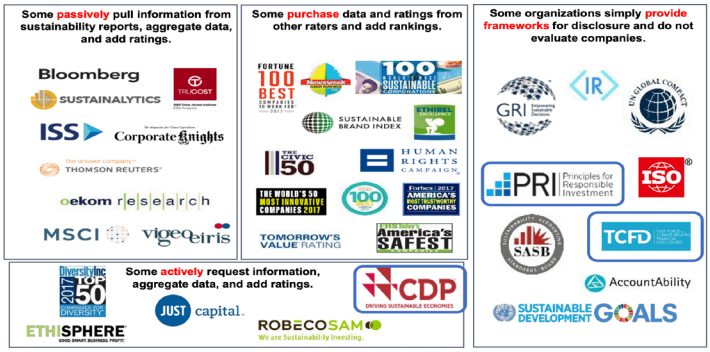


Figure 3. Frameworks for evaluation of ESG performance through commercial products and services.

ongoing effort to maintain their license to operate with the host governments and communities in which they operate. However, several new risk factors have now gained prominence and must be addressed.

These include climate risks, water management and usage risks, and risks associated with practices in the areas of diversity and inclusion, human rights, equity, and social justice. These non-traditional risks, of which many are intangible, present challenges for what to measure, how to evaluate the risks in fiscal terms, and how to benchmark the performance and reporting on key metrics beyond what the organization has traditionally believed to be relevant to its operations.

Different ESG aspects present different levels and forms of risks to business operations and performance. U.S. SEC guidelines state that organizations must report on items of risk that have a material impact on business performance, such that "the omission or misstatement of an item in a financial report is material if, in the light of surrounding circumstances, the magnitude of the item is such that it is probable that the judgment of a reasonable person relying upon the report would have been changed or influenced by the inclusion or correction of the item" (FASB, 2018) (U.S. SEC, 1999).

Therefore, materiality is the threshold above which missing or incorrect information in financial statements is considered to have an impact on the decision-making of users. The concept of materiality in financial terms is well understood and practiced in financial reports (Accounting Tools, 2021). However, attributing financial values to non-financial performance metrics and including them in financial reports is a challenge. To circumvent this challenge, most companies resort to including their non-financial performers in their sustainability reports instead of their financial reports.

Although materiality is a well-established concept within sustainability reporting guidelines and standards, there are variations in how it is defined and used. Guidance and definitions of materiality aim to ensure that important issues are communicated to stakeholders and that the company's ESG efforts are effectively measured, transparently disclosed, and best practices are shared within and across industries.

To this end, SASB has developed a complete set of 77 industry-specific sustainability standards (Sustainability Accounting Standards Board, 2018). Through these standards, SASB identifies the issues that are likely to impact the financial condition or operating performance of an organization, and therefore, are most important to investors. In 2018, SASB published these standards, providing a complete set of industry-specific standards which identify the minimal set of financially material sustainability topics and their associated metrics.

GRI's standards provide additional clarifications on the term "impact" as referred to in the "Materiality principle". These standards create a common language for organizations and stakeholders through which the economic, environmental, and social impacts of organizations can be communicated and understood. The interrelated standards are designed to enhance the global comparability and quality of information on these impacts, thereby enabling greater transparency and accountability of organizations.

The overall aim of GRI's standards is to aid how organizations communicate about the impacts they have on the economy, the environment, and society. This includes not just those impacts that have immediate consequences from a business perspective, such as financial costs or damaged reputation, but also the significant outward impacts on the economy, the environment, and society.

This enables the timely discovery of less visible issues that may need action or have critical consequences in the long term and provides stakeholders with information about an organization's contributions – positive or negative – toward the goal of sustainable development.

IPIECA is the global oil and gas industry association for advancing environmental and social performance. Its "Sustainability Reporting Guidance for the oil and gas industry" is a key tool to help companies shape the structure and content of their sustainability reporting. Published in conjunction with the American Petroleum Institute (API) and the International Association of Oil & Gas Producers (IOGP), it brings together the collective wealth of technical expertise from the membership of the three associations. IPIECA provides a comparison of materiality definitions as included in other industry standards and aims to develop, share, and promote good practices and knowledge (see Figure 4).

ESG metrics reported by organizations vary and are driven by several factors, including the nature of their business, operation locations, what their competitors are reporting, and most

importantly, what is material to their operations. The materiality assessment is influenced by the expectations of their key stakeholders, and this can vary between organizations that are in similar businesses but operate in different locations. Ultimately, organizations decide what is material to them and what information should be disclosed, taking legal obligations and requirements into account.

Defining materiality helps managers to develop, structure, and concentrate the organization's sustainability focus, strategies, tactics, training, team-building, and resources in ways that maximize return.

A structured materiality analysis can also provide other benefits such as operational excellence, improved relations with investors and key stakeholders, greater collaboration with external parties, and more effective deployment of human, financial and natural resources.

IPIECA Standards provide a comparisons of materiality definitions as included in other standards.

IPIECA
A principle and management process that determines which issues should be covered and their priority within a report.

GRI
Reporting must reflect the organization's significant economic, environmental, and social impacts; or aspects that substantively influence the assessments and decisions of stakeholders. Material topics are those that may reasonably be considered important for reflecting the organization's economic, environmental, and social impacts, or influencing the decisions of stakeholders.

Integrated Reporting
A matter is material if it could substantively affect the organization's ability to create value in the short, medium, or long term. The process of determining materiality is entity-specific and based on industry and other factors, as well as multistakeholder perspectives.

EU Non-financial Reporting Directive
Requires the disclosure of information to the extent necessary for an understanding of the development, performance, position, and impact of the organization's activities on matters relating to climate change impacts on a company's financial position, environmental, social and employee matters, human rights, anti-corruption, and bribery.

US GAAP
The omission or misstatement of an item in a financial report is material if, in the light of surrounding circumstances, the magnitude of the item is such that it is probable that the judgment of a reasonable person relying upon the report would have been changed or influenced by the inclusion or correction of the item.

Figure 4. Reporting frameworks and standards developed for ESG across a broad arena of industry.

C. Understanding Why Governance Matters

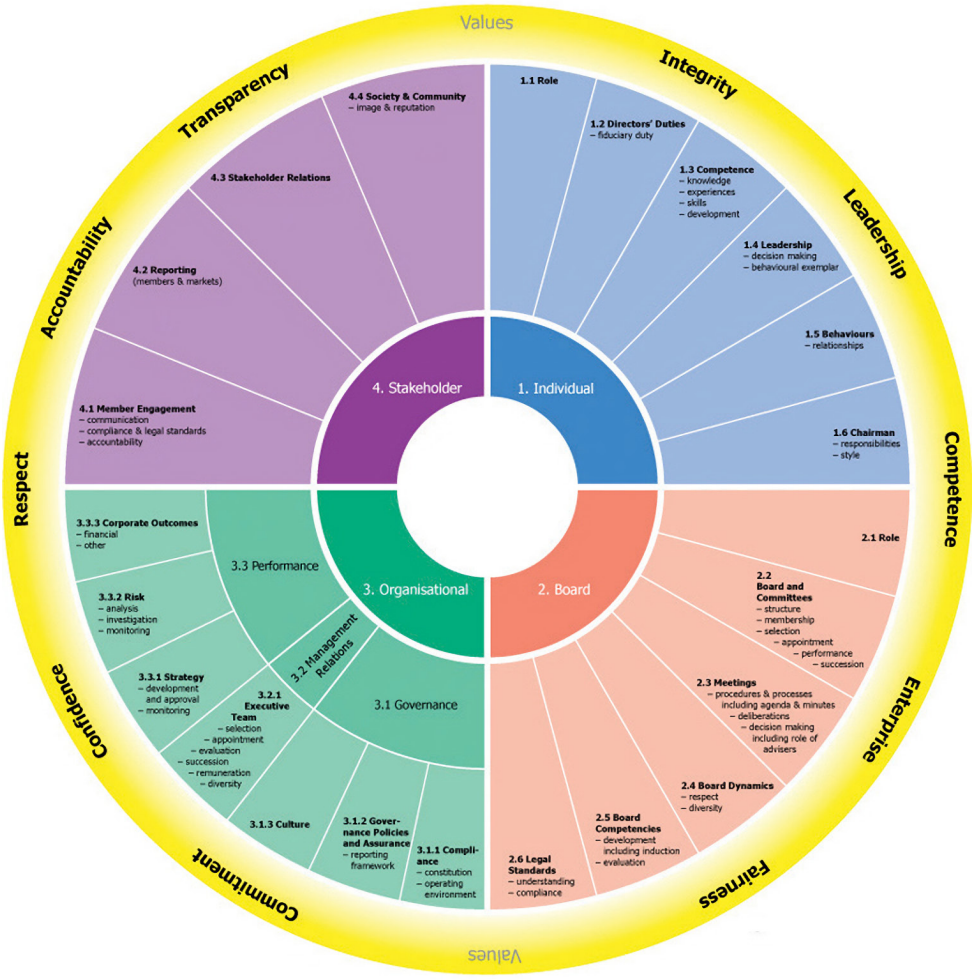
The "G" in ESG pertains to the governance factors of decision-making; from policymaking to the distribution of rights and responsibilities among different stakeholders in organizations, including the board of directors, managers, and shareholders. In the broad context of ESG, most organizations have gaps in their practices for the governance of E&S aspects of their business or have not yet grasped the significance of governance factors. This offers opportunities for significant improvement and knowledge sharing within the industry.

S&P Global's research on governance factors has demonstrated that companies that rank below average on good governance characteristics are particularly prone to mismanagement and risk their ability to capitalize on business opportunities over time (S&P Global, 2019a) (S&P Global, 2019b). S&P Global evaluates companies' governance performance by assessing four factors: structure and oversight, code and values, transparency and reporting, and cyber risk and systems. However, opinions within the industry on what governance interests should be prioritized in corporate decision-making are split. To provide guidance on governance, over 180 CEOs of major global corporations declared as part of the Business Roundtable in 2019 that companies should focus on providing benefits to all stakeholders alongside deriving profits for shareholders (S&P Global, 2019c).

When analyzing environmental, social, and governance factors, the "G" element is often forgotten amid "E" and "S" risks and opportunities. However, understanding governance risks and opportunities in decision-making is critical, as poor corporate governance practices have led to some of the biggest corporate scandals. Volkswagen's emissions tests scandal and Facebook's misuse of data caused significant financial damage to these companies (S&P Global, 2019d) (The New York Times, 2018). Other cases include Enron, BP's Deepwater Horizon explosion, TCP explosion, Brent Spar, etc. (Thomas, 2002) (U.S. EPA, 2010) (Collier, 2020) (Shell, 1995). In the face of the organization's missteps and increasing awareness of global climate change, diversity, and income inequality, corporate governance is a core component of ESG. Understanding the "G" in ESG is critical, as governance risks and opportunities will likely increase as social, political, and cultural attitudes continue to evolve. The following describes Corporate Governance by presenting the values which drive the practices of directors, boards, their organizations, and interactions with stakeholders (see Figure 5) (Australian Institute of Company Directors, 2017):

- **The individual quadrant:** This quadrant reflects the practices every director brings as an individual to their director role – for example, the responsibilities they have in relation to leadership both as a director and as a chairperson.

- **The board quadrant:** This quadrant reflects the practices of individual directors in relation to the whole board – their commitment to the successful



*Size of segments has no relation to importance
The values encircle the practices of directors, boards their organisations and interactions with stakeholders

Figure 5. Corporate Governance Framework. From Australian Institute of Company Directors.

functioning of the board and collegiate responsibilities.

- **The organizational quadrant:** This quadrant focuses on the overall and individual-level responsibilities of directors in relation to the performance of the organization and as part of the board, including those of senior executives. This quadrant also identifies the director-level operations that underpin peak organizational performance, including governance, risk, strategy, finance, and management relations.

- **The stakeholder quadrant:** This quadrant focuses on the essential interaction between directors and stakeholders. This is the outward focus corporate directors need to consider while carrying out directorship responsibilities. It reflects a focus that is beyond shareholders and caters to a broader range of stakeholders.

Additionally, the Business Roundtable has provided the following guidance on the principles of corporate governance (see Figure 6) (Harvard Law School Forum on Corporate Governance, 2016).

D. Climate-related Risks

Climate risks are non-stationary. Increasing temperatures will exacerbate climate risks and we must achieve net-zero GHG emissions to effectively mitigate them. Developing and implementing economically viable decarbonization solutions at the required scale is a challenge but being able to do so effectively will offer new and sustainable business opportunities to organizations.

The guidelines provided by SASB, GRI, and IPIECA indicate the sources and scope of the GHG gases that need to be monitored and measured. The Greenhouse Gas Protocol provides further clarity by

Rights and Equitable Treatment of Shareholders
Organizations should respect the rights of shareholders and help shareholders to exercise those rights. They can help shareholders exercise their rights by openly and effectively communicating information and by encouraging shareholders to participate in general meetings.

Interests of other Stakeholders
Organizations should recognize that they have legal, contractual, social, and market-driven obligations to non-shareholder stakeholders, including employees, investors, creditors, suppliers, local communities, customers, and policymakers.

Role and Responsibilities of the Board
The board needs sufficient relevant skills and understanding to review and challenge management performance. It also needs adequate size and appropriate levels of independence and commitment.

Integrity and Ethical Behavior
Integrity should be a fundamental requirement in choosing corporate officers and board members. Organizations should develop a code of conduct for their directors and executives that promotes ethical and responsible decision-making.

Disclosure and Transparency
Organizations should clarify and make publicly known the roles and responsibilities of the board and management to provide stakeholders with a level of accountability. They should also implement procedures to independently verify and safeguard the integrity of the company's financial reporting. Disclosure of material matters concerning the organization should be timely and balanced to ensure that all investors have access to clear and factual information.

Figure 6. Principles of Corporate Governance. Adapted from Business Roundtable and the Harvard Law School Forum on Corporate Governance.

classifying an organization's GHG emissions into three scopes (see Figure 7) (Sustain.Life, 2021).

Scope 1 are direct emissions from company-owned and controlled resources.

Scope 2 are indirect emissions from the purchase of goods and services from their suppliers, for example, the purchase of electricity. All GHG emissions released in the atmosphere from the consumption of purchased electricity, steam, heat, and cooling are part of Scope 2 emissions.

Scope 3 are all indirect emissions not included in Scope 2 and comprise of emissions from customers, end-users, and other downstream operations that utilize an organization's products and services.

Scope 3 emissions are the hardest to measure and monitor, and at present, most companies are not reporting Scope 3 emissions. Along with emissions reporting, the bigger challenge for organizations is to develop and demonstrate measurable progress on a viable plan of action to significantly and rapidly reduce GHG emissions.

Table 1 compares Scope 1 and Scope 2 emissions between 2016 and 2020 from several major upstream companies. Tables 2 and 3 detail Scope 1 and Scope 2 emissions over the same period from downstream, oilfield services companies, original equipment manufacturers (OEM) and electricity producers. The emissions are calculated on an equity share basis, *i.e.*, emissions based on a company's share of the risks and returns from all operations.

Thus far, investors' approach to boosting climate resilience has typically involved measuring the carbon emissions embedded in their investment portfolios. This measurement of carbon footprint helps assess the transition risk, *i.e.*, the transition to a low-carbon economy; but this strategy fails to account for the physical risks of climate change, such as rising sea level, droughts, flooding, wildfires, and cyclones (Deutsche Asset Management, 2017). These physical and potentially recurrent risks pose a greater immediate threat to investment. To assess their magnitude, the Financial Stability Board (FSB) established the Task Force on Climate-related Financial Disclosure (TCFD) in 2015 to develop voluntary, consistent climate-related financial risk disclosures for organizations to use when providing information to investors, lenders, insurers, and other stakeholders (TCFD, 2017).

TCFD's report provides recommendations for disclosing clear, comparable, and consistent information about the risks and opportunities presented by climate change. Widespread adoption of these recommendations will ensure that current and future impacts of climate change are routinely considered in business and

Figure 7. Scope 1, 2, and 3 emissions. Adapted from Sustain.Life

investment decisions, enhance market transparency, and enable efficient capital allocation for the low-carbon energy transition.

TCFD's framework is founded on the four thematic areas of governance, strategy, risk management, and metrics and targets (see Figure 8) (PRI, 2019) (Ceres, EDF, and PRI, 2018). Additionally, one of the key recommendations focuses on the resilience of an organization's strategy while accounting for different climate-related scenarios, including a 2 °C or lower scenario. The framework also advises that organizations provide climate-related disclosures in their mainstream (i.e., public) annual financial filings. TCFD believes that climate-related issues are material for many organizations and that its recommendations can be useful for effective compliance with current disclosure obligations, foster and enhance the quality of shareholder engagement, promote a more informed understanding of climate-related risks and opportunities by investors and others, and ensure that appropriate controls can be applied to the production and disclosure of information on climate-related issues.

TCFD recognizes that climate-related disclosures are evolving, and therefore, its recommendations can provide a foundation to improve organizations', investors', and other stakeholders' abilities to appropriately evaluate climate-related risks. Such improved practices and techniques can further improve the quality of climate-related disclosures and help appropriately price the opportunities and challenges related to climate change.

As organizations advance their decarbonization efforts, policy support can substantially de-risk the investment environment. If currently proposed U.S. federal policies aimed at net-zero electricity by 2035 are ratified by Congress and signed into law, the O&G industry will gain regulatory and legal certainty to back its decarbonization efforts. This will allow disruptive acceleration and diversification of the industry's low-carbon energy portfolio.

D. Navigating the Maze

The process of getting started in ESG can be confusing and possibly daunting. It is appropriate to start small, learn expeditiously and scale-up. Given the evolving ESG landscape, monitoring and reporting metrics must be prioritized by senior management and supported with appropriate resources. The following steps, based

Table 1. Scope 1 and Scope 2 emissions from upstream companies, 2016 to 2020, equity share basis, measured in MMtCO2eq

	2016	2017	2018	2019	2020
BP	57.6	56.6	54.2	54.4	45.5
Chevron	67.0	66.0	69.0	64.0	58.0
Exxon Mobil	125.0	123.0	124.0	118.0	112.0
Gazprom[1]	228.2	233.8	239.9	236.5	210.3
Pemex[1,2]	68.0	49.4	46.3	48.0	-
Royal Dutch Shell	83.0	85.0	82.0	80.0	72.0
Saudi Aramco	Data not publicly disclosed		61.3	71.0	67.0

1 Scope 1 emissions only

2 2020 data not publicly disclosed

Table 2. Scope 1 and Scope 2 emissions from downstream companies, 2016 to 2020, equity share basis, measured in MMtCO2eq

	2016	2017	2018	2019	2020
BASF	20.8	21.4	22.6	20.8	21.6
Dow	35.4	34.4	35.9	33.7	34.8
LyondellBasell	21.8	22.9	23.4	24.0	24.1
Phillips 66	35.5	35.4	35.7	34.7	30.0
SABIC	56.0	55.0	57.0	55.0	54.2
Total	55.0	54.0	58.0	59.0	55.0

Table 3. Scope 1 and Scope 2 emissions from oilfield services, OEM companies and electricity producers, 2016 to 2020, equity basis, measured in MMtCO2eq

	2016	2017	2018	2019	2020
Baker Hughes	0.8	0.7	0.6	0.8	0.7
Schlumberger	1.8	1.9	2.1	2.2	Data not publicly disclosed
Halliburton	2.1	2.2	4.7	3.9	2.7
NOV	Data not publicly disclosed	Data not publicly disclosed	1.3	Data not publicly disclosed	Data not publicly disclosed
Duke Energy	108.0	104.9	105.0	93.0	Data not publicly disclosed
NRG Energy	43.0	42.1	41.7	36.8	27.6
Southern Co	100.0	101.0	102.0	88.0	75.0

Governance
The organization's governance around climate-related risks and opportunities

Strategy
The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning

Risk Management
The processes used by the organization to indentify, assess, and manage climate-related risks

Metrics and Targets
The metrics and targets used to assess and manage relevant climate-related risks and opportunities

Figure 8. Core Elements of Recommended Climate-related Financial Disclosures. Adapted from PRI.

on experiences of several companies, provide a pathway to get started:

The first phase is to identify what aspects of ESG are relevant to the company.

- Identifying and examining the reporting of sector competitors.
- Review the various standards and identify a list of ESG factors that might be important.
- Conduct interviews with key stakeholders, both internal and external, to identify ESG metrics that are important to them and why.

The second phase is to identify those ESG metrics that are ***material*** to the business.

- Several senior managers are involved in this process and an aggregated list of material ESG metrics is created.
  The aggregated list is prioritized by the senior management.
- The prioritized list is communicated to all employees by operations managers.
- To ensure that ESG becomes a part of the fabric of the company, gathering of data, analyzing, setting of goals, and implementation of plans to achieve goals must be part of every operational manager's responsibility.
- The role of senior management must include working with the Board of Directors and develop a process to include ESG metrics as part of the Governance structure.

The reporting of ESG performance is to meet the needs of several stakeholders. The investor community is typically looking for reporting of items that are part of the SASB standards.

Shareholders of international companies follow the GRI standards. The IPIECA standards include detailed guidelines specifically for the oil and gas industry.

In developing a platform for gathering ESG data, a union of ESG metrics included in the three standards (SASB, GRI, and IPIECA), would meet the needs of most of the companies in the Oil and Gas industry.

The following is an example of how a union of SASB, GRI, and IPIECA standards for GHG emissions could prove useful. Consider the issue of GHG reporting.

		By source						
Emissions		Flared HC	Combustion (stationary and mobile)	Process emissions	Other vented emissions	Fugitive emissions	Cogeneration of heat and power	Generation of energy exported
GHG emissions by type	CO_2							
	CH_4							
	N2O							
	HFCs							
	PFC							
	SF_6							
	NF3							
Air emissions by type	VOCs							
	NOx							
	SOx							
	ODS							
	PM							

Figure 9. Framework for Collecting Emissions Data by Type and Source

While the overarching reporting from the three frameworks (SASB, GRI, and IPIECA) is philosophically comparable, differences may occur in the level of detail included in each framework.

All three frameworks suggest the tracking of total GHG emissions and air emissions at a corporate aggregate level. However, collecting granular data allows for aggregation in several useful formats. Figure 9 (see above) provides a framework for collecting the emissions data by type of emission and by source. The types of emissions and sources are a union of those suggested in the three standards mentioned above. All three standards recommend that companies collect these for Scope 1, 2, and 3 emissions.

Both GRI and IPIECA suggest additional ways for the data to be disaggregated to make it easier to monitor and manage GHG emissions. The following are suggested ways of disaggregating the data:

- By country of operation
- By line of business
- By nature of ownership (equity, financial control, and operational control)
- By intensity

E. Case studies to compare the reporting guidelines for different frameworks

I. Water Management

Table 4. Comparison of SASB, GRI, and IPIECA frameworks for Water Management reporting

	SASB	GRI	IPIECA
Water Management	Metrics and Core Elements	Metrics and Core Elements	Metrics and Core Elements
Water withdrawal	Total freshwater withdrawn *Basis and Units of Measurement- Measured in Thousand cubic meters (m^3)*	Total water withdrawal from all areas, and a breakdown of this total by sources- Surface water, Groundwater, Seawater, Produced water, Third-party water *Basis and Units of Measurement- Measured in Megaliters (Ml)*	Total volume of freshwater withdrawn *Basis and Units of Measurement- Measured in Thousand cubic meters (m^3)*
	Percentage of water withdrawn in regions with High or Extremely High Baseline Water Stress *Basis and Units of Measurement- Measured in %*	Total water withdrawal from all areas with water stress, and a breakdown of this total by sources- Surface water, Groundwater, Seawater, Produced water, Third-party water *Basis and Units of Measurement- Measured in Megaliters (Ml)*	Percentage of freshwater withdrawn in water-stressed or water-scarce areas *Basis and Units of Measurement- Measured in %*
	How and where is the water withdrawn *Basis and Units of Measurement- Measured by geographic location*		Total reduction in freshwater withdrawn by water reduction measures, including water replaced or recycled /reused within reporting boundaries
			Freshwater withdrawal per unit of production, the freshwater withdrawal intensity, and by business activity
			Freshwater withdrawals related to once-through cooling water, not included in the core reporting elements
Water consumption	Total freshwater consumed *Basis and Units of Measurement- Measured in Thousand cubic meters (m^3)*	Total water consumption from all areas *Basis and Units of Measurement- Measured in Megaliters (Ml)*	Total volume of freshwater consumed *Basis and Units of Measurement- Measured in Thousand cubic meters (m^3)*
	Percentage of water consumed in regions with High or Extremely High Baseline Water Stress *Basis and Units of Measurement- Measured in %*	Total water consumption from all areas with water stress *Basis and Units of Measurement- Measured in Megaliters (Ml)*	Percentage of freshwater consumed in water-stressed or water-scarce areas *Basis and Units of Measurement- Measured in %*

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Table 4 (cont'd). Comparison of SASB, GRI, and IPIECA frameworks for Water Management reporting

	SASB	GRI	IPIECA
	How and where is the water consumed *Basis and Units of Measurement- Measured by Geographic location*	Change in water storage, if water storage has been identified as having a significant water-related impact *Basis and Units of Measurement- Measured in Megaliters (Ml)*	Total reduction in freshwater consumed by water reduction measures, including water replaced or recycled /reused within reporting boundaries
			Freshwater consumption per unit of production, the freshwater consumption intensity, and by business activity, such as oil and gas production, refining
Water discharge	Volume of produced water and flowback generated *Basis and Units of Measurement- Measured in Thousand cubic meters (m^3)*	Total water discharge to all areas, and a breakdown of this total by types of destination- Surface water, Groundwater, Seawater, Produced water, Third-party water *Basis and Units of Measurement- Measured in Megaliters (Ml)*	Water discharges in areas with high water stress
	Percentage of produced water and flowback generated *Basis and Units of Measurement- Measured in %*	Total water discharge to all areas with water stress, and a breakdown of this total by sources - Surface water, Groundwater, Seawater, Produced water, Third-party water *Basis and Units of Measurement- Measured in Megaliters (Ml)*	For upstream facilities: the quantity of hydrocarbons and/or annual average concentrations in produced water and process wastewater discharged to surface water *Basis and Units of Measurement- Measured in Metric tonnes (t), milligrams per litre (mg/l), parts per million (ppm)*
	Hydrocarbon content in discharged water *Basis and Units of Measurement- Measured in Metric tons (t)*		For refineries and other downstream facilities: the quantity of hydrocarbons and/or annual average concentrations discharged to surface water from process wastewater and stormwater *Basis and Units of Measurement- Measured in metric tonnes (t), milligrams per litre (mg/l), parts per million (ppm)*
			Community and stakeholder engagement activities in

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Table 4 (cont'd). Comparison of SASB, GRI, and IPIECA frameworks for Water Management reporting

	SASB	GRI	IPIECA
			relation to the water discharge management
			Trends in discharged quantities with respect to operating conditions such as field maturity
			Volumes of produced water and process water that are: reused / recycled within the operation or to a third party; discharged to surface water; and/or disposed of via underground injection wells
Effluent discharge to water	Volume of produced water and flowback generated (1) injected, (2) recycled *Basis and Units of Measurement- Measured in thousand cubic meters (m^3)*	Priority substances of concern for which discharges are treated *Basis and Units of Measurement- Measured in number of incidents of non-compliance with discharge limits*	Quantity of substances other than hydrocarbons discharged to surface water from facilities
	Percentage of produced water and flowback generated (1) injected, (2) recycled *Basis and Units of Measurement- Measured in %*		Discharges to water by destination type
	Percentage of hydraulically fractured wells for which there is public disclosure of all fracturing fluid chemicals used *Basis and Units of Measurement- Measured in %*		
	Percentage of hydraulic fracturing sites where ground or surface water quality deteriorated compared to a baseline *Basis and Units of Measurement- Measured in %*		

II. GHG Emissions

Table 5. Comparison of SASB, GRI, and IPIECA frameworks for GHG Emissions reporting

	SASB	GRI	IPIECA
Greenhouse Gas Emissions	Metrics and Core Elements	Metrics and Core Elements	Metrics and Core Elements
Scope 1	Gross Global Scope 1 emissions *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*	Gross direct/ Scope 1 emissions and the GHGs included in the calculation whether CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3, or all. Base year and rationale for choosing it, if applicable; Source of the emission factors and the global warming potential (GWP) rates used, or a reference to the GWP source; Standards, methodologies, assumptions, and/or calculation tools used; Consolidation approach for emissions; whether equity share, financial control, or operational control *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*	Company-wide direct/ Scope 1 emissions, using operational, equity share or other method, and include direct CO_2; direct CH_4; and direct other greenhouse gases *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*
	Percentage methane of Scope 1 *Basis and Units of Measurement- Measured in %*	Biogenic CO_2 emissions included in Scope 1. Base year and rationale for choosing it, if applicable; Source of the emission factors and the global warming potential (GWP) rates used, or a reference to the GWP source; Standards, methodologies, assumptions, and/or calculation tools used; Consolidation approach for emissions; whether equity share, financial control, or operational control *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*	Scope 1 emissions disaggregated by business activity such as oil and gas production, refining *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*
	Percentage covered under emissions-limiting regulations of Scope 1 *Basis and Units of Measurement- Measured in %*		Company-wide emissions intensity and, if appropriate, disaggregated by business activity
	Gross Global Scope 1 emissions from- flared hydrocarbons, other combustion, process emissions, other vented emissions, and fugitive emissions *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*		A breakdown of major source categories for CO_2 and CH_4 emissions such as combustion (stationary and mobile equipment), flaring, venting, process / fugitive leaks and product transport *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*

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Table 5 (cont'd). Comparison of SASB, GRI, and IPIECA frameworks for GHG Emissions reporting

	SASB	GRI	IPIECA
	Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets		Emissions that relate to activities of special interest to stakeholders, such as oil sands, noted separately if these represent a substantial portion of the GHG profile *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*
			Scope 1 emissions associated with the cogeneration of heat and power, including information on emissions avoided through cogeneration *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*
Scope 2	No explicit discussion	Gross location-based energy indirect/ Scope 2 and the GHGs included in the calculation whether CO2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3, or all *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*	Company-wide indirect/ Scope 2 emissions, using operational, equity share or other method, and include direct CO_2; direct CH_4; and direct other greenhouse gases *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*
		If applicable, gross market-based energy indirect/ Scope 2 emissions Base year and rationale for choosing it, if applicable; Source of the emission factors and the global warming potential (GWP) rates used, or a reference to the GWP source; Standards, methodologies, assumptions, and/or calculation tools used; Consolidation approach for emissions; whether equity share, financial control, or operational control *Basis and Units of Measurement-*	Scope 2 emissions disaggregated by business activity such as oil and gas production, refining *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*

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Table 5 (cont'd). Comparison of SASB, GRI, and IPIECA frameworks for GHG Emissions reporting

	SASB	GRI	IPIECA
		Measured in metric tons CO_2eq (t)	
Scope 3	No explicit discussion	Gross direct/ Scope 3 emissions and the GHG included in the calculation whether CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3, or all. Base year and rationale for choosing it, if applicable; Source of the emission factors and the global warming potential (GWP) rates used, or a reference to the GWP source; Standards, methodologies, assumptions, and/or calculation tools used; Consolidation approach for emissions; whether equity share, financial control, or operational control *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*	Scope 3 emissions as listed within the GHG Protocol *Basis and Units of Measurement- Metric tons CO_2eq (t)*
		Biogenic CO_2 emissions included in Scope 3. Base year and rationale for choosing it, if applicable; Source of the emission factors and the global warming potential (GWP) rates used, or a reference to the GWP source; Standards, methodologies, assumptions, and/or calculation tools used; Consolidation approach for emissions; whether equity share, financial control, or operational control *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*	

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Table 5 (cont'd). Comparison of SASB, GRI, and IPIECA frameworks for GHG Emissions reporting

	SASB	GRI	IPIECA
GHG emissions intensity	No explicit discussion	Emissions intensity ratio with the metric used to calculate it, the types of GHG emissions included in the intensity ratio, whether direct (Scope 1), energy indirect (Scope 2), and/or other indirect (Scope 3), and the GHGs included in the calculation whether CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3, or all	No explicit discussion
Reduction of GHG emissions	No explicit discussion	Emissions reduced as a direct result of reduction initiatives, with the types of GHG emissions included; whether direct (Scope 1), energy indirect (Scope 2), and/or other indirect (Scope 3), the GHGs included in the calculation whether CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3, or all, the base year, and the standards, methodologies, assumptions, and/or calculation tools used *Basis and Units of Measurement- Measured in metric tons CO_2eq (t)*	No explicit discussion

III. Social Responsibility

Table 6. Comparison of SASB, GRI, and IPIECA frameworks for Social Responsibility reporting

	SASB	GRI	IPIECA
Social Responsibility	Metrics and Core Elements	Metrics and Core Elements	Metrics and Core Elements
Human Rights	Percentage of proved and probable reserves in or near areas of conflict *Basis and Units of Measurement- Measured in %*	Operations that have been subject to human rights reviews or impacts assessments *Basis and Units of Measurement- Measured in total number and percentage of operations that have been subject to human rights reviews or human rights impact assessments, by country*	Policies, programs, and due diligence processes relating to security and human rights along with details of implementation, communication efforts, and how potential human rights issues related to security forces are assessed and addressed, and concerns and grievances, especially in high-risk or conflict, are monitored and addressed *Basis and Units of Measurement- Measured in results of monitoring and auditing, Case studies*
	Percentage of proved and probable reserves in or near indigenous land *Basis and Units of Measurement- Measured in %*	Employee training on human rights policies or procedures *Basis and Units of Measurement- Measured in total number of hours and % of employees trained in the reporting period devoted to training on human rights policies or procedures concerning aspects of human rights that are relevant to operations*	Scope, content, tracking, and reporting period for human rights training programs *Basis and Units of Measurement- Measured by the number of people trained each year, the proportion trained against the population that may need training, and effectiveness of training*
	Engagement processes and due diligence practices with respect to human rights and operation in areas of conflict	Security personnel trained in human rights policies or procedures *Basis and Units of Measurement- Measured in percentage of security personnel who have received formal training in the organization's human rights policies or specific procedures and their application to security, and whether training requirements also apply to third-party organizations providing security personnel*	Processes and practices to ensure access to remedy mechanisms at the local level, including how human rights considerations are factored into early phase decision making, including project siting and planning for new projects, with joint venture partners, and likewise for decommissioning or selling of operations
		Significant investment agreements and contracts that include human rights clauses or that underwent human rights	Efforts to integrate human rights security into supply chain, approach, screening criteria, and assessment processes for

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Table 6 (cont'd). Comparison of SASB, GRI, and IPIECA frameworks for Social Responsibility reporting

	SASB	GRI	IPIECA
		screening *Basis and Units of Measurement-Measured in total number and percentage of significant investment agreements and contracts that include human rights clauses or that underwent human rights screening*	promoting respect for human rights by suppliers *Basis and Units of Measurement-Measured by % of significant contracts addressing human rights issues; Audits conducted, issues found, and corrective action taken; Case studies*
		Operations and suppliers at significant risk for incidents of child labor and young workers exposed to hazardous conditions in the reporting period intended to contribute to the elimination of all forms of child labor *Basis and Units of Measurement-Measured by type of operation and geographic region*	Policies, programs, procedures, and practices used to identify and address impacts on Indigenous Peoples; train staff on engagement and consultation with Indigenous Peoples; engage with Indigenous Peoples to secure a formal agreement or free, prior and informed consent where needed and to address their grievances, concerns and expectations; collaborate on opportunities that create mutual benefits; and increase indigenous participation through employment and business opportunities *Basis and Units of Measurement-Measured by types and numbers of issues raised by Indigenous Peoples in specific countries and actions taken; Case studies*
		Operations and suppliers considered to have significant risk for incidents of forced or compulsory labor and measures taken in the reporting period intended to contribute to the elimination of all forms of forced or compulsory labor *Basis and Units of Measurement-Measured by type of operation and geographic region*	Programs and procedures for involuntary resettlement, including engagement processes and practices with affected communities from land acquisition, including any international standards; Any use of powers of compulsory purchase / eminent domain to acquire private land for use when in the public interest; Efforts to avoid or limit involuntary resettlement, any restrictions on surface and subsurface land and soil use and, where applicable, and providing fair and transparent

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Table 6 (cont'd). Comparison of SASB, GRI, and IPIECA frameworks for Social Responsibility reporting

	SASB	GRI	IPIECA
			compensation *Basis and Units of Measurement-Case studies*
Labor practices, workforce engagement and accommodation	No explicit discussion	New employee hires and employee turnover *Basis and Units of Measurement-Measured in total number and rate of new employee hires and turnover during the reporting period, by age group, gender, and region*	Approach to the recruitment and employment of workforce
		Benefits which are standard for full-time employees of the organization but are not provided to temporary or part-time employees, by significant locations of operation such as life insurance, health care, disability and invalidity coverage, parental leave, retirement provision, stock ownership, and the definition used for significant locations of operation	Approach to monitoring and addressing working conditions, including the quality of worker accommodation
		Parental leave for those eligible, those who took parental leave, those who returned to work after parental leave, those who returned to work after parental leave ended that were still employed 12 months after their return to work *Basis and Units of Measurement-Measured in numbers, by gender*	Satisfaction with employment practices, working conditions; how employees, supply chains, or specific workforce groups engage in dialogue with management at national or local levels *Basis and Units of Measurement-Measured in records of formal conversations, promotion rates for women, the progression of national employees versus expatriates in a specific business, versus their percentage representation in the total workforce, annual turnover rate*

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Table 6 (cont'd). Comparison of SASB, GRI, and IPIECA frameworks for Social Responsibility reporting

	SASB	GRI	IPIECA
		Return to work and retention rates of employees that took parental leave *Basis and Units of Measurement- Measured in %, by gender*	Approach and/or mechanisms to ensure non-retaliation, non-discrimination and confidentiality when addressing grievances *Basis and Units of Measurement- Measured in approximate proportion of workers covered by the system, the number of issues raised and the extent to which workers are aware and trust the system; Assurance of non-retaliation and grievance mechanisms for short-term or contract workers; Case studies*
		Minimum notice periods regarding operational changes such as minimum number of weeks' notice typically provided to employees and their representatives prior to the implementation of significant operational changes that could substantially affect them *Basis and Units of Measurement- Measured in numbers, by area of operation and geographic region*	
		For organizations with collective bargaining agreements, whether the notice period and provisions for consultation and negotiation are specified in collective agreements; Operations and suppliers in which workers' rights to exercise freedom of association or collective bargaining may be violated or at significant risk *Basis and Units of Measurement- Measured in numbers, by area of operation and geographic region*	
Workforce training	No explicit discussion	Programs for upgrading employee skills and transition assistance program by type and scope of programs implemented and assistance provided; Transition assistance programs provided to facilitate continued employability and the management of career endings resulting from retirement or termination of employment	Key elements of approach to training and development *Basis and Units of Measurement- Measured in hours of training, training investment, number of staff trained; Case studies*
		Employees receiving regular performance and career development reviews	

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Table 6 (cont'd). Comparison of SASB, GRI, and IPIECA frameworks for Social Responsibility reporting

	SASB	GRI	IPIECA
		Basis and Units of Measurement-Measured in %, by gender and employee category	
Workforce health and safety	Policies and programs for workplace health and safety, and how the practices are integrated with the organization's culture *Basis and Units of Measurement-Measured in total recordable incident rate (TRIR), fatality rate, near miss frequency rate (NMFR), and average hours of health, safety, and emergency response training for full-time, contract, and short-service employees*	Workers with high incidence or high risk of diseases related to their occupation, types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities *Basis and Units of Measurement-Measured in types of injury, injury rate (IR), occupational disease rate (ODR), lost day rate (LDR), absentee rate (AR), and work-related fatalities, for all employees by gender and geographic region*	Approach to managing workforce participation in safety, health, and security; Processes and programs for identifying and addressing significant workforce health issues at the local, regional, and global level, together with any results and plans *Basis and Units of Measurement-Measured in coverage of safety, health and security engagement programs and the extent to which you include contractors; Total recordable injury frequency; Lost time injury frequency; Number of fatalities (excluding illness fatalities); Fatal accident rate (excluding illness fatalities); and Fatal incident rate; Case studies*
	Process Safety Event (PSE) for Loss of Primary Containment (LOPC) of greater consequence (Tier 1) *Basis and Units of Measurement-Measured in rate*	Health and safety topics covered in formal agreements with trade unions *Basis and Units of Measurement-Measured in whether formal agreements (either local or global) with trade unions cover health and safety and the % to which various health and safety topics are covered by these agreements*	Approach to transport safety, including policies and practices required within your management systems; efforts to engage with external parties, including local communities and authorities, to improve transport safety, including education and training and implementation of new technology *Basis and Units of Measurement-Measured in Number of work-related workforce fatalities caused by transport incidents; Number of motor vehicle crashes (MVC) by severity. If available, state the total distance driven in kilometers and the normalized severe MVC rate per 100 million kilometers; Number of aviation events you have recorded and the rate of aviation events per 100,000 flight hours*

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Table 6 (cont'd). Comparison of SASB, GRI, and IPIECA frameworks for Social Responsibility reporting

	SASB	GRI	IPIECA
	Description of management systems used to identify and mitigate catastrophic and tail-end risks		Process safety events based on industry-standard key performance indicators to be more predictive of major incident risks and to assess the strength of preventive barriers *Basis and Units of Measurement- Measured in Tier 1, 2,3, and 4 process safety events reported separately for each major business activity; Commitments or targets that relate to process safety*
Diversity and Equal Opportunity	No explicit discussion	Diversity of governance bodies and employees *Basis and Units of Measurement- Measured in %, by gender, age, race, other minority, and vulnerable groups*	Policies, programs, and procedures to promote workforce diversity and inclusion and non-discrimination, at all levels of the organization, workforce compensation and grievance mechanisms *Basis and Units of Measurement- Measured in workforce composition data by gender and/or other diversity categories, Information on other inclusive practices like equal pay for equal work, Data on the diversity and inclusion issues that are raised through grievance mechanisms or engagement surveys; Case studies*
		Ratio of basic salary and remuneration of women to men	Approach to product assessments and stewardship for new and existing products; Product HSE hazards and risk controls; Approaches to reduce, reuse and recycle products *Basis and Units of Measurement- Measured in number of product assessments conducted, for new and existing products, or the percentage that meet requirements within their applicable review periods*
		Incidents of discrimination and corrective actions taken in terms of incidents reviewed by the organization, remediation plans being implemented, remediation plans that have been implemented, with results reviewed through routine internal management review processes, incident no longer subject to action	

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Table 6 (cont'd). Comparison of SASB, GRI, and IPIECA frameworks for Social Responsibility reporting

	SASB	GRI	IPIECA
Community relations and engagement	Corporate positions related to government regulations and/or policy proposals that address environmental and social factors *Basis and Units of Measurement-Measured by geographic region*	Operations with local community engagement, impact assessments, including gender impact assessments based on participatory processes, environmental impact assessments and ongoing monitoring, public disclosure of results of environmental and social impact assessments and development programs, local community development programs based on local communities' needs, stakeholder engagement plans based on stakeholder mapping, broad based local community consultation committees and processes that include vulnerable groups, works councils, occupational health and safety committees and other worker representation bodies to deal with impacts, formal local community grievance processes *Basis and Units of Measurement-Measured in percentage of operations with implemented local community engagement, impact assessments, and/or development programs*	Strategies, programs, and procedures that are designed to improve the ability of local suppliers and contractors to support operations and projects, such as actions that help local suppliers meet company and international standards *Basis and Units of Measurement-Measured in countries/regions where local capacity assessments have been carried out, number (or percentage) of organizational entities that are covered by formal agreements or legislation within host countries regarding local content*
	Process to manage risks and opportunities associated with community rights and interests	Operations with significant actual and potential negative impacts on local communities *Basis and Units of Measurement-Measured by impact and geographic region*	Strategies, programs, and procedures aimed at providing employment opportunities to residents or nationals of host countries, to encourage diversity and inclusion *Basis and Units of Measurement-Measured in number and/or percentage of expatriate (international) employees in your total workforce and local employees that are trained in other(non-local) assets in target countries or regions*

IV. Governance

Table 7. Comparison of SASB, GRI, and IPIECA frameworks for Governance reporting

	SASB	GRI	IPIECA
Governance	Metrics and Core Elements	Metrics and Core Elements	Metrics and Core Elements
Governance approach and management	Corporate positions related to government regulations and/or policy proposals that address environmental and social factors affecting the industry	Significant fines and non-monetary sanctions for non-compliance with laws and/or regulations in the social and economic area *Basis and Units of Measurement-Measured in total monetary value of significant fines; Total number of non-monetary sanctions; Cases brought through dispute resolution mechanisms*	Governance architecture, including the role of the board, board committees, executives, managers, the workforce, and stakeholders, along with conduct, values principles, corporate policies, how they relate to sustainability, and how board reviews sustainability issues *Basis and Units of Measurement-Measured by risks and opportunities; Measure performance against strategic goals; Outline training and cultural awareness programs for board and executive management related to sustainability*
		Diversity of governing bodies and board	Composition of the board and executive team, including selection processes, expertise, diversity, and length of terms
			Relationship management with partners, including operated and non-operated joint ventures, contractors, and suppliers
			Structure and scope of management systems related to sustainability issues, including ethics and compliance, including the arrangements for non-operated joint ventures *Basis and Units of Measurement-Measured by assessment and addressing of impacts, risks, and opportunities; Processes and tools to monitor, verify, validate, and record performance of management system including external assurance and validation*
Preventing corruption	Management system for prevention of corruption and bribery throughout the value	No explicit discussion	Governance and management approach related to prevention of bribery and corruption

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Table 7 (cont'd). Comparison of SASB, GRI, and IPIECA frameworks for Governance reporting

	SASB	GRI	IPIECA
	chain		*Basis and Units of Measurement-Measured by risks, policies, codes of conduct, due diligence processes, internal controls, and follow up of non-compliance; Participation and level of involvement in voluntary initiatives or international conventions related to bribery and corruption*
	Proved and probable reserves in countries that have the 20 lowest rankings in Transparency International's Corruption Perception Index *Basis and Units of Measurement-Measured in %*		
Political contributions and lobbying		Total monetary value of financial and in-kind political contributions made directly and indirectly by the organization and how its value was estimated *Basis and Units of Measurement-Measured by country and recipient/beneficiary*	Governance approach and management processes on advocacy and lobbying *Basis and Units of Measurement-Measured in alignment, or differences, between business strategy and advocacy positions in relation to specific public policy issues or legislative initiatives*
			Political contributions from the organization
			Participation in trade associations in relation to public policy positions on key sustainability issues
Transparency	Proved and probable reserves in countries that have the 20 lowest rankings in Transparency International's Corruption Perception Index *Basis and Units of Measurement-Measured in %*	No explicit discussion	Policies and programs on revenue transparency and compliance requirements for government policies
			Disclosure of payments to host governments, by country *Basis and Units of Measurement-Measured by reporting in accordance with national or regional standards or according to the Extractive Industries Transparency Initiative (EITI)*

F. Comparison of the ESG Data reported by Upstream Oil and Gas Companies

Table 8. ESG reporting by oil and gas upstream companies, data as of 2020

		Shell	BP	Chevron	Exxon Mobil	Gazprom	Pemex*	Saudi Aramco
Water Management	Water withdrawal	✓	✓	✓	✓	✓	✓	✓
	Water consumption	✓	✓	✓	✓	✓	✓	✓
	Water discharge	✓	✓	✓	✓	✓		
	Effluents discharge to water	✓	✓		✓			
GHG emissions	Scope 1	✓	✓	✓	✓	✓	✓	✓
	Scope 2	✓	✓	✓	✓			✓
	Scope 3			✓		✓		
	GHG intensity		✓	✓	✓	✓		✓
	Reduction of GHG emissions			✓	✓	✓	✓	
Social Responsibility	Human rights	✓	✓	✓	✓		✓	
	Labor practices, workforce engagement and accommodation	✓	✓	✓	✓		✓	✓
	Workforce training	✓	✓	✓	✓		✓	✓
	Workforce health and safety	✓	✓	✓	✓	✓	✓	✓
	Diversity and equal opportunity	✓	✓	✓	✓		✓	
	Community relations and engagement	✓	✓	✓	✓		✓	
Governance	Governance approach and management	✓	✓	✓	✓			✓
	Preventing corruption	✓		✓	✓		✓	✓
	Political contributions and lobbying	✓		✓	✓		✓	
	Transparency	✓		✓	✓	✓	✓	✓

** Data as of 2019*

Table 9. Standards referenced by upstream companies for reporting, data as of 2020

	GRI	IPIECA	SASB
BP	Yes	Yes	-
Chevron	-	Yes	Yes
Exxon Mobil	Yes	Yes	-
Gazprom	-	-	-
Pemex	Yes	Yes	-
Shell	Yes	Yes	-
Saudi Aramco	-	-	-

G. Concluding Remarks

ESG's importance in the oil and gas industry has grown significantly over the last decade. The primary driving forces for this transition are the increased understanding that ESG factors have an impact on business performance and pose risks that need to be measured and managed. Several upstream O&G majors have made substantial progress in measuring, reporting, and managing ESG metrics, but their efforts lack consistency and standardization, which is crucial for advancing improvements and providing comparisons. Assessing the materiality of ESG metrics, as compared to traditional financial materiality, is complex. Evaluating ESG materiality and its impact and risks involves moving beyond a shareholder-centric perspective and aggregating the inputs of all stakeholders. Moreover, many of the impacts of ESG factors are challenging to quantify in financial terms. To debottleneck this challenge, several industry groups have developed guidelines for ESG measurement, reporting, and management.

The collection of data, methods/ methodology, the units of measurement, and the frequency of measurement must be consistent across the organization to ensure transparency and granularity in reporting, and for industry-wide adoption and knowledge sharing. Frameworks and guidelines that are adaptive to the evolving ESG landscape, relevant across all areas of operations, and support continuous measurement, monitoring, and reporting capabilities will offer the best value to the industry. An organization's choice of standards is influenced by its ESG priorities, what is deemed as material, and what is commonly accepted by its stakeholders. While the three leading standards or frameworks, *i.e.*, SASB, GRI, and IPEICA, are philosophically compatible, their guidelines differ in the specifics of what must be measured, reported, and managed. Given these subtle differences, most oil and gas majors rely on more than one standard for their ESG reporting. Therefore, a union of SASB, GRI, and IPEICA standards and guidelines can simultaneously provide flexibility, standardization, and consistency for measuring, reporting, and managing ESG metrics, demonstrate continuous performance improvements, and enhance stakeholder value.

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APPENDIX A

The acronym ESG stands for Environmental, Social, and Governance and refers to aspects of an organization's operations, the associated material risks, and its performance in these areas. While the items included in these areas vary based on the nature of the organization's business, the following are relevant for most (see Figure A1):

Figure A1. Key elements of corporate ESG and the increased focus on Sustainability.

APPENDIX B: List of Abbreviations

API – American Petroleum Institute
CCU – Carbon Capture and Utilization
DJSI – Dow Jones Sustainability Index
ESG – Environmental, Social, and Governance
FASB – Financial Accounting Standards Board
GHG – Greenhouse gas
GRI – Global Reporting Initiative
IOGP – International Association of Oil and Gas Producers
IPIECA – International Petroleum Industry Environmental Conservation Association
O&G – Oil and Gas
SASB – Sustainability Accounting Standards Board
SEC – U.S. Securities and Exchange Commission
TCFD – Task Force on Climate-related Financial Disclosures
CO_2 – Carbon dioxide
CH_4 – Methane
N_2O – Nitrous oxide
HFCs – Hydrofluorocarbons
PFC – Perfluorocarbons
SF_6 – Sulfur hexafluoride
NF_3 – Nitrogen trifluoride
VOCs – Volatile organic compounds
NOX – Nitrogen oxides
SOX – Sulfur oxides
ODS – Ozone Depleting Substances

APPENDIX C: Corporate ESG Reports and Standards Consulted

Baker Hughes
https://www.bakerhughes.com/sites/bakerhughes/files/2020-08/Baker%20Hughes%202019%20Corporate%20Responsibility%20Report.pdf

BP
https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/sustainability/group- reports/bp-gri-reporting-index-2020.pdf
https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/sustainability/sasb-index- 2020.pdf

Chevron
https://www.chevron.com/-/media/shared-media/documents/2019-sustainabilty-performance-data.pdf

Exxon
https://corporate.exxonmobil.com/-/media/Global/Files/sustainability-report/publication/Sustainability- Report.pdf

IPIECA
https://www.ipieca.org/media/4950/draft_ipieca_api_iogp_sustainability_reporting_guidance_eb4.pdf

Halliburton
https://asr.halliburton.com/wp-content/uploads/2021/03/2020_Halliburton_Annual_and_Sustainability_Report.pdf

GRI
https://www.globalreporting.org/standards/

SASB
https://www.sasb.org/standards/download/

Schlumberger
https://www.slb.com/sustainability/pdf/Schlumberger_GlobalStewardship_2019.pdf

Shell
https://reports.shell.com/sustainability-report/2020/servicepages/downloads/files/our-performance-data- shell-sr20.pdf

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