OIL & GAS
REFINING & MARKETING
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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INTRODUCTION

Petroleum products from the Oil & Gas, Refining & Marketing industry have driven economic activity since the early part of the 20th century, and will continue to be important in meeting global energy needs in the future. Petroleum products have fueled transportation and facilitated global commerce. They have served as key inputs to chemicals and plastics production, which themselves touch upon every aspect of modern life.

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 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 refining and marketing 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 Refining & Marketing industry:

SUSTAINABILITY DISCLOSURE TOPICS

Environment
- Greenhouse Gas Emissions
- Air Quality
- Water Management
- Hazardous Materials Management

Business Model and Innovation
- Product Specifications & Clean Fuel Blends

Leadership and Governance
- Health, Safety, and Emergency Management
- Pricing Integrity & Transparency
- Management of the Legal & Regulatory Environment
• Managing energy consumption to minimize direct GHG emissions;
• Reducing 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;
• Ensuring effective hazardous materials management;
• Innovating to lower environmental and health impacts at the use phase and to meet evolving regulatory requirements;
• Ensuring worker health and safety and promoting a strong safety culture;
• Ensuring transparency in product pricing, and avoiding direct or indirect market manipulation; and
• Ensuring that lobbying and political contributions to manage a complex legal and regulatory environment are aligned with long-term societal interests and company value.

INDUSTRY SUMMARY

The Oil & Gas, Refining & Marketing (R&M) industry consists of the downstream operations of the oil and gas value chain. Companies are involved in refining petroleum products, marketing the products, or operating gas stations and convenience stores. The U.S. Federal Trade Commission (FTC) finds that refining companies have become less integrated into gasoline retailing since 2005, given that a number of large refiners sold parts of their retail operations.

Most of the companies listed on U.S. exchanges that are primarily involved in oil and gas refining and marketing activities are domiciled in the U.S. There are also several U.S.-based and international integrated oil companies involved in the refining or marketing of products; however, they also conduct upstream (exploration and production) and midstream operations, which 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.

Modern refineries are highly complex systems, transforming crude oil into a variety of refined products. Refinery products include “light distillates” such as gasoline, aviation fuel, and naphtha; “middle distillates” like jet fuel, diesel fuel, and kerosene; and “heavier” products like marine bunker fuel, solvents, petroleum coke, lubricants, and bitumen, many of which are used as feedstock in the chemicals industry.

Motor gasoline accounted for 47 percent of all refined petroleum consumption in the U.S. in 2010. Global annual industry revenues are around $6 trillion, with refining and marketing

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1 Industry composition is based on the mapping of the Sustainable Industry Classification System (SICS™) to the Bloomberg Industry Classification System (BICS). A list of representative companies appears in Appendix I.
activities accounting for approximately 98.6 percent, and retail gas stations accounting for the rest.5, 6

Major drivers of refinery costs include crude oil feedstock prices and quality; the latter determining fixed and operating costs for equipment and labor. For example, heavy crude oil with higher sulfur content ("heavy sour") generally costs less than light "sweet" crude, but can be more expensive to refine. In fact, crude oil is a primary driver of gasoline prices, accounting for about 38 percent of the cost of each gallon of gasoline.6 Other significant costs for refining companies include energy and transportation costs, as well as regulatory compliance costs.

The difference between the price of crude oil and refined products, or the "crack spread," drives industry profitability. The crack spread based on Brent crude oil was $17 per barrel in 2012, in 2011 dollars.7 Refining margins for benchmark U.S. Gulf Coast heavy sour coking (coking is one of several refining processes) have shown wide variations over the past ten years, with lows of negative $1 per barrel towards the end of 2011, and peaks of almost $25 per barrel in 2007.8 Refinery downtime can be expensive, particularly during periods of high demand and prices.9

Profit margins in the industry are subject to seasonal volatility, due to seasonal demand for gasoline. Over the past ten years, gasoline demand in the U.S. has increased by three to six percent from February to August every year (summer driving season). At the same time, regulations from the U.S. Environmental Protection Agency (EPA) on gasoline blends with lower polluting content during the summer months limit the amount of refined products that can be supplied. The increased demand and lower supply lead to peaks in gasoline prices during the spring and summer months, improving refining margins.10

The number of refineries in the U.S. consistently declined from the 1940s onwards, primarily due to industry consolidation and the shutting down of smaller, inefficient refineries. However, the capacity per refinery expanded.11 As a result, crude oil distillation capacity increased overall from around 15 million barrels per Cal day in 1990 to 17.7 million in 2012.12 More recently, refinery capacity utilization has been affected, with average annual utilization falling to about 84 percent in 2010, the lowest level since 1987. One of the reasons was federal ethanol blending requirements mentioned in the next section. Ethanol by volume, as a percentage of finished gasoline consumed in the U.S., increased from about 0.5 percent in 2001 to 8.6 percent by 2010.13

The U.S. accounted for about 22 percent of the global refinery output of petroleum products in 2010, and has the world's largest refining capacity.14 Global demand for light products such as gasoline increased at a Compound Annual Growth Rate (CAGR) of 2.2 percent from 2009 to 2011, compared to 1.8 percent in the ten years prior to that. At the same time, there was a reduction in demand in the U.S. and

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5 Due to the sustainability impacts and financial significance of refinery operations, this industry brief focuses primarily on refining activities, although the operation of gas stations and marketing activities are also covered where relevant.
Europe during 2009 to 2011, at a compound annual rate of around one percent.\textsuperscript{15} Lower demand in developed countries is expected to continue with the focus on vehicle fuel efficiency. Furthermore, the increasing development and use of alternative fuels (such as electricity, propane, higher-ethanol gasoline blends, and compressed natural gas) will also challenge traditional petroleum refining and retail activities in the U.S. For example, there are already around 10,000 alternative fuel stations in the U.S., although this compares to 160,000 gasoline stations.\textsuperscript{16} Despite this trend, lower domestic demand has been offset by increasing U.S. light product exports since the beginning of 2010.\textsuperscript{17}

The industry is fragmented globally, with lower cost production in one region having the potential to affect refiner profitability in other regions, due to the relatively low cost of fuel transport between regions.\textsuperscript{18} Increasing oil supply in the U.S. with the development of unconventional oil and gas resources in North America, as well as midstream infrastructure constraints, are increasing price differentials between U.S. crude oil and North Sea Brent crude. Since 2010, West Texas Intermediate (WTI) crude has been trading at a discount to Brent crude, sometimes of as much as $30 per barrel. Likewise, crude oil from the Bakken reserves has been trading at a discount to Brent.\textsuperscript{19} As a result, while refining margins have historically been similar across regions, lower cost crude oil inputs for U.S. refiners are enhancing their margins relative to their global peers.\textsuperscript{20}

In order to capitalize on lower crude oil prices, and to gain access to Bakken and Canadian crude without delays, U.S. refiners are purchasing rail cars and building rail terminals. Even though this results in more expensive transport costs (as much as $24 per barrel) U.S. refiners will still benefit from processing domestic oil due to the deep price discount. However, as transport bottlenecks diminish, the Bakken- and WTI-to-Brent discount is likely to diminish.\textsuperscript{21} Furthermore, the trend away from light sweet Brent crude to North American oil (which includes heavy Canadian oil inputs), along with greater ownership of transportation, has implications for the energy costs and greenhouse gas (GHG) emissions attributable to refining companies.

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**LEGISLATIVE AND REGULATORY TRENDS IN THE OIL & GAS, REFINING & MARKETING INDUSTRY**

Companies in the R&M industry are subject to various environmental regulations at the federal, state, and local levels. These regulations add to capital expenditures and refining costs, and can lead to delays in obtaining permits. While they relate primarily to refining operations, they can also affect the profitability of gasoline retailing companies through additional capital expenditures or restricting product sales. The following section provides a brief summary of
In terms of process-related regulations, companies require permits from federal, state, and local agencies to construct or modify their facilities. More recently, these include permits related to GHG emissions under the EPA’s GHG Tailoring Rule, discussed in the GHG emissions section below. The Clean Air Act (CAA) regulates air emissions from refining operations (and from the use of refined products). The industry’s management of hazardous waste is regulated under the Resource Conservation and Recovery Act (RCRA).

Furthermore, GHG mitigation efforts are already impacting the industry. The EPA requires reporting of GHG emissions from large emissions sources in the U.S., under its Greenhouse Gas Reporting Program (GHGRP). The GHGRP includes reporting by 41 source categories, including petroleum refining. The program also requires refiners to report as Suppliers of Petroleum Products, which means they have to calculate emissions from the combustion of the net volume of all products leaving their facility. In addition, state GHG laws also affect R&M companies. Under the cap-and-trade program of California’s Global Warming Solutions Act, AB32, refineries are ‘covered entities’ subject to annual and triennial compliance obligations.

In addition to the above process-related regulations, R&M companies are also affected by a number of regulations related to fuels and fuel additives. These regulations, which can vary considerably by state, and at a national level, can restrict the amount or type of fuel that companies can sell in specific markets, and increase R&M costs.

Under the CAA, refiners and importers are required to register their products with the EPA before they are offered for sale. Among other requirements, manufacturers have to survey existing scientific information for each product, and where adequate information is unavailable, they have to conduct tests for potential adverse health effects of emissions.

The CAA Amendments of 1990 and EPA regulations banned lead in gasoline, which is harmful to human health, after 1995. Under the 1990 CAA Amendments, cities with high smog levels are required to adopt a reformulated gasoline (RFG) program for blending gasoline to reduce smog-forming and toxic pollutants. The RFG program is currently in force in 17 states and D.C., and, as a result, about 30 percent of gasoline sold in the U.S. is reformulated.

The EPA is proposing to introduce more stringent standards to reduce the sulfur content of gasoline, under the Tier 3 Ultra Low Sulfur Gasoline regulations. These standards, which apply to U.S. refiners and importers, would reduce the allowable sulfur content of gasoline, including any ethanol-blend sold in the U.S. It would be reduced from the 30 parts per million (ppm) for the annual corporate average that exists under the current Gasoline Sulfur program to 10 ppm beginning in 2017.

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11 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.
Furthermore, the EPA regulates hazardous air pollutants emitted by cars and trucks, such as benzene, formaldehyde, and naphthalene, through its Mobile Source Air Toxics program. Under the program, refineries and importers are required to meet specific compliance baselines for conventional gasoline and RFG.

The industry also faces seasonal regulatory requirements for gasoline. First, to lower evaporative emissions that contribute to smog, the EPA regulates the Reid Vapor Pressure (RVP) of gasoline sold at retail stations during the summer months. RVP is a measure of gasoline volatility. As a result, refiners have to use a blend of products and feedstocks with fewer Volatile Organic Compounds (VOCs). Second, the CAA requires the use of oxygenated gasoline to reduce carbon monoxide (CO) emissions from vehicles in areas where winter CO levels are not in keeping with federal air quality standards. These wintertime requirements are implemented at the state level.

Twelve states have also adopted their own “boutique” clean fuel programs, many of which are effective for only part of the year. In addition, states such as California banned or partially restricted the use of Methyl tertiary butyl ether (MTBE) as an oxygenate in gasoline. There was concern about its health and ecological impacts as a result of groundwater contamination. MTBE began to be used as a replacement for lead during the 1980s, and was used in higher concentrations to meet the oxygenate rules under the CAA Amendments of 1990. However, the Energy Policy Act of 2005 removed the oxygenate requirement for RFG, and introduced a Renewable Fuel Standard (RFS) for blending gasoline with alternative fuels such as ethanol. As a result, MTBE has been replaced by ethanol, and its use reduced since 2005. The RFS was expanded under the Energy Independence and Security Act of 2007 to include renewable fuel blending in diesel, and to increase the volume of renewable fuels used.

Companies are also subject to rules prohibiting market manipulation. They are being investigated by the U.S. FTC and U.S. Commodity Futures Trading Commission (CFTC) in relation to whether they are complying with these rules.

Furthermore, regulations such as the Corporate Average Fuel Economy (CAFE) standards that are not directly imposed on the industry can also affect it. The regulations affect the industry by lowering the demand for its products, due to greater fuel efficiency in the use phase.

President Obama outlined his Climate Action Plan in June 2013, which includes a focus on fuel economy standards, next-generation biofuels, and advanced technologies such as fuel cells.

Finally, organizations like the American Petroleum Institute (API) and American Fuel and Petrochemical Manufacturers (AFPM) represent and support industry players through industry standards, research support, and lobbying.

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Footnote:

10 Oxygenates are fuel additives, which contain oxygen that can improve the octane quality of gasoline and its combustion, lowering exhaust emissions.
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 R&M industry:

- **Use of common capitals**: R&M companies use natural capital inputs such as energy, water, and crude oil feedstock in the refining process. Resource efficiency can help avoid higher costs or unstable supply of these inputs due to environmental pressures, such as climate change and water scarcity.

- **Negative externalities**: The refining process, operation of gas stations, and refined products in the use phase, all create negative environmental externalities. These include GHG emissions and air or water pollution, and can harm human health. As a result, environmental regulations could lower the demand for, or constrain the supply of, R&M companies’ outputs without management of these impacts.

- **Social license to operate**: R&M companies depend on support from employees and local communities to engage in operations that can be harmful to human health and the environment. Therefore, negative impacts, or negative public perceptions of such companies, may disrupt or destroy this social license to operate.

- **Importance of innovation to a mature industry**: By innovating the refining process and investing in cleaner and safer products and infrastructure, industry players have the potential to provide economic, environmental, and social benefits. These benefits 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 R&M 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 R&M 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.

ENVIRONMENT

The environmental dimension of sustainability includes corporate impact on the environment, through the use of non-renewable natural resources as inputs to the factors of production (e.g., water, minerals, ecosystems, and biodiversity). Or, the impact can be through environmental externalities or other harmful releases in the environment, such as air and water pollution, waste disposal, and greenhouse gas emissions.

The R&M industry depends heavily on environmental capital for inputs to production, many of which account for a significant share of operating costs. At the same time, its operations and the use of its products can generate wide-ranging environmental impacts affecting land, air, and water resources, as well as human health. As resources are becoming limited or exhibiting price volatility, and legislation seeks to address externalities, companies within this industry need to manage these risks, and innovate to reduce the environmental impacts of their operations.

Greenhouse Gas Emissions

While the use of refined petroleum products, such as gasoline, receives a lot of public attention in discussions about GHG mitigation, GHG emissions from the industry during refining operations are also significant relative to other industries. R&M companies may face additional operating and capital expenditures for mitigating GHG emissions and meeting regulatory requirements to purchase carbon credits, pay carbon taxes, or report GHG emissions, including obtaining third-party verification.

The industry’s direct GHG emissions primarily result from the stationary combustion of fossil fuels for energy consumption. Particularly, use of refinery fuel gases and catalyst petroleum coke—both produced during the refining process—in on-site combustion accounted for a majority of total (direct and indirect) carbon dioxide (CO₂) emissions from petroleum refining.
in the U.S. in 2005.\textsuperscript{32} Energy accounts for a significant share of refinery operating costs, and therefore, energy efficiency can help mitigate emissions, while lowering costs. Some refineries have co-generation facilities for producing steam and electricity, which increase the energy efficiency of the refining process, and reduce dependence on purchased electricity.\textsuperscript{38}

GHGs are also released from process emissions (for example, during hydrogen production), fugitive emissions resulting from leaks, emissions from venting and flaring,\textsuperscript{3} and from non-routine events such as equipment maintenance.\textsuperscript{39}

Most of the GHG emissions from refining are of CO$_2$; however methane (CH$_4$) emissions account for 2.25 percent of the total. The relative share of CO$_2$ and CH$_4$ depends on the type of process units and other refinery characteristics.\textsuperscript{40} Furthermore, the energy intensity of production, and therefore the GHG emissions intensity, can vary significantly depending on the type of crude oil that is used as feedstock and the specifications for refined products. These also influence equipment and capital expenditures. For example, the processing of heavier crudes tends to be more GHG-intensive than that of lighter crudes, while reducing sulfur content to meet federal standards for ultra-low sulfur fuel requires significant energy consumption.\textsuperscript{41}

Decisions about producing electricity on-site (versus sourcing it from third parties) and implementing energy efficiency would depend, among other things, on the availability and price of raw materials for on-site generation, the technical and economic energy efficiency potential, and the cost to the company of direct GHG emissions from regulatory regimes such as California’s cap-and-trade system, which puts a price on carbon. In the past few years, a significant proportion of GHG emissions reduction in the oil and gas industries has occurred through co-generation facilities at refineries.\textsuperscript{42}

Companies that cost-effectively reduce GHG emissions from their operations, implementing industry-leading technologies and processes, can create operational efficiency. They can mitigate the effect of increased fuel costs and regulations that limit – or put a price on – carbon emissions. 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; and
- Long- and short-term strategy to manage Scope 1 emissions.

**Evidence**

Energy consumption and related GHG emissions affect the industry through energy costs and regulations. Petroleum refining accounts for the second-highest industrial energy consumption in the U.S.,\textsuperscript{43} and energy costs are about 44 percent of operating expenses for

\textsuperscript{3} Venting and flaring are operational and safety measures to ensure safe disposal of vapor gases. See http://www.ifc.org/wps/wcm/connect/52870d60488557e5be44fe6a6515bb18/Final%2B-%2BPetroleum%2BRefining.pdf?MOD=AJPERES&ID=1323153091008
refineries. CO₂ emissions from such energy consumption account for about 11.6 percent of industrial CO₂ emissions in the U.S. Therefore, reductions in energy consumption will not only protect companies against regulatory risks, but will also enable them to reduce operating costs. Competitive benchmarking data for the industry indicates that most refineries can economically improve energy efficiency by 10 to 20 percent, indicating the potential for significant cost savings and GHG mitigation.

R&M companies are taking concrete actions to improve energy efficiency. For example, from 2005 to 2009, ExxonMobil refineries improved their energy efficiency at a rate three times higher than the historical industry average, with an improvement of almost 10 percent since 1990. Using co-generation technology, the company reduced GHG emissions at 30 refining plants globally.

R&M industry emissions of CH₄, which is a more potent GHG compared to CO₂, increased by seven percent between 1996 and 2005. The relatively large magnitude of overall GHG emissions, and the trend of growing high-potency emissions, put the industry under the scope of existing GHG regulations at the state, national, and regional levels globally. The industry is exposed to higher operating and capital expenditures as a result.

In the U.S., R&M companies are required to report GHG emissions annually to the EPA under the GHGRP (see Legislative and Regulatory Trends section above), at the facility level, if emissions exceed 25,000 metric tons. Data for 2011 shows that reported direct GHG emissions from refineries accounted for about 5.5 percent of the total under the national GHGRP. These were the third largest source of emissions after power plants and oil and gas production. This suggests that where broad-based federal climate change legislation introduced, it could substantially increase operating costs for R&M companies.

R&M companies already face compliance costs for GHG regulations at a state level. All of California’s 20 refinery facilities are listed as Covered Entities for the First Compliance Period of California’s Cap-and-Trade Program, and the total GHG emissions for 2011 from these were around 22 percent of total covered emissions in the first compliance period. These include entities owned by the major U.S.-based R&M companies, including Phillips 66, Tesoro, Valero, and integrated companies such as ExxonMobil and Chevron. Among the largest reported emissions from all covered entities in the list, including those from other industries, three refinery facilities were within the first five facilities.

Nevertheless, the emissions from refineries in 2011 represented significant reductions compared to the previous year, arguably as a direct result of the AB32 legislation. Eleven refineries reduced GHG emissions by 2 to 22 percent. Valero’s refinery in Benicia decreased covered emissions significantly by installing a flue gas scrubber.

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VI 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.

VII This excludes emissions from their hydrogen production plants, and from industrial waste landfills and wastewater treatment at these facilities, which the EPA categorizes under other sectors.
The quarterly auction held in February 2014 under the 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 Phillips 66, BP, Chevron, and ExxonMobil. 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, in 2010, the EPA introduced a permitting program under the Clean Air Act (CAA), known as the GHG Tailoring Rule, which state and local authorities can use to issue CAA construction permits to GHG emissions sources, including refinery facilities. As a result, R&M companies will need to manage their emissions from existing and proposed new facilities, in order to prevent disruption to their production plans.

In the Risk Factors section of its Form 10-K for fiscal year (FY) 2012, Tesoro states: “Currently, multiple legislative and regulatory measures to address greenhouse gas emissions [...] are in various phases of consideration [...] or implementation, [...] which could require reductions in our greenhouse gas [that] could result in increased costs to (i) operate and maintain our facilities, (ii) install new emission controls at our facilities and (iii) administer and manage any greenhouse gas emissions programs, including acquiring emission credits or allotments.”

**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. Companies can benefit from reductions in energy costs, which are a significant proportion of their operating expenses. Through lower emissions, companies could potentially improve their reputation and brand value.

GHG emissions caps or other regulatory restrictions on emissions could pose a long-term threat to the industry. If companies are required to modify their facilities, such regulations could result in increased, potentially unanticipated capital expenditures and permitting costs, affecting cash flows. Delays in permitting can disrupt production, or companies could be forced to curb production, which would lower revenues. A price on carbon emissions could increase operating expenditures. Furthermore, companies could also face fines if GHG emissions rules are violated, affecting one-time costs.

Increased operating risks due to the relative magnitude of emissions from the industry and regulatory risks could create uncertainty about the revenue growth and cost structure of companies. This could lead to a higher cost of capital.

While regulatory development in this area is an inherently slow and politically charged process whose exact outcome is nearly impossible to
predict, increasingly stringent GHG regulations will be needed in different regions in order to address climate change targets. The probability and magnitude of these impacts are, therefore, likely to increase in the future.

Air Quality

Apart from GHGs, which have global impacts, other air emissions from R&M 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. The EPA, as well as state and local agencies, regulate them under the CAA, creating significant regulatory risks for R&M companies. Petroleum refineries in the U.S. are located near East and West Coast population centers. These refineries can have significant human health impacts in these areas from process air emissions, as well as from accident-related emissions. Refineries emit HAPs, such as benzene, which is a known human carcinogen. Refineries also emit persistent bioaccumulative HAPs, such as mercury. HAPs are emitted from stationary combustion sources, storage vessels, flares, and equipment leaks. VOCs are a precursor to PM$_{2.5}$ and ozone formation. PM$_{2.5}$ is associated with health effects such as premature mortality for adults and infants, heart attacks, asthma attacks, and work loss days. Besides its human health effects, ozone is associated with impacts on vegetation and the climate. The EPA sets permissible levels for CAPs, such as sulfur dioxide (SO$_2$) and nitrogen oxides (NO$_x$), based on human health and/or environmental criteria.

Refiners face regulatory compliance costs, and higher operating and capital expenditures, for technological and process improvements to keep air emissions under control. R&M companies could also face restrictions on, or delays in, obtaining permits from state and local agencies if their facilities do not meet specific emissions criteria. Furthermore, human health impacts and financial consequences for R&M companies are likely to be exacerbated the closer a facility is to a local community.

Active management of facility emissions through implementing industry best practices across operations can lower costs, and potentially enhance operational efficiency. Informing the local population in a timely manner about the hazards of operational and incident-related emissions, and steps to address these, can lower reputational and litigation risks. Company performance in these areas 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 from industry-specific pollutants; and
- Number of refineries in or near areas of dense population.
Evidence

The R&M industry is a significant source of certain harmful air pollutants; as a result, it faces substantial regulatory risks. According to data from 2005, refinery operations led to emissions of 552,609 tons per year (tpy) of air pollutants, the most significant of these being of SO₂, NOₓ, and VOCs. SASB’s analysis of air pollution data for all industrial processes from EPA’s National Emissions Inventory (excluding emissions from fuel combustion) shows that in 2008, petroleum refineries released just over five percent of all benzene emissions from industrial processes. Refineries’ share of nitrogen oxides from all industrial processes was around nine percent. The share of sulfur dioxide was 16.6 percent, and VOCs 5.5 percent.

R&M companies face regulatory compliance costs and penalties associated with air pollution from a number of different regulations. Specific provisions under the CAA affecting refineries include: the New Source Review/ Prevention of Significant Deterioration, New Source Performance Standards, Leak Detection and Repair (LDAR) requirements, and Benzene National Emissions Standards for Hazardous Air Pollutants. Emissions controls under the CAA are also generally required for small pollution sources, such as gasoline stations, in “non-attainment” areas where the air does not meet allowable limits for a common air pollutant.

Under the EPA’s national Petroleum Refinery Initiative to address air emissions, since 2000 the EPA has entered into 31 settlements with U.S. companies. That represents over 90 percent of the country’s refining capacity. The full implementation of the settlements, which require significant reductions of NOₓ, SO₂, benzene, VOCs, and particulate matter, is expected to lower annual emissions of NOx by more than 93,000 tons. SO₂ emissions are expected to be reduced by more than 255,500 tons. Companies have agreed to invest more than $6.5 billion in control technologies, pay civil penalties of more than $93 million, and perform supplemental environmental projects of over $80 million.

In 2007, Valero reached an agreement with the Department of Justice and the EPA that provided for a $4.25 million penalty, plus $232 million in new and upgraded pollution controls at three of its refineries. The agreement included several supplemental projects, including $500,000 for shelter-in-place air control systems at two local schools.

With increasing public concerns about air quality, air emissions regulations are becoming more stringent. In May 2014, the EPA proposed tightening oil refinery emission standards for the first time in almost 20 years. The changes to the standards could include monitoring benzene emissions, upgrading storage tank emission controls, and ensuring proper destruction of waste gases. Refinery operators would also have to make public the results of emissions monitoring.
Besides regulatory fines and costs, company value may also be affected by compensation payments to the local population and businesses from significant releases of pollutants, for example, as a result of accidental leaks and explosions. A fire at the Richmond refinery of Chevron in 2012 led to shelter-in-place orders for area residents as a result of the smoke. The incident led to approximately 23,900 claims being initiated against the company, and the company provided approximately $10 million in compensation to local hospitals, affected community members, and local government agencies.\(^3\)

Company 10-K filings discuss risks from regulations and legal actions related to air emissions. In its FY 2012 10-K filing, PBF Energy discusses that due to provisions of the CAA, the company needs to install certain air pollution control devices at its refineries, requiring capital expenditures. According to the company, it may need to incur additional expenditures in future years due to similar provisions, new rulings, or stricter interpretation of existing rules. PBF also states that it faces potential future claims and lawsuits related to air pollution.

R&M companies have technological and process-related opportunities for cost-effectively lowering pollution and related incidents, for example, through effective monitoring of leaks. The LDAR program under the CAA requires companies to monitor and address equipment leaks resulting in fugitive emissions. A study commissioned by API in 1997 showed that more than 90 percent of the controllable fugitive emissions result from about 0.1 percent of all refinery components. Additionally, it showed that “smart” LDAR programs that focus on these few high-leak areas could improve environmental performance significantly.\(^4\)

Value Impact

Managing air emissions can provide operational efficiency and affect the cost structure of companies in the industry, with a direct, ongoing impact on value.

Air pollution may result in regulatory penalties, higher regulatory compliance costs, or new capital expenditures to upgrade equipment. While the timeline for regulatory compliance is partly designed to allow companies to reallocate resources to cover the costs, companies are nonetheless likely to face higher ongoing operating costs. Companies could face one-off impacts on cash flows as a result of fines and litigation. There may be legal challenges from the local population or businesses that are directly affected by air pollutants, also resulting in liabilities. Companies could face delays in obtaining permits if they do not meet state or local emissions limits, which could impact production, and therefore, revenues. Production could also be affected due to unscheduled downtime from incidents resulting in emissions of harmful pollutants.

Active management of the issue—through technological and process improvements—could allow companies to limit the impact of regulations and benefit from operational efficiencies that could lead to a lower cost structure over time.
Public concern and regulatory action on improving air quality is increasing globally. As a result, the probability and magnitude of the impact of air emissions management on financial results is likely to increase in the near term.

**Water Management**

The two main challenges that refineries face with respect to water are: securing adequate supplies for what is a water-intensive production process, and ensuring that contamination of water resources is prevented or addressed where it occurs. This could minimize the impacts of regulations, water supply shortages, and community-related disruptions on company operations.

While water has typically been a freely available and abundant commodity in many parts of the world, it is becoming a scarce resource. This is due to increasing consumption from population growth and rapid urbanization, and potentially reduced supplies due to climate change. Furthermore, water pollution renders 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.” Water scarcity can result in higher supply costs and social tensions for many companies across different sectors.65

Refineries can use relatively large quantities of water depending on their size, the type of crude inputs, specifications of refined products, and the complexity of the refining process.66 Sources of water include rivers, lakes, seas, or local aquifers. As a result, refineries tend to be located near such water sources. They may also purchase drinking water and treated effluent from local municipalities. Rainwater within the refinery is typically treated before discharge, but may also be harvested for use in the refinery’s operations.67 Most of the water withdrawal and consumption in refineries takes place for steam and cooling water use.68

Furthermore, refinery operations lead to process wastewater (contaminated with hydrocarbons) and surface water runoff. Many of the waste streams require treatment at on-site wastewater treatment plants before discharge. Some refineries also use a once-through system of cooling water, whereby incoming cool water exchanges heat with a process fluid. The resulting warmer water is returned to its source, causing thermal pollution.69

Refining facilities, depending on their location, may be exposed to the risk of reduced water availability, and related cost increases. Extraction of water from “water-stressed” regions or water contamination may also create tensions with local communities, for example, if it affects the quality or availability of drinking water. Consequently, adoption of technologies and processes that reduce water consumption and contamination could lower operating risks and costs for companies and create a competitive advantage.
A significant proportion of water can be reused or continually recycled within a refinery, lowering environmental impacts. Refineries are able to lower the amounts of discharge, and operating and maintenance costs for wastewater treatment, by separating the various waste streams of water, and through other water management strategies. Marathon Petroleum has an on-site wastewater treatment plant that uses water from the Mississippi, but returns it to the river cleaner than when it was withdrawn.

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; and
- Number of incidents of non-compliance with water quality permits and standards.

**Evidence**

As discussed above, refining operations require significant amounts of water. They lead to substantial wastewater discharges and surface water runoff, exposing companies to regulatory risks and operational impacts.

According to the EPA, refineries use about 1 to 2.5 gallons of water for every gallon of product. As a result, petroleum refining in the U.S. uses one to two billion gallons of water each day for fuel production. Refining activities are water-intensive relative to other industries. “Oil and Gas Refining” is ranked 20th out of 130 GICS VIII sub-industries by water intensity per dollar of output.

Given the significant water needs, effective management of watersheds and local community engagement on the issue can create operational benefits for companies, improving their financial performance. For example, the Petrobras refinery in Sao Paulo partnered with a committee on local watersheds to finance actions to improve water availability. As a result of these actions, including reforestation of mountain areas and studies on water availability, the refinery was able to increase its water collection quota in the basin.

The last EPA sector report from 2008 shows that 121 refineries reported water discharges of Toxic Release Inventory (TRI) chemicals. These discharges measured around 18 million pounds in 2005, a 42 percent increase since 1996. Refineries face regulations and related risks for direct discharges and discharges to publicly owned treatment works. Refineries with materials exposed to precipitation are also regulated for storm water runoff, which is sometimes under a general permit with sector-specific limits on pollutants such as zinc, nickel, lead, etc. In 2007, BP applied for a permit to discharge additional pollutants into Lake Michigan from its oil refinery in Indiana, in order to be able to process crude from oil sands. After protests from local environmental groups and citizens, BP agreed to invest in technology that would enable it to limit wastewater discharges to pre-expansion levels.
R&M companies recognize both impacts as well as opportunities related to water consumption and treatment in their SEC filings. For example, Western Refining faced a hazardous waste inspection at one of its refineries, resulting in a settlement with the EPA and the New Mexico Environment Department (NMED). In relation to that settlement, the company spent a total of $38.6 million to upgrade its wastewater treatment plant at its Gallup refinery between 2011 and 2013, according to the company’s 10-K filing for FY 2013. Phillips 66 discusses in its Form 10-K filing that water consumption is one of the areas of focus for its research activities. According to the EPA: “As the standards and costs for wastewater treatment increase and the costs for feedwater makeup increase, the industry has become more aware of water costs. In addition, large amounts of energy are used to process and move water through the refinery. Hence, water savings will lead to additional energy savings.”

Value Impact
Managing water consumption and discharge can influence operational risks faced by companies, with potentially acute impacts on value from disruptions to production. Water management can also affect ongoing operating costs and impact cash flows through one-off capital expenditures.

Water access is a long-term material concern to companies in the R&M industry, given its key role in the refining process. Water shortages are a problem in many regions of the world. Higher water prices or lack of availability can directly affect operating costs of R&M companies. Limits on industrial water consumption could force companies to curb or cease production, with impact on market share and revenue growth. Furthermore, regulations related to wastewater treatment could affect ongoing compliance costs and require additional capital expenditures. Additionally, higher water use may also imply higher energy costs, due to the strong link between water use and energy consumption.

Water intensity, particularly in regions with water scarcity, can lead to social and political unrest, which can affect a company’s reputation and license to operate. This impact can increase its risk profile and ultimately the cost of capital.

Water costs are gradually expected to rise across the globe. This is a result of human consumption rising with higher standards of living, existing sources becoming unfit for use due to pollution, and climate change causing variations in precipitation patterns. Therefore, the probability and magnitude of the impact of water management on financial results in this industry are likely to increase in the near term.
Hazardous Materials Management

R&M companies face regulatory and operational challenges in managing waste generated by their activities and in handling and storing petroleum products. Many of these substances are hazardous to human health and the environment. As discussed earlier, refineries in the U.S. expanded their capacity in the last decade. At the same time, smaller refining facilities were shut down. Both active and closed sites have the potential to create contamination through waste and hazardous materials. Remediation often takes several years to be completed, and companies could continue to accrue liabilities for past operations.

Releases of hazardous substances from underground storage tanks (USTs) used by refining facilities and gas stations can affect redevelopment of land for abandoned or closed facilities. Of the estimated 450,000 brownfield sites in the U.S., approximately 50 percent are thought to be impacted by petroleum, mostly from leaking USTs at old gas stations. These sites often cannot be used for other purposes without remediation, affecting the local population through impacts on land value. Spills or releases of hazardous substances could also occur during normal operations. These can create negative human health and environmental impacts, including groundwater contamination.

R&M companies generate different types of wastes that are subject to the Resource Conservation and Recovery Act (RCRA). The Act regulates solid wastes, hazardous wastes, and USTs. Hazardous wastes generated by refineries include: metals, spent acids, caustics, solid catalysts, wastewater treatment sludges, and residues from tank cleaning operations. RCRA regulations affect the generation, transport, treatment, storage, and disposal of such wastes.

RCRA regulations specific to USTs govern storage of hazardous substances and petroleum products, and focus on preventing, detecting, and cleaning up releases. When such substances leak from USTs, the UST cleanup program monitors and regulates the cleanup. Waste management also affects the release of toxic air pollutants and wastewater discharges, both of which are discussed under earlier disclosure topics.

R&M companies can take actions to lower regulatory and litigation risks and costs associated with handling hazardous materials. These include: reducing and recycling hazardous waste streams, ensuring the integrity of their USTs, and having effective and prompt cleanup and remediation measures in place for normal operations and closed facilities. 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):

- Amount of hazardous waste from operations, percentage recycled; and

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IX A brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of hazardous substances or contaminants
• Number of USTs, number of UST releases requiring cleanup, percentage in states with financial assurance funds for USTs.

Evidence: R&M company operations produce relatively large amounts of hazardous wastes, which can affect companies’ costs and create regulatory risks. Petroleum refineries in the U.S. generated and managed approximately 5 million tons of hazardous waste in 2005. Disposal is the most common method used for hazardous waste management, accounting for 84 percent of the waste managed in 2005.63

Handling of hazardous waste and remediation of contaminated sites can be expensive for companies in the R&M industry. R&M companies spend relatively larger amounts on waste management compared to companies in other industries. According to data for the U.S. from the 2005 EPA survey on Pollution Abatement Costs and Expenditures, the petroleum refining industry had pollution abatement operating costs for solid waste of $434 million in 2005. This was eight percent of the total abatement operating costs for all industries. The industry had related capital expenditures of $27.8 million, or four percent of the total for all industries. Its total capital expenditures, including air, water, and solid wastes, were around 29 percent of the total for all industries. The industry spent an additional $118 million in 2005 for site cleanup costs, which was 11 percent of the total for all industries.64

Furthermore, the R&M industry is the focus of federal and state efforts to clean up sites contaminated with hazardous substances. There are more than 640,000 federally regulated active USTs that store fuels or hazardous substances, the majority of which contain petroleum products, such as gasoline and diesel. Federal and state programs on leaking USTs have overseen the cleanup of almost 351,000 leaking tank sites. These programs are facing new challenges, such as addressing contamination from MTBE. According to the EPA, around 25,000 USTs contain hazardous substances covered by federal regulations. The main chemicals of concern in gasoline are benzene, toluene, ethylbenzene, and xylenes (BTEX). The benzene in a ten-gallon gasoline leak can potentially contaminate about 12 million gallons of water. Although there have been improvements in UST systems, leaks still occur.65 As a result, R&M companies may continue to be impacted by related regulatory actions.

Leaks occurring in populated areas can be difficult and expensive to clean up. Cleanup costs can range from $100,000 to more than $1 million. Estimates suggest that the EPA and individual states have paid out more than $10 billion to clean up underground tank releases over the past 20 years.66

R&M companies face numerous requirements (as well as supporting mechanisms) related to their financial responsibility for cleanups. The RCRA requires UST owners and operators to demonstrate financial responsibility by obtaining insurance or financial coverage for cleanup...
costs. Coverage is also required for third-party compensation for bodily injury and property damage caused by leaking tanks. The required amount of financial responsibility for petroleum refiners or marketers includes per occurrence coverage of $1 million.⁸⁷

There are state financial assurance funds to provide insurance for UST-related cleanups.⁹⁰ This insurance helps owners or operators to meet their federal financial responsibility requirements. The state funds typically generate money with tank registration and petroleum fees. These funds also include a deductible that owners or operators are responsible for paying. Some state funds incorporate eligibility requirements, such as demonstrating that facilities meet technical requirements.⁸⁸

Furthermore, there exists a federal trust fund to oversee and enforce corrective action by a responsible party. The fund also covers cleanup of abandoned tanks whose owners are unknown, unwilling, or unable to pay for cleanup. It is capitalized by a federal tax on gasoline of one-tenth of a cent per gallon. The Energy Policy Act of 2005 created the Underground Storage Tank Compliance Act for more stringent regulations for USTs.⁹¹ The provisions focus on preventing releases from USTs, and expand the use of the trust fund to include inspections and cleanup of releases containing oxygenated fuel additives.⁹²

There have been many instances of legal action against owners of gas stations to clean up abandoned stations to mitigate soil and groundwater contamination. For example, in March 2013, the City of Evanston in Illinois filed a lawsuit against Chevron. Evanston sought injunctive relief, an order directing a cleanup, and an award of compensatory and punitive damages.⁹³ In Chicago, a city program in 1997 sought to clean up 60 abandoned gas stations that had caused environmental contamination. The City initiated legal action against the owners of 27 stations. The remaining owners agreed to clean up their stations, or negotiated with the City on environmental compliance.⁹⁴ In some cases, owners may have been franchisees of R&M companies rather than the companies themselves. Nonetheless, such lawsuits can damage the brand value of the company.

Most of the leading companies disclose risks and regulatory responsibilities related to hazardous materials management in their Form 10-K filings. For example, in its Form 10-K for FY 2013, CVR Refining lists its hazardous waste units and storage tanks. It goes on to discuss its financial assurance requirement related to two facilities (one closed) under a 2004 Consent Decree. The company explains that: “this financial assurance is currently provided by a bond in the amount of $4.8 million for cleanup obligations at the Phillipsburg terminal and a letter of credit in the amount of $0.2 million for estimated costs to close regulated hazardous waste management units at the Coffeyville refinery. Additional self-funded financial assurance of approximately $4.8 million and $2.4 million is required by the 2004 Consent Decree.

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⁸⁷ Around 36 states have created financial assurance funds, which supplement or are a substitute for private insurance. These are used to help owners and operators meet financial responsibility requirements and to help cover remediation costs. These are discussed further in the Evidence section below.

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for clean-up and post-closure obligations at the Coffeyville refinery and Phillipsburg terminal, respectively.”

**Value Impact**

Hazardous materials management can create operational efficiencies for companies, with a potential to lower costs on an ongoing basis. A company’s performance on this issue can have a chronic impact on value, due to ongoing operating expenditures related to handling wastes and hazardous materials. Significant quantities of hazardous waste disposal could also affect companies through one-time regulatory fines if such disposal subsequently leads to contamination.

Maintaining the integrity of USTs through industry best practices can help mitigate contingent liabilities, and could bring down insurance costs, for remediation of contaminated sites. Effective and timely remediation measures could lower overall remediation costs and liabilities.

R&M companies face higher capital expenditures and regulatory compliance costs for generating or storing large quantities of hazardous substances. Permitting of R&M facilities could be affected by their waste generation or remediation performance, with an impact on companies’ revenue-earning potential. Companies could also face legal challenges due to inadequate prevention or remediation, resulting in contingent liabilities.

**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. It includes issues around access to products and services, affordability, responsible business practices in marketing, and customer privacy.

R&M operations can affect communities in which they are located through noise and air pollution, hazardous substances, and impacts on land value. Community impacts can hurt a company’s social license to operate and affect brand value. As a result of public pressure, companies may find it difficult to gain regulatory approvals for expanding refinery capacity, or may face more stringent regulations. Companies could also have legal liabilities related to their community impacts. These impacts are addressed by the disclosure topics of “Air Quality,” “Hazardous Materials Management,” as well as “Health, Safety, and Emergency Management.”
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. In addition, it includes 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, as well as the ability to create a safety culture for companies that operate in dangerous working environments.

The nature of refinery operations—in particular, the complex refining activities that use flammable fossil fuels as inputs, high-temperature processes, and chemical catalysts—generates 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 at all levels of the organization, can directly influence the results of its operations.

Company performance on ensuring workforce health 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. The safety culture of an R&M company can impact both environmental and social capitals, in addition to its human capital.

BUSINESS MODEL AND INNOVATION

This dimension of sustainability is concerned with the impact of environmental and social factors on innovation and business models. It addresses the integration of environmental and social factors in the value creation process of companies, including resource efficiency and other innovations in the production process. It also includes product innovation, product efficiency, and responsibility in the design, use-phase, and disposal of products. It includes management of environmental and social impacts on tangible and financial assets—either a company’s own, or those it manages as the fiduciary for others.

An increasing understanding of human health risks and emerging environmental trends, such as climate change, raises concerns about the use of end products, such as gasoline, from the R&M industry. As a result, the industry faces
multiple complex and evolving regulations related to product specifications and clean fuel blends. This is discussed in the Legislative and Regulatory Trends section. There could also be longer-term impacts on demand for carbon-intensive fuels. In this context, companies that focus on product specifications and fuel additives that have minimal human health risks and low lifecycle environmental impacts could enjoy a strong competitive position over the long term.

Product Specifications & Clean Fuel Blends

R&M companies can have significant environmental and human health impacts—not only through their own operations, but also through the end use of their products. This is particularly true in the case of refined products used in transportation.

Environmental and health impacts at the use phase can affect company value through laws and regulations implemented to address these issues. Petroleum products are important to meet global energy needs, particularly in emerging markets. However, demand for fossil fuel-based transportation fuels could slow down or decline, either abruptly or over the longer term, under different future scenarios. For example, there could be disruptive innovation in clean energy, or stringent new regulations to meet climate change targets. Alternatively, trends such as vehicle fuel efficiency, or growth in alternative transport infrastructure, could erode demand over the long term. In the face of these trends, R&M companies will need to innovate to reduce the environmental and health impacts of their products.

Base gasoline production requires all R&M companies selling products in a certain market to meet government specifications, such as those related to sulfur content. This base gas is often transported by multiple R&M companies from their refineries through common pipelines, and flows into co-mingled storage tanks. However, R&M companies spend significant research and development (R&D) resources on patented additives that are added to the base gas. Additives such as MTBE were previously discovered to be hazardous to human health.

R&M companies are required to assess the human health risks of their products in order to register their products with the EPA, as discussed earlier. If health risks are not considered during product development, therefore, the returns on R&D investments could be affected. Companies also face regulatory requirements to blend gasoline with ethanol and advanced biofuels, with the aim of mitigating climate change. Such blending requirements can affect the capacity utilization of refineries producing petroleum products. Furthermore, companies that purchase credits known as renewable identification numbers (RINs) to meet regulatory requirements for renewable fuels can face regulatory and cost risks, as discussed below.
In order to ensure regulatory compliance and position themselves for long-term competitiveness, some companies are investing in formulating and supplying cleaner fuel blends with non-toxic additives. They are also investing in or purchasing ethanol and other renewable biofuels. Investments in developing and producing biofuels can be expensive, and therefore need to be oriented towards products that will pay off over the long term. Even cleaner burning fuels can have substantial social and environmental impacts over their lifecycle.

One way to minimize future regulatory risks and public pressure is by financing and investing in the commercialization of advanced fuel technologies, which have lower lifecycle impacts. However, appropriate vehicle technology may not be available for innovative, alternative fuels. Therefore, R&M companies will need to address this systems challenge in partnership with vehicle manufacturers.

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):

- Percentage of a company’s Renewable Volume Obligation met through production of qualifying renewable fuels, or purchase of “separated” RINs; and
- Total addressable market and share of market for advanced biofuels and associated infrastructure.

**Evidence**

R&M companies face the possibility of slowing demand growth or even declining demand for basic petroleum products in the medium to long term. A recent study found that petroleum refining has a “very high sensitivity” to mitigation policy that puts a price on carbon. According to the study, the industry faces potentially significant declines in output, because a carbon constraint increases the cost of the industry’s products to consumers relative to clean energy products. Consumers can easily substitute energy from fossil fuels with energy from renewable sources.95

The International Energy Agency (IEA) estimates that biofuels need to supply about 27 percent of road fuels worldwide by 2050 to meet climate targets, up from three percent in 2012.96 This suggests that with more stringent global climate change regulations that attempt to meet climate targets, R&M companies will need to invest in supplying biofuels to remain profitable.

In addition to demand pressures, R&M companies also face operational risks and regulatory compliance costs related to product specifications and fuel blends. Petroleum refiners and importers can use Renewable Identification Numbers to demonstrate compliance with the appropriate Renewable Fuel Standard (RFS) rules set by the EPA. RINs are assigned to batches of renewable fuels of renewable fuel producers and importers, and can be traded or sold.
In the past, due to the use of fraudulently generated RINs, companies that were not aware the RINs were invalid violated RFS standards. Despite the unintentional use of invalid RINs, the EPA came to a settlement with, and enforced civil penalties on, R&M companies using such RINs. These included Marathon Petroleum, Western Refining, and ExxonMobil, among others. Marathon, for example, agreed to pay a civil penalty of around $200,000. 

R&M companies also face higher RIN prices due to increasing demand for RINs. The higher demand comes from potential technical vehicle limitations and product liability. As a result, R&M companies are reluctant to supply higher ethanol blend percentages and are instead purchasing RINs. RIN prices for corn-based ethanol increased from about 2-3 cents per RIN in January 2013 to as much as 79 cents per RIN in March 2013. Marathon Petroleum discusses in its Form 10-K for FY 2013 that its “cost of purchasing RINs increased to $264 million in 2013 from $105 million in 2012, primarily due to higher ethanol and biomass-based diesel RIN prices.”

Furthermore, as discussed in the Industry Summary, refinery capacity utilization has been affected by federal ethanol blending requirements. Average annual utilization in the U.S. has fallen to the lowest level since 1987.

In its Form 10-K for FY 2012, PBF Energy discusses the risks its operations face from not producing renewable fuels: “Because we do not produce renewable fuels, increasing the volume of renewable fuels that must be blended into our products displaces an increasing volume of our refinery’s product pool, potentially resulting in lower earnings and profitability. In addition, in order to meet certain of these and future EPA requirements, we must purchase credits, known as “RINS,” which have fluctuating costs.”

Although the use of biofuel blends can be beneficial, biofuels themselves can generate negative externalities. Irrigation for corn production means that currently, biofuels are actually the most water-intensive fuel source in the U.S. Water consumption for biofuels is orders of magnitude greater than for refining crude oil. Crop production for biofuels also has the potential to distort other markets, such as the food industry.

Advanced biofuels could reduce water consumption significantly, but these technologies are yet to be proven on a commercial scale. Short-term costs to find commercially viable technologies can be significant, and these are lowering investments in advanced biofuels. However, investments in R&D for such technologies could serve to advance R&M companies’ long-term profitability. For example, together with DuPont, BP opened a $520 million wheat-to-ethanol facility in the U.K. in 2013, with a plan to eventually make biobutanol, which is more efficient than ethanol.

Furthermore, infrastructure for alternative fuels and electric vehicle charging is expanding in the U.S., providing both risks and opportunities...
for R&M companies. Vehicle manufacturers are increasingly placing flex-fuel vehicles on the market that can use gasoline blends with 85 percent ethanol (E85). Such offerings doubled in 2011 from the previous year. R&D on hydrogen fuel for fuel cell vehicles is leading to an increasing number of such stations, particularly in California and New York. Liquefied natural gas (LNG) and compressed natural gas stations exist in most U.S. states. LNG stations are structurally similar to gasoline and diesel stations.

Besides the RFS, other regulatory pressures to address environmental and health impacts from the use of refined petroleum products exist. These include CAFE standards for vehicles, GHG cap-and-trade legislation in states such as California, and state and federal regulations related to the phase-out of gasoline additives such as MTBE. They also include the EPA’s Tier 3 Ultra Low Sulfur Gasoline regulations, Mobile Source Air Toxics program, and seasonal product specification regulations. These requirements can increase capital and operating expenditures for R&M companies, potentially in unanticipated ways.

For example, to comply with the EPA’s proposed Tier 3 regulations for Ultra Low Sulfur Gasoline, refiners are expected to invest between $3.9 billion to $10 billion in new capital expenditures to modify their facilities. In its Form 10-K for FY 2012, Alon USA Energy states: “To the extent that the costs associated with meeting any of these requirements are substantial and not adequately provided for, our results of operations and cash flows could suffer.” The EPA estimates that production costs for refiners will increase by one cent per gallon as a result of the new rules. However, this is disputed by an industry study estimating a nine cent increase.

Apart from regulatory risks, companies can face lawsuits for using additives that may be harmful to human health in their products. Contamination of groundwater due to the suspected carcinogenic gasoline additive MTBE has resulted in over 70 lawsuits filed against major oil companies in the U.S. The lawsuits for MTBE-related contamination of 153 public water systems are estimated to have resulted in over $423 million of oil company settlement payments over 30 years. While the use of MTBE is largely a legacy issue for the industry in the U.S., these lawsuits highlight the importance of considering lifecycle health and environmental impacts when developing additives and fuels.

Oil and gas companies recognize product-related risks and opportunities. One study reveals that around 33 percent of energy firms mention these risks and opportunities in their 10-K forms, and 40 percent in their annual and sustainability reporting. Such disclosures covered both the potential reduction in demand for carbon-intensive fuels, and the potential market for products and services that address climate change risks. The study mentions that Valero, according to its Form 10-K, is investing in emerging biofuels technologies, such as diesel generation from recycled animal fat and
cooking oil, as well as ethanol from cellulosic feedstocks and municipal solid waste. In its Form 10-K for FY 2013, Phillips 66 discusses the focus of its research activities, saying: “Research allows Phillips 66 to be well positioned to address issues like corrosion, water consumption, and changing climate regulations, as well as progressing the technology development of second-generation biofuels both internally and with external collaborators.”

Value Impact

Developing and maintaining product specifications and fuel blends that meet and anticipate regulatory requirements and customer demand could contribute to company value over the long term. The issue also has implications for a company’s operational risks.

R&M companies could face reductions in revenue from fossil fuel-based products and services through impacts on both the market share and price of fossil fuel products. This could be due to environmental regulations and the emergence of competition from non-fossil fuel products. Revenue can also be affected by capacity utilization, due to GHG mitigation policies, such as the RFS. Regulations have the potential to add to capital expenditures, affecting company cash flow. They can also increase operating costs, leading to lower profit margins. In some cases, companies could face liabilities due to regulatory enforcement actions or litigation.

Companies at the forefront of developing new products and services that address environmental and social concerns are likely to benefit from higher revenues in the long term. They are also likely to experience enhanced brand value. Together with R&D activities, this could lead to greater intangible assets. Companies’ risk premium, and cost of capital may also be affected depending on the nature of their product development and compliance-related activities.

As more stringent climate change regulations that attempt to meet climate targets are implemented, the probability and magnitude of impacts from this issue are likely to increase in the future.

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 that are in potential conflict with the interest of broader stakeholder groups (government, community, customers, and employees). Therefore, they create a potential liability, or worse, a limitation or removal of license to operate. This includes regulatory compliance, lobbying, and political contributions. It includes risk management, safety management, supply chain and resource management, conflict of interest, anti-competitive behavior, corruption, and bribery.

In the R&M industry, governance issues arise from the need to manage the safety of opera-
tions and the health of workers across facilities. This can avoid incidents with wide-ranging environmental and social impacts. Furthermore, the relative lack of transparency in the pricing of petroleum products can create the potential for market manipulation, with an impact on consumers and businesses. Finally, a company’s lobbying efforts to deal with a complex, changing regulatory environment can potentially conflict with societal interests. This could in turn affect the company’s own long-term sustainability.

Health, Safety, and Emergency Management

The R&M industry poses risks to employee health and safety because of the use of flammable hydrocarbons. High temperatures and pressures in refining operations also play a role. Workers face fire hazards, for example, due to vapor or product leaks. Accidents or inadvertent exposures to chemicals and other hazards, such as heat or noise, during routine and non-routine activities may result in fatalities, severe injuries, or illnesses. Significant releases of hydrocarbons or other hazardous substances as a result of accidents or leaks can also have negative consequences for neighboring communities. This is likely to be a material issue particularly for companies operating refineries.

Organizational research and examples from other similarly risky industries show that it is important for a company to develop a culture of safety, one that reduces the probability of accidents and other health and safety incidents occurring. 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 to work with management in safeguarding their own health and safety—and preventing accidents—is likely to help companies mitigate costs. This also ensures workforce productivity.

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):

- Injury, fatality, and near-miss frequency rates for full-time and contract 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, from a process;
- Near-miss or “high learning value” events; and
- Discussion of metrics developed by the company—specific to its operating context—that include leading, proactive measures to maintain and improve safety and manage risk.
Evidence

The R&M industry experiences higher than average rates of worker fatalities. According to data from the U.S. Bureau of Labor Statistics, in 2011, petroleum refineries had fatal work injuries per 100,000 full time equivalent (FTE) U.S. workers of 4.29, compared to the U.S. national average of 3.5 for all industries. (Including gas station operations, the number of fatal injuries falls below the national average. This is likely due to the relatively large number of workers at gasoline stations, in addition to lower fatality rates compared to refining operations. Incidence rates of non-fatal injuries were lower than the national average for both refining and gas station operations.)

As a result of dangerous working conditions, and due to the importance of maintaining process safety in order to avoid high-impact incidents, R&M companies have been the focus of certain regulatory efforts. These efforts are related to worker health and safety, as well as process safety management practices. These can increase regulatory compliance costs for R&M companies, as well as lead to potentially significant fines and penalties. Under the Clean Air Act, facilities that use listed toxic or flammable chemicals above certain thresholds are required to implement a specified set of accident prevention and emergency response program elements. They are also required to submit a risk management plan (RMP) to the EPA.

Furthermore, the Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor initiated a National Emphasis Program (NEP) for refineries, focusing on the implementation of Process Safety Management (PSM). The refinery NEP was launched in 2007 and completed in 2011. It found compliance to be highly uneven among companies.

The NEP was initiated to address catastrophic releases of highly hazardous chemicals (HHC) at refineries. According to OSHA, since it commenced industry PSM standards in 1992, no other industry “has had as many fatal or catastrophic incidents related to the release of HHCs as the petroleum refining industry.” There were 36 fatality/catastrophe incidents related to HHC releases in the refining industry from 1992 until the NEP was initiated. These resulted in 52 employee deaths and 250 employee injuries. The number of incidents was more than the combined total of the next three highest industries over the same period.

In 2005, an explosion and fire at BP’s Texas City refinery killed 15 contractor employees, injuring over 170 more BP employees and contractors. The explosion resulted from the over-pressurization of a distillation tower due to flooding with hydrocarbons. An investigation into the incident by the U.S. Chemical Safety and Hazard Investigation Board revealed that it was caused by organizational and safety deficiencies at all levels of the company. After the incident, OSHA conducted 17 inspections and issued several citations. These resulted in a series of agreements between BP and OSHA to address hazards and protect worker health and safety. In 2009, OSHA issued record-breaking

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* Such programs provide for planned inspections in high hazard industries, focusing on specific hazards.
fines of more than $87 million for BP’s failure to correct potential hazards faced by employees. Many of these fines related to violations of PSM standards. In addition to paying around $51 million of those fines in 2010, the company also agreed to allocate $500 million to undertake immediate measures to protect those working at the refinery at the time.\textsuperscript{112}

New health and safety legislation at the state or federal level could impose additional costs on companies. In California, new legislation is being proposed to improve safety and risk management at refineries. This includes increasing penalties for violating safety regulations from $25,000 to $100,000.\textsuperscript{113} These proposed changes follow the pipe explosion at Chevron’s Richmond refinery in August 2012, mentioned earlier. The U.S. Chemical Safety Board, in an interim report, said that Chevron failed to act upon six recommendations over 10 years to increase inspection and install upgraded pipe at the refinery.\textsuperscript{114}

In addition to regulatory costs, accidental leaks and explosions can result in unplanned downtime, with an impact on revenues. In 2009, Valero’s Delaware City refinery had to be closed for several months for unscheduled maintenance after an incident that led to the leak of almost 125,000 pounds of harmful pollutants. According to Valero’s first quarter 2009 SEC filing, the company experienced a 142,000 barrel-per-day decrease in output from its first-quarter 2008 output. This was a result of the downtime at the Delaware City refinery, together with more unscheduled maintenance at Valero’s refinery in Port Arthur, Texas, and planned repairs at several other Texas refineries.\textsuperscript{115}

R&M companies are cognizant of the risks posed by poor safety management practices. In the Risk Factors section of its Form 10-K for FY 2012, PBF Energy says: “Failure to comply with OSHA requirements […] could have a material adverse effect on our results of operations, financial condition and the cash flows of the business if we are subjected to significant fines or compliance costs.” CVR Energy discusses some details of its PSM program, emergency planning, and emergency response in its Form 10-K for 2012. It states: “We operate a comprehensive safety, health and security program, with participation by employees at all levels of the organization. We have developed comprehensive safety programs aimed at preventing OSHA recordable incidents.”

**Value Impact**

Frequent health or safety incidents at facilities could lead to chronic impacts on company value. These impacts can be due to lower employee morale and workforce productivity, lowering operating profits. Higher-than-average accident and fatality occurrences can impact a company’s reputation and brand value. Such companies could face greater regulatory compliance costs and penalties from more stringent oversight. A company’s health and safety record can also affect its insurance premiums and, therefore, operating costs.
Serious incidents with low probability of occurrence, but high potential magnitude of impacts can lead to acute, one-time costs. They can also lead to contingent liabilities from legal action or regulatory penalties. Furthermore, companies can lose revenue-generating opportunities if a health or safety incident results in production downtime or operations at reduced capacity.

Pricing Integrity & Transparency

Consumers in the U.S. spend a significant proportion of their annual income on gasoline and motor oil. Expenditures on these items increased by almost 34 percent from 2009 to 2011. Concerned about the impacts of oil and gas market distortions on American consumers and businesses, regulators such as the U.S. Federal Trade Commission (FTC), and the U.S. Commodity Futures Trading Commission (CFTC) have focused on and investigated market manipulation by oil and gas companies, including R&M companies. Maintaining market integrity and ensuring transparency in product pricing can lower regulatory risks and liabilities for R&M companies, and protect consumers from unfair pricing.

The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 expanded the CFTC’s powers to prosecute parties involved in the manipulation of commodities markets. Following this, the CFTC issued Anti-Manipulation and Anti-Fraud Rules, prohibiting price manipulation in swaps, futures, and physical commodities trading. Similarly, based on the authority provided by Congress under the Energy Independence and Security Act of 2007, the FTC issued a rule prohibiting market manipulation specifically in the wholesale petroleum industry. This rule became effective in 2009. It relates to “the purchase or sale of crude oil, gasoline, or petroleum distillates at wholesale, and the reporting of false or misleading information related to the wholesale price of those products.” The FTC is also a member of the Oil and Gas Price Fraud Working Group. It is an interagency effort by state and federal authorities to monitor and share information on the oil and gas markets.

The focus of recent investigations and regulatory actions has been on the reporting of prices to price index publishers, such as Platts. Platts publishes benchmark oil prices, calculated based on transactions that traders report to Platts. These prices impact global commodity trading. Such reported prices can be subject to manipulation, as was the case with the global interest rate benchmark, the London Interbank Offered Rate (Libor). In addition, there has been a focus on price distortion using trading positions in physical transactions, swaps, futures, and derivatives, as well as by anticompetitive business practices.

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):

- Amount of legal and regulatory fines and settlements associated with price fixing or manipulation.

### Evidence

Companies in the energy markets, including R&M companies, have faced investigations and enforcement actions from the FTC and CFTC related to manipulating prices of petroleum products. In some cases, this resulted in significant fines.

The FTC opened an investigation in June 2011 that focused mainly on refineries. The investigation sought to determine whether petroleum market participants were involved in anticompetitive, manipulative, or fraudulent practices that would allow them to raise prices for consumers.\(^\text{122}\) The FTC continued the investigation in 2013, with a focus on utilization and maintenance decisions, inventory holding decisions, product supply decisions, product margins and profitability, and capital planning.\(^\text{123}\)

The International Organization of Securities Commissions (IOSCO) began an investigation in 2010 concerning manipulation in the physical commodities markets. The investigation concluded that the practices of price-reporting agencies such as Platts suffered from flaws.\(^\text{124}\) Both E.U. anti-trust authorities and the U.S. FTC are currently investigating integrated oil companies, including Shell, Statoil, and BP (also Platts, and energy trading firms such as Argos Energy). These companies are being investigated for potentially manipulating prices of crude oil, refined oil products, and biofuels since 2002.\(^\text{125}\) According to one estimate, following E.U. regulators’ raids on its offices in London and the Netherlands, Shell’s market value fell by approximately GBP 3 billion.\(^\text{126}\)

In the U.S., the President’s Corporate Fraud Task Force consists of the U.S. Department of Justice (DoJ), the Federal Bureau of Investigation (FBI), and the CFTC. This task force has investigated instances of manipulation and attempted manipulation in the energy markets by a number of energy companies, including BP. Its actions have resulted in monetary penalties of approximately $430 million against 25 companies and criminal indictments against 42 individuals and companies.\(^\text{127}\)

In 2007, BP Products North America, a subsidiary of BP Plc, was required to pay a civil monetary penalty of $125 million to the CFTC. It was also required to establish a compliance and ethics program and install a monitor to oversee BP’s trading activities in the commodities markets. The CFTC charges against BP related to manipulating (and attempting to manipulate) the price of propane, as well ascornering the market for propane from 2003 to 2004. The monetary settlement, which included paying $53 million into a restitution fund for victims, was the largest manipulation settlement in CFTC history at the time. Related to the same conduct, the DoJ entered into a deferred prosecution agreement with BP.
America Inc., requiring it to pay $100 million in criminal penalties and another $25 million into a consumer fraud fund. This demonstrates the potentially extensive financial and operational impacts of activities that result in the manipulation of prices.

The issue of market manipulation is more likely to be material for integrated companies that enjoy a dominant position in the market, particularly those with large commodities trading desks. However, it could also have a financial impact on independent R&M companies. For example, in 2007, Concord Energy, a gas marketing firm, was asked to pay civil monetary penalties of $800,000 as part of charges that the CFTC brought against Concord Energy and some other firms. The CFTC claimed the firms falsely reported natural gas information in order to manipulate natural gas prices. Also in 2007, the CFTC settled charges against Marathon Petroleum Company for attempting to influence downwards the Platts market assessment for spot cash WTI on November 26, 2003. Marathon—a net buyer of foreign crude oil for which prices were based on the Platts spot cash WTI assessment—would have benefited from a lower price assessment. Marathon was required to pay $1 million in civil penalties.

Value Impact
Activities leading to market manipulation can result in an acute impact on value through one-off costs and contingent liabilities from significant regulatory enforcement actions. Regulatory actions can also result in higher ongoing compliance costs. On the other hand, smaller, recurring fines could have a chronic impact on value.

This issue can also affect a company’s reputation and therefore intangible assets. Combined with potential legal liability, this can raise its risk profile and cost of capital.

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.

Companies in the R&M 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 fuel blends and air quality).
Such actions and subsequent changes or delays to regulations may lead to positive outcomes for R&M companies and their shareholders in the short term. However, their broader societal implications could create medium- to long-term regulatory 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 air quality, may affect companies' reputation and social license to operate.

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. Reputational impacts are especially relevant in cases where lobbying campaigns are misaligned with corporate social responsibility initiatives.

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 global, high-impact issues such as climate change. 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**

R&M 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 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. Among independent R&M companies, one estimate suggests that Phillips 66 spent around $3.7 million on lobbying in 2013, Marathon Petroleum, $2.6 million, and Tesoro, $1.4 million.\textsuperscript{134}

Tesoro was also among the largest spenders on ballot measures in 2010, with total spending of around $2 million. Tesoro is among a handful of companies whose boards conduct semi-annual reviews of political spending.\textsuperscript{135}

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.\textsuperscript{136}

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.\textsuperscript{137} In general terms, it is not clear whether expenditures related to lobbying and campaign contributions result in favorable regulations that offset these costs. It is also unclear as to what the magnitude and direction of the impact on shareholder value is for companies engaged in lobbying and campaign contributions. Some studies indicate that campaign contributions affect politicians' stance toward specific companies. Others show that campaign finance has limited impacts on election outcomes.\textsuperscript{138} 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 expenditures."\textsuperscript{138} Therefore, without demonstrating a clear link between lobbying and political expenditures and positive, long-term outcomes for shareholder value, R&M companies expending significant sums attempting to influence policy are likely to affect shareholder value negatively through impacts on costs.

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.\textsuperscript{139} (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 in the oil and gas industries. Average votes for such proposals were at 25 percent, and the maximum percentage of votes was around 44.5 percent. Twenty-eight of the 39 proposals were at companies in the R&M industry, with similar percentages of votes supporting the proposals.\textsuperscript{140}

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 this 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.\textsuperscript{141}

**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. In some cases, lobbying and related expenditures may not even generate short-term positive regulatory outcomes for companies to offset these costs.
APPENDIX I: Five Representative

Oil & Gas, Refining & Marketing Companies

<table>
<thead>
<tr>
<th>COMPANY NAME (TICKER SYMBOL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phillips 66 (PSX)</td>
</tr>
<tr>
<td>Valero Energy (VLO)</td>
</tr>
<tr>
<td>Marathon Petroleum (MPC)</td>
</tr>
<tr>
<td>World Fuel Services (INT)</td>
</tr>
<tr>
<td>Tesoro Corp (TSO)</td>
</tr>
</tbody>
</table>

Integrated Oil & Gas Companies

<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>
</tr>
<tr>
<td>Petrochina-ADR (PTR)</td>
</tr>
<tr>
<td>BP (BP)</td>
</tr>
</tbody>
</table>

xiii This list includes five companies representative of the Oil & Gas, Refining & Marketing industry and its activities. This includes only companies for which the R&M industry is the primary industry; that are U.S.-listed but are not primarily traded Over-the-Counter; and where at least 20 percent of revenue is generated by activities in this industry, according to the latest information available on Bloomberg Professional Services. Retrieved on June 12, 2014.

xiv 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>HM (1-100)</th>
<th>IWGs %</th>
<th>Priority</th>
<th>EVIDENCE OF INTEREST</th>
<th>EVIDENCE OF FINANCIAL IMPACT</th>
<th>FORWARD-LOOKING IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Revenue &amp; Costs</td>
<td>Assets &amp; Liabilities</td>
<td>Cost of Capital</td>
</tr>
<tr>
<td>Greenhouse Gas Emissions</td>
<td>100*</td>
<td>92</td>
<td>1</td>
<td>High</td>
<td>•</td>
<td>High</td>
</tr>
<tr>
<td>Air Quality</td>
<td>100*</td>
<td>67</td>
<td>4</td>
<td>High</td>
<td>•</td>
<td>High</td>
</tr>
<tr>
<td>Water Management</td>
<td>90*</td>
<td>92</td>
<td>3</td>
<td>High</td>
<td>•</td>
<td>High</td>
</tr>
<tr>
<td>Hazardous Materials Management</td>
<td>80*</td>
<td>75</td>
<td>5</td>
<td>Medium</td>
<td>•</td>
<td>High</td>
</tr>
<tr>
<td>Product Specifications &amp; Clean Fuel Blends</td>
<td>85*</td>
<td>58</td>
<td>6</td>
<td>High</td>
<td>•</td>
<td>High</td>
</tr>
<tr>
<td>Pricing Integrity &amp; Transparency</td>
<td>75*</td>
<td>67</td>
<td>7</td>
<td>Medium</td>
<td>•</td>
<td>Medium</td>
</tr>
<tr>
<td>Health, Safety, and Emergency Management</td>
<td>97*</td>
<td>83</td>
<td>2</td>
<td>High</td>
<td>•</td>
<td>High</td>
</tr>
<tr>
<td>Management of the Legal &amp; Regulatory Environment</td>
<td>15*</td>
<td>(-)</td>
<td>(-)</td>
<td>Medium</td>
<td>•</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 &amp; EXPENSES</th>
<th>ASSETS &amp; LIABILITIES</th>
<th>COST OF CAPITAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Revenue</td>
<td>Operating Expenses</td>
<td>Non-operating Expenses</td>
</tr>
<tr>
<td>Greenhouse Gas Emissions</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Air Quality</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Water Management</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Hazardous Materials Management</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Product Specifications &amp; Clean Fuel Blends</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Pricing Integrity &amp; Transparency</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Health, Safety, and Emergency Management</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Management of the Legal &amp; Regulatory Environment</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

**HIGH IMPACT**

**MEDIUM IMPACT**
### APPENDIX III: Sustainability Accounting Metrics

#### Oil & Gas - Refining & Marketing

<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>Greenhouse Gas Emissions</strong></td>
<td>Gross global Scope 1 emissions, percentage covered under a regulatory program</td>
<td>Quantitative</td>
<td>Metric tons CO$_2$-e, Percentage (%)</td>
<td>NR0103-01</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>NR0103-02</td>
</tr>
<tr>
<td><strong>Air Quality</strong></td>
<td>Air emissions for the following pollutants: NO$_x$ (excluding N,O), SO$_x$, particulate matter (PM), H$_2$S, and volatile organic compounds (VOCs)</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>NR0103-03</td>
</tr>
<tr>
<td></td>
<td>Number of refineries in or near areas of dense population</td>
<td>Quantitative</td>
<td>Number</td>
<td>NR0103-04</td>
</tr>
<tr>
<td><strong>Water Management</strong></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 (m$^3$), Percentage (%)</td>
<td>NR0103-05</td>
</tr>
<tr>
<td></td>
<td>Number of incidents of non-compliance with water quality permits, standards, and regulations</td>
<td>Quantitative</td>
<td>Number</td>
<td>NR0103-06</td>
</tr>
<tr>
<td><strong>Hazardous Materials Management</strong></td>
<td>Amount of hazardous waste from operations, percentage recycled</td>
<td>Quantitative</td>
<td>Metric tons (t), Percentage (%)</td>
<td>NR0103-07</td>
</tr>
<tr>
<td></td>
<td>Number of underground storage tanks (USTs), number of UST releases requiring cleanup, percentage in states with UST financial assurance funds</td>
<td>Quantitative</td>
<td>Number, Percentage (%)</td>
<td>NR0103-08</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 and (b) contract employees</td>
<td>Quantitative</td>
<td>Rate</td>
<td>NR0103-09</td>
</tr>
<tr>
<td></td>
<td>Process Safety Event (PSE) rates for Loss of Primary Containment (LOPC) of greater consequence (Tier 1) and lesser consequence (Tier 2)</td>
<td>Quantitative</td>
<td>Rate</td>
<td>NR0103-10</td>
</tr>
<tr>
<td></td>
<td>Challenges to Safety Systems indicator rate (Tier 3)</td>
<td>Quantitative</td>
<td>Rate</td>
<td>NR0103-11</td>
</tr>
<tr>
<td></td>
<td>Discussion of measurement of Operating Discipline and Management System Performance through Tier 4 Indicators</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>NR0103-12</td>
</tr>
<tr>
<td><strong>Product Specifications &amp; Clean Fuel Blends</strong></td>
<td>Percentage of Renewable Volume Obligation (RVO) met through: (1) Production of renewable fuels, (2) Purchase of “separated” renewable identification numbers (RIN)</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>NR0103-13</td>
</tr>
<tr>
<td></td>
<td>Total addressable market and share of market for advanced biofuels and associated infrastructure</td>
<td>Quantitative</td>
<td>U.S. Dollars ($), Percentage (%)</td>
<td>NR0103-14</td>
</tr>
</tbody>
</table>
### APPENDIX III: Sustainability Accounting Metrics
#### Oil & Gas-Refining & Marketing (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>Pricing Integrity &amp; Transparency</td>
<td>Amount of legal and regulatory fines and settlements associated with price fixing or price manipulation&lt;sup&gt;XV&lt;/sup&gt;</td>
<td>Quantitative</td>
<td>U.S. Dollars ($)</td>
<td>NR0103-15</td>
</tr>
<tr>
<td>Management of the Legal &amp; Regulatory Environment</td>
<td>Amount of political campaign spending, lobbying expenditures, and contributions to tax-exempt groups including trade associations</td>
<td>Quantitative</td>
<td>U.S. Dollars ($)</td>
<td>NR0103-16</td>
</tr>
<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>NR0103-17</td>
</tr>
</tbody>
</table>

<sup>XV</sup> Note to NR0103-15 – Disclosure shall include a description of fines and settlements and corrective actions implemented in response to events.
APPENDIX IV: Analysis of 10-K Disclosures | Oil & Gas - Refining & Marketing

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

<table>
<thead>
<tr>
<th>Type of Disclosure on Sustainability Topics</th>
<th>NO DISCLOSURE</th>
<th>BOILERPLATE</th>
<th>INDUSTRY-SPECIFIC</th>
<th>METRICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil &amp; Gas - Refining &amp; Marketing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greenhouse Gas Emissions</td>
<td></td>
<td></td>
<td></td>
<td>92%</td>
</tr>
<tr>
<td>Air Quality</td>
<td></td>
<td></td>
<td></td>
<td>67%</td>
</tr>
<tr>
<td>Water Management</td>
<td></td>
<td></td>
<td></td>
<td>92%</td>
</tr>
<tr>
<td>Hazardous Materials Management</td>
<td></td>
<td></td>
<td></td>
<td>75%</td>
</tr>
<tr>
<td>Product Specifications &amp; Clean Fuel Blends</td>
<td></td>
<td></td>
<td></td>
<td>58%</td>
</tr>
<tr>
<td>Pricing Integrity &amp; Transparency</td>
<td></td>
<td></td>
<td></td>
<td>67%</td>
</tr>
<tr>
<td>Health, Safety, and Emergency Management</td>
<td></td>
<td></td>
<td></td>
<td>83%</td>
</tr>
<tr>
<td>Management of the Legal &amp; Regulatory Environment</td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>

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


2. Based on data obtained from Bloomberg Professional service, using the Bloomberg Industry Classification System (BICS), and mapping to SASB’s Sustainable Industry Classification System (SiCSTM). Excludes company securities traded over-the-counter. June 12, 2014.


5. 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, Refining & Marketing industry, using Levels 3 and 4 of the Bloomberg Industry Classification System.


References (cont.)


40 Ibid.

41 Ibid.


51 Data obtained from California Environmental Protection Agency Air Resources Board. “List of Covered Entities for the First Compliance Period of ARB’s Cap-and-Trade Program.”
References (cont.)


70 Ibid.


References (cont.)


81 Accessed August 5, 2013. [Link](http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=500003RE.PDF)


88 Ibid.


References (cont.)


References (cont.)


