OIL & GAS
EXPLORATION & PRODUCTION
Research Brief

SASB’s Industry Brief provides evidence for the material sustainability issues in the industry. The brief opens with a summary of the industry, including relevant legislative and regulatory trends and sustainability risks and opportunities. Following this, evidence for each material sustainability issue (in the categories of Environment, Social Capital, Human Capital, Business Model and Innovation, and Leadership and Governance) is presented. SASB’s Industry Brief can be used to understand the data underlying SASB Sustainability Accounting Standards. For accounting metrics and disclosure guidance, please see SASB’s Sustainability Accounting Standards. For information about the legal basis for SASB and SASB’s standards development process, please see the Conceptual Framework.

SASB identifies the minimum set of sustainability issues likely to be material for companies within a given industry. However, the final determination of materiality is the onus of the company.

Related Documents

• Non-Renewable Resources Sustainability Accounting Standards
• Industry Working Group Participants
• SASB Conceptual Framework

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needs in the future. The use of petroleum and natural gas as a source of energy is widespread across all economic activity and both hydrocarbons have served as key inputs for industrial and technological processes and innovations. Oil & Gas, Exploration & Production companies have played a vital role in the past several years in the technological advances that have increased access to oil and gas and contributed to energy independence, particularly in the U.S.

However, there has been an emergence of new global threats, such as climate change, water scarcity, and resource constraints. Together with greater public concern about the environmental and health impacts of extractive activities and industrial production, these threats are intensifying regulatory action and business needs related to companies’ sustainability performance around the world. Given the resource intensity of industries in the Non-Renewable Resources sector, and their potential wide-ranging environmental and social externalities, this sector has been the focus of regulation and public attention. Management (or mismanagement) of material sustainability issues, therefore, has the potential to affect company valuation through impacts on profits, assets, liabilities, and cost of capital.

Investors would obtain a more holistic and comparable view of performance with oil and gas exploration and production companies reporting metrics on the material sustainability risks and opportunities that could affect value in the near- and long-term in their regulatory filings. This would include both positive and negative externalities, and the non-financial forms of capital that the industry relies on for value creation.
Specifically, performance on the following sustainability issues will drive competitiveness within the Exploration & Production industry:

- Reducing GHG emissions, particularly of methane and carbon dioxide;
- Reducing other air pollution that can create hazards for human health and the environment;
- Securing water supplies without exacerbating local water system stresses and preventing water contamination;
- Minimizing the biodiversity impacts of operations;
- Ensuring strong relations with local communities at all project stages;
- Protecting human rights, with special consideration for operations in conflict areas and on indigenous peoples’ lands;
- Ensuring business ethics, not engaging in corruption and bribery, and ensuring transparency in payments;
- Ensuring worker health and safety, and promoting a strong safety culture, including emergency preparedness and response;
- Incorporating environmental considerations into the valuation of oil and gas reserves and long-term business strategy;
- Ensuring that lobbying and political contributions to manage a complex legal and regulatory environment are aligned with long-term societal interests and company value; and
- Engaging the services of companies and contractors that implement best practices in environmental, health, and safety performance.

INDUSTRY SUMMARY

Oil and Gas Exploration and Production (E&P) companies explore for, extract or produce energy products such as crude oil and natural gas, which comprise the upstream operations of the oil and gas value chain. Integrated oil companies conduct upstream operations but are also involved in the transport and/or refining or marketing of products. These have different financial and sustainability-related risks and opportunities. Sustainability disclosure topics specific to the three components of the oil and gas value chain are discussed in separate SASB Industry Briefs.

E&P companies are involved in the development of “conventional” and “unconventional” oil and gas resources. Unconventional resources, characterized by low permeability or poor fluid characteristics of the geological basin, require the application of thermal, mechanical, or chemical energy for extraction; for example, this includes oil or gas shales, oil sands, and gas hydrates. As conventional oil and gas wells in the U.S. have reached their peak production,
E&P companies have extended their activities to unconventional resources, and also to more remote locations, including deep-water offshore drilling.

Vast unconventional reserves are becoming economically and technically feasible to extract because of higher oil and gas prices, and advances in hydraulic fracturing (“fracking”) and horizontal drilling techniques. Fracking has garnered much public attention over the past few years due to its contribution to U.S. domestic energy production, as well as its potential negative environmental and health impacts. About 60 percent of U.S. drilling is now targeted at unconventional plays and approximately 90 percent of onshore wells require some form of fracking.

The E&P industry is a mature industry with global industry revenues of around $1.5 trillion. Within E&P (excluding royalty income), about 59 percent of the revenues come from crude oil production, and 28.6 percent from natural gas production. Oil sands account for around eight percent of revenues, and natural gas liquids another four percent. The U.S. produced about 9 million barrels per day of crude oil in 2012 (including conventional and unconventional oil) and 681 billion cubic meters of natural gas.

Gross Domestic Product (GDP) is a key driver of demand for the industry’s products and products further downstream. Between 2004 and 2010, crude oil demand from North America, Europe, Korea, and Japan declined, while demand increased in emerging markets such as China. In China, crude oil consumption increased by 46 percent, a trend that is likely to continue over the next few years. Crude oil is a primary driver of gasoline prices, accounting for about 38 percent of the cost of each gallon of gasoline. Natural gas has more diversified uses than oil; with higher supply of natural gas from shale resources and lower natural gas prices, utilities in the U.S. are expected to shift increasingly to natural gas from coal.

E&P is a capital-intensive industry, characterized by high-risk, high-return activities. Few exploration efforts lead to the discovery of commercially viable oil or gas fields. Capital expenditures for the 50 largest U.S. E&P companies (including integrated companies) were in the range of $70 billion to $150 billion between 2007 and 2011. Expensed exploration and depreciation form a significant proportion of total costs. Depreciation can be as high as 50 percent of all costs. Other significant costs include fuel purchases, payments to contractors (including companies that are part of the Oil & Gas Services industry, discussed in a separate SASB Industry Brief), and purchase of materials, such as equipment and drilling mud. Enhanced recovery and unconventional resources require higher production costs per barrel; costs for horizontal drilling are about 24 percent higher than for conventional drilling.

A lot of major U.S. oil producers operate in foreign markets, and foreign companies such as BP and Shell operate in the U.S. Concentration in the industry is low due to the large size of the market, the significant number of small E&P companies, and dispersion across geographies. However, larger companies with global operations tend to dominate the industry, especially due to the capital-intensive and risky nature of operations.
During periods of high oil prices, production can be increased without a proportionate increase in costs, whereas costs are more difficult to reduce during periods of declining prices. Considering the largest 50 U.S. E&P companies, integrated E&P companies had after-tax profit margins of around 27 percent in 2011, and independent E&P companies had margins of 23 percent. Standard & Poor’s calculates internal rates of return (IRR) for major shale plays of less than five percent to over 35 percent in 2011, depending on the shale resource. IRRs are mainly affected by initial production rates, the decline in production after the first year, well costs, oil and gas prices in the first year of production, long-term oil and gas prices, and royalty rates.

The two most common global benchmark crude oil prices are North Sea Brent and West Texas Intermediate (WTI) Cushing. Although WTI historically traded above Brent crude, increasing unconventional oil supply in North America and midstream infrastructure constraints are increasing price differentials in the opposite direction between U.S. crude oil and Brent crude. Since 2010, WTI crude has been trading at a discount to Brent crude, sometimes as much as $30 per barrel, and likewise, crude oil from the Bakken reserves has been trading at a discount to Brent. Crude oil prices still remain at high levels, and have increased over the last few years, while natural gas prices have declined in the U.S., going from about $8.79 per million British thermal unit (Btu) in 2005 to $2.76 per million Btu in 2012. As a result, the market ratio of oil to natural gas prices has risen to as much as 25-to-1 in the past few years.

While high natural gas prices prior to 2005 and improved technology led companies to increasingly focus on natural gas, current prices are creating financial risks for E&P companies continuing to drill for natural gas, with unhedged natural gas revenues potentially being lower than costs. With high oil prices, E&P companies are instead focusing on unconventional shale oil resources. These dynamics are driving an increase in overall oil rig counts (an increase of over 50 percent in 2011 compared to the previous year) and a decline in rigs focused on natural gas (of around 10 percent in 2011). Despite this, E&P companies continue to develop natural gas resources, expecting lower costs and higher natural gas prices in the future.

More than 70 percent of global proved oil reserves are in member countries of the Organization of the Petroleum Exporting Countries (OPEC). Despite these reserves, OPEC’s share of global production has declined to around 42 percent. The OPEC cartel tries to control oil prices by limiting output and assigning member country quotas; however, its effectiveness as a cartel may be limited due to increases in non-OPEC crude supply in recent years. The Reserves-to-Production ratio (RPR) for U.S. oil reserves was 10.7 at the end of 2012, compared to 88.5 in OPEC. While the U.S. accounted for around two percent of global proved reserves of oil, its share of production was about 9.6 percent, and its share of global oil consumption was about 19.8 percent. U.S. RPR for natural gas was 12.5 at the end of 2012, compared to 78.4 in countries not part of the Organisation for Economic Co-operation and Development (OECD). The U.S. accounted for about 4.5 percent of global proved natu-

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1 RPR is the ratio of reserves remaining at the end of any year to the production in that year, indicating the length of time that the remaining reserves would last assuming the same production rate.
eral gas reserves at the end of 2012, but 20.4 percent of global production, the largest of any country, followed by Russia.\(^{18}\)

With increasing domestic and regional oil and gas supplies from unconventional resources, U.S. oil imports from countries such as Nigeria, Algeria, and the U.K. have declined. Canada is now the main supplier of crude oil to the U.S., with the development of its oil sand resources.\(^{19}\) The U.S. is expected to become a net exporter of natural gas by 2020, and of liquefied natural gas (LNG) even earlier, by 2016. The Energy Information Administration projects that by 2040 there will be a reduction in gasoline consumption, reflecting more stringent Corporate Average Fuel Economy (CAFE) standards, growth in diesel fuel consumption, and increased use of natural gas for heavy-duty vehicles,\(^{20}\) which will pose new challenges and opportunities for E&P companies.

**LEGISLATIVE AND REGULATORY TRENDS IN THE OIL & GAS, EXPLORATION & PRODUCTION INDUSTRY**

Extensive federal, state, and local regulations in the U.S. control operations in the E&P industry. Additionally, the industry depends on permits and concessions from governments to be able to extract oil and gas resources globally. Emerging social and environmental issues related to the industry and the trend towards offshore and unconventional resource extraction have increased public and regulatory pressure on E&P companies. The following section provides a brief summary of key regulations and legislative efforts related to this industry.\(^{21}\)

U.S. government agencies that oversee federal lands and water resources, and manage related leases, include the Bureau of Land Management (BLM), of the Department of the Interior, and the Bureau of Ocean Energy Management (BOEM). BOEM manages resources on the outer continental shelf (OCS). The U.S. Environmental Protection Agency (EPA) and related state agencies regulate the environmental performance of E&P companies.

The federal government collects a royalty fee from producers on federal land; in addition, companies have to deal with state and tribal governments in order to operate on their lands. Furthermore, unique to the U.S., oil and gas E&P companies also negotiate leases with private landowners for their mineral rights. On the other hand, when operating in most other countries where governments own mineral resources, companies largely obtain licenses for E&P through governments or state agencies, rarely dealing with private parties.\(^{21}\)

Significant federal environmental regulations related to the industry include those requiring companies to submit a bond to ensure compliance with plugging wells, reclaiming and restoring leased areas. Other applicable laws and

\(^{*}\) This section does not purport to contain a comprehensive review of all regulations related to this industry, but is intended to highlight some ways in which regulatory trends are impacting the industry.
regulations include the Clean Air Act (CAA), the Clean Water Act (CWA) for pollutant discharges to surface waters, the Oil Pollution Act, the Safe Drinking Water Act for subsurface injection of waste water, and the Resource Conservation and Recovery Act (RCRA) (Subtitle D for solid wastes).

The EPA issued new rules in 2012 under the CAA related to New Source Performance Standards (NSPS) for Volatile Organic Compounds (VOCs) and National Emissions Standards for Hazardous Air Pollutants (NESHAP) for oil and gas production, addressing for the first time air pollution (including VOCs, HAPs and methane) from the development of unconventional resources. Furthermore, under the federal Greenhouse Gas Reporting Program (GHGRP), the EPA requires reporting of Greenhouse Gas (GHG) emissions from large emissions sources in the U.S., including E&P companies.

Moreover, in March 2014, the Obama Administration put forward a Climate Action Plan with a “Strategy to Reduce Methane Emissions” as a key element. Additional cost-effective techniques will be encouraged in order to reduce methane emissions from the oil and gas sector. The EPA will assess potential sources of methane emissions and may require the use of leak detection and prevention technologies that would be implemented by companies in the oil and gas sector.

However, the industry also enjoys significant benefits and certain exemptions from federal environmental laws and regulations. For example, major E&P wastes such as drilling and associated wastes and produced water are exempt from the section of the RCRA related to the management of hazardous wastes. Oil and gas production and construction are also exempt from storm water run-off regulations of the CWA. Furthermore, oil and gas wells are exempt from the aggregation rule of the CAA, which means that each well site is considered individually rather than in aggregate with other well sites in a particular area. E&P activities are not included within the EPA’s Toxic Release Inventory (TRI).

Throughout the 1980s and 90s, Congressional bans on offshore drilling prevented companies from operating in a majority of the OCS, although drilling was allowed to continue in large parts of the Gulf of Mexico and the Alaskan coastline. However, these moratoria were allowed to expire in 2009, resulting in a push into deep-sea E&P. The Deepwater Horizon oil spill in 2010 led to another moratorium being imposed on deep-sea drilling, although this was lifted within six months.

The Energy Policy Act of 2005 provided incentives for fossil fuel development, such as royalty relief for leases in deep-water areas and incentives for gas production from deep wells in the shallow waters of the Gulf of Mexico. Furthermore, fracking wells are not classified as injection wells due to the 2005 Energy Policy Act, which exempted them from regulation under the Safe Drinking Water Act. Companies are allowed to withhold information about the chemical composition of fracking fluids when they are considered “trade secrets.”

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16 This includes NAICS code 211111 Crude Petroleum and Natural Gas Extraction.
In addition to exemptions from environmental regulations, the industry also benefits from tax regulations. It is allowed to expense (instead of capitalize) “intangible” drilling costs such as fuel, labor, and supplies, and it can earn a 15 percent income tax credit for the cost of recovering oil through enhanced recovery.32

However, new legislative and regulatory efforts are likely to create risks and costs for E&P companies. While there is debate about whether fracking contaminates groundwater supplies, due to the difficulty of establishing causality without baseline data, bills such as the Fracturing Responsibility and Awareness of Chemicals (FRAC) Act have been introduced in Congress to repeal the exemption for fracking operations under the Safe Drinking Water Act.33 In May 2013, the Bureau of Land Management (BLM) published a revision of an earlier proposed rule – “Oil and Gas; Well Stimulation, Including Hydraulic Fracturing on Federal and Indian Lands” that addresses three primary subjects: 1) the disclosure of chemicals used in hydraulic fracturing; 2) well construction and integrity testing; and 3) flowback water management.34 Furthermore, the EPA, at the request of Congress, is conducting a study on the impacts of fracking on drinking water resources, investigating the full lifespan of water in fracking. A draft report is expected to be released for public comment and peer review in 2014.35

Many states are implementing their own regulations on fracking as health concerns mount. For example, New York State issued a statewide fracking moratorium in 2008. In Texas, operators are required by law to use an otherwise voluntary industry registry called FracFocus for disclosing fracking fluid additives. In general, however, while many companies involved in fracking provide disclosures on FracFocus, not all do so. A National Petroleum Council (NPC) report recommends “[i]ncreasing the participation in FracFocus to all natural gas and oil companies that engage in hydraulic fracturing, and adding into the system all wells currently in drilling or production…” The NPC identifies this as important for community engagement.36

Aside from environmental regulations, E&P companies with global operations are subject to the Foreign Corrupt Practices Act (FCPA) of 1977, which makes it unlawful to pay foreign government officials to assist in obtaining or retaining business.37 Pursuant to Section 1504 of the Dodd-Frank Act, the U.S. Securities and Exchange Commission (SEC) issued rules in September 2012 for resource extraction issuers to disclose certain payments made to foreign governments or the U.S. federal government for the commercial development of oil, gas, or minerals. However, this rule was vacated by the U.S. District Court for DC in July 2013. In issuing its rule, the SEC considered guidelines for payments transparency under the Extractive Industries Transparency Initiative (EITI), to which a growing number of companies and countries are signatories.38

E&P companies are also affected by environmental and social regulations in other jurisdictions, such as the U.K. Bribery Act and
the European Emissions Trading Scheme (EU ETS). In addition to direct regulations for E&P, E&P companies are impacted by regulation of downstream oil and gas industries, such as the EPA’s fuel specification standards. Such regulations may affect the demand for their products.

Overarching regulatory trends towards a “clean energy” economy could have a material financial impact on E&P companies.

SUSTAINABILITY-RELATED RISKS AND OPPORTUNITIES

Industry drivers and recent regulations suggest that traditional value drivers will continue to impact financial performance. However, intangible assets—environmental and social capitals, company leadership and governance, and the company’s ability to innovate to address environmental and social issues—are likely to increasingly contribute to financial and business value.

Broad industry trends and characteristics are driving the importance of sustainability performance in the E&P industry:

• Use of common capitals: E&P companies use natural capital inputs such as energy and water, which could lead to higher costs or an unstable supply of these resources due to environmental pressures such as climate change. Companies may also face long-term depletion of their non-renewable fossil fuel reserves.

• Negative externalities: Regulations to limit the significant negative environmental and social externalities that E&P activities can generate, could lower the demand for, or constrain the supply of, E&P companies’ outputs. They could also lead to uncertainty in the value of oil and gas reserves. These externalities include GHG emissions, air and water pollution, and disruptions to local communities.

• Social license to operate: E&P companies rely on permits to extract resources from public and private lands, and depend on support from employees and local communities to engage in potentially dangerous or harmful operations. Negative impacts, or negative public perceptions of such companies, are therefore likely to disrupt or destroy this social license to operate.

• Importance of innovation to a mature industry: By innovating in the E&P process, industry players have the potential to provide economic, environmental, and social benefits that can make them more competitive in the long-term, not only compared to others within the industry, but also to alternative sources of energy.

As described above, the regulatory and legislative environment surrounding the E&P industry emphasizes the importance of sustainability management and performance. Specifically, recent trends suggest a regulatory emphasis
on the reduction of environmental and human health impacts, which will serve to align the interests of society with those of investors.

The following section provides a brief description of each sustainability issue that is likely to have material implications for companies in the Oil & Gas E&P industry. This includes an explanation of how the issue could impact valuation and evidence of actual financial impact. Further information on the nature of the value impact, based on SASB’s research and analysis, is provided in Appendix IIA and IIB. Appendix IIA also provides a summary of the evidence of investor interest in the issues. This is based on a systematic analysis of companies’ 10-K and 20-F filings, shareholder resolutions, and other public documents. It also based on the results of consultation with experts participating in an industry-working group convened by SASB.

A summary of the recommended disclosure framework and accounting metrics appears in Appendix III. The complete SASB standards for the industry, including technical protocols, can be downloaded from www.sasb.org. Finally, Appendix IV provides an analysis of the quality of current disclosure on these issues in SEC filings by the top companies in the industry.

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**ENVIRONMENT**

The environmental dimension of sustainability includes corporate impacts on the environment. These could result from the use of non-renewable natural resources as inputs to the factors of production (e.g., water, minerals, ecosystems, and biodiversity) or environmental externalities and harmful releases in the environment, such as air and water pollution, waste disposal, and GHG emissions.

The industry depends heavily on environmental capital for inputs to production. At the same time, its operations and the use of its products generate wide-ranging environmental impacts affecting land, air, and water resources, as well as human health. The type and magnitude of impacts can vary depending on the type of resource, onshore versus offshore extraction, and extraction methods. Companies are facing public pressure to reduce their impacts from fracking operations. According to the International Energy Agency (IEA), greater disclosures; community engagement; effective monitoring of wells; stringent rules on well design, fracking, and surface spills; water management; and a reduction in methane emissions would add only about seven percent to total well costs, and would lead to greater public acceptance.39 (Costs per well are in the range of $6-11 million for U.S. shale resources.)40
Greenhouse Gas Emissions

E&P activities generate significant direct GHG emissions, contributing to climate change and creating additional regulatory compliance costs and risks for companies due to climate change mitigation policies.

The industry’s direct greenhouse gases are emitted from combustion in stationary and mobile internal combustion engines, gas processing equipment, and from venting, flaring, and fugitive methane (methane leaks).

The main components of GHG emissions from the industry are carbon dioxide (CO₂) and methane (CH₄). Typically, natural gas itself is composed of 70 to 90 percent methane, so methane emissions imply lost revenues for E&P companies. While natural gas is a cleaner-burning fuel than coal (a shift from coal to gas in electricity generation is expected to provide a 50 percent reduction in GHG emissions), emissions of the highly potent GHG methane from the natural gas value chain have the potential to lower the extent of benefits significantly.

With natural gas production from shale resources expanding, the management of methane emissions from oil and gas E&P systems has therefore emerged as a major operational, reputational and regulatory risk for companies. Furthermore, the development of other unconventional resources such as oil sands is more GHG-intensive than conventional oil and gas, which is likely to increase regulatory risks.

Energy efficiency, use of cleaner fuels, or process improvements to reduce fugitive emissions, venting, and flaring can therefore provide benefits to E&P companies in the form of lower costs and risks or higher revenues.

Company performance in this area can be analyzed in a cost-beneficial way internally and externally through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Global Scope 1 emissions, percentage covered under a regulatory program, percentage by hydrocarbon resource;
- Amount of global Scope 1 emissions from combustion and non-combustion sources; and
- Long- and short-term strategy to manage Scope 1 emissions.

Evidence

The relative magnitude of GHG emissions from the oil and gas E&P industry exposes it to direct regulatory risk from reporting obligations and more stringent emissions permits programs (e.g., cap-and-trade) at the state, national, and international levels. The industry faces uncertainties about the nature and extent of future GHG regulations.

The E&P industry is required to report its GHG emissions annually to the EPA under the GHGRP at the facility level when emissions of GHG exceed 25,000 metric tons. Data for 2011 shows that GHG emissions from “Petroleum and Natural Gas systems” were 217
million metric tons CO₂-equivalent (CO₂e), accounting for 6.6 percent of the total reported under the national GHGRP and ranking second after power plants. These relatively high direct emissions from the E&P industry typically put E&P companies under the purview of regulatory programs that require reductions in GHG emissions.

An annual analysis of risk factors disclosed in 10-K filings by the 100 largest publicly traded U.S. E&P companies shows that in 2013, the impact of climate change and GHG legislation ranked 12th among the top 20 risk factors cited (in terms of frequency), with 89 percent of companies citing it as a risk in 2013, compared to 69 percent in 2011. A recent study found that crude oil and gas extraction is “highly sensitive” to the impacts of mitigation policy that puts a price on carbon, with companies facing “direct cost due to their own greenhouse gas emissions, and an indirect cost due to their high energy consumption.”

The EPA’s NSPS and NESHAP standards issued in 2012 introduced new regulations related to methane emissions (discussed again under the Air Quality issue below), including fracking operations. GHG emissions from the industry are also regulated under California’s Global Warming Solutions Act (AB32). The quarterly auction held in February 2014 under the AB32 cap-and-trade program resulted in a settlement price of $11.48 per allowance for a total of 19.5 million emissions allowances for 2014, and included bids from several oil and gas companies such as BP, ExxonMobil, and Shell.

All allowances available for sale were sold, and bid prices ranged from $11.34 to $50, indicating market viability and variations in marginal costs of reducing emissions.

Furthermore, the entire value chain of natural gas and petroleum systems is the largest source of emissions of CH₄ (a more potent GHG than CO₂) from industry in the U.S., and accounts for 30 percent of total CH₄ emissions. Published estimates of CH₄ leakage rates from natural gas supply systems vary widely, from less than one percent of CH₄ production to about eight percent. Basin-level studies have reported leakage rates as high as 17 percent. This is bringing more regulatory scrutiny and new proposals on limiting methane emissions from the industry, potentially increasing costs for E&P companies.

For example, in February 2014, Colorado became the first state to require producers to detect and address methane leaks. Following the White House’s announcement of the strategy to reduce methane emissions, the EPA published white papers for external peer review on methane and VOC emissions. If the agency decides to implement new rules, those are expected to be completed by the end of 2016.

There is evidence of shareholder concern for the environmental, regulatory, and business risks from significant fugitive methane emissions. In 2013, a shareholder proposal for the management of methane leakage by Range Resources, an E&P company, received 21.7

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1 The atmospheric lifetime of methane is 12 years and its 100-year Global Warming Potential (GWP) is 21 (i.e., the comparative impact of methane on climate change relative to CO₂), making it a more potent GHG compared to CO₂.
percent favorable votes from shareholders. A shareholder resolution calling on ExxonMobil to provide detailed annual data on its reductions in fracking air emissions received a 30.2 percent vote at its 2013 annual general meeting.\textsuperscript{55}

Reducing fugitive CH\textsubscript{4} emissions can mitigate regulatory risks while leading to profit increases, because it maximizes the amount of natural gas products from the same level of extraction activities. The Natural Resources Defense Council estimates that control processes could generate $2 billion in annual revenues for the industry and reduce methane emissions by 80 percent. Most methane-control technologies have payback periods of less than three years.\textsuperscript{56}

E&P companies are already taking actions to address GHG emissions. In 2005, Devon Energy prevented the release of around 6 billion cubic feet of CH\textsubscript{4} through emissions-reduction techniques and process improvements, with an economic benefit of more than $43 million.\textsuperscript{57}

There are also concerns that rapid expansion in other unconventional oil and gas E&P such as oil sands could increase GHG emissions from the industry. For example, Well-to-Tank or production GHG emissions are, on average, 70 to 110 percent higher for Canadian oil sands crudes than for the weighted average of transportation fuels sold or distributed in the U.S.\textsuperscript{58} E&P companies whose revenues depend on the extraction of significant unconventional resources therefore could face higher mitigation costs and regulatory risks than for conventional resources.

Companies are increasingly recognizing the business risks associated with their GHG emissions. In its Form 10-K for fiscal year (FY) 2013, ConocoPhillips discusses the different ways in which its business could be affected by GHG regulations. “Compliance with changes in laws and regulations that create a GHG emission trading scheme or GHG reduction policies could significantly increase our costs, reduce demand for fossil energy derived products, impact the cost and availability of capital and increase our exposure to litigation. Such laws and regulations could also increase demand for less carbon intensive energy sources, including natural gas.” In order to address these risks, the company put in place a climate action plan that included the reduction of GHG emissions. The company reports reducing emissions in 2012 by around 1 million metric tons through a range of programs across its business units.\textsuperscript{59}

In its Form 10-K for FY 2013, Occidental Petroleum reports that its non-income-related taxes increased each year from 2011 to 2013, due in part to California’s cap-and-trade program.\textsuperscript{60} Noble Energy highlights in its 10-K filing for 2013 that “[t]he commercial risk associated with the exploration and production of hydrocarbons lies in the uncertainty of government-imposed climate change legislation.”\textsuperscript{61}

Value Impact

Managing GHG emissions can provide operational efficiency and affect the cost structure of companies in the industry, with a direct, ongoing impact on value. Mandated emissions reductions through regulations can significantly increase operational costs and capital expenditures. At the same time, reducing emissions can generate incremental revenue, create operational efficiency, and protect companies from further regulations that limit or put a price on emissions. As a relatively large emitter of GHG emissions, the E&P industry might face
difficult borrowing conditions and increased cost of capital as the trend to divest from fossil fuels gains more traction with major investment funds and insurance companies.

As companies increasingly develop unconventional resources with higher GHG emissions, and as newer or more stringent GHG regulations are implemented, the probability and magnitude of these impacts are likely to increase in the near to medium term.

Air Quality

Apart from GHGs, which have global impacts, other air emissions from E&P operations include Hazardous Air Pollutants (HAPs), Criteria Air Pollutants (CAPs) and Volatile Organic Compounds (VOCs). HAPs, CAPs and VOCs have more localized (but significant) human health and environmental impacts than GHGs. Oil and gas production, which has relatively large air emissions compared to other industries, is exempt from the aggregation rule of the CAA (see Legislative and Regulatory Trends section). However, it is included as an area source category for regulation under the EPA’s Urban Air Toxics Strategy and is still subject to regulation under the CAA, with new rules issued in 2012 for fracking operations. It is also subject to state and federal operating permit requirements to limit air pollution.

Management of air quality and meeting or exceeding regulatory limits on air emissions is likely to be material, especially for companies with significant onshore operations. Company performance in this area can be analyzed in a cost-beneficial way internally and externally through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Air emissions of industry-specific pollutants.
Evidence

Relatively high air emissions from the industry expose it to regulatory risks and costs. SASB’s analysis of air pollution data for all industrial processes (excluding emissions from fuel combustion) from the National Emissions Inventory shows that in 2008, oil and gas production processes released over 1.5 million pounds of benzene, which is equivalent to 49 percent of all benzene emissions from industrial processes in 2008. A 1997 EPA database shows that oil and gas extraction accounted for the second-highest sulfur dioxide emissions of all the industries included in the database (29 total), the fifth-highest VOC emissions, and the third-highest nitrogen dioxide emissions.65

Increasing concerns about air quality are leading to new rules with expanded scope on limiting emissions from the industry. The EPA’s new NSPS and NESHAP standards issued in 2012 affect stationary sources such as gas well completions, pneumatic controllers, compressors, and storage vessels. They build on the existing NSPS rules, and for fractured and re-fractured gas wells, require owners/operators to use reduced emissions completions (REC) (also known as “green completions”) to reduce VOC emissions. Under NESHAP, the EPA establishes emissions limits for some currently uncontrolled HAP emission sources, reflecting the Maximum Achievable Control Technology (MACT). These include limits for benzene, ethylbenzene, toluene and xylene (BTEX).66

The new rules are expected to reduce emissions of VOC by 190,000-290,000 tons per year (tpy), of HAPs by 12,000-20,000 tpy,67 and of methane by 1-1.7 million tpy. Overall, the rules are expected to result in net industry cost savings of $11-22 million a year, because they require recovery of salable natural gas (methane) and condensate.68

Furthermore, in 2014, the U.S. EPA is expected to reveal the results of its five-year review of the 2008 ozone National Ambient Air Quality Standards (NAAQS). This is expected to include a proposal for a lower ozone NAAQS, which could result in additional areas being designated as “non-attainment.” This could affect new E&P operations, and according to Marathon Oil’s Form 10-K for FY 2013, result in “an increase in costs for emission controls and requirements for additional monitoring and testing, as well as a more cumbersome permitting process.”

Companies are also facing new risks from litigation challenging the enforcement of air quality regulations. Changes in permitting or regulations resulting from such litigation has the potential to delay new or existing extraction activities. In August 2013, the BLM agreed to re-evaluate the air quality impacts of 34 previously approved oil and gas drilling projects across western Colorado, in response to a 2011 federal lawsuit alleging that the agency ignored the potential impacts of air pollution across the region. In the previous year, the BLM had agreed to withdraw its approval of three drilling projects comprising about 400 wells in order to conduct a full air quality analysis of each one.69

Companies face ongoing risks related to the CAA and may be required to implement changes in operations to monitor and limit emissions. For example, in 2013, Shell agreed
to pay $1.1 million in civil fines for air-quality violations under the CAA from vessels used to drill two oil exploration wells in Arctic waters off Alaska. In addition, flare compliance has been an ongoing priority for the EPA, particularly under the Air Toxics National Enforcement Initiative.

There is evidence of shareholder interest in this issue. Apart from the ExxonMobil shareholder resolution mentioned above, shareholder resolutions at Ultra Petroleum, Cabot and EOG Resources on the environmental impacts of their fracking operations, including air emissions, were subsequently withdrawn after the companies agreed to update and report their plan for reducing emissions, among other actions.

Pioneer Natural Resources discusses the impact of the CAA and state air pollution laws on its operations in the Risk Factors section of its 2012 Form 10-K: “Such laws and regulations may require a facility to obtain pre-approval for the construction or modification of certain projects or facilities expected to produce air emissions or result in the increase of existing air emissions; obtain or strictly comply with air permits containing various emissions and operational limitations; or utilize specific emission control technologies to limit emissions of certain air pollutants.”

**Value Impact**

Air pollution from E&P operations can have an ongoing impact on the cost structure of companies as well as one-off effects on cash flows. Acute impacts can occur if drilling permits are delayed or revoked as a result of air quality regulations or investigations.

Harmful air emissions from operations may result in regulatory penalties, higher regulatory compliance costs, or new capital expenditures to install the best-in-class control technology. Denial or delays in permit approval can have a significant impact on revenues and profitability. Financial impacts of air pollution will vary depending on the specific location of companies’ operations and the prevailing air emissions regulations, which may be less developed in some regions and countries than others. Companies may also face legal challenges from the local population or other businesses, resulting in one-time costs and increased contingent liabilities.

As concerns about the health effects of air emissions grow around the world, the probability and magnitude of impacts from this issue are likely to increase in the future.

**Water Management**

The two main challenges that E&P companies face with respect to water are those of securing adequate supplies for what is a water-intensive process and ensuring that contamination of water resources is prevented or addressed where it occurs.

While water has typically been a freely available and abundant commodity in many parts of the world, it is becoming a scarce resource...
due to increasing consumption from population growth and rapid urbanization, as well as reduced supplies as a result of climate change. Furthermore, water pollution makes available water supplies unusable or expensive to treat. Based on recent trends, it is estimated that by 2025, important river basins in the U.S., Mexico, Western Europe, China, India, and Africa will face severe water problems as demand overtakes renewable supplies. Many important river basins can already be considered “stressed.”

For oil and gas E&P, depending on the extraction technique, operations need relatively large quantities of water. Depending on their location, E&P facilities may be exposed to the risk of reduced water availability and related cost increases. Extraction of water from “water-stressed” regions, or the contamination of aquifers and water bodies from produced water, fracking fluids, methane leaks, and oil or chemical spills may also create tensions with local communities if, for example, they are deprived of drinking water.

With the rapid expansion of shale gas development in populated areas of North America over the last few years, there have been rising public concerns about groundwater pollution resulting from fracking. This has resulted in new legislation and regulations being proposed related to water contamination and use of fracking fluids, creating regulatory risks for companies. Water use and contamination are also important operational considerations for companies operating in foreign markets such as China and India, both of which are estimated to have significant shale reserves. Water stresses and community impacts are likely to be significant due to the higher population density in these countries and estimated impacts of climate change on water resources.

E&P companies can adopt various strategies to deal with these risks, such as recycling produced water, improving production techniques to lower water use per well, ensuring well integrity, monitoring groundwater quality and addressing leaks with the potential to create contamination, being transparent about the toxicity of chemicals used in fracking fluids, and using fracking fluids that contain non-toxic substances. Company performance in this area can be analyzed in a cost-beneficial way internally and externally through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Freshwater withdrawals, percentage recycled, percentage in water-stressed regions;
- Volume of produced water and flowback generated, percentage discharged, injected, and recycled, hydrocarbon content in discharged water;
- Percentage of fracked wells for which there is public disclosure of all fracking fluid chemicals used; and
- Percentage of fracking sites where water quality deteriorated compared to a baseline.

VI Produced water is low-quality water that emerges from the ground in large quantities along with oil and gas in the extraction process.
Evidence

The substantial and growing use of water resources in oil and gas extraction can pose operational risks to companies from lack of water availability or higher costs. Fracking of a conventional well with a single fracture generally requires 50,000 to 100,000 gallons of fluid, whereas fracking of a horizontal shale well requires one to eight million gallons of water, and significant volumes of chemicals.74 According to a report from Ceres, a network of investors, companies, and public-interest groups promoting sustainability leadership, a 2013 survey of 24,450 oil and gas wells in the U.S. showed that nearly half are already located in areas with “high and extremely high water stress.”75

Companies in the industry report risks to their business from operations located in such regions and the specific actions they are taking to address them. For example, Devon Energy Corporation reports in its 2013 CDP disclosure that physical and regulatory risks in the U.S. and Canada, including higher water prices and mandatory limits on water use, could lead to a potential reduction in drilling and completing future wells in the next one to five years. The company identifies the potential for cost savings from developing and executing a holistic water-management plan related to sourcing and disposal of water.76

Similarly, Apache Corporation notes in its 2013 CDP Water Disclosure report that approximately 69 percent of its operations (by production) are located in regions with water-related risks. The company reports using between 2 and 8.3 megaliters of water per megaliter of product (produced volumes of crude oil, natural gas, and condensates) across its global operations. Apache’s actions include using 20-25 percent of the make-up water for fracking from recycled sources and recycling over 90 percent of produced water in some locations.77

Water contamination is a significant regulatory and reputational risk for the E&P industry, particularly where operations intersect with drinking water supplies. Contamination could result from produced water, fracking fluids, or methane leakage.

U.S. Department of Energy figures show that, in the extraction process, the global oil industry produces two to three times more water than oil, and more produced water is generated as oil fields age.78 Components and impurities that are water-soluble are difficult to remove from produced water. Harmful substances in produced water may include benzene, lead, arsenic, and uranium. Over 90 percent of onshore produced water is injected for enhanced recovery or disposal, and involves a closed system that minimizes the potential for releases.79 Nevertheless, unintentional releases can occur, impacting water resources as well as soils and vegetation.80 Furthermore, around three percent of the industry’s produced water is discharged.81

There are incentives for reducing and recycling produced water, as the large volumes of produced water discharged and injected can
lead to significant costs for E&P companies. Produced water handling and treatment is estimated to represent $18 billion in costs for the oil and gas industry in the U.S. alone, with per-gallon costs of cleaning produced water being as much as 300 times greater than costs of municipal water and 3,000 times greater than agricultural irrigation water.82

Wastewater from operations can also lead to regulatory penalties. In July 2013, XTO Energy reached a settlement with the EPA and U.S. Department of Justice to resolve charges of CWA violations related to the discharge of wastewater from a storage facility for its fracking operations. XTO was required to pay a penalty of $100,000 and spend a federal government-estimated $20 million on a comprehensive plan to improve wastewater management practices to recycle, properly dispose of, and prevent spills of wastewater generated from its E&P activities.83

Not only do E&P companies face high costs from managing produced water, but they also face public pressure related to the contamination of drinking water resources from fracking operations, which has heightened regulatory scrutiny. Despite the separation between fractures, which are several thousand feet below ground, and drinking water supplies, which are close to the surface, human error leaves open the possibility of contamination occurring. Proper surface casing design and cementing are required to isolate and protect water supplies, and casing pressures need to be monitored throughout the life of the well to identify and address leaks. Furthermore, some fracturing occurs close to the surface and near aquifers, elevating the risks.84 However, the impact on groundwater quality is often hard to measure due to the lack of baseline data before commencement of fracturing operations.

As a result, the use of fracking fluids containing harmful chemicals is an area of particular concern. A Congressional study shows that between 2005 and 2009, oil and gas companies used fracking products containing 29 chemicals that are known or possible human carcinogens, regulated under the Safe Drinking Water Act for their human health risks, or listed as HAPs under the CAA.85 The exact chemical composition of fracking fluids is often proprietary information, and was not previously disclosed, as it was treated as a trade secret. This again made it difficult to assess the impacts on water quality from fracking operations.

Methane levels in local drinking water due to shale gas operations are another area of concern. An analysis of 121 drinking water wells in northeastern Pennsylvania detected methane in 82 percent of drinking water samples, with average concentrations six times higher for homes less than one kilometer from natural gas wells.86 Well casing integrity is therefore important to lower such risks. In 2011, Chesapeake Energy had to pay a fine of close to $1 million for contaminating private water wells with methane in Bradford County, PA, and agreed to a corrective action plan that included strengthening its well casings and expanding its water-quality testing.87

Regulators have sought to address these concerns through several actions and proposed rules, with potential for significant costs and
business risks to E&P companies. Despite the 2005 federal Safe Drinking Water Act exemption for underground injection of chemicals, at the state level, 17 states representing 96 percent of unconventional production have fracking regulations that address the issue of chemicals disclosure. In September 2009, the New York State Department of Environmental Conservation released draft permit conditions that would require disclosure of chemicals used, specific well-construction protocols, and baseline pre-testing of surrounding drinking water wells.

Since then, federal agencies have also taken action to investigate and introduce new rules on chemicals disclosure and water management. The BLM’s proposed rules for fracking on federal and Indian lands, released in May 2013, deal with the disclosure of chemicals used in fracking. Under the proposed rules, BLM would have the ability to demand the specific chemical details of any materials being proposed for trade secret exemption. The rules also address well construction and integrity testing to ensure fluids used in fracking are not contaminating groundwater.

Wells located on federal lands account for 13 percent of U.S. natural gas production. These rules are therefore expected to impose significant costs on companies. The BLM estimates annualized costs to the industry of only between $12 million to $20 million; other cost estimates vary widely and are much higher, with some industry players estimating costs of $345 million per year, including lengthy production delays. Other cost estimates range from $2.7 billion to $12 billion.

The EPA is also expected to propose rules in 2014 regarding chemical disclosures and control of wastewater discharge, in addition to completing its study on risks to drinking water from fracking, which could result in additional rulemaking. These are likely to apply more broadly to any company conducting fracking, not limited to federal lands.

High risk of regulation around water contamination from fracking can create difficult conditions for access to capital. For example, ExxonMobil included a clause in the $41 billion offer it made in December 2009 to buy natural gas producer XTO Energy that would allow ExxonMobil to back out if regulations made fracking illegal or “commercially impracticable.” Although the deal ultimately went through, this highlights the potential impacts emerging fracking regulations could have on E&P company value.

According to a study of corporate disclosures on sustainability issues, around 64 percent of energy companies disclosed information on water risks in their annual 10-K filings. Those companies involved in fracking were among the most likely to discuss water use.

**Value Impact**

Managing water consumption and wastewater can influence operational risks faced by companies, with potentially acute impacts on value.
from disruptions to production. Water use and contamination can also affect ongoing operating costs and can impact cash flows through one-off capital expenditures or regulatory penalties.

Water use and potential for contamination by E&P companies, particularly through fracking, can lead to water supply shortages, permitting restrictions, or protests from local communities, creating operational disruptions that increase costs or lower revenues. Additionally, companies may face higher capital expenditures, water treatment costs, and regulatory compliance costs. At the extreme, improper management of water quality and quantity could prevent the use of fracking, which, in some cases, is the only economically and technologically viable method to extract certain gas reserves. This impacts the risk profile (and cost of capital) for companies’ ongoing operations as well as the quantity and value of proven reserves. Ongoing scientific research on the negative impacts of fracking poses near-term regulatory and operational risks for companies that increase the probability and magnitude of financial impact.

**Biodiversity Impacts**

The E&P industry’s activities can have significant impacts on biodiversity, including habitat loss and alteration through land use for exploration, production, disposal of drilling and associated wastes, and decommissioning of wells. Many species and habitats are also threatened by oil spills and leaks.96

Oil and gas E&P operations can generate significant wastes, the primary categories being produced water (discussed above under “Water Management”), drilling waste, which includes rock cuttings and fluids produced from drilling a new wellbore, and associated wastes, which cover a variety of small waste streams (such as completion fluids, workover fluids, and oily sludges from tank bottoms). While operational best practices have reduced the amount of waste generated over time, waste from operations can nonetheless affect biodiversity. The large volumes of drill cuttings, along with potentially hazardous substances in the muds that coat the cuttings as they are extracted, can make disposal of such waste challenging, particularly for offshore operations.97

Furthermore, decommissioning of onshore and offshore oil and gas wells can have negative environmental and social impacts if not properly managed, including land use impacts, soil and groundwater contamination, and erosion.98

Areas such as the Arctic and certain shorelines with mangroves and swamps are highly ecologically sensitive, and externalities from E&P operations in these areas can be extremely damaging to biodiversity and ecosystems. Operations in these areas also entail more complex and expensive cleanup operations should there be hydrocarbon spills or leaks. As oil and gas companies attempt to access more remote, ecologically sensitive locations like the Arctic and deep-water resources and develop unconventional resources, such as oil sands requiring larger land area and generating more waste, risks that E&P operations will affect biodiversity, and therefore company value, could be exacerbated.

Significant spills or explosions as a result of accidents can also affect biodiversity, and therefore company value. Such significant risks, with low probability of occurrence but high po-
tential impact, are discussed under the disclosure topic of “Health, Safety, and Emergency Management.”

Biodiversity impacts of E&P operations can both affect the valuation of oil and gas reserves and create operational risks, potentially affecting E&P companies’ cost of capital. The environmental characteristics of the land where reserves are located could increase extraction costs due to increasing awareness and protection of ecosystems and endangered species, making it uneconomical to extract from such sites. Companies could also face regulatory or reputational barriers to accessing reserves in ecologically sensitive areas due to more stringent legislation and permitting to protect ecosystems and endangered species, delays or denial of permits, and new protection statuses afforded to areas where reserves are located. In fact, the number and size of protected conservation areas has increased exponentially around the world over the past several years.⁹⁹

Conversely, companies with a good track record of minimizing biodiversity risks and impacts could gain a competitive advantage in accessing new reserves in or near protected areas. Negative future impacts on the value of reserves could be mitigated by incorporating the specific considerations of reserves located in or near protected areas when making investment or capital expenditure decisions.

In addition to potential impacts on reserves, ongoing E&P operations could be at risk due to E&P companies’ performance on this issue. In countries with strong enforcement of environmental regulations, including those related to well decommissioning or waste disposal, companies could face significant costs associated with regulatory requirements and penalties. In all countries of operation, community and public pressures associated with biodiversity impacts could increase regulation or disrupt operations through strikes, protests, and lawsuits.⁸⁹ Effective environmental management plans that lower risks and magnitude of impacts on biodiversity at different stages of the project lifecycle can therefore serve to lower costs, disruptions, and regulatory penalties.

Company performance in this area can be analyzed in a cost-beneficial way internally and externally through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Environmental management policies and practices for active sites;
- Number and volume of spills, volumes in ecologically sensitive areas, volumes recovered; and
- Proved and probable reserves in or near sites with protected conservation status or endangered species habitats.

⁹⁹ Impacts on E&P operations due to community-related impacts and opposition, and therefore the importance of strong community relations, are discussed in detail under the issue of “Community Relations.”
Evidence

An E&P company’s performance in mitigating biodiversity impacts of operations can affect its value through impacts on reserves and production. This includes managing land clearing for operations and infrastructure as well as spills, leaks, wastes, and decommissioning.

First, E&P companies’ decisions about acquiring reserves in ecologically sensitive areas, together with their performance on managing biodiversity impacts, could have material implications for the value of their reserves, and therefore shareholder value. A 2002 study by the World Resources Institute found that companies’ share of reserves in ecologically important areas varied significantly. According to the report, future policies related to companies’ access to reserves in ecologically sensitive areas could lead to an average two percent loss in shareholder value across different scenarios. Non-integrated companies would be the most affected.

The scenarios included one which assumed global support for conservation would formally put a certain percentage of companies’ reserves “off-limits.” (This scenario was assigned a 20 percent probability at the time). Negative impacts on shareholder value from this scenario compared to the baseline (where shareholder value for reserves and acreage was calculated without the assumption in the scenario above) ranged from less than one to almost four percent. Based on all scenarios for restricted access to reserves, including community opposition to operations in ecologically sensitive areas (which was assigned a 60 percent probability), the authors concluded: “Companies heavily invested in sensitive areas are at higher risk from emerging opposition to industry presence.”

In fact, as concerns over ecological impacts have grown in the past decade, additional areas have been designated as protected under new or existing laws, increasing risks to reserves. From 1990 to 2010, global protected area coverage increased from 8.8 percent to 12.7 percent on land, and from 0.9 percent to 4 percent in marine areas under national jurisdiction.

E&P companies recognize that their access to reserves could be affected temporarily or permanently as a result of laws to protect endangered species and sensitive habitats. In its Form 10-K for FY 2013, Andarko Petroleum discusses U.S. laws related to the protection of biodiversity, including the Endangered Species Act, the Marine Mammals Protection Act, and the Migratory Bird Treaty Act. According to the company, these laws could require “the implementation of operating restrictions or a temporary, seasonal, or permanent ban in affected areas.”

Chesapeake Energy discloses in its Form 10-K for FY 2013 that some of its assets and lease acreage may be located in areas designated as...
habitats for endangered or threatened species. While the company believes it is compliant with the Endangered Species Act in these areas, it recognizes that previously unidentified endangered or threatened species could be designated as such in areas where the company intends to conduct construction activity, which could materially limit or delay the company’s plans. It provides the example of the U.S. Fish and Wildlife Service being required to make a determination on the listing of more than 250 species as endangered or threatened over the next several years due to a 2011 settlement. In addition to restricted access to reserves from formal legal protection of ecologically sensitive areas and endangered species, drilling in ecologically sensitive areas such as the Arctic also creates regulatory uncertainty for companies and operational risks from drilling in harsh environments. These could affect both the value of reserves and also operating costs. For example, Shell faced a number of difficulties in its Arctic drilling operations in 2012, including the grounding of a drill ship. As a result, the company abandoned its plans for drilling in the Arctic in 2013. In early 2014, the company’s plans for Arctic drilling were yet again halted due to a federal appeals court ruling that determined that the U.S. government’s decision to open up around 30 million acres for oil and gas exploration in the Arctic seas near Alaska was illegal. Shell had already spent around $5 billion over seven years preparing to explore the area. Similarly, ConocoPhillips decided not to pursue its plans to explore for oil in the Arctic in 2014 due to regulatory uncertainty. Impacts on biodiversity from waste generated from operations and inadequate remediation at the end of life of oil and gas wells can lead to regulatory penalties. Proper waste management and decommissioning, while requiring significant expenditures, also provide opportunities for cost savings, operational efficiencies, and mitigation of regulatory risk.

Drilling waste management can require large areas of land and wastes may contain harmful substances, which can lead to ecological impacts. The accumulated volume of solid drilling waste from the industry is estimated to be approximately 140 million barrels per year, enough to fill almost 9,000 Olympic swimming pools. According to a 1995 API survey (most recent year for which data was available), 68 percent of drilling wastes are buried or evaporated onsite. Only 25 percent of new wells were drilled with a closed mud system, which did not require reserve pits to store and dispose of used drilling muds and cuttings. This indicates a potential for improved operational efficiencies, including reuse or recycling, and minimizing generation of new wastes. Average drilling waste burial costs are estimated at $7-10 per barrel of waste. Given the above numbers, the industry spends around $666 million to $952 million on onsite disposal of drilling wastes per year. While many of these wastes are classified as non-hazardous under federal law, creating lower risks for E&P companies, laws could change due to heightened concerns over the impacts of E&P activities in recent years. In its 10-K for 2012, Pioneer Natural Resources dis-
closes the potential material impacts of waste generation on its business: “It is possible that certain oil and gas [E&P] wastes now classified as non-hazardous could be classified as hazardous wastes in the future. Any such change could result in an increase in the Company’s costs to manage and dispose of wastes, which could have a material adverse effect on the Company’s results of operations and financial position.”

As companies become involved with oil sands mining operations, they will face additional waste handling challenges. For example, oil sand mines in Alberta, Canada, produce around 250 million liters of tailings per day, and tailings ponds cover 176 square kilometers and hold around 830 million cubic meters of water, sand, and clay. Inadequate management of the small amounts of wastes from the industry that are indeed classified as hazardous can lead to regulatory penalties. In 1999, BP Exploration (Alaska) Inc., the U.S. subsidiary of BP Amoco, pleaded guilty to charges related to the illegal disposal of hazardous waste in Alaska, and agreed to pay $22 million to resolve the criminal case and related civil claims. It also paid a fine of $500,000, $6.5 million in civil penalties, and agreed to establish an Environmental Management System at all of BP Amoco’s E&P facilities in the U.S. The waste in this case included waste oil, paint thinner, and toxic solvents containing lead and chemicals such as benzene, toluene, and methylene chloride, constituting illegal disposal under the RCRA.

Adequate decommissioning of oil and gas wells can impose significant costs on E&P companies. In its Form 10-K for FY 2012, ConocoPhillips discusses its material legal obligations related to decommissioning and the storage, disposal, or release of chemical, mineral, and petroleum substances at both active and inactive sites, adding, “We have material legal obligations to remove tangible equipment and restore the land or seabed at the end of operations at operational sites.”

For offshore operations of E&P companies, the BOEM may require supplemental bonding from oil and gas companies leasing offshore fields “to ensure that lessees are capable of meeting their financial obligations and complying with the laws and regulations associated with the decommissioning of offshore oil and gas facilities, including pipelines, in Federal waters.” A 2010 study of decommissioning costs for oil and gas facilities in the Pacific OCS region shows that estimated costs for 23 OCS platforms were in the range of $12 million to $156 million, with the total cost for all platforms being around $1.3 billion.

Adequate decommissioning can also create value for E&P companies. Among the main conclusions of a study on well plugging and abandonment were that “[b]enefits from reduced operational costs and/or increased production, especially in redeveloped, older fields, generally has been underappreciated. By plugging wells correctly, future environmental issues, related to fluid or gas leakage, can be eroded by remediation or litigation costs.”

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VIII Tailings includes water, residual oil, clays and, primarily, sand left over after mining and separation.

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Finally, operational spills, leaks, and clearing of vital ecosystems affecting ecologically sensitive areas can create the risk of lawsuits. In 2013, Southeast Louisiana Flood Protection Authority-East filed a lawsuit against a number of oil and gas companies. The flood protection agency blamed the companies for the ecological destruction of coastal wetlands as a result of the network of thousands of miles of oil and gas pipelines and canals in the area. The agency alleges that oil and gas production and transportation resulted in killing vegetation, eroding soil, and allowing salt water to spread into freshwater areas.\footnote{116} Oil and gas activities allegedly have taken up $470 billion of Louisiana’s natural resources over the previous 20 years. The flood protection agency’s lawsuit seeks abatement and restoration of affected coastal lands.\footnote{117}

\textbf{Value Impact}

Biodiversity impacts can have both a chronic and acute impact on company value. The location of a company’s reserves and its performance on biodiversity impact mitigation and management can affect its long-term value through impacts on the value of reserves. Unanticipated changes in environmental laws could also result in acute impacts on reserves. Minimizing risks and impacts to biodiversity and ecosystems can help companies manage operational risk, which can influence one-time costs and contingent liabilities. Companies can also gain operational efficiencies and ongoing cost savings from effective waste handling and decommissioning of wells.

In countries with strong enforcement of laws protecting endangered species and habitats and governing waste handling and decommissioning, companies could face significant regulatory penalties and compliance costs. Permitting of drilling facilities may be affected in ecologically sensitive areas, lowering companies’ revenue-earning potential. Performance in this area can also affect remediation costs, including cleaning spills and leaks. Depending on their waste management practices and the locations in which they operate, E&P companies may also face significant waste-handling costs.

Generally, companies’ impact on biodiversity may lead to community protests and lawsuits, which can lead to lost revenue and higher costs from delayed production, create legal liabilities, and ultimately increase their risk profile and cost of capital.

Conversely, effective plugging of oil and gas wells and efficient waste management could lower operating costs or result in increased production from well redevelopment. Strong biodiversity risk and impact management could improve companies’ access to finance, as an increasing number of lenders and equity investors are incorporating environmental criteria in their lending or investment decisions. Additionally, reducing both the probability and magnitude of occurrence of ecological impacts can enhance a company’s reputation and increase intangible assets.

With the expansion of unconventional oil and gas production, coupled with increasing concerns about and protection of ecologically sensitive areas and species, the probability and magnitude of impact on financial results from this issue are likely to increase in the future.
SOCIAL CAPITAL

Social capital relates to the perceived role of business in society, or the expectation of business contribution to society in return for its license to operate. It addresses the management of relationships with key outside stakeholders, such as customers, local communities, the public, and the government.

E&P activities have significant impacts on local communities and it is important for companies to manage the concerns of these stakeholders. Companies performing poorly on such issues are generally impacted by their ‘social license to operate’ eroding or being completely taken away. This could be in the form of being denied regulatory permits, losing market share, suffering impacts on brand value, or facing frequent disruptions to operations.

Community Relations

E&P activities take place over a number of years, and companies may be involved in multiple projects in a region that can have a wide range of community impacts. Communities may be affected by environmental and social impacts of E&P operations, such as competition for access to local energy or water resources, air and water emissions and waste from operations, and strain on local health services, as well as high-magnitude, acute impacts from oil spills and explosions. Land acquisition and resettlement of communities can be particularly disruptive to both communities and E&P operations in countries that do not have well-established land or property rights. Generally, impacts from E&P operations risk impinging on the basic economic, social, environmental, or cultural rights and interests of community members.

In recent years, with the expansion of oil and gas E&P activities—particularly fracking operations in the U.S.—near populated areas and valuable surface and ground water resources, community concerns around environmental and health impacts have increased. With expansion in these areas, additional concerns such as those around seismicity induced by extraction and production activities have emerged, although some amount of induced seismicity has been common to E&P operations historically.

In addition to community concerns around direct environmental and social impacts of projects, the presence of E&P activities may give rise to associated socioeconomic concerns such as education, health, livelihoods, and food security for the community. E&P companies that are perceived as engaging in rent-seeking and exploiting a country or community’s resources without providing any socioeconomic benefits in return may be exposed to the risk of resource nationalism actions by host governments and communities, such as imposition of ad hoc taxes, export restrictions, local content requirements, or other additional costs. Such resource nationalism risks may be higher in countries heavily dependent on oil and gas for their economic growth, or where there are fewer checks and balances on executive action that might lead the government to renege on prior policy commitments.
Ultimately, whether in countries such as the U.S. with well-defined individual and community rights, or in countries where communities or individuals may not have legal recourse or rights, E&P companies need support from local communities to be able to obtain permits and leases and conduct their activities without disruptions. The expected value of reserves could be affected if the community interferes, or lobbies its government to interfere, with the rights of an E&P company in relation to those reserves.119

Engaging with local communities to gain their consent or buy-in and addressing their concerns is therefore important for a company’s reputation in order to build trust with the community and maintain its social license to operate. Companies have adopted various community engagement strategies in international operations to minimize and address community impacts, such as integrating community engagement into each phase of the project cycle, and promoting participatory monitoring by local communities.120

Whereas company programs to improve socio-economic conditions were traditionally conducted as Corporate Social Responsibility (CSR) or public relations efforts that did not necessarily materially affect company value, companies are beginning to adopt a “shared value” approach, sometimes together with other companies operating in the project area. Under this approach, a company may provide a key product or service to the community (such as preventive vaccination) that also creates value for the company itself (in this case, through lower absenteeism in the workforce).121

Company management of community-related risks and opportunities can affect company and project value through impacts on expected value of reserves and through community-related disruptions to operations. Company performance in this area can therefore be analyzed in a cost-beneficial way internally and externally through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Discussion of process to manage risks and opportunities associated with community rights and interests; and
- Number and duration of non-technical delays.

**Evidence**

Community relations could affect the financial market valuation of E&P companies if a discount is placed on the value of reserves to account for the effect that conflict with the community can have on the probability of timely exploitation of reserves. A 2011 research paper by the Wharton School, University of Pennsylvania, investigated the discount placed by investors on the value of gold reserves owned by publicly traded companies, and therefore the companies’ financial market valuation, due to expectations of significant planning and operational delays. The paper looked at two factors affecting the timely extraction of reserves: the level of stakeholder cooperation or conflict and country-level political risk.

The authors concluded, “theoretical arguments and empirical results point to the existence of a direct positive and economically substantive
relationship between financial market valuation and stakeholder relations. According to the authors, the same argument applies to other natural resources such as oil and gas. The empirical analysis looked at how the expected resource valuation of a mining company determined the market value of the company, compared to its announced resource valuation. The expected valuation was calculated by adjusting the valuation of a company’s mines at a given point in time as determined with a traditional valuation method, by taking into account the probability, at that time, that the company will advance the exploitation of that mine’s resources according to the announced schedule.

The authors found that the market value of the firm placed a discount on the announced resource valuation (based on net present value of the gold controlled by the mining firms) of up to 72 percent. When the authors tested the market value using the expected resource valuation, this discount was reduced to between 33 and 12 percent. This indicates that the market value of the gold firms incorporated the probability that the resources could not be extracted as planned—i.e., market value is affected by the level of stakeholder cooperation or conflict and by country-level political risk.

Community relations efforts can pay off in the form of avoided planning or operational delays and associated costs for projects. Research by the World Resources Institute (WRI) shows that community engagement efforts by Shell during the development of a natural gas project in the Philippines cost $6 million, which was around 0.13 percent of total project costs. The efforts, however, resulted in estimated avoided costs of around $50-72 million by preventing anticipated delays due to community concerns that could have led to higher costs. According to the WRI, “the experiences of [its] other case studies suggest that had affected communities felt the need to mobilize in opposition to the project, the financial impacts […] could have far exceeded these base case estimates.” For example, in the related mining industry, community opposition to an expansion plan for the Yanacocha gold mine in Peru led to project delays worth $1.69 billion. In fact, a study analyzing 190 oil and gas projects found that 73 percent of project delays were due to non-technical risks, which included stakeholder resistance.

Community relations efforts related to socioeconomic development could also enable a community’s acceptance of a project. In the case of Shell’s community relations efforts, the company provided $1 million in grants to local NGOs for micro-finance and livelihood loans in one of the communities where it faced initial opposition. In another community whose livelihood was affected by the project, Shell provided training and employment opportunities for work on the project, allaying some of the community’s concerns and enabling their approval.
In addition to direct disruption from community action, E&P companies also face the risk of resource nationalism actions by governments impacting their operations. A 2012 report estimates that 44 percent of global oil production is in countries that pose a “high” or “extreme” risk of resource nationalism. Several oil and gas companies have been affected by such actions. For example, Ecuador imposed windfall taxes on oil exporters in 2006 and required oil companies operating there to enter into new flat-fee service contracts instead of more profitable production-sharing deals.¹²⁸

Investors and companies that have brought international litigation or arbitration cases against host governments, seeking to recuperate their profits and investments, have not always received the full amount they sought. For example, in January 2012, an ICC arbitration tribunal required Venezuela to pay Exxon $908 million as compensation for the nationalization of a heavy oil project in 2007. However, this was less than 10 percent of the amount originally claimed by Exxon. Actions to mitigate the risk of resource nationalism could include investments in socioeconomic development in the host country and minimizing negative impacts of operations on the host community.¹²⁹

In developed countries, community concerns can often translate into increased regulatory scrutiny, the introduction of more stringent laws and regulations, or lawsuits. For example, regulators in several areas are investigating induced seismicity caused by E&P activities, as community concerns related to this issue heighten. In the U.S., state oil and gas regulators, together with the Interstate Oil & Gas Conservation Commission and Groundwater Protection Council, are examining whether a relationship exists between injection wells and seismic events in several states.¹³⁰,¹³¹ In the Netherlands, NAM, a joint venture between Shell and ExxonMobil, agreed to compensate property owners for the damage caused by seismic activity. According to an independent expert, the joint venture received 5,640 damage claims between August 2012 and March 2013, with an average repair cost per claim of around EUR 10,000.¹³²

In the U.S., regulatory and legal filings in states such as Wyoming, Arkansas, Pennsylvania and Texas show that oil and gas companies have agreed to cash settlements or property buyouts with individuals in those states who allege that fracking operations resulted in groundwater contamination. In most cases under the agreements, homeowners are restricted from discussing their case.¹³³ This has contributed to a lack of information, together with concerns about the social, health, and environmental impacts of fracking. While many communities have benefited economically from increased oil and gas extraction activities, these concerns have led to community opposition to fracking, with several local and some state measures passed to ban or place moratoria on fracking activity.

In New York state alone, where a state-level moratorium on fracking is in place, pending environmental review, there have been 75 bans, 102 moratoria, and 87 movements for prohibitions (bans or moratoria) against high-
volume horizontal fracking at the municipal level (as of March 2014). In California, where the Monterey Shale is estimated to contain the country’s largest shale oil reserves, drought conditions and seismic activity have provided momentum for similar moratoria driven by concerns of local industries and communities. Concerns around fracking have also led to bans in other countries such as France and Bulgaria.134,135,136

Highlighting the risk from lawsuits, Chesapeake Energy, in its Form 10-K for FY 2012, discloses that “[i]t is not uncommon for neighboring landowners and other third parties to file claims for personal injury and property damage allegedly caused by the release of hazardous substances, hydrocarbons or other waste products into the environment.”

The financing of E&P projects could also be affected depending on community impacts and efforts by E&P companies to address them. The International Finance Corporation (IFC) has set community engagement principles and standards for international project financiers, and the IFC’s Performance Standards have become the most widely accepted framework for managing environmental and social risks in emerging markets. Financing of E&P company projects in international markets could be affected if companies fail to adhere to these standards, or others, such as the Equator Principles.137

Some leading independent oil and gas E&P companies recognize the link between the success or efficiency of their operations and the impact on local communities in their Form 10-K filings for FY 2013. Noble Energy states, “We strive to build trust through stakeholder engagement, act on our values, provide a safe work environment, respect our environment and care for our people and the communities where we operate.” The company discloses that it has an enterprise risk management (ERM) process for its activities, which aims to minimize the effects of risks on the company’s capital, cash flows, and earnings. The ERM includes strategic, operational, and political risks, among others. Elements of the process, which is integrated with the company’s long-term plans, include government and community relations initiatives.

**Value Impact**

Community relations issues can be a source of both value and risk for E&P companies. Without due diligence and effective action to address community or regional impacts throughout a project’s lifecycle, companies may expose themselves to short-term and acute operational risks or longer-term reputational impact from ongoing community cooperation or conflict.

Difficulty in obtaining energy or water resources or other materials due to competition with, or pushback from, affected communities could create delays in commencing operations or disruptions to on-going production. Operational disruptions could result from community protests or worker strikes over air pollution or land use. They could also result from the introduction of more stringent regulation, particularly in countries with stronger governance. Additionally, governments seeking to nationalize resources in certain jurisdictions could impose ad hoc tax liabilities, local content requirements, or export restrictions that would greatly reduce company revenues.
All of these factors could lead to lost revenues, cost increases, restricted access to equity or debt funding for projects, or a rise in a project’s risk profile, and therefore its cost of capital. Companies also risk facing significant costs and liabilities from class action lawsuits. Legacy community impacts can hurt a company’s future social license to operate and ability to access critical resources, thus affecting its longer-term revenue growth profile.

Security, Human Rights, and Rights of Indigenous Peoples

E&P companies face heightened community-related risks when operating in conflict zones; in areas with weak or absent governance institutions, rule of law, and legislation to protect human rights; or in areas with vulnerable communities such as indigenous peoples. Without corresponding enhanced diligence measures to protect human rights and the rights of indigenous peoples in such areas, companies could encounter difficulties in accessing reserves or significant operational disruptions with impacts on costs and liabilities.

In their global operations, E&P companies may find themselves operating in zones of conflict (which often are resource-rich areas subject to what is known as the “resource curse”), in areas under socially repressive regimes, or in places where conflict or political instability subsequently emerges. Company activities in such areas, including using private or government security forces to protect their workers and assets, may knowingly or unknowingly contribute to extreme cases of human rights violations, including the use of excessive force. The Voluntary Principles on Security and Human Rights (VPSHR), developed in 2000, seek to address the balancing of safety needs with respecting human rights and fundamental freedoms.

Furthermore, indigenous peoples are often the most vulnerable sections of the population, with limited capacity to defend their unique rights and interests. Indigenous peoples have lived on their land for generations, and rely on it for their livelihoods and self-identity. The displacement of such communities or the degradation of their land due to oil and gas activities may lead to loss of identity, culture, and natural resource-based livelihoods, and expose them to impoverishment and disease.

The UN Declaration on the Rights of Indigenous Peoples calls for the free, prior, and informed consent (FPIC) of indigenous peoples for decisions affecting them. The IFC’s Performance Standards include one recognizing the unique vulnerabilities of indigenous peoples, and requiring project sponsors to obtain the FPIC of affected communities. With greater awareness, several countries are also beginning to implement specific laws protecting indigenous peoples’ rights, creating increasing regulatory risk for companies.

Companies perceived as contributing to human rights violations or failing to account for indigenous peoples’ rights may be affected due to protests, riots, or suspension of permits. They could face substantial costs related
to compensation or settlement payments and write-downs in the value of their reserves in such areas.

Company performance in this area and the potential for value impact can therefore be analyzed in a cost-beneficial way internally and externally through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Proved and probable reserves in or near areas of conflict;
- Proved and probable reserves in or near indigenous land; and
- Discussion of engagement and due diligence practices with respect to human rights, indigenous rights, and operations in conflict areas.

**Evidence**

Reserves in or near areas of conflict or indigenous lands can expose companies to operational risks if there is not adequate due diligence and policies in place that take into account the special considerations of operating in such areas. A 2013 paper analyzing the location of operations of 52 oil, gas, and mining companies found that 92 percent of the 370 oil, gas, and mining sites analyzed that were located on or near indigenous land posed a medium to high risk to shareholders. The risk score for each site was based on its location, indigenous peoples policy, reputation, country, community, and legal features. Only one of the 52 companies analyzed had an explicit policy of abiding by the FPIC mandate of the UN Declaration mentioned earlier, and only four others had a company-wide policy related to indigenous peoples. As indigenous peoples’ rights become more formally recognized around the world, and such communities begin to exercise these rights, the lack of a clear policy to engage with such communities could affect company value.144

The 2013 paper also finds that while 39 percent of oil and gas production was occurring on or near indigenous areas considered to be at medium to high risk, 46 percent of reserves were located in such areas. This implies greater risks to future production.

Driven by shareholder pressures, E&P companies are beginning to adopt specific indigenous peoples policies. For example, in 2011, ConocoPhillips adopted a policy consistent with the UN Declaration as well as a convention by the International Labor Organization (ILO), as a result of dialogue with Boston Common Asset Management.144

In April 2014, Achuar indigenous protestors occupied Peru’s largest oil field in the Amazon, demanding the clean-up of decades of contamination from oil spills. The spills were said to have caused significant negative health effects on the native communities. The field had been operated by Pluspetrol since 2001, following Occidental Petroleum’s operations there. Production output from the field fell by 70 percent within the week of the protest. In the previous year, the government had declared three environmental emergencies in large areas near the oil field after finding dangerous pollution levels on indigenous lands.145
Apart from risks of physical disruptions to operations, E&P companies may face additional environmental or safety regulations when operating on indigenous peoples’ lands in certain countries. This could increase their costs, cause delays in obtaining permits, or lead to a suspension of operations. In its Form 10-K for FY 2013, Marathon Oil discusses impacts on its operations from specific U.S. EPA regulations concerning air emissions on tribal lands. A new rule issued in August 2012 creates additional costs for the company for its facilities on tribal lands in North Dakota.  

EOG Resources discusses in its 10-K filing for FY 2013 that a portion of its oil and gas leases are granted by the federal government and administered by the Bureau of Indian Affairs. Federal leases require companies to comply with “numerous additional statutory and regulatory restrictions and, in the case of leases relating to tribal lands, certain tribal environmental and permitting requirements and employment rights regulations.” The company’s disclosure further notes that it could be affected materially if operations on such leases are suspended or terminated.

When operating in politically unstable areas or countries subject to the “resource curse,” oil and gas companies face reputational, legal, and operational risks from their close association with governments that are viewed as corrupt or repressive, and from their use of security forces, where the security forces have been allegedly involved in human rights violations. Often, indigenous peoples are affected by these violations.

For example, in 2009, Shell settled a case brought against it in U.S. courts under the Alien Tort Claims Act (ATCA), in relation to its Nigerian operations, for $15.5 million. Shell denied liability and explained that the settlement was part of its reconciliation process within Nigeria. The plaintiffs were seeking to hold the company liable for the persecution and killings of members of the Movement for the Survival of the Ogoni People (MOSOP), alleging that Shell supplied weapons to Nigerian security forces and participated in security actions that led to the shootings of Ogoni people in the mid-1990s.

While Shell had been operating in Nigeria since the 1950s, it became associated with the government and its exploitation of natural resources without providing adequate benefits to people. Despite its progress in stakeholder engagement and social investments, protests against the company became stronger and more organized, with groups such as MOSOP sometimes protesting in extralegal or violent ways. It is estimated that Shell’s Nigerian operations were able to produce at only 25 percent of capacity in 1999 and 40 percent in 2000. Other E&P companies have faced similar situations that have had a significant impact on their reputations, illustrating the potential impacts and complexity of operating in volatile regions.
Value Impact

Performance on this issue can have acute impacts on company value.

Physical occupation of oil field roads and infrastructure, protests, and sometimes violent actions can prevent a company from accessing new oil fields or damage its existing assets. Reputational impacts could hurt a company’s social license to exploit its reserves. This could lower the value of reserves. Protests and occupation of oil fields could also disrupt operations temporarily, lowering production volumes and therefore revenues. Furthermore, additional environmental or social protections under national law or international instruments could increase operating expenditures in areas belonging to indigenous peoples or could lead to a suspension of permits. Companies could also face litigation liabilities.

Operational risks from operating in or near indigenous peoples’ lands or in conflict zones could also increase the risk premium for financing, and therefore the cost of capital.

HUMAN CAPITAL

Human capital addresses the management of a company’s human resources (employees and individual contractors), as a key asset to delivering long-term value. It includes factors that affect the productivity of employees, such as employee engagement, diversity, and incentives and compensation, as well as the attraction and retention of employees in highly competitive or constrained markets for specific talent, skills, or education. It also addresses the management of labor relations in industries that rely on economies of scale and compete on the price of products and services. Lastly, it includes the management of the health and safety of employees and the ability to create a safety culture for companies that operate in dangerous working environments.

E&P activities involve harsh working environments and drilling flammable oil and gas under high pressure. This poses significant health and safety risks for workers. A safety culture is critical to proactively guard against accidents or other incidents with negative environmental and social impacts. A company’s ability to protect employee health and safety and to create a culture of safety for employees at all levels of the organization can directly influence the results of its operations.

Company performance in ensuring workforce health and well-being and process safety, as well as preparedness for emergency situations such as catastrophic releases of hazardous substances, is addressed by the disclosure topic of “Health, Safety, and Emergency Management.” The topic is discussed under the Leadership and Governance category of issues below, as the safety culture of an E&P company can impact both environmental and social capitals, in addition to its human capital.
LEADERSHIP AND GOVERNANCE

As applied to sustainability, governance involves the management of issues that are inherent to the business model or common practice in the industry and are in potential conflict with the interest of broader stakeholder groups (government, community, customers, and employees). They therefore create a potential liability, or worse, a limitation or removal of license to operate. This includes regulatory compliance, lobbying, and political contributions. It also includes risk management, safety management, supply chain and resource management, conflict of interest, anti-competitive behavior, and corruption and bribery.

Governance issues in the E&P industry are driven by operations in various international markets and tight regulatory environments. They are also driven by strong environmental and social expectations from a variety of stakeholders, in many aspects, more so than other industries.

Governance issues in the industry relate to the need to manage the safety of operations and the health of employees as well as contractors across operations, in order to avoid incidents with wide-ranging environmental and social impacts. Evolving environmental regulations make the stewardship of a company’s capital resources vital, in order to ensure the long-term viability of the business. Finally, a company’s lobbying efforts to deal with a complex and changing regulatory environment can potentially conflict with societal interests, in turn affecting the company’s own long-term sustainability.

Business Ethics & Payments Transparency

E&P companies depend on licenses and permits from governments or government agencies to conduct their business and gain access to oil and gas resources in the U.S. and abroad. They make related payments to governments such as taxes and royalties, which, in many resource-rich nations, along with profits from oil production, are at risk of being used by the government for purposes other than economic and social development. The “resource curse” can lead to corrupt practices in these countries. When oil and gas companies engage in corrupt practices to access E&P rights, they contribute to distorting the fair awarding of contracts, allowing a poor quality of public services, and limiting opportunities to develop a competitive private sector in the host country.

Business ethics and transparency in payments to governments or individuals are likely to be material for companies in this industry due to the importance of government relations in order to conduct business, and the emergence of several anti-corruption, anti-bribery, and payments-transparency laws. These include the FCPA in the U.S. and the Bribery Act 2010 in the U.K. (see the Legislative and Regulatory Trends section), among others. A number of global initiatives have also been developed to address these issues, including the United Nations Global Compact (10th Principle); the World Economic Forum (WEF)’s Partnering Against Corruption Initiative (PACI); the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises; and EITI.
In the U.S., prosecution under the federal FCPA poses a financial risk to companies. As the exploration and production of unconventional resources in the country expand to more states, state anti-bribery and anti-corruption laws such as those in California and New York also will increasingly pose risks to company value. Companies’ dealings with private landowners, including contract negotiations and non-disclosure agreements, may create additional regulatory or litigation risks.

Companies are under pressure to ensure that their governance structures and practices can address corruption and willful or unintentional participation in illegal or unethical payments and gifts to government officials or private persons. Ensuring transparent and fair accounting of production contracts and costs in any revenue or profit-sharing agreement with the host government is another area of concern.\textsuperscript{153}

Company performance in this area can be analyzed in a cost-beneficial way internally and externally through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Proved and probable reserves in countries that have the 20 lowest rankings in Transparency International’s Corruption Perception Index; and

- Description of the management system for preventing corruption and bribery throughout the value chain, including contractors and business partners.

**Evidence**

There is a large amount of evidence of interest and of financial impact highlighting the importance of this issue for oil and gas E&P companies. Research by the Investor Responsibility Research Center Institute (IRRCI) shows that companies in the Energy sector, including oil and gas companies, were the most likely to disclose risks related to payments to governments for exploration and development rights in their Form 10-K.\textsuperscript{154}

Pursuant to Section 1504 of the Dodd-Frank Act, the SEC issued rules in September 2012 requiring companies that file an annual report with the SEC to file separately a certified report of all payments totaling $100,000 or more made to the U.S. or a foreign government. Although this rule was vacated by the U.S. District Court for DC in July 2013 due to concerns about its public disclosure requirements and the lack of exemptions for these, the SEC could appeal the decision or conduct new rulemaking that takes these concerns into account.\textsuperscript{155}

Furthermore, the American Petroleum Institute, one of the entities that challenged the SEC rule, supports global efforts such as the EITI to promote transparency on payments, and includes disclosures on the issue of business ethics and transparency in its voluntary sustainability reporting guidelines for the industry.\textsuperscript{156}

Investigations into the Iraqi Oil-for-Food Programme illustrate that payments by oil and gas companies could knowingly or unknowingly contribute to financing an authoritarian regime otherwise under international sanctions. Iraq
under Saddam Hussein received total illicit income of around $1.8 billion between 1996 and 2003 as a result of oil surcharges paid to the government in connection with the contracts of 139 companies as well as humanitarian kickbacks paid in connection with the contracts of 2,253 companies.\textsuperscript{157} Charges brought against the company Total in relation to this program (although the company was recently acquitted) points to the risks involved in dealing with such regimes, including the reputational risks.\textsuperscript{158}

Reputational implications are also apparent from the results of Transparency International’s Bribe Payers Index for 2011, which shows that business executives view global oil and gas sector companies among those most engaged in bribery.\textsuperscript{159}

The anti-bribery provisions of the FCPA apply to all U.S. persons and certain foreign issuers of securities. The FCPA also includes accounting provisions for accurate and fair reflection of transactions, and requires adequate internal accounting controls.\textsuperscript{160} Several companies in the E&P industry have faced enforcement actions related to the FCPA. Ernst & Young reviewed 118 FCPA cases, and around 167 prosecutions, and found that oil and gas companies accounted for the largest share (18 percent) of all prosecutions. While the analysis did not show a direct relationship between bribery and corruption convictions and long-term share price performance across any sector, it highlighted reputational risk as a key factor for management to consider.\textsuperscript{161}

In May 2013, Total, a diversified oil and gas company, agreed to pay a $245.2 million fine to resolve charges related to violations of the FCPA in connection with illegal payments to a government official in Iran to obtain valuable oil and gas concessions. The company agreed to cooperate with the Justice Department and foreign law enforcement to retain an independent corporate-compliance monitor for a period of three years, and to continue to implement an enhanced compliance program and internal controls designed to prevent and detect FCPA violations. Total also agreed to pay an additional $153 million in disgorgement and prejudgment interest to the SEC.\textsuperscript{162} This shows the extensive repercussions of FCPA violations charges against E&P companies.

Regulatory risks also exist from foreign anti-bribery laws. According to Ernst & Young, oil and gas sector companies are most likely to be impacted by the U.K.’s Bribery Act.\textsuperscript{163} In Canada in January 2013, Griffiths Energy International self-reported a $2 million bribe to the wife of Chad’s ambassador to Canada for negotiations over access to oil fields in Chad, and agreed to pay a Canadian $10.35 million penalty.\textsuperscript{164}

\textbf{Value Impact}

Fines or penalties from violation of the FCPA and other bribery and corruption laws can result in significant one-time costs, or higher ongoing compliance costs. Reputational impacts from corruption and bribery can significantly lower a company’s brand value. Litigation related to corruption and bribery incidents can generate contingent liabilities. Extreme cases of corruption can risk a company’s social license to operate and increase its risk profile, potentially affecting the cost of capital.
Health, Safety, and Emergency Management

Employees and contractors of E&P companies face numerous occupational hazards. These include flash fires, explosions, travel- or equipment-related accidents, and hazardous conditions such as remote places with extreme weather conditions. In addition to acute impacts, workers may develop chronic health conditions from inhaling silica or proppant dust and being exposed to chemicals. The working environment in this industry may also lead to mental health problems, with workers spending a significant amount of time at drilling sites, often under dangerous conditions such as offshore oil rigs, and away from their families for several days at a time.

The health and well-being of employees and contractors in the industry is linked inextricably to the safety performance of the company. It can also affect the probability and magnitude of significant releases of hydrocarbons or other hazardous substances as a result of accidents or leaks. In addition to worker injuries and fatalities, such incidents can have a variety of detrimental impacts on the environment and communities. The industry has faced several such major incidents and accidents, such as the Deepwater Horizon explosion, which pollute water resources and land, directly affect local populations and ecosystems, and result in loss of livelihoods.

Organizational research and investigations of previous incidents show that it is important for a company to develop a culture of safety, one that reduces the probability that accidents and other health and safety incidents will occur. If accidents and other emergencies do occur, companies with a strong safety culture can effectively detect and respond to such incidents. Inclusive workforce participation programs can help to identify and address potential health and safety problems. A culture that engages and empowers employees as well as contractors to work with management to safeguard their own health and safety and prevent accidents, is likely to help companies mitigate or eliminate costs and ensure workforce productivity.

The strategic and active management of health, safety, and emergencies at the corporate level, including in relationships with contractors, is critical to retaining a company’s license to operate. With unconventional resource development recently expanding in the U.S., local communities in drilling areas have grown rapidly. This growth is often supported by transient workers who do not have health insurance and are not covered by oil and gas companies’ health benefits. Health impacts on these workers may not only strain the health services of the local community, but also affect worker productivity and company operations as a result. Many workers live in temporary housing camps near the drilling site, which can lead to the spread of diseases.

Health and safety protocols and adequate healthcare provision for not only employees of E&P companies but also their contractors and temporary workers are therefore important for workforce productivity. Furthermore, companies’ health and safety practices may impact
the companies beyond downtime, worker productivity, and potential legal actions, as high standards of health and safety are likely to assist in employee recruitment and retention.

Company performance in this area can therefore be analyzed in a cost-beneficial way internally and externally through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Injury, fatality, and near-miss frequency rates for full-time, contract, and short-service employees;
- Process safety performance indicators, including those related to unplanned or uncontrolled loss of primary containment of any material, including non-toxic and non-flammable materials; and
- Discussion of management systems used to integrate a culture of safety and emergency preparedness throughout the value chain and throughout the E&P lifecycle.

**Evidence**

Dangerous working conditions in the E&P industry lead to high fatality rates and incidents with significant social and environmental consequences, which in turn affect company value. Between 2003 and 2010, the U.S. Oil & Gas Extraction industry, including onshore and offshore operations, had a fatality rate seven times higher than the rate for all U.S. workers (27.1 compared to 3.8 deaths per 100,000 workers).

As demonstrated by the Deepwater Horizon incident, the hazards of increased deep-water offshore drilling over the past few years are contributing to the high rate of fatalities. Between 2003 and 2010, there was a statistically significant increase in the number of fatalities per rig for offshore oil and gas operations. Transportation events were the leading cause of death for the 128 fatalities related to offshore operations during this period, the majority of which involved aircraft.

Of the workers classified as being employed in the Oil & Gas Extraction industry (around 70 percent of the total of 128 deaths), those working for oil and gas operators accounted for 21 percent, the rest being employed by well servicing companies and drilling contractors. This shows that health and safety is a concern not only for employees of E&P companies, but also for their contractors.

Accidents can result in high death tolls and significant costs for companies. Even excluding the Deepwater Horizon spill, the five deadliest offshore accidents in the world resulted in a total of 546 deaths, and the five costliest offshore accidents in the world resulted in total costs of $2.9 billion (in 2002 dollars).

Analysis of the causes of major accidents, such as large oil spills, nuclear events, and space exploration accidents, often point to a lack of organizational structures to flag, communicate, and take actions on risks; lack of a safety culture in the organization; inadequate learning from prior events; and lack of internal communication due to operational silos. Management commitment to safety has been found to be the most important factor in distinguishing between organizations with high and low accident rates.
The Deepwater Horizon oil spill is one example illustrating these operational silos, and subsequent events show potential impacts on value from this issue. The investigation of the 2010 incident highlights communication failures and shows that BP and its contractors, including Halliburton and Transocean, “lost sight of operational risk, compartmentalizing information that would have been useful to other companies carrying out their respective tasks.” While BP relied heavily on its contractors for important decisions, it failed to adequately supervise them and ensure that relevant information was communicated to all decision-makers. At the same time, Halliburton failed to alert BP of potential problems with aspects of the project that it was managing. In April 2013, the state of Florida filed a lawsuit against both BP and Halliburton over the 2010 oil spill demanding more than $5 billion for “misconduct that led to this environmental and economic disaster.”

After the oil spill, BP’s share price had dropped significantly given the uncertainty of potential liabilities, with estimates reaching billions of dollars, raising fears of bankruptcy. BP had put aside $7.8 billion when it agreed to pay compensation in 2012 for the Deepwater Horizon spill, but in a 2013 earnings note, it warned investors that this amount might not be sufficient. According to the company, the amount that it might be required to pay was “uncapped except for economic loss claims related to the Gulf Seafood industry.” A Congressionally mandated report estimates that the oil spill affected almost 1,100 linear miles of coastal wetland, and fishery closures decreased commercial production by about 20 percent.

The reputational impacts of the spill have been almost as significant as the direct financial costs. BP spent $50 million on an apology commercial alone, as well as additional millions of dollars to repair its image.

Apart from a safety culture and preparedness for emergencies, attention to overall worker well-being is also important for worker productivity and reduced occurrence of accidents. Studies suggest that offshore oil workers exhibit significantly higher anxiety than onshore workers. Furthermore, behaviors and attitudes associated with heart disorders (“Type A coronary-prone behavior”) were found to be a significant predictor of reduced mental well-being and increased accident rates offshore.

In a recent study of two offshore oil platforms, the researchers observed that the E&P company operating the platforms, whose workforce consisted primarily of men, broke from the industry’s traditions of equating competence with masculinity. Instead, the company rewarded those who showed the skills and behaviors needed to get the job done. Both platforms are said to have performed well on safety and productivity as a result of the company’s safety initiative, with the accident rate falling by 84 percent and production at an all-time high.
Value Impact

A company’s performance on health, safety, and emergency management can lead to acute impacts on value from high-impact incidents. Conversely, a safety culture and importance placed on worker well-being can also have longer-term, ongoing positive impacts on value.

Accidents and other events leading to worker deaths and environmental and social impacts can lead to one-time costs and contingent liabilities related to litigation and regulatory penalties. Companies can also face higher compliance and remediation costs as a result. Reputational damage can result in lower brand value, potentially making it difficult to attract and retain employees.

Health and safety incidents can result in downtime or reduced-capacity operations and ultimately a loss of revenue-generating opportunities. Workforce productivity may be lower with frequent health or safety incidents, lowering operating profits.

Companies seen as having a poor safety culture or health and safety record may also face higher costs of capital or insurance premiums due to an increased risk profile. Accidents with high environmental and social impacts are likely to fuel the trend among investment funds and insurance companies to divest from fossil fuel, leading to more difficult borrowing conditions and higher cost of capital.

Reserves Valuation & Capital Expenditures

E&P companies make significant investments in the exploration of new oil and gas reserves. Additional investment is needed for these reserves to qualify as “proven” reserves that can be accounted for in financial statements and added to the company’s valuation of long-term growth. However, the prospect of climate change regulation limiting GHG emissions during the E&P process and at the use phase of oil and gas products, as well as improved competitiveness of renewable energy technologies—including through tax breaks and subsidies—have the potential to significantly alter the economic value of reserves, particularly those of oil.

Scenarios that consider a future price on carbon emissions—whether through carbon taxes, cap-and-trade systems, or policies that limit emissions—indicate that demand for, and prices of, oil and gas could be lower than projected under the baseline case without carbon pricing. This could impact future cash flows from projects for E&P companies. Furthermore, a carbon price could also affect production costs, possibly rendering some reserves uneconomical to extract (for example, those with higher embedded carbon content).

The likelihood of global climate change regulation is high in the medium term as actual
global emissions diverge from the required emissions trajectory to keep global temperature increases to two degrees Celsius, and as the impacts from climate change begin to be experienced. Companies with higher actual or potential GHG impacts (for example, those with a larger proportion of unconventional oil reserves or those with greater oil sands production) and companies with higher capital costs are likely to face greater risks as more globally integrated climate change regulation is put into place. Significant regulatory actions in one or more large oil or gas producing or consuming regions could also have the same effects.

The price and cost impacts from climate regulations can affect the net present value of proven reserves, and therefore the valuation of E&P companies. These factors can also add uncertainty to the calculation of the Reserves-to-Production (RPR) ratio, a key indicator of future growth for the E&P industry. Therefore, the effect of climate change regulations and the development of alternative energy must be considered in the valuation of reserves and the determination of appropriate levels of capital expenditures to explore for and develop oil and gas reserves.

Company performance in this area and impact on company value can therefore be analyzed in a cost-beneficial way internally and externally through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Sensitivity of hydrocarbon reserve levels to future price projection scenarios that account for a price on carbon emissions;
- Estimated carbon dioxide emissions embedded in proved hydrocarbon reserves; and
- Discussion of how climate regulation influences the capital expenditure strategy for exploration, acquisition, and development of assets.

Evidence

According to the International Energy Agency (IEA), global GHG emissions need to peak before 2020 for a 50 percent chance of limiting global temperature increases to two degrees Celsius; for this to occur, CO2 levels in the atmosphere need to be kept under 450 parts per million (ppm). In May 2013, the CO2 emissions levels in the atmosphere reached close to 400 ppm, the highest level in at least three million years. Based on government policies adopted until mid-2012 and the cautious implementation of existing policies and commitments, CO2 levels are expected to continue to increase rather than begin to decline in 2020.178,179

Mitigating climate change will therefore require urgent and potentially significant policy changes. Even without global consensus on binding national commitments for emissions reductions and mitigation actions, climate change mitigation policies are already being implemented in the E.U., China, Australia, and in several U.S. states. For example, California recently launched a carbon cap-and-trade program, and 29 U.S. states have implemented Renewable Portfolio Standards.180

Although 90 percent of global oil and gas reserves are controlled by governments or
national oil companies (70 percent in OPEC countries), privately-owned companies have secured a significant share of current production, estimated at around 40 to 50 percent, indicating that they are likely to be impacted significantly by a global cap on emissions. Furthermore, oil and gas companies account for most of the “embedded carbon” among U.S.-listed companies—calculated as the sum of all carbon emissions from the production of goods and services—and the level of embedded carbon has increased by 37 percent since 2011.

The top oil and gas companies analyzed by the Carbon Tracker Initiative spent $593 billion on capital expenditures over the previous 12 months, a majority of which was used for exploration, production, and refining. Yet the study estimates that 60 to 80 percent of coal, oil, and gas reserves of listed companies are “unburnable” if GHG emissions are to be kept within the “carbon budget” for a two-degree temperature rise.

HSBC, a U.K. bank, conducted research on the potential risks for major European oil and gas companies, considering the effects on future projects from a low-carbon scenario in which future CO₂ emissions until 2050 are limited consistent with a two-degree goal. Depending on factors such as project costs, stage of project development, and types of reserves, the research highlights a range of impacts, from almost none for BG Group’s proven and probable (2P) reserves to almost 26 percent of BP’s 2P reserves being “unburnable” (in terms of volume). The research also looks at the value at risk from “unburnable” reserves, and finds that, for example, the value of Statoil’s reserves at risk of becoming unburnable represents 17 percent of its market capitalization.

In an extreme scenario, the research concludes that around 40 to 60 percent of market capitalization of European oil and gas companies could be at risk if lower demand also led to lower oil and gas prices. According to HSBC, “Under the IEA ‘450’ scenario, this becomes a growing risk beyond 2020. Our analysis probably overstates the value at risk as we assume an efficient world today. Nevertheless, our analysis shows that the impact of lower prices on value could be material.”

Although this research is limited to assets of European majors, many of these companies are publicly listed in the U.S. In addition, the same risks apply to U.S.-based companies, as many are developing reserves in international markets, and in U.S. states that are likely to introduce, or already have introduced, climate change-related regulations. Therefore, while the size of impacts may differ, the effect of climate change on the value of oil and gas reserves is likely to be a material issue for most companies in the industry. As the Carbon Tracker Initiative states, “Many factors – including policies and prices in the countries where fossil fuels are extracted, marketed and combusted – will affect which particular fossil fuel assets turn out to be unburnable.”

According to HSBC, “Capital intensive, high-cost projects, such as heavy oil and oil sands, are most at risk under our scenario.” The bank also suggests that companies with a gas bias would face lower risks. Analysis by Standard & Poor’s (S&P), a debt-rating company, shows that the financial risk profiles of smaller companies with high exposure to Canadian oil sands will deteriorate in a scenario of low oil prices (low prices reflect a fall in demand from policy measures such as vehicle efficiency standards),
potentially leading to negative outlook revisions and then downgrades over 2014-2017.

While companies generally do not disclose in their 10-K filings the effects of climate change regulation on the value of their reserves, many companies recognize the impacts that these regulations can have on the value of their business through impacts on prices, demand, and costs. For example, in its FY 2013 Form 10-K, Hess mentions that agreements and measures related to GHG emissions “may require significant equipment modifications, operational changes, taxes, or purchase of emission credits to reduce emission of greenhouse gases from our operations, which may result in substantial capital expenditures and compliance, operating, maintenance and remediation costs. In addition, our production is used to produce petroleum fuels, which through normal customer use may result in the emission of greenhouse gases. Regulatory initiatives to reduce the use of these fuels may reduce our sales of crude oil and other hydrocarbons. The imposition and enforcement of stringent greenhouse gas emissions reduction targets could severely and adversely impact the oil and gas industry and significantly reduce the value of our business.”

Value Impact

Stewardship of capital resources taking into account medium- to long-term trends, particularly related to climate change mitigation actions, is critical to prevent asset write-downs and maintain profitability and creditworthiness.

Regulatory limits on GHG emissions and the development of alternative energy could reduce global demand and prices for oil products or put them on a lower growth trajectory, thus lowering the quantity and net present value of oil reserves. Climate-related regulations could result in a significant correction in the market value of companies’ assets, as well as a material impact on future growth prospects and cost of capital.

Falling demand or prices for oil and gas or increased extraction costs are likely to affect equity valuations, through delayed capital expenditures, mothballed assets, reductions in asset values, or decommissioning and closure of oil and gas wells. Returns on invested capital are likely to be affected due to lower prices, putting pressure on margins. Companies at risk may also face ratings downgrades for their corporate debt, increasing their cost of capital and potentially restricting their access to refinancing.184

At an aggregate level, the magnitude and probability of impacts of climate change regulation on reserves valuation and capital expenditures are likely to increase in the medium term, particularly towards 2020, when the global emissions trajectory begins to deviate significantly from the required path to keep temperature increases to below two degrees Celsius.

Management of the Legal & Regulatory Environment

Political contributions and lobbying are an important component of how some companies manage their legal and regulatory environment. Furthermore, companies may engage in
regulatory capture. This occurs when special interest groups influence policymaking and regulation through implicit biases. These are groups who have significant resources and a stake in the regulation of their industry. In more extreme cases companies may offer bribes or other payoffs to regulators or policymakers. These actions can sometimes lead to negative social and environmental impacts. For example, in oil and gas, Minerals Management Service's capture and failure is associated with the 2010 Deepwater Horizon oil rig fire and subsequent spill.  

Companies in the E&P industry spend significant sums of money on lobbying and campaign contributions related to climate change laws or regulations. They may also benefit, at least in the short term, from otherwise influencing regulators and policymakers on climate change and other environmental issues (such as those related to fracking and waste management). Such actions and subsequent changes or delays to regulations may lead to positive outcomes for E&P companies and their shareholders in the short term. However, their broader societal implications could create medium- to long-term regulatory and reputational risks with a negative impact on value.

The scientific consensus is that human-induced climate change is occurring. As a result, there is a need for urgent action to curb emissions to acceptable levels. So, efforts to delay or loosen climate-related regulations may prove counterproductive to the industry in the medium to long term by creating regulatory, and therefore investment, uncertainty, or imposing higher costs in the future. Efforts to influence other environmental regulations unfairly, such as those regulations related to fracking fluid use, may affect companies' reputation and social license to operate.

Companies with a clear strategy for engaging policymakers and regulators that is aligned with their goals and activities for long-term sustainable outcomes, and accounts for societal externalities, could benefit from a stronger, long-term license to operate. Such companies will likely be better prepared for medium- to long-term regulatory adjustments to deal with high-impact issues such as climate change and water scarcity and contamination. Such companies could thereby achieve a lower risk profile relative to peers.

Company performance in this area can be analyzed in a cost-beneficial way internally and externally through the following direct or indirect performance metrics (see Appendix III for metrics with their full detail):

- Total amount of spending on political campaigns, lobbying, and contributions to tax-exempt groups including trade associations; and
- Five largest political, lobbying, or tax-exempt group expenditures.
Evidence

E&P companies, together with other oil and gas firms, are heavily involved in lobbying and campaign contributions. Oil and gas companies spent about $145 million on lobbying in the U.S. in 2013. The industry was the third highest (out of 121) in terms of its total lobbying expenditures for 2013. Lobbying expenditures from the industry have increased substantially since the early 2000s, and have remained at higher levels in the past few years.\(^\text{186}\)

Among independent E&P companies, one estimate suggests that Occidental Petroleum spent around $8.3 million on lobbying in 2013, ConocoPhillips, $4 million, and Andarko Petroleum, $3 million. Integrated oil and gas companies involved in upstream operations spent even more significant amounts. ExxonMobil’s lobbying expenditure for 2013 was around $13.4 million, Shell’s $9 million, and BP’s $8 million. Exxon Mobil was also among the top 20 spenders on lobbying in 2013, among companies in all industries.\(^\text{187}\)

E&P companies typically lobby on a range of issues, including those related to the environmental impacts from their operations. Occidental Petroleum, for example, lobbied on issues such as solid and hazardous waste as well as clean air and water in 2013.\(^\text{188}\) Some E&P companies have board oversight of spending decisions. For example, at Occidental Petroleum, the board must approve all direct and indirect political contributions.\(^\text{189}\)

Furthermore, some energy companies fund climate-skeptic organizations, more so than other types of companies. At the same time, they also support organizations that generally agree with climate change science. On the other hand, energy companies, including some oil and gas ones, provide more funds to anti-climate members of Congress compared to pro-climate ones, and have substantially higher ratios compared to other types of companies. For example, the ratio of Murphy Oil’s funding to members of Congress with voting records that oppose science-based climate policy to its funding to members who support such policy is estimated to be 29:1.\(^\text{190}\)

There is debate about how lobbying efforts and campaign contributions impact companies. In the current economic and political environment, more money is flowing into politics. So, if companies are seen as having undue influence on regulators and policymakers, they are likely to face reputational harm. For example, few public companies have directly contributed to super PACs, a practice now permitted under the Supreme Court’s Citizens United decision. Instead, they have made contributions to trade associations and industry groups engaged in lobbying efforts, possibly due to concerns that this could damage their brand.\(^\text{191}\) Reputational impacts are especially relevant in cases where lobbying campaigns are misaligned with corporate social responsibility initiatives.\(^\text{192,193}\)

The SEC has previously recognized that political activity may be significant to an issuer’s business, even if this is not apparent from an economic viewpoint.\(^\text{194}\) According to an article by the New York Times, while companies that lobby intensely outperform those that do not, “the evidence suggests most companies do not get any return from their lobbying expen-
Therefore, without demonstrating a clear link between lobbying and political expenditures and positive, long-term outcomes for shareholder value, E&P companies expending significant sums attempting to influence policy are likely to affect shareholder value negatively through impacts on costs.

In fact, as growing concerns about fracking demonstrates, the E&P industry can come under pressure over time due to exemptions gained previously for laws related to waste management and water quality (such as those discussed in the Legislative and Regulatory Trends section). As discussed previously, despite the exemptions, new legislative and regulatory proposals and the introduction of increasingly stringent rules related to these issues are beginning to affect company value.

Furthermore, there appears to be strong investor interest in the issue. Between 2011 and 2013, the SEC received a record-breaking 643,599 comment letters on a petition calling for a corporate disclosure rule on political contributions and lobbying. A majority of comments support the rule. (Note that this was not industry-specific). Furthermore, Proxy Monitor data shows that between 2009 and 2014, there were 39 shareholder proposals at Fortune 250 companies for disclosures on political spending and/or lobbying. An average of votes for such proposals were at 25 percent, and the maximum percentage of votes was around 44.5 percent. A proposal on disclosure of political lobbying expenditures in 2012 at Chesapeake Energy received 36 percent of supporting votes.197

After signaling that it might consider formally proposing a rule, the SEC recently dropped the issue from its list of priorities for 2014, along with some other issues. Despite this, the agency is not precluded from acting on the matter. There are also some other initiatives underway to require disclosure on the issue, including legislation introduced by some senators. The Treasury Department indicates that it might restrain certain tax-exempt groups if they do not disclose their donors.198

Value Impact
Managing the legal and regulatory environment through lobbying, campaign contributions, or regulatory capture in a way that creates negative social or environmental externalities could erode companies’ social license to operate over the long term. This could affect revenues and growth. Companies could face acute, substantial impacts on value if environmental regulations that favor short-term industry profitability are subsequently reversed, or if the regulatory environment becomes more burdensome. This increases the risk profile of companies, with an impact on their cost of capital.

Contractor & Supply Chain Management
Oil & Gas E&P companies contract with Oil & Gas Services companies and other business partners for services and equipment at different stages of the exploration and production
processes. The responsibility for environmental, health, and safety incidents and associated costs, while sometimes outlined in contracts, is not always clearly defined. As a result, both parties may face significant costs and reputational impacts when such incidents occur. On the other hand, E&P companies can benefit directly from contracting with suppliers that are able to provide cutting-edge equipment, materials, and services to lower the environmental impacts of E&P operations.

Therefore, the performance of contractors, suppliers, and business partners on the environmental and social issues that are material to E&P companies can impact the operations and financial performance of E&P companies themselves. E&P companies applying selection and performance standards for environmental and social issues relevant to their operations to their contractors and suppliers would benefit from lower risks and improved shareholder value. In addition, enhancing communication with business partners and contractors during operations, particularly in relation to emergency preparedness and response, can help reduce the probability that damaging incidents occur.

Company performance in this area can be analyzed in a cost-beneficial way internally and externally through the metrics related to disclosure topics discussed previously in this brief. The metrics for these topics incorporate a consideration of an E&P company’s policies with regard to its suppliers, contractors, and business partners. These topics include: Community Relations; Security, Human Rights, and the Rights of Indigenous Peoples; Health, Safety, and Emergency Management; and Business Ethics & Payments Transparency. Additionally, metrics related to the topics discussed under the Environment category will also be influenced by the performance of the company in engaging with its contractors and suppliers.

Evidence

E&P companies are facing several challenges in relation to their environmental performance, which can have an impact on company value, as discussed above. They benefit from partnering with suppliers and service companies that help them enhance their environmental performance. For example, Apache Energy, a major U.S. oil and gas producer, partnered with Halliburton and Schlumberger, two of its largest drilling partners, to convert fracking equipment to run on a combination of natural gas and diesel, called dual fuel technology, in order to lower energy costs by as much as 40 percent. Similarly, Baker Hughes converted diesel pumps to run on natural gas at a well site in Texas in 2012. The conversion reduced GHG emissions by 20 percent and cut diesel use by 65 percent at the well site.

In another example, Schlumberger has developed a more water efficient fracking method that pumps proppant in pulses, improving fissure flow and durability. A 60-day case study in the Eagle Ford Formation in Texas revealed some of the benefits of the new process: oil and gas production rose by 43 percent and 61 percent, respectively; 5 million gallons of water was saved per well; proppant usage fell by 35 percent; and fracturing fluid consumption dropped by 58 percent.
E&P companies generally obtain fracking fluids from their suppliers, rather than produce them. However, public and regulatory concern about the toxicity of fracking fluids have reputational impacts on E&P companies too and can create operational and regulatory risks for them. Companies seeking fracking fluids that have lower environmental and health impacts from their suppliers are therefore able to protect shareholder value. Baker Hughes offers a water soluble friction reducer that lowers the amount of chemical needed. The product is specifically qualified by the Center for Environment, Fisheries & Aquaculture Science for use in environmentally sensitive regions in Canada, the North Sea, the U.S., and elsewhere. Such solutions could allow E&P companies to operate in sensitive areas, expanding production and revenues.

The Deepwater Horizon spill discussed earlier highlights the importance of contractor management in order to prevent incidents with wide-ranging environmental and social impacts. The incident resulted in thousands of lawsuits against BP and its contractors Transocean, the owner of the drilling rig, and Halliburton, which provided cementing services for the project.

**Value Impact**

Contractor and supply chain management can affect ongoing costs of E&P companies, with a chronic impact on value. It can also determine the probability and magnitude of incidents that can have an acute impact on value.

E&P companies contracting with suppliers and business partners that help improve environmental and safety performance of operations can lower operating costs, and reduce the risk of one-off costs from regulatory penalties. Contractor and supplier management can also help reduce litigation liabilities. Obtaining efficient, cost-effective production technologies and processes with minimal environmental and health impacts can also help E&P companies expand operations, thereby increasing revenues.

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**SASB INDUSTRY WATCH LIST**

The following section provides a brief description of sustainability issues that did not meet SASB’s materiality threshold at present, but could have a material impact on the Oil & Gas E&P industry in the future.

**Employee Recruitment, Development, and Inclusion:** The Oil and Gas E&P industry, which has global operations, is facing an impending shortage of experienced and skilled workers. A significant proportion of the workforce is close to retirement and there is a need for more workers due to rapid growth in the industry. At the same time, studies show that the industry has a relatively lower representation of women and minorities in the workforce and on the Boards of companies compared to other industries. Gender-based discrimination within the industry, family care responsibilities, and societal conditioning, among other factors, are cited as making the work environment in the E&P industry less attractive for women.
In the context of upcoming human capital needs of the industry and the lack of diversity in the workforce, companies that have a comprehensive recruitment and development strategy, which may include recruiting from a diverse talent base; ensuring equal career advancement opportunities; partnering with educational institutions; and employing and training local hires in international operations, could improve efficiencies and lower disruptions to operations in the future, as the skills gap becomes more acute.

While there is an emerging awareness and understanding of the business risks from the expected skills shortage, SASB’s analysis of companies’ 10-K and 20-F filings, shareholder resolutions, and other public documents shows that the evidence of interest in the topic is as yet weak. The business impacts of the skills shortage and implications for diversity in the workforce and training and development of workers in developing countries will likely become more apparent in the future.
APPENDIX I: Five Representative Companies

Oil & Gas, Exploration & Production Companies

<table>
<thead>
<tr>
<th>COMPANY NAME (TICKER SYMBOL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ConocoPhillips (COP)</td>
</tr>
<tr>
<td>CNOOC LTD-ADR (CEO)</td>
</tr>
<tr>
<td>Occidental Petroleum (OXY)</td>
</tr>
<tr>
<td>Apache Corp (APA)</td>
</tr>
<tr>
<td>Marathon Oil (MRO)</td>
</tr>
</tbody>
</table>

Integrated Oil & Gas

<table>
<thead>
<tr>
<th>COMPANY NAME (TICKER SYMBOL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exxon Mobil Corp (XOM)</td>
</tr>
<tr>
<td>Royal Dutch-ADR (RDS)</td>
</tr>
<tr>
<td>Chevron Corp (CVX)</td>
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<tr>
<td>Petrochina-ADR (PTR)</td>
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<tr>
<td>BP (BP)</td>
</tr>
</tbody>
</table>

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* This lists five representative companies of the industry. Only companies that are US listed and where at least 20 percent of revenue is generated by activities in this industry according to the latest information available on Bloomberg Professional Service were included.

* This list includes five companies representative of integrated oil and gas activities. This includes only companies for which the Integrated Oil and Gas industry is the primary industry under the Bloomberg Industry Classification System; and that are U.S.-listed but are not primarily traded Over-the-Counter, according to the latest information available on Bloomberg Professional Services. Retrieved on June 9, 2014.
APPENDIX IIA:
Evidence for Sustainability Disclosure Topic

<table>
<thead>
<tr>
<th>Sustainability Disclosure Topics</th>
<th>EVIDENCE OF INTEREST</th>
<th>EVIDENCE OF FINANCIAL IMPACT</th>
<th>FORWARD-LOOKING IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HM (1-100)</td>
<td>IWGs % Priority</td>
<td>EI Revenues &amp; Costs</td>
</tr>
<tr>
<td>Greenhouse Gas Emissions</td>
<td>90*</td>
<td>79</td>
<td>High</td>
</tr>
<tr>
<td>Air Quality</td>
<td>90*</td>
<td>79</td>
<td>High</td>
</tr>
<tr>
<td>Water Management</td>
<td>60*</td>
<td>90</td>
<td>Medium</td>
</tr>
<tr>
<td>Biodiversity Impacts</td>
<td>90*</td>
<td>90</td>
<td>High</td>
</tr>
<tr>
<td>Community Relations</td>
<td>47</td>
<td>82</td>
<td>Medium</td>
</tr>
<tr>
<td>Security, Human Rights, and Rights of Indigenous Peoples</td>
<td>N/A (-) (-)</td>
<td>N/A • • •</td>
<td>N/A • • •</td>
</tr>
<tr>
<td>Business Ethics &amp; Payments Transparency</td>
<td>60*</td>
<td>80</td>
<td>Medium</td>
</tr>
<tr>
<td>Health, Safety, and Emergency Management</td>
<td>80*</td>
<td>93</td>
<td>High</td>
</tr>
<tr>
<td>Reserves Valuation &amp; Capital Expenditures</td>
<td>N/A</td>
<td>79</td>
<td>Medium</td>
</tr>
<tr>
<td>Management of the Legal &amp; Regulatory Environment</td>
<td>15a (-) (-)</td>
<td>Medium • •</td>
<td>Medium • •</td>
</tr>
<tr>
<td>Contractor &amp; Supply Chain Management</td>
<td>15 (-) (-)</td>
<td>Low • •</td>
<td>Medium • •</td>
</tr>
</tbody>
</table>

HM: Heat Map, a score out of 100 indicating the relative importance of the topic among SASB’s initial list of 43 generic sustainability issues; asterisks indicate “top issues.” The score is based on the frequency of relevant keywords in documents (i.e., 10-Ks, shareholder resolutions, legal news, news articles, and corporate sustainability reports) that are available on the Bloomberg terminal for the industry’s publicly-listed companies; issues for which keyword frequency is in the top quartile are “top issues.”

IWGs: SASB Industry Working Groups

%: The percentage of IWG participants that found the disclosure topic to likely constitute material information for companies in the industry. (-) denotes that the issue was added after the IWG was convened.

Priority: Average ranking of the issue in terms of importance. One denotes the most important issue. (-) denotes that the issue was added after the IWG was convened.

EI: Evidence of Interest, a subjective assessment based on quantitative and qualitative findings.

EFI: Evidence of Financial Impact, a subjective assessment based on quantitative and qualitative findings.

FLI: Forward Looking Impact, a subjective assessment on the presence of a material forward-looking impact.

The Evidence section above highlights other evidence of interest, including shareholder resolutions and comment letters to the SEC.
## APPENDIX IIB:
### Evidence of Financial Impact for Sustainability Disclosure Topics

<table>
<thead>
<tr>
<th>Evidence of Financial Impact</th>
<th>Revenue</th>
<th>Operating Expenses</th>
<th>Non-operating Expenses</th>
<th>Assets</th>
<th>Liabilities</th>
<th>COST OF CAPITAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenhouse Gas Emissions</td>
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<td>Air Quality</td>
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<tr>
<td>Water Management</td>
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<tr>
<td>Biodiversity Impacts</td>
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<tr>
<td>Community Relations</td>
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<tr>
<td>Security, Human Rights, and Rights of Indigenous Peoples</td>
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<tr>
<td>Business Ethics &amp; Payments Transparency</td>
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<tr>
<td>Health, Safety, and Emergency Management</td>
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<tr>
<td>Reserves Valuation &amp; Capital Expenditures</td>
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<tr>
<td>Management of the Legal &amp; Regulatory Environment</td>
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<tr>
<td>Contractor &amp; Supply Chain Management</td>
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</tbody>
</table>

- **HIGH IMPACT**
- **MEDIUM IMPACT**
## APPENDIX III: Sustainability Accounting Metrics
### Oil & Gas, Exploration & Production

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>ACCOUNTING METRIC</th>
<th>CATEGORY</th>
<th>UNIT OF MEASURE</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenhouse Gas Emissions</td>
<td>Gross global Scope 1 emissions, percentage covered under a regulatory program, percentage by hydrocarbon resource</td>
<td>Quantitative</td>
<td>Metric tons CO₂-e, Percentage (%)</td>
<td>NR0101-01</td>
</tr>
<tr>
<td></td>
<td>Amount of gross global Scope 1 emissions from: (1) combustion, (2) flared hydrocarbons, (3) process emissions, (4) directly vented releases, and (5) fugitive emissions/leaks</td>
<td>Quantitative</td>
<td>Metric tons CO₂-e</td>
<td>NR0101-02</td>
</tr>
<tr>
<td></td>
<td>Description 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</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>NR0101-03</td>
</tr>
<tr>
<td>Air Quality</td>
<td>Air emissions for the following pollutants: NOₓ (excluding N₂O), SOₓ, volatile organic compounds (VOCs), and particulate matter (PM)</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>NR0101-04</td>
</tr>
<tr>
<td>Water Management</td>
<td>Total fresh water withdrawn, percentage recycled, percentage in regions with High or Extremely High Baseline Water Stress</td>
<td>Quantitative</td>
<td>Cubic meters (m³), Percentage (%)</td>
<td>NR0101-05</td>
</tr>
<tr>
<td></td>
<td>Volume of produced water and flowback generated; percentage (1) discharged, (2) injected, (3) recycled; hydrocarbon content in discharged water</td>
<td>Quantitative</td>
<td>Cubic meters (m³), Percentage (%), Metric tons (t)</td>
<td>NR0101-06</td>
</tr>
<tr>
<td></td>
<td>Percentage of hydraulically fractured wells for which there is public disclosure of all fracturing fluid chemicals used</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>NR0101-07</td>
</tr>
<tr>
<td></td>
<td>Percentage of hydraulic fracturing sites where ground or surface water quality deteriorated compared to a baseline</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>NR0101-08</td>
</tr>
<tr>
<td>Biodiversity Impacts</td>
<td>Description of environmental management policies and practices for active sites</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>NR0101-09</td>
</tr>
<tr>
<td></td>
<td>Number and aggregate volume of hydrocarbon spills, volume in Arctic, volume near shorelines with ESI rankings 8-10, and volume recovered</td>
<td>Quantitative</td>
<td>Number, Barrels (bbls)</td>
<td>NR0101-10</td>
</tr>
<tr>
<td></td>
<td>(1) Proved and (2) probable reserves in or near sites with protected conservation status or endangered species habitat</td>
<td>Quantitative</td>
<td>Million barrels (MMbbls), Million standard cubic feet (MMscf)</td>
<td>NR0101-11</td>
</tr>
</tbody>
</table>
### APPENDIX III: Sustainability Accounting Metrics

**Oil & Gas, Exploration & Production (cont.)**

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>ACCOUNTING METRIC</th>
<th>CATEGORY</th>
<th>UNIT OF MEASURE</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Security, Human Rights, and Rights of Indigenous Peoples</strong></td>
<td>(1) Proved and (2) probable reserves in or near areas of conflict</td>
<td>Quantitative</td>
<td>Million barrels (MMbbls), Million standard cubic feet (MMscf)</td>
<td>NR0101-12</td>
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<tr>
<td><em>(cont.)</em></td>
<td>(1) Proved and (2) probable reserves in or near indigenous land</td>
<td>Quantitative</td>
<td>Million barrels (MMbbls), Million standard cubic feet (MMscf)</td>
<td>NR0101-13</td>
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<tr>
<td><em>(cont.)</em></td>
<td>Discussion of engagement processes and due diligence practices with respect to human rights, indigenous rights, and operation in areas of conflict</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>NR0101-14</td>
</tr>
<tr>
<td><strong>Community Relations</strong></td>
<td>Discussion of process to manage risks and opportunities associated with community rights and interests</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>NR0101-15</td>
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<tr>
<td><em>(cont.)</em></td>
<td>Number and duration of non-technical delays</td>
<td>Quantitative</td>
<td>Number, Days</td>
<td>NR0101-16</td>
</tr>
<tr>
<td><strong>Health, Safety, and Emergency Management</strong></td>
<td>(1) Total Recordable Injury Rate (TRIR), (2) Fatality Rate, and (3) Near Miss Frequency Rate for (a) full-time employees, (b) contract employees, and (c) short-service employees</td>
<td>Quantitative</td>
<td>Rate</td>
<td>NR0101-17</td>
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<tr>
<td><em>(cont.)</em></td>
<td>Process Safety Event (PSE) rates for Loss of Primary Containment (LOPC) of greater consequence (Tier 1)</td>
<td>Quantitative</td>
<td>Rate</td>
<td>NR0101-18</td>
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<tr>
<td><em>(cont.)</em></td>
<td>Discussion of management systems used to integrate a culture of safety and emergency preparedness throughout the value chain and throughout the exploration and production lifecycle</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>NR0101-19</td>
</tr>
<tr>
<td><strong>Business Ethics &amp; Payments Transparency</strong></td>
<td>(1) Proved and (2) probable reserves in countries that have the 20 lowest rankings in Transparency International’s Corruption Perception Index</td>
<td>Quantitative</td>
<td>Million barrels (MMbbls), Million standard cubic feet (MMscf)</td>
<td>NR0101-20</td>
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<tr>
<td><em>(cont.)</em></td>
<td>Description of the management system for prevention of corruption and bribery throughout the value chain</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>NR0101-21</td>
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</table>
## APPENDIX III: Sustainability Accounting Metrics

### Oil & Gas, Exploration & Production (cont.)

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>ACCOUNTING METRIC</th>
<th>CATEGORY</th>
<th>UNIT OF MEASURE</th>
<th>CODE</th>
</tr>
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<tbody>
<tr>
<td>Reserves Valuation &amp; Capital Expenditures</td>
<td>Sensitivity of hydrocarbon reserve levels to future price projection scenarios that account for a price on carbon emissions</td>
<td>Quantitative</td>
<td>Million barrels (MMbbls), Million standard cubic feet (MMscf)</td>
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<tr>
<td></td>
<td>Estimated carbon dioxide content emissions embedded in proved hydrocarbon reserves</td>
<td>Quantitative</td>
<td>Metric tons CO₂</td>
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<td></td>
<td>Discussion of how price and demand for hydrocarbons and/or climate regulation influence the capital expenditure strategy for exploration, acquisition, and development of assets</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>NR0101-24</td>
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<tr>
<td>Management of the Legal &amp; Regulatory Environment</td>
<td>Amount of political campaign spending, lobbying expenditures, and contributions to tax-exempt groups including trade associations</td>
<td>Quantitative</td>
<td>U.S. Dollars ($)</td>
<td>NR0101-25</td>
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<tr>
<td></td>
<td>Five largest political, lobbying, or tax-exempt group expenditures</td>
<td>Quantitative</td>
<td>U.S. Dollars ($), by recipient</td>
<td>NR0101-26</td>
</tr>
</tbody>
</table>
APPENDIX IV: Analysis of 10-K Disclosures
Oil & Gas, Exploration and Production

The following graph demonstrates an aggregate assessment of how the top ten U.S.-domiciled Oil & Gas Exploration & Production companies, plus the top three U.S.-domiciled Integrated Oil & Gas companies, by revenue, are currently reporting on sustainability topics in the Form 10-K.

**TYPE OF DISCLOSURE ON SUSTAINABILITY TOPICS**

<table>
<thead>
<tr>
<th>Issue Area</th>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
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<tr>
<td>Greenhouse Gas Emissions</td>
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<td>Air Quality</td>
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<td>82%</td>
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<td></td>
<td></td>
<td></td>
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<td>N/A</td>
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<tr>
<td>Indigenous Peoples</td>
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<td>Business Ethics &amp; Payments Transparency</td>
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<tr>
<td>Health, Safety, and Emergency Management</td>
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<td>Management of the Legal &amp; Regulatory Environment</td>
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<td></td>
<td></td>
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</tbody>
</table>

IWG Feedback*

*Percentage of IWG participants that agreed topic was likely to constitute material information for companies in the industry.

**Note:** No disclosure analysis was performed for the Contractor & Supply Chain Management topic.
References


3 Data from Bloomberg Professional service accessed on June 12, 2014, using the ICS <GO> command. The data represents global revenues of companies listed on global exchanges and traded over-the-counter from the Oil & Gas, Exploration & Production industry, using Level 3 of the Bloomberg Industry Classification System.


10 Ibid.

11 Author’s calculation based on Ernst & Young, “U.S. E&P Benchmark Study.” June 2012.


References (cont.)


References (cont.)


References (cont.)


References (cont.)


101 Ibid.


References (cont.)


123 Ibid.


129 Ibid.
References (cont.)


144 Ibid.


146 Form 10-K for fiscal year 2013. Marathon Oil.

147 Form 10-K for fiscal year 2013. EOG Resources.


149 Ibid.


References (cont.)


References (cont.)


187 Ibid.

188 Ibid.


References (cont.)


