RAIL TRANSPORTATION
Research Brief

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Sustainability Accounting Standards Board®
RAIL TRANSPORTATION
Research Brief
SASB's Industry Brief provides evidence for the material sustainability issues in the Rail Transportation 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

- Automobiles Sustainability Accounting Standards
- Industry Working Group Participants
- SASB Conceptual Framework

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INTRODUCTION

The Rail Transportation industry has been the backbone of American commerce since the 1800s, connecting the eastern and western parts of the country. The cost effectiveness of rail transport and the extensive mobility offered due to a widespread railroad network make the industry attractive to shippers. With an ability to move a significantly greater volume of goods per load than trucks, freight trains are one of the most efficient means of transport. Moreover, railroad cars designed to various specifications allow safe and convenient shipments of diverse types of products, which makes the industry vital to the economic growth of the United States.

As environmental regulation becomes more stringent in the U.S. and customer demands for low lifecycle impacts of products and services increase, shippers are seeking to reduce their total greenhouse gas (GHG) emissions by choosing more efficient means of transporting cargo. This is placing the rail industry at an advantage over other means of transport due to its relative efficiency. Nonetheless, fueled by petroleum products, locomotives emit GHGs themselves during operations. While the industry has made significant strides to improve the fuel efficiency of trains, intensifying intermodal traffic indicates that companies will need to continue reducing their environmental externalities. Moreover, railroad companies often transport hazardous substances, which requires them to ensure the safety of cargo and minimize the risk of accidents. Increased regulatory scrutiny of the industry’s environmental and safety performance influences both factors.

Additionally, the industry is a classic natural monopoly due to the network effects that established companies enjoy, and the high capital intensity of the industry, especially the initial capital investment required to build new infrastructure. Regulatory attention and shipper concerns therefore also focus on companies’ competitive behavior under such favorable conditions.

Management (or mismanagement) of material sustainability issues 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 rail transportation 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 Rail Transportation industry:

- Improving fuel efficiency of trains and reducing direct GHG emissions and harmful air pollutants;
• Ensuring a fair, competitive business environment in the industry; and
• Reducing externalities from cargo transportation (particularly of hazardous substances) by ensuring the highest standards of safety management.

INDUSTRY SUMMARY

The Rail Transportation industry consists of companies that provide rail freight shipping and support services. Key activities include shipping containerized and bulk freight, including consumer goods and commodities. This industry brief does not consider passenger rail transportation, which is mainly operated by publicly funded or owned entities in the U.S. There is only one U.S.-listed company involved in passenger rail transportation, which is domiciled in China.

In the U.S., railroad companies are organized according to revenues and scale of their rail network: Class I railroads have annual revenues greater than $378 million, regional railroads have revenues between $40 and $378 million and operate more than 350 miles of track, and local railroads have revenues less than $40 million and fewer than 350 miles of track.

The Rail Transportation industry is characterized by a low level of globalization, with companies listed on U.S. exchanges operating mostly in the U.S., Canada, and Mexico. In 2013, revenues of rail companies listed on global exchanges and those traded over-the-counter were $260 billion, with $200 billion from rail freight transportation and $60 billion from passenger rail transportation. Companies listed on U.S. exchanges generate over $50 billion in revenue from rail freight transportation. In the Rail Transportation industry, revenue is typically measured in ton-miles. According to the Federal Railroad Administration, in 2010 rail networks accounted for 40 percent of the freight moved by ton-miles. Railroads generate approximately 400 billion revenue ton-miles per quarter.

Industry revenues are closely correlated with industrial output, energy production, and demand for agricultural and consumer goods. Individual company performance is largely driven by carload volume and fuel prices. In the U.S., bulk freight services (which include transport of metal ores, coal, chemicals, forest products, and agricultural goods), account for 54.1 percent of industry revenue. Intermodal container freight services, which largely involve transport of finished consumer goods, comprise 41.3 percent of revenue. In terms of important market segments, the industry is especially dependent on the coal market. Even though the dominance of coal as the main

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1 Industry composition is based on the mapping of the Sustainable Industry Classification System (SICSTM) to the Bloomberg Industry Classification System (BICS). A list of representative companies appears in Appendix I.

2 The figure includes revenue generated by BNSF Railway, a wholly owned subsidiary of Berkshire Hathaway Inc.

3 A single ton of goods that is transported for one mile.
transported commodity declined in 2012 and 2013, it is expected to represent 41 percent of U.S. rail freight tonnage in 2014. However, it is expected to account for only 20.9 percent of revenues in the same year. Industrial products account for the largest market segment by revenue, or 22.3 percent. The Rail Transportation industry is the primary means of transport for certain commodities. For example, 70 percent of domestically produced automobiles, 70 percent of coal delivered to power plants, and 35 percent of grain harvest are transported by rail.

The industry is characterized by relatively high profitability, which could be explained partly by its relative fuel efficiency compared to road transportation. The median operating margin for companies in the industry is 29 percent, while the median net income margin is 16 percent. The industry substantially improved profitability over the past decade, due to factors explained below. In 2004, the median operating margin and net income margin were 13 percent and five percent, respectively.

Wages are the industry’s greatest expense, followed by fuel. This is due to the large number of workers required to load trains and maintain railroad tracks, locomotives, and cars (called rolling stock). In 2014, wages accounted for around 26 percent of revenue, which is down from 33 percent in 2009. This is primarily due to increased automation and reduced reliance on labor. Volatile oil prices have a significant impact on profitability due to the industry’s heavy reliance on diesel fuel to power locomotives. Fuel surcharges are often used by rail companies to mitigate some of the impacts of fuel price fluctuations. Companies are also investing in capital improvements, such as replacing tracks and investing in more fuel-efficient locomotives that can lower fuel and maintenance costs. These are enabling companies to gain competitive advantage through operational efficiencies and increased reliability.

The industry is characterized by high capital intensity. Operators need to develop and maintain their own infrastructure. According to the Association of American Railroads (AAR), from 2002 to 2011 the average U.S. manufacturers’ capital expenditure (CapEx) to revenue ratio was three percent, while rail freight operators’ ratio was 17 percent. Most of the CapEx is used for maintenance of the existing infrastructure and 15 to 20 percent of it is used to enhance capacity.

Incumbents in the Rail Transportation industry enjoy network effects from their rail infrastructure. Establishing a new railroad requires significant capital investments, and companies need an extensive network built around the main consumer markets. Combined, these factors create high barriers to entry in the industry. There are concerns that established players, therefore, can enjoy natural monopoly conditions, which can give them significant market power. Furthermore, merger and acquisition (M&A) activity of the largest Class I railroads in the U.S., which has increased in recent years, has led to even higher industry concentration. Today, the top four companies—Burlington Northern Santa Fe LLC (BNSF, owned by Berkshire Hathaway Inc.), Union Pacific, CSX, and
Norfolk Southern—account for 77.7 percent of total industry revenue in the U.S. Union Pacific alone has a third of the intermodal revenue market share. It is equally hard to enter into regional and local operations due to dependence on Class I operators for access to their tracks. Class I operators not only dominate the industry but also are increasingly acquiring small railroads. Trackage contracts, or agreements allowing a rail company to use another’s track, can be expensive. However, as demand for the industry’s services increases, higher revenues may help smaller companies to offset enough of these costs to maintain a healthy profit margin, increasing the attractiveness of entering the industry.

Prior to 1980, the industry was heavily regulated under the Interstate Commerce Commission (ICC). Various acts in the early 1900s enhanced the ability of the ICC to set railroad rates, aiming both to ensure financial stability of the industry and also to prevent abuse of market power. During this time, railroad rates were determined by the value of commodities being shipped, rather than the cost of shipping them. This was rationalized by railroads’ significant scale economies, as well as the need to enable the industry to cover its high fixed costs and earn a normal profit. However, inefficiencies in the industry led the market share of rail freight by ton-miles to fall from 70 percent in the post-World War II years to 37 percent in 1975. Together with the bankruptcies of several Northeastern and Midwestern railroads in the 1970s, this led to Congress passing the Staggers Rail Act in 1980.

The Staggers Act widely deregulated the U.S. rail industry, giving rail companies a stronger competitive stance against the trucking industry. Since deregulation, the number of companies in the industry declined through M&A activity. But, the consolidation had a beneficial effect on shippers and railroads as competition among large Class I operators intensified. Furthermore, the deregulation significantly contributed to the growth of the Rail Transportation industry. Operators were able to dispose of thousands of miles of unprofitable low-density lines, as well as eliminate duplicate tracks following mergers among companies. It is estimated that all efficiency improvements combined resulted in annual industry cost savings of $2 billion to $3.3 billion.

The Staggers Rail Act gave rail companies freedom to negotiate shipping rates, limiting the authority of the ICC, now the Surface Transportation Board (STB). Specifically, the Act limited the ICC’s ability to regulate rates only for traffic where competition is not effective to protect shippers. It allowed railroads to adjust their rates and tailor services to meet shipper needs and their own revenue requirements. According to the STB, it currently regulates approximately 20 percent of rail traffic. The Act legalized railroad-shipper contracts and privately negotiated agreements. The latter established, among other things, rates, service levels, equipment, and minimum annual volume of traffic. Currently, 30 percent of railroad traffic on a revenue basis is covered by contract. This helped the industry to improve asset utilization by better planning their freight cars. Overall, the Staggers Rail Act had a positive impact on shippers, as rates declined by 0.5 percent per year on average, adjusted for inflation.
In addition to benefiting from the Staggers Act, rail transportation entered a period of renewed growth in the early 2000s due to a shift away from freight trucking. The rail industry benefitted from increased shipping of finished consumer goods because long-haul trucking became more expensive. This was due to higher fuel costs, labor shortages, and congestion. The resurgence of the U.S. auto industry, combined with expanding oil and natural gas production in Canada and the northern U.S., were other contributing factors. Intermodal rail freight, which uses containers to shift goods between different modes of transport, has been another key driver of recent rail growth. In the U.S. and Canada, intermodal freight utilizes standard-sized containers either 48 or 53 feet long. This model leads to faster loading times, point-to-point distribution, and greater fuel efficiency.

Having exhausted many of the productivity gains achieved following the Staggers Act, companies in the industry will need substantial new capital spending to maintain profitability. The ability of rail companies to internally generate, or raise from outside sources, additional capital for these purposes is therefore important.

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**LEGISLATIVE AND REGULATORY TRENDS IN THE RAIL TRANSPORTATION INDUSTRY**

The rail industry is subject to regulatory oversight at the federal and state levels. In particular, the industry faces regulations related to pricing structures, transport of hazardous goods, worker health and safety, and public safety. The STB, the Federal Railroad Administration (FRA), and the Pipeline and Hazardous Materials Safety Administration (PHMSA) have broad jurisdiction over railroad standards and practices. The following section provides a brief summary of key regulations and legislative efforts related to this industry.

Environmental legislation affecting the industry includes the Clean Air Act (CAA), the Comprehensive Environmental Response, Compensation, and Liability Act, and the Resource Conservation and Recovery Act (RCRA). Emissions regulation came late to the rail industry: the U.S. Environmental Protection Agency (EPA) issued its first emissions standards for locomotives in 1998. Increasing public concerns since then have resulted in more stringent regulations regarding environmental protection. In 2004, the EPA finalized rules for non-road diesel fuel that reduced the allowable levels of sulfur in diesel fuel used in locomotives by 99 percent.

In 2008, the EPA established new emissions standards and idling controls for newly

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\[ \text{This section does not purport to contain a comprehensive review of all regulations related to this industry, but is} \]

intended to highlight some ways in which regulatory trends are impacting the industry.
manufactured and remanufactured locomotives. The standards are a part of the EPA’s locomotive exhaust program divided into tiers and first established in 1973. They are aimed at significantly reducing the amounts of particulate matter (PM) and nitrogen oxides (NOx) emitted by diesel engines. Tier 3 standards went into effect in 2011 and Tier 4, the strictest emissions standard, goes into effect in 2015. These standards are likely to financially impact locomotive engine manufacturers, requiring additional investment in innovation. But, as discussed further, meeting the EPA standards may require additional investment from rail operators.

The industry is exempt from some provisions of antitrust laws, but market dominance and certain types of rate-setting are regulated by the STB. The STB, which serves as both an adjudicatory and regulatory entity, regulates routes, service conditions, fuel surcharges, and the construction, transfer, extension, or abandonment of rail lines. As mentioned above, the Staggers Rail Act limited the regulatory authority of the STB. However, the Board still has jurisdiction over railroad rate and service issues and rail restructuring transactions (mergers, line sales, line construction, and line abandonments). The STB determines the composite cost of capital for the freight rail industry on an annual basis to evaluate the adequacy of railroads’ revenue. The determined cost of capital figure is also employed in maximum rate cases, estimating variable and total unit costs for Class I U.S. railroads, rail line abandonments, and trackage-rights cases.

Under federal law, rail companies have an obligation to provide rail service upon a reasonable request. Since 1980, companies can either provide the service under privately negotiated rates agreed upon with a shipper (through contracts) or under openly available common-carriage rate and service terms. The STB requires railroads to disclose common-carriage rates and service terms upon request. It also requires railroads to give an advance notice to the Board in cases of rate increases or changes in service terms. But some commodity classes and rail services, such as most agricultural products, intermodal container traffic, boxcar traffic, and other miscellaneous commodities, are exempt from the regulatory requirements stated above.

In cases where a railroad has market dominance over the traffic involved, the STB has jurisdiction to investigate complaints challenging the reasonableness of rates. A railroad can be determined to have market dominance if it charges a rate that is over 180 percent in a revenue-to-variable cost (RVC) ratio. If the STB finds a company to have market dominance and that the company charges rates deemed “unreasonable,” it may require an operator to lower the rates. Moreover, among other financial information, operators are required to report to the STB, on a quarterly basis, the total fuel costs, gallons of fuel consumed during the quarter, increases or decreases of fuel costs from the previous quarter, and total quarterly revenue from fuel surcharges. Such disclosure could be useful in determining reasonableness of fuel surcharges to shippers. Since a new STB rule enacted in 2007, the amount of fuel surcharges must be correlated with the cost of the freight being shipped.

In 2011, the National Industrial Transportation
League (NITL) submitted a petition to the STB to propose changes to how access to the tracks of competing railroads is granted. Particularly, the NITL proposed that the STB mandate “[s]witching” where a captive shipper (located in a terminal area) is within 30 miles of a working interchange and the transportation rate charged by the Class I carrier from origin to destination exceeds 240 [percent] of its variable costs of providing service.” If mandated, the rule would increase rail-to-rail competition and reduce the STB’s role in rates regulation. The STB has not proposed any rules in response to the petition, as it could not “fully gauge its potential impact.” However, it has initiated a process of gathering empirical evidence of the proposal’s potential effect on rates and services for all the parties that could be impacted.  

Health and safety standards for railroad employees are enforced by the Occupational Safety & Health Administration (OSHA) and the FRA. PHMSA and FRA are responsible for the regulatory oversight of safety in rail operations.

The organizations aim to prevent rail accidents, such as derailments involving flammable liquids, and potential consequences the accidents may have on individuals and communities. PHMSA and FRA conduct the oversight with unannounced spot inspections, sampling, and monitoring of the movement and classification of crude oil within and out of oil fields throughout the U.S. In 2008, Congress enacted the Rail Safety Improvement Act, responding to fatal rail accidents in the preceding years. The Act introduced measures to reduce collisions and improve operational safety. Class I freight railroads must implement the positive train control system (PTC) on certain lines by December 31, 2015. The PTC relies on advanced technology to prevent collisions and derailments. Moreover, the Act established new standards on allowable work hours for rail crews and added 200 new safety inspectors for the FRA.

SUSTAINABILITY-RELATED RISKS AND OPPORTUNITIES

Industry drivers and recent regulations suggest that traditional value drivers will continue to impact financial performance. However, intangible assets such as social, human, and environmental capitals, company leadership and governance, and the company’s ability to innovate to address these 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 Rail Transportation industry:

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V The ability of a shipper or competing railroad to use the services or facilities of the incumbent rail company to extend their reach.
VI One of the means by which shippers and carriers can gain competitive access is through reciprocal or competitive “switching,” where the STB may require an incumbent “to transport the cars of a competing carrier and to switch those cars between the two lines for a fee.” This introduces competition even though the competing railroad cannot physically access the shipper’s facility. According to the STB’s current switching policy, in order for competitive access to be granted, it needs to be demonstrated that such actions are necessary to prevent anti-competitive practices by the incumbent.
VII Captive shippers are those that have no alternative carrier for shipping their goods.
• Energy inputs and externalities from fuel intensity of operations: As a fuel-intensive sector with significant direct emissions contributing to climate change and local pollution, the Transportation sector, including rail transport, is attracting growing attention from U.S. regulators. At the same time, increasing energy costs are providing incentives for efficient fuel management.

• **Ensuring safety in transporting hazardous and other types of products:** Transportation of hazardous and highly valuable goods requires companies in the industry to maintain the highest safety standards. Rail accidents may result in significant environmental and social externalities. These could lead to the loss of license to operate if a company fails to maintain reputation as a safe service provider.

• **Industry concentration creates competition concerns:** The industry is characterized by the existence of network effects, creating natural monopoly conditions. High capital intensity and concentration in the industry raise concerns about anti-competitive business practices. Increasing industry profitability, recent higher rates, and differential rates charged to shippers are inviting more customer and regulatory scrutiny of the industry, with a potential for regulatory changes to impact company value significantly.

As described above, the regulatory and legislative environment surrounding the Rail Transportation industry emphasizes the importance of sustainability management and performance. Specifically, recent trends suggest a regulatory emphasis on environmental protection and high standards of safety and accident management. This 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 Rail Transportation 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 from the leading companies in the industry.
ENVIRONMENT

The environmental dimension of sustainability includes corporate impacts on the environment. This could be through the use of natural resources as inputs to the factors of production (e.g., water, minerals, ecosystems, and biodiversity). It could also be through environmental externalities and harmful releases in the environment, such as air and water pollution, waste disposal, and GHG emissions.

The rail industry faces both risks and opportunities related to environmental factors. Companies stand to benefit from increased demand for more efficient means of transport while reducing the total emissions of their shippers. More stringent emissions standards could make renewal of the fleet more costly, but would result in improved fuel efficiency in the long term.

ENVIRONMENTAL FOOTPRINT OF FUEL USE

The Rail Transportation industry generates air emissions mainly from the combustion of diesel in locomotive engines. The industry is relatively more efficient than other modes of transport, which has been an important driver of its growth in recent years. As a result, its GHG emissions are among the lowest in the Transportation sector. However, despite relative efficiencies, air emissions—both of GHGs and other air pollutants—are likely to be a material issue for companies in the Rail Transportation industry due to the reliance of their operations on fossil fuels. Rail companies continue to focus on managing their fuel use in response to customer demand, rising fuel costs, and regulation. Regulation of GHG emissions and other air pollutants can lead to direct regulatory compliance costs such as additional capital expenditures to install emission control equipment. Meanwhile, rising fuel costs can directly affect profitability. GHGs from the industry, including carbon dioxide and nitrogen oxides, are of particular importance to government regulators concerned about climate change. Moreover, NOx emissions from diesel-powered locomotives have significant health and environmental impacts, as they are a major component of smog and acid rain. Combined with hydrocarbons (HC), nitrogen oxides are responsible for forming ground-level ozone, the primary constituent of smog.38 In addition to GHGs, rail operations can emit several types of air pollutants regulated under the CAA, including Hazardous Air Pollutants (HAPs), Criteria Air Pollutants (CAPs) and Volatile Organic Compounds (VOCs). These pollutants tend to have more localized environmental and health impacts. HAPs, such as benzene, are known human carcinogens.

Meanwhile, VOCs are a precursor to PM 2.5, which is associated with health effects such as premature mortality for adults and infants, heart attacks, asthma attacks, and work loss days.39 Locomotive engine idling at rail yards has been cited as a health concern for nearby human populations.40 The EPA sets standards aimed at reducing exhaust emissions of locomotives which is likely to have material impacts on rail operators.
Management of the environmental externalities associated with operations of locomotive engines may present a great opportunity for the Rail Transportation industry. Utilization of diesel engines that comply with the strictest EPA standards, as well as engines that allow usage of alternative fuels, would reduce emissions of rail companies.

Furthermore, it would also improve rail companies’ fuel efficiency, resulting in significant operating cost savings.

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;
- 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;
- Total fuel consumed, percentage renewable; and
- Emissions of NOx and PM.

**Evidence**

Rail industry GHG emissions comprised just 2.2 percent of total Transportation sector emissions in the U.S. in 2010. Rail transportation is substantially more efficient than trucking in terms of fuel and labor costs. Approximately 435 trucks are required to transport the same volume of freight as a single 100-car train. A train can transport one ton of freight from the U.S. East coast to the West coast on seven gallons of fuel, while a truck would consume 27 gallons. By switching from road to rail transportation, shippers may not only benefit from increased efficiency, but can also reduce their total emissions. According to Union Pacific, its customers reduced an estimated 33.5 million metric tons of GHG emissions by switching to the company’s services. According to BNSF, the company helped to reduce its clients’ carbon footprint by 30 million metric tons in 2013 by their switching from road to rail transportation.

Despite the low relative emissions, fuel management has implications in terms of operating costs and regulatory compliance for companies in the industry. These factors provide incentives for rail companies to implement fuel efficiency enhancements. This in turn improves companies’ competitive position both within the industry and compared to other modes of transport.

The EPA’s locomotive exhaust program is one type of regulation intended to reduce emissions from the industry. It is divided into tiers, starting with Tier 0, initiated in 1973. Tier 1 standards became effective in 2002, Tier 2 in 2005, Tier 3 in 2011, and Tier 4 go into effect in 2015. Each successive tier is designed to improve exhaust standards for new and remanufactured locomotives and requires all operators to comply. For example, Tier 3 standards mark a 50 percent reduction in PM from Tier 2 levels. Tier 3 locomotives will emit a maximum of 0.1 grams of PM per horsepower hour, and will have a maximum NOx discharge of 5.5 grams per horsepower hour.
The increasingly stringent standards have led to a gradual increase in fuel efficiency and improved emissions performance within the industry. Gross freight ton-miles per gallon of fuel consumed increased by more than 40 percent from 1989 to 2012. The EPA regulations have made compliance for locomotive engine manufacturers costly, but the Rail Transportation industry has benefited from the new standards by reducing fuel consumption. As long as companies in the industry have locomotives to be upgraded, they may profit from increased fuel efficiency. When the U.S. rail carriers reach a technological barrier, by retiring all of the older, less efficient locomotives, to continue improving fuel efficiency, operators may turn to alternative fuels, such as natural gas or fuel cells.\(^4^6\)

Compliance with stricter EPA regulations primarily requires locomotive engine manufacturers to increase their investment in research and development of cleaner diesel engines. Facing an increasingly stringent regulatory environment, locomotive engine manufacturers are investing in innovation to produce the most advanced engines on the market. For example, GE states that their new Evolution Series Advance Power 4 locomotive will meet the Tier 4 standards that take effect in 2015 without any after-treatment. The new engine will lower locomotive diesel engines’ particulate emissions by 70 percent and NO\(_x\) by 76 percent, compared to engines introduced in 2005. Locomotives using this engine would be the first on the market that meet the regulatory standards with technological advancement, rather than using urea exhaust additives, another way to meet the Tier 4 EPA standard. Urea exhaust additives would require railroad operators to build an extensive network of fueling stations across North America. Utilizing GE locomotives would save rail companies an estimated $1.5 billion in infrastructure and fuel costs.\(^4^7\)

The EPA has been implementing additional regulations to limit emissions from the industry. Therefore, fuel and emissions management continue to be important for the industry in order to mitigate regulatory risk. In March 2008, the EPA finalized a three-part program designed to reduce emissions from new and remanufactured locomotives. The program addresses locomotive idling through the application of automatic idle-reduction technology. It requires all newly manufactured locomotives, and nearly all remanufactured ones, to be equipped with idle-reduction technology that automatically shuts down engines when power is not needed.\(^4^8\)

Locomotive idling has significant impacts in terms of both emissions and fuel use. Locomotive switchers that idle 75 percent of the time consume 27 percent of fuel and account for 25 percent of NO\(_x\) emissions produced.\(^4^9\) The EPA idling program targets 90-percent reductions of NO\(_x\), HC, and PM emissions by 2015 from “uncontrolled” levels seen before 2000. Because the rules apply only to new or remanufactured locomotives, the EPA has also mandated automatic shutdown systems for all locomotives. An EPA emissions-testing program will ensure that operators comply with the emissions rules. Moreover, the EPA is working with rail operators on implementing voluntary efforts, such as SmartWay Transport Program launched in 2004, to reduce idle emissions beyond the mandated reductions. CSX, Norfolk South, Canadian National
Railway, BNSF, and Union Pacific, among others, joined the Program. Such technologies as automatic engine stop-start systems, auxiliary power unit or diesel-driven heating systems, electrical shorepower connections, and company idle-shutdown policies can help companies reduce their fuel use by reducing idling.\textsuperscript{50}

In addition to the regulatory implications, fuel costs can strongly influence profitability in the industry, making effective fuel management imperative. Before the rise of fuel prices in the mid 2000s, fuel costs comprised between 7 and 11 percent of operating expenses.\textsuperscript{51} By 2012, this number reached 23 percent. With fuel costs accounting for almost a quarter of operating expenses, strategies to reduce fuel use can help rail companies significantly improve operational efficiency and lower costs.

At the same time, top U.S. railroad companies are investigating the use of liquefied natural gas (LNG) as an alternative to diesel fuel in locomotives.\textsuperscript{52} Increased natural gas production in recent years made this fuel cheaper than diesel fuel. Rail companies are preparing to experiment with redesigned engines that can use both diesel and LNG. Using LNG as a fuel would not only reduce operating costs, but would also lower operators’ emissions, as it is a cleaner source of energy. A full switch to LNG would require significant investments in infrastructure, so changes are likely to happen incrementally.\textsuperscript{53}

Norfolk Southern has taken several initiatives that helped the company to reduce its GHG emissions and fuel consumption. Its LEADER train-handling initiative, a GPS-based technology, saved approximately 10 million gallons of diesel fuel and reduced locomotive GHG emissions by about 110,500 metric tons in 2013. The company continues to purchase more fuel-efficient locomotives as well as upgrade older ones with reconditioned engines. Moreover, the company invests in network improvements to increase freight rail capacity. It also explores locomotive fuel alternatives, such as battery power and natural gas.\textsuperscript{54}

Major players in the industry have started recognizing this issue as a material risk in their SEC filings. Union Pacific, for example, reports in its 2012 Form 10-K that “restrictions, caps, taxes or other controls on emissions (…) could significantly increase our operating costs.”\textsuperscript{55}

**Value Impact**

Management of fuel use and emissions can lead to operational efficiency and can impact the cost structure of railroad companies, with chronic and acute impacts on value. To comply with increasing regulation, companies in the industry need to reduce the environmental impact of their operations by investing in new technology to reduce fuel consumption and emissions. At the same time, investments in fuel efficiency and alternate fuels will reduce ongoing fuel expenses in the medium term, improving profitability.

By actively managing this issue, railroad companies can also benefit from converging macro trends, such as the need to reduce long-term highway congestion and increased demand for environmentally friendlier...
means of freight transport. As rail transportation companies are able to reduce total emissions of their customers, they may be able to capture growth opportunities and expand to new markets. As international and national efforts continue to advance regulation to reduce total GHG emissions, the probability and magnitude of these impacts are likely to increase in the near to medium term. The magnitude of these impacts can be estimated using companies’ Global Scope 1 emissions, in absolute terms and relative to their peers, factoring in mitigation efforts reflected in concrete emissions reduction targets. It can also be assessed through the energy efficiency and energy mix (renewables) of transportation companies’ fleets, as well as the fleets’ total emissions of NOx and PM.

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, incentives, and compensation. It also 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 Rail Transportation industry relies on many trained workers to manage complex rail tracks logistics operations. Labor costs are a substantial outlay for companies in the industry. Managing labor safety is an important sustainability issue that is strongly aligned with the management of accidents and safety management of railroad operations. Due to its wide-ranging impacts beyond worker health, the issue is discussed under Leadership and Governance below as an “Accidents & Safety Management” issue.

BUSINESS MODEL & 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 innovation in the production process. It also includes product innovation, 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.

Relative to other industries in the Transportation sector, rail transportation companies do not face specific and material risks or opportunities associated with business model and innovation,
aside from aspects covered in the “Environmental Footprint of Fuel Use” section above.

LEADERSHIP & GOVERNANCE

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

As a natural monopoly, the Rail Transportation industry may be subject to regulatory scrutiny and concerns over anti-competitive business practices. Continued business practices that take undue advantage of market power could result in costly regulatory changes at the industry level, as well as heightened scrutiny of individual companies. Moreover, since the Rail Transportation industry has a vast network of rail tracks, it is important to maintain a safety culture at all levels of the organization, and to continually improve safety performance.

Regulations and public relations involving the impact of railroad accidents on communities and the environment can put a company’s license to operate at risk, and can affect financial performance.

Competitive Behavior

Transportation industries such as rail are characterized by network effects, whereby it is cost-effective to connect multiple locations by a common network. Additionally, the value of the network changes with the number of people using it. In particular, the rail industry exhibits economies of density due to its network effects, lending itself to natural monopoly conditions. Such economies make it more cost-effective for a few large suppliers to provide services in the relevant market or region, instead of multiple, smaller players. Together with large sunk costs of rail infrastructure, this provides a competitive advantage to incumbent firms in the Rail Transportation industry and creates significant barriers to entry for new firms.56

Natural monopoly conditions can potentially lead to excessive prices, poor quality of service, and inefficiencies, among other concerns. In order to recover sunk costs of large capital expenditures, incumbents may engage in strategic behavior to retain break-even prices and limit market entry. Industries exhibiting natural monopoly characteristics have therefore faced regulations related to prices, market entry, and other aspects of operations, in the U.S. and other countries. The regulation of the rail industry prior to the Staggers Act of 1980 was partly driven by concerns over discriminatory pricing for shippers needing to transport similar commodities.
Shippers depending on one railroad were being charged higher rates by the same railroad than those served by other transport or rail competitors. Various laws in the early 1900s responding to such concerns gave the ICC, the STB’s predecessor, significant powers to set railroad rates.

Despite the natural monopoly enjoyed by rail companies, concerns over their financial viability resulted in substantial deregulation of the industry with the passage of the Staggers Act. The Rail Transportation industry faces inherent tensions between “the view that railroads are private, profit-maximizing firms operating under competitive conditions versus the view that railroads are “public utility” firms with market power that need to be regulated.”

The Staggers Rail Act reduced the STB’s role in industry oversight and allowed rail companies to independently determine shipping rates. Since the Staggers Act, M&A activity in the industry has led to high industry concentration, with the top four companies sharing almost 80 percent of the market. As a result, despite the Act’s positive effects on the Rail Transportation industry and its customers, there are concerns about the industry’s competitive conditions. In particular, there are concerns that the largest Class I railroads may have negotiating power over captive shippers, leading to unfair pricing. Higher rates charged to shippers may be passed on to end-users.

The STB has jurisdiction over the rates charged by companies that have market dominance. However, the industry enjoys immunity from certain antitrust provisions. Transactions such as mergers do not need additional antitrust investigations once approved by the STB. Rail companies also enjoy antitrust immunity related to rates charged. A shipper is unable to challenge a rate in court if the STB has approved a rate-related agreement.

Despite the long-term decline in freight rates since the Staggers Act was passed, in the face of higher prices more recently, rail industry customers are pressuring policy makers to introduce rules to improve competition in pricing. Consolidation in the railroad industry and alleged anti-competitive practices in relation to captive shippers, among other reasons, are creating political pressure to remove the antitrust immunity granted to railroads. Some of the proposed changes could lead to significant costs or impede investment in the rail industry. Rail companies operating at the limits of allowable charges in areas where they could be found to have market dominance, or those not complying with STB rules regarding reasonable rates are likely to face increased regulatory scrutiny. Such companies could potentially incur high penalties and other costs if found to abuse market dominance.

In an environment of increased concerns about the market power and pricing practices of rail companies, it is in their interest to continue to ensure competitive pricing and transparency in rates-setting while achieving adequate returns on their significant investments.

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 anti-competitive practices.

**Evidence**

Shippers of major commodities in the U.S. are increasingly concerned about the rates charged by rail companies, and are urging lawmakers to introduce more stringent regulation related to pricing and other aspects of rail company operations. The shippers allege potential impacts on end-users as a result of unfair rates being charged by rail companies.

According to the Consumer Federation of America (CFA), rates for captive shippers are higher than they would be if the market was competitive, by about $3 billion per year. The CFA finds that as coal transport is a major segment of railroad freight, and since two-thirds of coal deliveries go to facilities served by only one railroad, inflated rail rates are reflected on consumer utility bills. The excess charges could lead to costs of up to $100 per year per household.

According to another study released on behalf of organizations representing manufacturers, farmers, and others, in 2011, 57 percent of all the rail rates in the U.S. exceeded the 180 percent RVC ratio used by the STB. Twenty-three percent of rates were at a 300 percent RVC ratio or above. At the same time, the total rate premium paid by commodity shippers increased 90 percent from 2005 to 2011, while carload volume reduced by 1.1 percent. The study estimates that the total premium paid by commodity shippers exceeded $16 billion in 2011.

Inherent industry characteristics lead to a tension between recovering costs and ensuring competitive pricing. At the same time, market dominance in certain segments can increase the potential for charging rates that may be determined unreasonable by the STB. Cases of shippers challenging rates of rail companies are common for the industry. As mentioned earlier, the STB has jurisdiction over complaints related to rail operations where a railroad has market dominance over the traffic involved. Between 2008 and 2012, the STB made decisions on 18 rate cases involving Union Pacific, CSX Transportation, BNSF, and Norfolk Southern. Twelve of the cases resulted in settlements between the parties. In five cases, rates were found to be unreasonable, and only in one case were the rates found to be reasonable.

Depending on the method used in evaluating reasonableness of rates, the maximum recoveries for relief are set at $1 million or $5 million per case. As of January 2014, six cases were pending a decision by the STB. One of the pending cases is M&G Polymers vs. CSX Transportation. In 2012, M&G Polymers USA contended that 42 separate rates charged for the transportation of certain chemicals by CSX Transportation were unreasonably high. Previously, the STB concluded that the railroad had market dominance in the case of 36 of the 42 challenged rates.

Concerns over rates charged have the potential to drive substantial regulatory changes for the industry.
Since 2004, when the U.S. economy was booming, rail companies were able to gain pricing power, as demand for their services exceeded capacity. It allowed railroads to increase their rates, which fueled resistance from shippers. Rapidly increasing rates made railroad customers demand reinstatement of tighter federal regulations of the industry. A bipartisan legislation introduced in March 2013, entitled The Railroad Antitrust Investment Act, is supposed to “address so-called ‘captive shipping’ and help promote fairness and competition in the railroad industry and remove the railroad industry’s exemption from antitrust laws.” If passed, the bill is expected to result in more competitive pricing, keeping costs down for shippers and their customers. Lobbying groups for the railroad industry, including the Association of American Railroads, claim the proposed law would undermine private investment in railroad infrastructure.

As fuel is a significant portion of operating costs for rail operators, companies pass on increases in fuel prices to shippers through fuel surcharges. In response to illegal fuel surcharge concerns, the STB issued final rules regarding these charges in 2007, mandating reporting requirements of rates and prohibiting assessment of fuel surcharges unrelated to actual fuel costs. Since the ruling, a number of antitrust lawsuits have been brought against Union Pacific, BNSF, CSX, and Norfolk Southern, alleging the companies colluded to charge artificially high fuel surcharges to a group of customers over a three-and-a-half year period. Allegedly, as a result of collusion, over $30 million in fuel surcharges were imposed on six Oxbow companies. In response to the lawsuits, the American Chemistry Council sponsored a study that estimated total possible overcharges amounted to $6.4 billion. In early 2014, the cases were dismissed by a federal judge. Despite the dismissal, the presence of lawsuits indicates that the industry faces regulatory and customer scrutiny of its pricing practices. This could have a material impact on value through compensation payments or penalties if rail companies were found to be engaging in anti-competitive practices.

**Value Impact**

Failure to comply with STB regulations related to market dominance may lead to significant fines and penalties, resulting in extraordinary expenses. Price-fixing and other market manipulation practices can also damage a company’s reputation with customers, resulting in lower market share and revenue. Market manipulation can lead to increased scrutiny from regulatory authorities and can impact companies’ ability to raise prices. Increased regulatory oversight increases the risk of legal liabilities and creates a restrictive operating environment, raising the risk profile of companies and their cost of capital. Ongoing legal and regulatory fines indicate how well companies manage this issue, and provide an understanding of the probability and magnitude of the financial impact.

**Accidents & Safety Management**

Moving freight by rail, as with other modes of transport, creates risks of accidents and unintended releases of hazardous materials, either due to...
mechanical failure or human error. This can have wide-ranging repercussions for a company's employees, the environment, and valuable property, as well as financial impacts on companies themselves.

The health and well-being of workers in the industry are linked inextricably to the safety performance of the company, as rail operators are likely to be impacted by accidents. Poor health may also cause accidents in some cases. Maintaining miles of railroad tracks and equipment to the highest standards of safety presents additional safety governance challenges to the industry. A healthy workforce, strong safety culture, a thorough and systematic approach to safety, risk management (including emergency preparedness and response), and operational integrity at all levels of the organization can help lower the probability and magnitude of rail accidents.

The FRA's Office of Railroad Safety enforces safety standards for issues such as hazardous materials transportation, signal and train control, and equipment operation. Safety regulations for the industry have recently been updated with the 2008 Railroad Safety Act. Increasingly stringent regulations, potential for significant costs following major accidents, and lost consumer confidence resulting in lower revenues after such events, provide incentives for rail companies to manage their safety performance effectively.

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):

- Number of accidents and incidents;
- Total recordable injury rate, fatality rate, and near miss frequency rate;
- Number of accident and non-accident releases;
- Number of FRA recommended violation defects; and
- Frequency of internal railway integrity inspections.

**Evidence**

While railroad accidents are not as common as those in road transportation, they can be damaging due to the large size of trains and potentially hazardous cargo. Recent high-profile accidents underscore the continued importance of maintaining strong safety management of railroad operations.

The 2008 Railroad Safety Act, the first major overhaul of railroad safety standards since 1994, focused on essential areas of safety improvement. These areas include hours of service requirements for railroad workers, positive train control implementation, standards for track inspections, certification of locomotive conductors, and safety at highway-rail grade crossings. Compliance with more stringent regulation may require railroad companies to increase their operating and capital expenditures, while non-compliance could result in regulatory penalties. With the passage of the 2008 Railroad Safety Act, all Class I railroad companies must implement the PTC in an effort to avoid deadly and costly accidents. Since then, railroads have encountered significant technical and programmatic
issues. Despite the fact that railroads have raised and expended $1.5 billion of private capital to try and resolve the issues, the FRA has acknowledged it is unlikely that the current deadline of December 15, 2015 will be met. The AAR estimates that the PTC will require operators to equip approximately 22,000 locomotives and 60,000 miles of track with PTC technology.

Although hazardous materials transportation accident rates have fallen considerably in recent decades, accidents pose a likely material risk. In the U.S., transportation of hazardous and flammable materials has increased in recent years. The transportation of crude oil increased 443 percent in the U.S. between 2005 and 2012, while transportation of highly flammable ethanol rose 442 percent between 2005 and 2010. Between 2002 and 2012, U.S. railroads suffered 129 incidents that resulted in spills.

There has been increased volume of crude oil transportation, as well as an increased amount of train accidents involving oil spills (from none in 2010 to five in 2013 and five more by February 2014). In light of this, in 2014, the Obama administration proposed new regulations aimed at improving safety of oil transportation. As rail freight becomes increasingly a popular means of oil transportation, the regulations are likely to have a material impact on the industry. The rules introduce lower speed limits, new brake requirements, stricter regulations on the sturdiness of oil tank construction, and a plan for phasing out some older oil tank cars.

Freight trains carrying crude oil may often pass through, or near, populated areas. If an accident occurs in such area, it may have devastating environmental and social consequences. Rail companies themselves are likely to suffer financial damage as a result of such incidents. In July 2013, a train carrying 72 tankers of crude oil derailed in the center of Lac-Megantic in Quebec, Canada, killing 40 people and destroying dozens of buildings. The train was operated by Montreal, Maine and Atlantic Ltd. The company filed for bankruptcy in August 2013, citing a massive loss of revenue since the incident. A few weeks after the incident, the FRA issued an emergency set of safety directives for hazardous material trains.

Generally, when accidents involving release of hazardous materials occur in proximity to populated areas, evacuation may follow, resulting in significant costs. On January 16, 2007, a derailment of 26 cars of an 80-car CSX train resulted in the release of significant amounts of flammable, hazardous liquids contained in 12 of the derailed cars. Even though no one was injured, 500 people were evacuated from the area near the accident, and 50 of them were treated at local hospitals. The company estimated the property damages associated with the accident at $22.4 million.

Regulatory penalties and remediation costs for accidents are likely to have acute impacts on a company’s value. In 2005, a Norfolk Southern train derailed in Graniteville, South Carolina, spilling 60 tons of chlorine gas from a ruptured tanker car. The incident resulted in the evacuation of over 5,000 people; a cloud of gas that spread from the crash site killed nine people. The company paid $4 million
to settle CWA violations. Meanwhile, it reported total civil penalties and cleanup costs of $58 million in the second quarter of 2011, since an arbitration panel struck down the company’s insurance claims.80

Train collisions or other accidents may also put lives of crew members in danger, as well as result in monetary damages from a loss of the company’s and customers’ assets. In September 2010, two Canadian National Railway freight trains collided in a non-signaled territory. The collision occurred due to the failure of one of the train’s crew to execute an after-arrival track authority. The accident led to a derailment of three locomotives and 14 railcars. All five crew members on the two trains were injured and transported to hospitals. The property damages were estimated to amount to $8.1 million.81 A similar accident involving two Union Pacific freight trains happened in June 2014 in Oklahoma. The collision led to derailment of five locomotives and 32 cars, killing two engineers and one conductor. Several tankers carrying diesel fuel ruptured, and the fuel ignited and burned. The damages amounted to $14.8 million.82

Companies in the industry recognize material impacts associated with management of the issue in their SEC filings. Rail companies are focusing on several strategies to reduce risks and eliminate incidents from their operations. For example, Union Pacific states the following: “Our sustained efforts to improve crossing warning systems and, where possible, close at-grade crossings reduced grade crossing incidents per million train miles by 7 percent during the year. We closed 212 grade crossings in 2013 to reduce our exposure to incidents and continued using video cameras on our locomotives to analyze safety incidents. Although reportable personal injury incidents per 200,000 employee hours increased four percent from last year’s record low, it is our second lowest year and a nine percent decline from 2011. Our reportable derailment incidents per million train miles increased slightly, less than one percent, from 2012. These results demonstrate our continued development and expansion of our safety programs and initiatives, including Courage to Care, Total Safety Culture, and Standard Work.”83

According to CSX, “[s]afety and train accident prevention programs rely on the latest tools, programs, and employee participation that strengthen the safety culture in a supportive environment that allows each employee to be successful at [the Company]. Continued capital investment in the Company’s assets, including track, bridges, signals, equipment and detection technology also supports safety performance. [The Company’s] safety programs are designed to prevent incidents that can impact employees, customers and the communities we serve.”84

**Value Impact**

Rail accidents, particularly those involving human casualties and/or damage to the environment are regional news events. Accidents can negatively affect railroads’ reputation, with acute and long-term impacts on revenue and market share. Accidents also lead to extraordinary expenditures and contingent liabilities related to compensation of victims and regulatory sanctions with acute impact on value. Moreover, accidents may result in asset write-downs from equipment loss. Failure to comply
with safety standards can result in chronic impacts on value through fines and additional capital requirements to remain in compliance. Poor safety records can also increase the risk profile of railroad companies and their cost of capital.

Conversely, investment in infrastructure and detection technology, and promotion of a safety culture, can lead to lower operational, human, and environmental risk. It can ultimately enhance a company’s social license to operate. Incident-based safety metrics (accidents and incidents, injury and fatality rates, and releases) characterize past performance as a proxy for how well companies manage this issue. They also provide an understanding of the probability and magnitude of incidents. The number of FRA violations and internal inspections provide complementary, forward-looking insight on how companies are likely to perform in the future.

### SASB INDUSTRY WATCH LIST

The following section provides a brief description of sustainability issues that did not meet SASB’s materiality threshold at present, but could present a material issue in the future.

**Climate Change Adaptation:** Because railroad companies operate vast networks of track and facilities, changing weather patterns and increased severity and frequency of storms pose a serious risk to future operations.

The nation’s extensive rail infrastructure is vulnerable to potential climate change impacts, such as increased flooding events, erosion, and higher temperature extremes that can corrode and bend steel tracks. For example, the U.S. Global Change Research Program estimates that 246 miles of freight track are at risk of permanent flooding within 50 to 100 years along the US Gulf Coast. Strategies to adapt to changing climate conditions by improving the resilience of the rail infrastructure are likely to become increasingly important as the effects of climate change become stronger over time. Climate impacts on essential infrastructure, such as rail tracks, have important implications not only for commerce and economic growth in the U.S., but also for the financial performance of rail companies in the future.

Companies in the industry address the implications of extreme weather events in their Form 10-Ks. For example, Kansas City Southern reports in its 2012 Form 10-K that: “the Company operates in and along the Gulf of Mexico, and its facilities may be adversely affected by hurricanes, floods and other extreme weather conditions that could also adversely affect KCS’s shipping, agricultural, chemical and other customers.”
APPENDIX I
FIVE REPRESENTATIVE RAIL TRANSPORTATION COMPANIES

<table>
<thead>
<tr>
<th>COMPANY NAME (TICKER SYMBOL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Union Pacific (UNP)</td>
</tr>
<tr>
<td>Burlington Northern Santa Fe (parent company: Berkshire Hathaway (BRK))</td>
</tr>
<tr>
<td>Canadian National Railway (CNI)</td>
</tr>
<tr>
<td>CSX Corp. (CSX)</td>
</tr>
<tr>
<td>Norfolk Southern (NSC)</td>
</tr>
</tbody>
</table>

VIII This list includes five companies representative of the Rail Transportation industry and its activities. This includes only companies for which the Rail Transportation industry is the primary industry, companies that are U.S.-listed but are not primarily traded Over-the-Counter, and for which 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 July 11, 2014.
### APPENDIX IIA

**EVIDENCE FOR SUSTAINABILITY DISCLOSURE TOPICS**

<table>
<thead>
<tr>
<th>Sustainability Disclosure Topics</th>
<th>Evidence of Interest</th>
<th>Evidence of Financial Impact</th>
<th>Forward-Looking Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HM (1-100)</td>
<td>IWGs</td>
<td>Revenues &amp; Costs</td>
</tr>
<tr>
<td>Environmental Footprint of Fuel Use</td>
<td>60*</td>
<td>91</td>
<td>2</td>
</tr>
<tr>
<td>Competitive Behavior</td>
<td>25</td>
<td>77</td>
<td>3</td>
</tr>
<tr>
<td>Accidents &amp; Safety Management</td>
<td>83*</td>
<td>100</td>
<td>1</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.
## 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>RISK PROFILE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Revenue</td>
<td>Operating Expenses</td>
<td>Non-operating Expenses</td>
</tr>
<tr>
<td></td>
<td>Market Size</td>
<td>New Markets</td>
<td>Pricing Power</td>
</tr>
<tr>
<td>Environmental Footprint of Fuel Use</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Competitive Behavior</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Accidents &amp; Safety Management</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

- **MEDIUM IMPACT**
- **HIGH IMPACT**
## APPENDIX III
### SUSTAINABILITY ACCOUNTING METRICS – RAIL TRANSPORTATION

<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>Environmental Footprint of Fuel Use</strong></td>
<td>Gross global Scope 1 emissions</td>
<td>Quantitative</td>
<td>Metric tons CO2-e</td>
<td>TR0401-01</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>TR0401-02</td>
</tr>
<tr>
<td></td>
<td>Total fuel consumed, percentage renewable</td>
<td>Quantitative</td>
<td>Gigajoules, Percentage (%)</td>
<td>TR0401-03</td>
</tr>
<tr>
<td></td>
<td>Air emissions for the following pollutants: NOx and particulate matter (PM)</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>TR0401-04</td>
</tr>
<tr>
<td><strong>Competitive Behavior</strong></td>
<td>Amount of legal and regulatory fines and settlements associated with anti-competitive practices&lt;sup&gt;9&lt;/sup&gt;</td>
<td>Quantitative</td>
<td>U.S. dollars ($)</td>
<td>TR0401-05</td>
</tr>
<tr>
<td><strong>Accidents &amp; Safety Management</strong></td>
<td>Number of accidents and incidents</td>
<td>Quantitative</td>
<td>Number</td>
<td>TR0401-06</td>
</tr>
<tr>
<td></td>
<td>(1) Total recordable injury rate, (2) fatality rate, and (3) near miss frequency rate</td>
<td>Quantitative</td>
<td>Rate</td>
<td>TR0401-07</td>
</tr>
<tr>
<td></td>
<td>Number of (1) accident releases and (2) non-accident releases (NARs)&lt;sup&gt;10&lt;/sup&gt;</td>
<td>Quantitative</td>
<td>Number</td>
<td>TR0401-08</td>
</tr>
<tr>
<td></td>
<td>Number of Federal Rail Administration (FRA) Recommended Violation Defects</td>
<td>Quantitative</td>
<td>Number</td>
<td>TR0401-09</td>
</tr>
<tr>
<td></td>
<td>Frequency of internal railway integrity inspections&lt;sup&gt;11&lt;/sup&gt;</td>
<td>Quantitative</td>
<td>Inspections per week</td>
<td>TR0401-10</td>
</tr>
</tbody>
</table>

<sup>9</sup> Note to TR0401-05 – Disclosure shall include a description of fines and settlements and corrective actions implemented in response to events.

<sup>10</sup> Note to TR0401-08 – Disclosure shall include a discussion of the registrant’s processes, procedures, and strategies to manage non-accident and accident releases.

<sup>11</sup> Note to TR0401-10 – Disclosure shall include, where relevant, a discussion of rail maintenance practices and operating precautions additional to inspections.
APPENDIX IV: Analysis of SEC Disclosures
Rail Transportation

The following graph demonstrates an aggregate assessment of how the top ten U.S.-listed Rail Transportation companies by revenue are currently reporting on sustainability topics in the SEC Disclosures.

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


3 Data from Bloomberg Professional service accessed on July 11, 2014, using the BICS <GO> command. The data represents global revenues of companies listed on global exchanges and traded over-the-counter (OTC) from the Rail Transportation industry, using Levels 3 and 4 of the Bloomberg Industry Classification System.

4 Author’s calculation based on data from Bloomberg Professional service, accessed on July 11, 2014 using Equity Screens (EQS) for U.S. listed companies generating at least 20 percent of revenue from the Rail Transportation segment.


10 Author’s calculation based on data from Bloomberg Professional service, accessed on September 5, 2014, using the equities (EQS) screen for U.S. listed companies (and those traded primarily OTC) and generating at least 20 percent of revenue from the Rail Transportation segment.


23 Ibid.

24 Ibid.


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