SUSTAINABLE RAILROADING ACROSS CANADA AND BEYOND

Paul D. Larson, University of Manitoba
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Introduction

The well-known triple bottom line breaks sustainability down into economic, environmental and social dimensions. According to Vantuono (2016), the triple bottom line "in railroading terms translates to a safety culture and highly competitive wages and benefits (people); fuel efficiency and far less pollution compared to other modes (planet); and shareholder value (profit)." On a ton-mile basis, rail is known to compare favorably vis-à-vis trucking in terms of fuel consumption and GHG emissions.

In highly competitive markets, motor and rail carriers have been developing sustainability initiatives focused on reducing fuel consumption and GHG emissions, along with increasing operational efficiency (Shacklett 2012). Though fuel consumption and GHG emissions are prominent among the GRI (2013) sustainability reporting guidelines, surprisingly these items did not make a more recent top 10 list of GRI "sustainability aspects for the railroad sector" (Coppola 2014). This list includes: local communities, remediation, freedom of association and collective bargaining, diversity and equal opportunity, equal remuneration for women and men, non-discrimination, indirect economic impacts, labor/management relations, corruption and product and service labeling.

This paper analyzes and critiques the sustainability reports published by Canada's Class I railroads. There are four more sections. The first one briefly profiles the Canadian railroading industry. This is followed by a definition of sustainability, which expands the typical triple bottom line (of economic, environmental and social dimensions) by adding a cultural dimension. The third section introduces sustainability reporting, based on the Global Reporting Initiative guidelines, then uses the guidelines to study the Class I railroad sustainability reports. The fourth and final section offers conclusions and suggestions for future research.

Canadian Railroading

Rising and variable fuel prices, increasing concerns about GHG and other emissions, and growing interest in carbon taxes in transportation are making rail freight (especially intermodal movements) an attractive option (vs. trucking) for more commodities (Larson 2013).

Canadian National (CN) and Canadian Pacific (CP), Canada's Class I railroads, are the focus of this study. Facts and figures in this section are drawn from the Railway Association of Canada *Rail Trends* report (RAC 2016). In 2015, freight traffic fell from the previous year to 283.2 billion revenue ton-miles, while revenue per ton-mile (a proxy for freight rates) rose to 4.69 cents. Intermodal traffic was the leading commodity in terms of both carloads and revenue, rising to a record 3.1 million containers and trailers. Average length of haul and average cars per train also rose to new highs of 943 miles and 102 cars, respectively. Canadian railroads burned almost 470 million gallons of fuel in 2015, at an average cost of $3.46 per gallon. During the year, they paid $45 million in carbon taxes.

The industry employed nearly 33,000 people and experienced about three accidents per 10,000 carloads of dangerous goods moved during 2015. In 2015, industry initiatives included continuing investment in fuel conservation and reduction of GHG emissions, along with several safety improvements. Numerous safety-related meetings were held with First Nations and municipal leaders across the country. In addition, thousands of first responders received training on matters of emergency response and handling of dangerous goods (RAC 2016).

What is sustainability?

The triple bottom line of sustainability is limited to three dimensions – economic, environmental and social. The sustainability "sweet-spot" balances and enhances all three areas: people, planet and profit. While the triple bottom line is widely accepted by supply chain sustainability experts, there seems to be something missing. The business literature is loaded with examples in which environmental harm is reduced and/or social conditions are improved—as long as profit margins increase as well. Larson and Khare (2013) refer to such initiatives as "little s" or doing things right. What is being done is not questioned; the quest is to do it better. Economic interests and the profit motive trump any environmental and social concerns. The legacy of the profit motive includes the occupation of land, cultural genocide, abduction and enslavement of people, global warming and a widening gap between rich and poor. On the other hand, "Big S," or doing right things, questions the wisdom of sacrificing the planet, its people or their culture in the interests of profit.

Culture – the fourth dimension

There is a time element to sustainability. Following the U.S. Environmental Protection Agency (EPA) and others, the Institute for Supply Management (ISM) defines sustainability as: "the ability to meet current needs without hindering the ability to meet the needs of future generations in terms of economic, environmental and social challenges." How far into the future should business and government leaders look? Should they look to the end of the fiscal year, to the next election, or to the seventh generation?

The time element inspires adding culture as the fourth dimension of sustainability. Figure 1 reveals several aspects of this cultural dimension, e.g. relationships, diversity and creativity. The Creative City Network (2007) identifies 10 key themes of cultural sustainability, starting with *the culture of sustainability*, i.e. the need to change lifestyles and consumption patterns. Three other themes are the need for protection from negative aspects of *globalization*, such as loss of cultural identity; *heritage conservation*; and a *sense of place*, in terms of community involvement in creating awareness.

Another important theme is *indigenous knowledge and traditional practices*. This key theme pertains to "recovery and protection of cultural health, history, and the culture of indigenous knowledge in society." It is about "celebrating local and regional histories and passing down cultural values to future generations." Its tools include storytelling to keep memories alive, to celebrate history, and to inform policy debates.

Regarding matters of sustainable development and the environment, Clarkson, Morrissette and Régallet (1992) offer the following advice: "the voices of Indigenous people strike a resounding note, since their appeal is rooted in a deep and longtime relationship to the earth." Indigenous people have rich knowledge about living "on the land in an ecologically and socially sustainable way." Indigenous perspectives on sustainability include concepts such as Mother Earth as a living person—and a life-giving force; air, fire and water as life-sustaining elements; and the interconnectedness of people, animals and things (Manitoba Education and Training 2000).

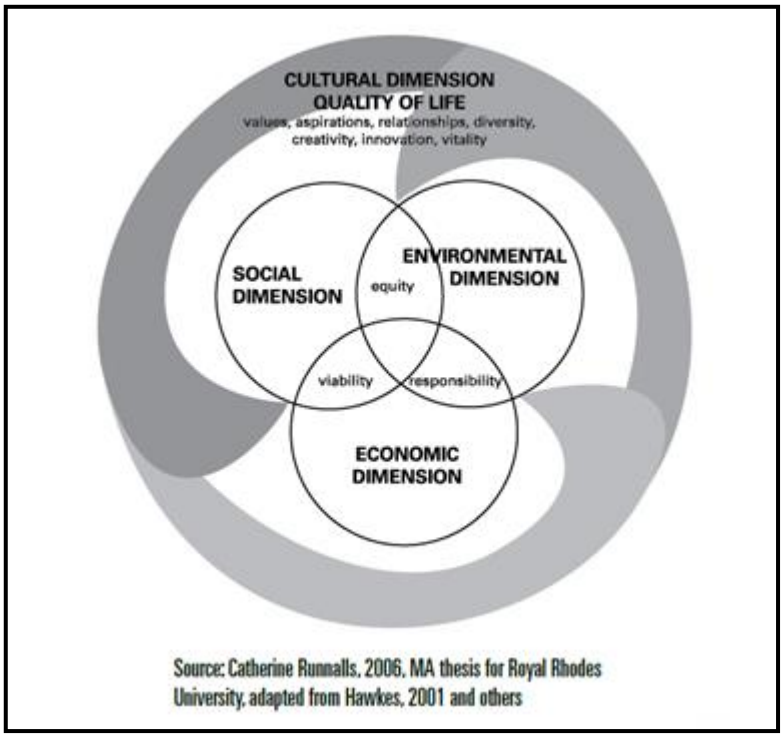

Figure 1. Culture – The Fourth Dimension

To synthesize, sustainability considers the economic, environmental, social and culture impacts of an organization's activities on all its stakeholders, i.e. all those affected by its activities (Larson 2015).

Sustainability Reporting

Perhaps the premier guidelines on such matters are the Global Reporting Initiative *G4 – Sustainability Reporting Guidelines* (GRI 2013). Both Canadian Class I rail carriers adapt these guidelines in creating their sustainability reports.

The GRI guidelines are based on principles for defining report content and report quality. The four principles for defining report content are: stakeholder inclusiveness, sustainability context, materiality and completeness. Broadly, stakeholders are those invested or involved in the organization, as well as those affected by the organization's activities. Thus, stakeholders include customers, employees and company owners – but also communities that track and trains pass through. It can be argued that animals (other than humans) and plants are also stakeholders, to the extent they are affected by railroading.

Sustainability context refers to impact of the organization in improving or degrading environmental, social and economic conditions, both locally and globally. This is a broad view of sustainability. *Materiality* serves as a guide for which aspects of sustainability should be reported. Material aspects reflect economic, environmental and social impacts that substantively affect stakeholders. Finally, completeness pertains to the coverage of material aspects in the report – and whether it sufficiently enables stakeholders to assess the organization's sustainability performance.

There are six principles for defining report quality: balance, comparability, accuracy, timeliness, clarity and reliability. A balanced report is unbiased, reflecting both positive and negative areas of performance. Comparability is about enabling stakeholders to analyze the organization's performance over time and relative to other organizations. While timeliness refers to the regularly of reporting (e.g. annually), clarity

caters to the accessibility of the report for stakeholders and their ease of understanding its contents. The remaining two principles of report quality, accuracy and reliability, pertain to level of detail provided in the report and confidence stakeholders have in its contents.

In the GRI guidelines, "specific standard disclosures" are arranged into the categories or dimensions of the triple bottom line: economic, environmental and social. The economic category consists of four more detailed aspects, as follows: economic performance, market presence, indirect economic impacts and procurement practices. Under each aspect, the GRI recommends precise metrics and facts for reporting purposes. In anticipation, the analysis of Canadian Class I railroad sustainability reports in the next sub-section will cover all environmental aspects and selected social aspects – but it will neglect the economic aspects.

Twelve aspects make up the environmental category: materials, energy, water, biodiversity, emissions, effluents and waste, products and services, compliance, transport, overall, supplier environmental assessment and environmental grievance mechanisms. As noted above, precise metrics and other items of content are recommended for each aspect. For instance, emissions are divided into *direct* (scope 1) emissions from operations, *energy indirect* (scope 2) emissions from purchased electricity, and *other indirect* (scope 3) emissions not covered above. Precise metrics include emissions of CO_2 and other GHG emissions, GHG emissions intensity (e.g. CO_2/ton-mile) and emissions of NO_x, SO_x, etc.

The social category is comprised of the following four sub-categories: labor practices and decent work, human rights, society and product responsibility. Each of these sub-categories contains multiple aspects. The analysis presented next covers only two aspects of labor practices (diversity and equal opportunity, equal remuneration for women and men), along with one aspect of human rights (indigenous rights).

CN

While responsible procurement, dangerous goods shipments, talent attraction and development, and customer innovation are highly important to CN and its stakeholders (CN 2015), emissions and energy efficiency, diversity and inclusion, aboriginal programs, and sustainability policies are of more modest importance to both groups (see Figure 2). Nonetheless, the CN environmental sustainability strategy focuses on emissions and energy efficiency, waste management, and biodiversity and land management.

In terms of energy consumption, CN (2015) reports total direct and indirect energy consumed in megawatt hours. It is noted that currently the firm does not use fuel from renewable sources. Energy intensity is reported as 1.84 megawatt hours per U.S.$1,000 of freight revenue. CN also claims a 35% improvement in fuel efficiency since 1994, as well as a 15% energy savings at rail yards attributed to its EcoConnexions – Employee Engagement Program.

Of CN's GHG emissions, 85% are generated from rail operations (i.e. locomotives), while the remaining 15% are split between vehicle/vessel fleets and buildings and yards. CN reports scope 1, 2 and 3 GHG emissions, measured by metric tonnes of CO_2 equivalent. In 2014, total scope 1 and 2 GHG emissions were nearly 5.9 million metric tonnes. GHG emissions intensity is reported as 0.51 metric tonnes of CO_2e per $1,000 of freight revenue. The company also reveals that 142,012 tonnes of CO_2 emissions were avoided due to fuel efficiency improvements. Finally, emissions of nitrous oxides (NO_x), sulphur dioxide (SO_x) and particulate matter are enumerated in the sustainability report.

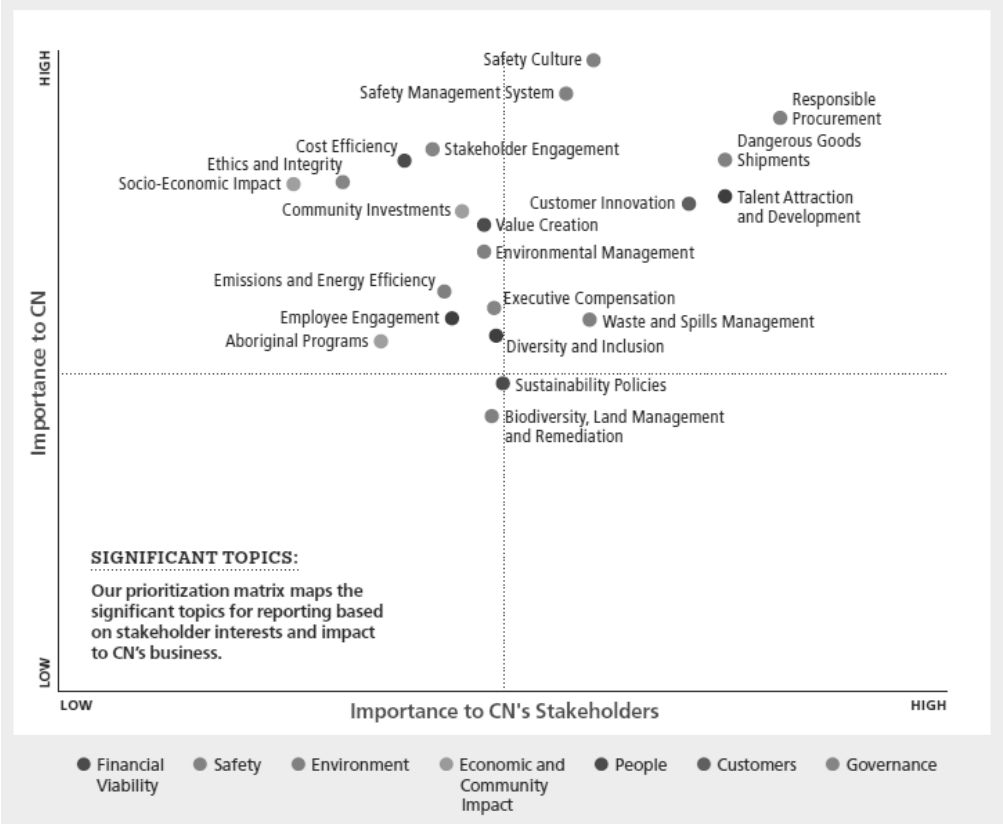

Figure 2. Important Aspects of Sustainability (CN 2015, p. 11)

The other environmental aspects covered in the CN sustainability report are: effluents and waste, biodiversity and overall investments. The railroad reports metric tonnes of both hazardous waste generated and non-hazardous waste. Waste management initiatives include reducing waste at the source, reusing materials and recycling. CN experienced a 20% reduction in total operational waste generated from 2012 to 2014. In addition, an estimated 30,000 litres of hazardous chemical waste were eliminated by switching to a solvent-free cleaning system. The report makes specific reference to a March 2015 derailment and crude oil spill near Gogama, Ontario, along with clean-up and remediation plans.

In 2014, CN spent $19 million on biodiversity site assessments and remediation. This compares to $1.25 billion invested in track maintenance that year. As part of a mass reforestation effort, over one million trees have been planted since 2012. While CN's biodiversity and land management initiatives involve "conducting impact assessments, preserving and restoring ecosystems" (including a wildlife management program) and cleaning up spills; the report offers little detail in these important areas.

CN is committed to "attracting a diverse workforce that reflects the communities" where they operate. The firm reports female employees as a percent of total employees (8.74% in 2014), along with diverse employees – "visible minorities, persons with disabilities and Aboriginals" – as a percent of the total (13.1% in 2014). There is no reporting of a gender pay gap. However, 19% of CN's promotions in Canada were filled by women in 2014, and the firm has developed a target for one-third of its Board members to be women. While the report makes no mention of a supplier diversity program, CN has participated at Canadian Aboriginal and Minority Supplier Council (CAMSC) events. To its credit, CN seems genuinely determined to foster respectful relationships with Indigenous communities, through collaboration on environmental stewardship and enhanced understanding. Still the true depth of this commitment is unclear. Is CN ready to embrace Indigenous perspectives on sustainability?

CP

Figure 3 depicts the materiality of various sustainability issues, from the perspective of CP and its stakeholders. Safety, GHG emissions/fuel efficiency, economic performance and environmental protection appear to be important to both groups. Of somewhat lesser importance and/or impact are workforce diversity, community engagement, waste management and environmental incidents. The former CEO suggests that sustainability is about "making sure that you do the right thing for your shareholders, your customers, your communities, and your employees" (CP 2015, p. 2).

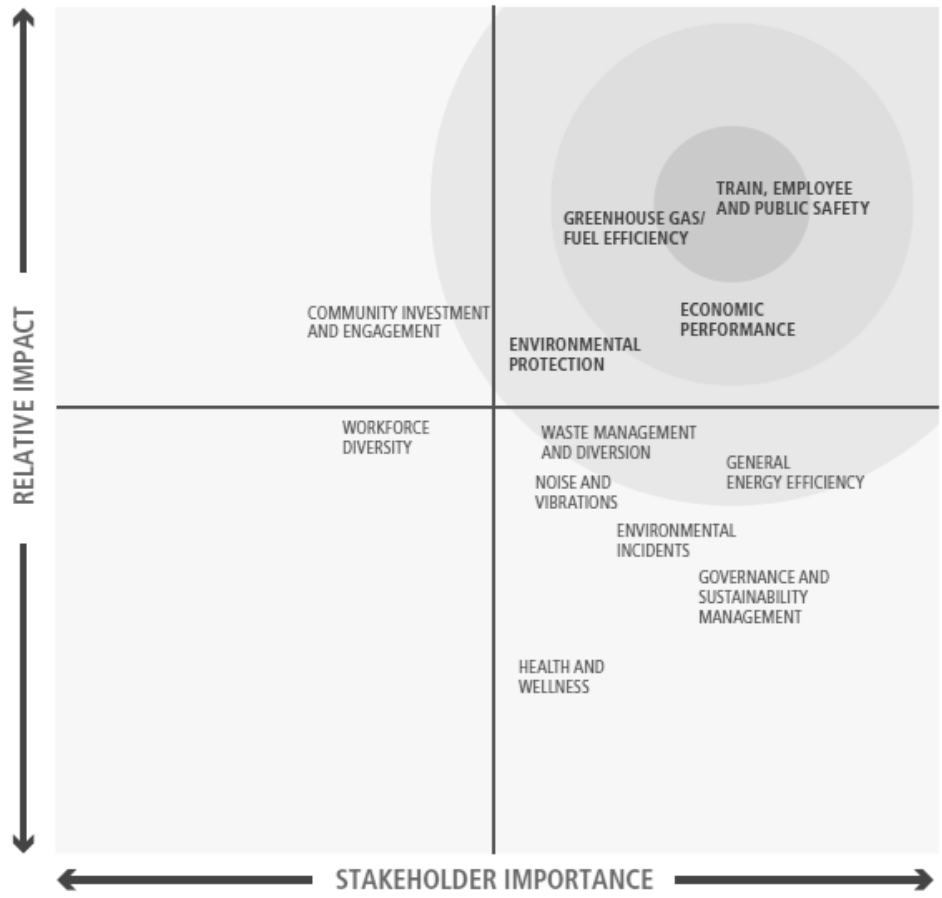

Figure 3. Materiality of Sustainability Issues (CP 2015, p. 18)

CP's energy consumption is dominated by diesel fuel. The railroad burned 282 million gallons of locomotive fuel in 2013, the equivalent of nearly 39 million gigajoules (GJ). That same year, fuel efficiency improved to a record 507 revenue ton-miles per gallon of diesel. CP reports scope 1, 2 and 3 GHG emissions in thousand tons of CO_2 equivalent. Scope 1 emissions are almost entirely attributable to locomotives. The company separates scope 3 emissions into those linked to business air, car and hotel travel. In recent years, average train length and weight have increased, while locomotive GHG intensity (CO_2/ton-mile) has declined.

In 2013, CP disposed of more than 1 million railroad ties, with most of them sent to co-generation facilities to produce heat and power. This disposition of ties kept 65,000 metric tonnes of waste out of landfills. Overall, the firm recycled 38.6% of its solid wastes and 95.9 percent of its liquid wastes.

Unlike CN, the CP (2015) report reveals water consumption from municipal sources. The firm also reports that it treats all water that comes into contact with oil and lubricants. CP claims to be conscious of their "role as stewards of the land." In 2013, the rail carrier spent $9 million on remediation of contaminated sites and experienced less than one (0.96) environmental incidents per billion ton miles. An interesting joint initiative with Parks Canada focuses on reducing grizzly bear mortality on the lines passing through Banff and Yoho National Parks. In terms of spills, CP (2015) endured five derailments in 2012 and 2013 involving release of dangerous materials.

Regarding workforce diversity, CP recognizes "strength in diversity." In 2013, the firm's workforce was made up of 10.5% females, 3.9% Aboriginal people, 7.5% visible minorities and 3.1% persons with a disability. CP reported that 28.6% of its board directors were female in 2013. Like CN, CP provides no reporting of a possible gender pay gap. Finally, other than listing "Aboriginal relations" among its local community stakeholders, the CP (2015) report is silent on its connection to the Indigenous community.

Conclusions

As expected, both CN and CP sustainability reports focus prominently on energy consumption and emissions. Both reports also cover effluents and waste and biodiversity to varying degrees. In the social category, both rail carriers present statistics on workforce diversity—but neither firm addresses the issue of gender pay disparity. Though their tracks pass through Indigenous communities (and spills often affect these communities), both reports are light on Indigenous rights. To its credit, CN acknowledges a 2015 spill affecting the Mattagami First Nation in northern Ontario, along with plans for a collaborative approach to remediation.

Further research is needed to drill deeper into environmental aspects (and especially social aspects) of sustainability. While this paper analyzed two Class I railroad sustainability reports, future research should expand the sources of data to include interviews with railroaders and news reports on events with sustainability implications. This research could also be extended to American railroads and railroads on other continents.

The railroad industry, and others interested in sustainability, could learn much from Indigenous perspectives on these important issues. Perhaps the time has come to think beyond the box – and get into the circle …

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Endnote

This is a regular paper.