



LAFARGE CEMENT

HUMAN RESOURCES – 2015 – FINAL ROUND
JANUARY 2015



This case was written by Warren E. Mabee for Minerva Canada, Queen's University, Department of Geography, Kingston. It is intended as a basis for student discussion, not to show either effective or ineffective administrative decision-making.

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LAFARGE CEMENT: DEVELOPING SOCIAL LICENCE TO IMPLEMENT A WORLD-LEADING LOW CARBON FUEL SYSTEM

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PREFACE

This case study describes how Lafarge Cement Canada's Bath Plant approached the issue of social licence when developing a low carbon fuel system which would offset consumption of fossil fuels and provide an alternative to address GHG emissions associated with cement production.

The purpose of this case study is to teach students strategies for managing public relations in the implementation of new technologies within a company's operations, and to highlight the importance of engaging with the community when undertaking these types of projects.

The approach taken in developing this case study was a review of media publications and corporate information, including analyses of the concept of social licence as well as a review of low carbon fuel implementation in other jurisdictions.

Lafarge Cement was chosen for this case study because of the leadership that they have shown in aggressively pursuing a low carbon fuel alternative for their Bath cement plant; as a company often listed as one of the 100 most sustainable companies in the world, Lafarge prides itself on leadership in this area. This case study was also selected because the process of developing this project has highlighted the challenges involved in engaging community members when environmental issues are at stake.

This case study is organized as follows. The Lafarge company and the Bath Plant is described, as are some key policies, which are driving decisions within the plant. An introduction is provided into the concepts of alternative fuels, and particularly low carbon fuels, which are being explored at the Lafarge plant. The issue of social licence is also reviewed. A past attempt by the Lafarge Bath Plant to introduce alternative fuels is described and an annotated timeline of this project is provided. The current Low Carbon Fuel project is similarly described. The differences between the two are summarized and a look forward to 2015 is also provided. Finally, some questions are posed and an assignment is placed before the reader. A detailed list of references, complete with online linkages where possible, is provided at the end.

INTRODUCTION

Lafarge Canada is a member of the Lafarge group of companies headquartered in France; the company operates cement, aggregate and concrete businesses around the world and is one of the leaders in this industry. Lafarge North America, which began in 1956 with a plant in Richmond, BC, is now one of the largest cement, concrete and aggregate businesses in North America (Lafarge 2014).

Lafarge opened its plant in Bath, Ontario in 1973. The plant takes limestone from a quarry just north of the actual facility, which is crushed and conveyed into the facility. The crushed limestone is then burned in the kiln at temperatures of over 1450°C to produce clinker, which in turn is mixed with gypsum and ground into powder – producing Portland cement. The Bath Plant supplies the cement product to users throughout the Great Lakes Basin via road, rail, and ship.

Since the early 1990's, companies like Lafarge have become aware that greenhouse gas emissions are a serious issue. The cement industry is a major producer of greenhouse gases; worldwide, about 5% of anthropogenic carbon emissions come from the sector (Worrell, Price et al. 2001). Producing a metric tonne (t) of cement results in emissions of about 0.87 t of CO₂-equivalent; 40% of these emissions (about 0.35 t CO₂-e) are related to the combustion of fuel to drive the plant, while the remainder of the GHGs are produced by chemical reactions during the production of clinker in the kiln (World Business Council for Sustainable Development and International Energy Agency 2009).

The Canadian government, through the Federal Regulatory Framework for Industrial Air Emissions, has proposed that the industry reduce GHG emissions by 2% annually (Cement Association of Canada 2014). In 2010, about 54.8% of the fuel used by the cement industry in Canada was coal, and about 30.2% of the fuel was petroleum coke.

At Lafarge's Bath Plant, Environment and Public Affairs Manager Rob Cumming has a challenge on his hands. As stated above, the federal regulations require him to find ways to reduce the overall footprint of the Bath Plant operations. One of the best options he has on the table is to find alternative, low carbon fuels, which can be substituted for coal and petroleum coke to power the kiln. A low carbon fuel would reduce greenhouse gas emissions by 50% or more on a life cycle basis.

While the technology may be there, the path won't be easy. Lafarge has tried to introduce alternative fuels at the plant before, and ended up putting these plans on hold because the public was not yet ready to accept fuel switching.

The challenge is – how can Lafarge obtain social licence to implement low carbon fuels and meet the federal regulation? Specifically, what kind of engagement strategy might the company build with the public to get the support that they need?

LOW CARBON FUELS

While coal is the dominant fuel used in cement production, cement plants can use a variety of alternative fuels to heat the kiln. These alternative fuels are often chosen because they have a better environmental footprint than coal, or because they offer a price advantage (Murray and Price 2008). For the current project, Lafarge has defined low carbon fuels as being alternative fuels that reduce greenhouse gas emissions by at least 50% when compared with coal on a life cycle basis (Cumming 2014). Low carbon fuels under consideration at the plant will include construction and demolition waste, asphalt shingles, used railway ties, and used utility poles.

BENEFITS OF LOW CARBON FUELS

There is a wide range of biomass-based fuels – wood, agricultural residues, or municipal wastes – as well as fossil-based fuels – shingles, tires, used oil, etc. – that can be recovered from the waste stream (CEMBUREAU 2014). It has been shown that combustion in a cement kiln is one of the most efficient ways to re-use these waste materials; furthermore, because the ash residues are incorporated into the clinker, there are no end products that require further management (Cordi and Lombardi 2004, Houillon and Jolliet 2005). Fossil-based alternative fuels also have an environmental advantage over coal or petroleum coke because they do not require the extraction of new fossil fuels but instead reuse fossil resources that have already been extracted, thereby reducing the demand for fossil fuels (Bernstein, Roy et al. 2007). Studies on the use of alternative fuels with coal and petroleum coke have shown that this approach has clear environmental benefits (UK Health Protection Agency 2004, Albino, Dangelico et al. 2011). Using biomass fuels in cement production avoids landfilling, which is important because landfills are rapidly reaching capacity and new landfills are hard to develop (Pembina Institute 2005, Association of Municipalities of Ontario 2013). Using biomass as fuel can eliminate the generation of methane in landfills, which has a global warming potential 21 times that of CO₂ (CEMBUREAU 2014). Of course, it is important to make sure that no dangerous emissions are associated with the handling or use of alternative fuels in any given cement-making process (Murray and Price 2008).

THE WORLD IS USING ALTERNATIVE FUELS

In 2010, the global average alternative fuel substitution ratio was 12.3%, with 2.9% attributed to alternative biomass fuels. Fuel substitution is highest in Europe at 18% (CEMBUREAU 2014). The average alternative fuel substitution ratio in North America as of 2010 was 13.8% (World Business Council for Sustainable Development and Cement Sustainability Initiative 2010). In Canada, alternative fuel usage is about 11.3% across all provinces 2010 (Cement Association of Canada 2013). The Low Carbon Fuels project at Lafarge Bath Plant is not the only alternative fuel project in Ontario, but would be the first to use biomass-based fuels to a significant extent. Importantly, other jurisdictions in Canada, such as BC, are using biomass-based fuels in the cement industry as an alternative fuel.

HEALTH AND SAFETY ISSUES

Development of a low carbon fuel project at the Lafarge Bath Plant requires the delivery of new fuels to the site. This raises flags with respect to health and safety, particularly with respect to road safety and dust generation. Biomass dust inhalation has been linked to conditions such as Parkinson's and Alzheimer's disease, but the dangers associated with dust can be controlled through use of proper equipment (Jumpponen, Ronkkomaki et al. 2014). The design of modern cement kilns, which use temperatures in excess of 1450oC, ensures that dangerous or toxic compounds (such as dioxins) are completely broken down (Karstensen 2008). Lafarge is actively engaging with its workers around the world on dust control, as this is a key issue for the company; they have also engaged in road safety training with relevant stakeholders, and highlighted this issue in 2013 (Lafarge 2013).

SOCIAL LICENCE

The concept of 'social licence' is not new, but instead evolved from the older concept of 'corporate social responsibility' – essentially the requirement that companies behave in a socially aware and positive fashion in developing, implementing, and operating their businesses.

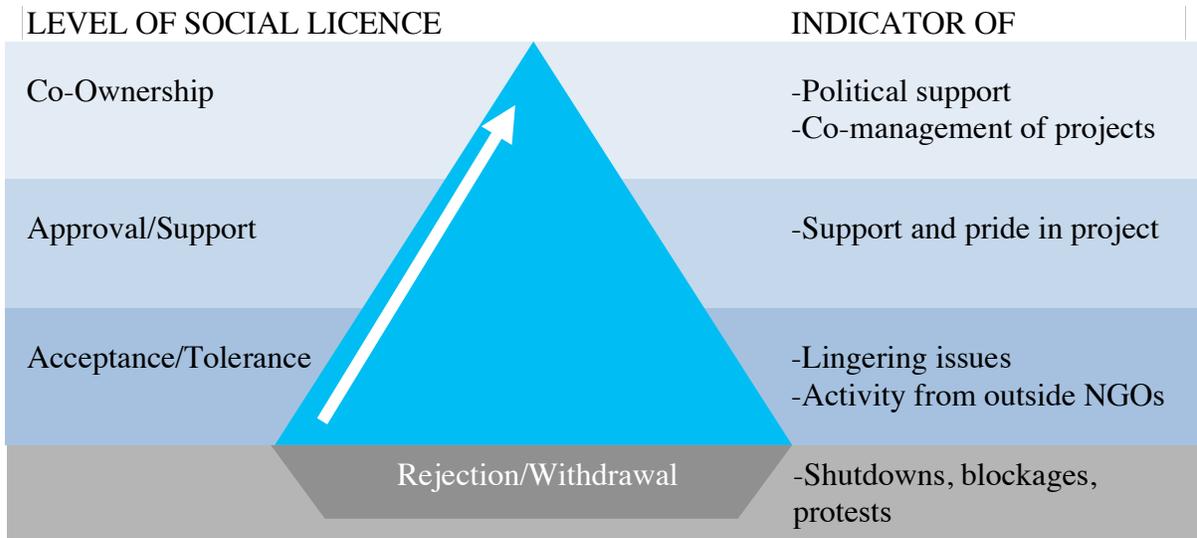
Jim Cooney, an engineer with long experience in the mining sector, coined the term 'social licence to operate' in 1997 as a key consideration for the mining industry in gaining approval for new projects. The term has since spread to many other sectors, including the development of pipelines and new oil sands projects (Leyne 2014).

The term has received a fair bit of publicity in Canada lately. Terence Corcoran wrote a scathing article in the Financial Post on April 22, 2014, which pointed out that “...*its proponents refuse to, or simply cannot, define the concept*” and that the concept “...*appoints the governments and politicians as overseers of endless direct public negotiations between corporations and people*” (Corcoran 2014).

Jeffrey Simpson published a similar piece recently in the Globe and Mail, in which he points out a significant problem with social licence: the fact that we don't, in fact, know what it is. As he states, “...*we seem to have reached a point where even the most exhaustive examination by an apparently expert panel does not provide for enough 'consultation' and for 'social licence' to have been achieved*” (Simpson 2014).

Brian Lee Crowley, with the Macdonald-Laurier Institute, is highly critical of the concept, stating that social licence has become “...*a kind of extra-legal, outside the law way of people who oppose change to get their way in spite of the law*” (Crowley 2014).

Boutilier and Thomson have described a hierarchy to the levels of social licence, illustrated below (Navigator 2014, SocialLicense.com 2014).



FIRST ATTEMPT

In 2003, Lafarge’s Bath Plant launched an “Alternative Fuels Project” which would run until 2008. This project did not meet with success and was ultimately stopped by Lafarge. The timeline on the next page describes the various actions that led to this decision.

One of the main issues with the Alternative Fuels Project was that it focused on used tires as a fuel. In Ontario, most discarded tires are classified as municipal solid waste and are sent to landfill (Nova Scotia Environment 2007). Studies that have examined alternative uses for these tires have identified cement kilns as an optimal approach to disposal (Schmidthals and Schmidthals 2003, Fiksel, Bakshi et al. 2011), and nearly 60% of used tires in the US are currently disposed of in this fashion (World Business Council for Sustainable Development and International Energy Agency 2009). In Canada, only 20% of tires are sent to cement kilns (Environment Canada 2014). It has been shown that using tires instead of coal can reduce CO₂, SO₂ and NO_x emissions significantly (Portland Cement Association 2008). Lafarge’s Alternative Fuel Project (2003-2008) would have used tires as the dominant alternative fuel, although other feedstock (including biomass fuels and plastics) would also have been included (Cumming 2014).

A number of issues were raised by community members and by the NGO community at large. These issues included the need to respect legal rights, the need to track emission changes and to estimate the cumulative effects of introducing alternative fuels, and the deep desire of most to see a full Environmental Assessment Review process undertaken (Cumming 2014).

In the timeline that follows on the next page, key activities are described with links to relevant documents and stories.



TIMELINE – “ALTERNATIVE FUELS PROJECT”, 2003 - 2008

2003 Lafarge's Bath Plant launches its *Alternative Fuels Program*, which focused on burning tires and other waste material in the kiln.

2005 On November 25, 2005 it was reported that the Lafarge Bath Plant would be ultimately be permitted to burn old tires and garbage including wood, plastics, and organics, as soon as certificates of approval were issued by the government. This plan was immediately criticized by the Loyalist Environmental Coalition, who noted that the project was given the go-ahead without a stand-alone environmental assessment despite requests from the public that such an assessment be carried out (Solid Waste & Recycling 2005, Pritchett 2006).

2006 On December 21 2006, the Ontario Ministry of Environment and Climate Change had provided Lafarge with two certificates of approval, which would allow the plant to replace up to 30% of its fuel with used tires and other municipal wastes. Among other measures, the approvals required Lafarge to meet Ontario's A7 air guideline emissions limits (Ontario Ministry of Environment and Climate Change 2006). Immediately, groups such as Lake Ontario Waterkeeper, the Sierra Legal Defence Fund, and the Canadian Environmental Law Association – as well as two community groups – began to organize to appeal the decision. Major concerns included the storage of tires and other waste on the Lafarge site, which people felt might lead to groundwater contamination and other environmental or health hazards (CBC News 2007).

2007 On September 11 2007, the Ontario Environmental Review Tribunal (ERT) began independent hearings, which examined Lafarge’s plan to burn tires, a necessary step before an appeal to the approvals could be launched. The Environmental Review Tribunal is appointed by the Government of Ontario and is an independent body that reviews applications and appeals under environmental statutes. The public launched this process based on fears that burning tires in the kiln would lead to the emission of contaminants that could be hazardous to human or environmental health. Key players included community members, Lake Ontario Waterkeeper and Gord Downie, other members of the Tragically Hip, Clean Air Bath, and the Loyalist Environmental Coalition (Solid Waste & Recycling 2007).

2008 In the spring of 2008, the ERT granted the community the right to appeal the Lafarge approvals. While Lafarge sought judicial review in order to stop these appeals, the Ontario Divisional Court ruled that citizens had the right to continue based on four key criteria, including the fact that at the time the Ontario government had limited experience with regulating tire burning (Solid Waste & Recycling 2008). Lafarge continued to appeal the process through the fall of 2008 but was unsuccessful, despite the fact that alternative fuels had been accepted and were in use in other jurisdictions in North America by that time (southwesternontario.ca 2008). When the Ontario Court of Appeal denied Lafarge’s motion on November 26, 2008, the company made a decision to abandon the alternative fuels project (Mitchell 2009).

REVISE AND REFOCUS

Flash forward to 2010. Lafarge still has a requirement to reduce its greenhouse gas emissions, but the environmental rationale for undertaking this kind of work has grown. The company recognizes that “true sustainability makes Lafarge a stronger competitor, both now and in the long run” (Cumming 2014). The plant at Bath must be updated in order to remain competitive – should no upgrades be undertaken, eventually the plant would close. Lafarge has a new logo tagline – “Building Better Cities” – and a commitment to being part of processes such as LEED, which recognize green initiatives. In light of these issues, Lafarge’s Bath Plant launched Cement 2020 and the Low Carbon Fuels Project, which are aimed at developing the knowledge required to drastically reduce GHG emissions in the cement industry.

A big difference between 2010 and 2003 is the alternative fuel of choice. In the Low Carbon Fuels project, Lafarge has chosen to focus initially on biomass fuels. Wood residues are currently the mostly widely used biomass fuel in the Canadian cement industry. They include things like bark, sawdust, and chips from the forest products sector, slash from forest harvesting, urban wood waste, construction and demolition waste, and treated wood waste like railway ties or utility poles (Miller and Tillman 2008). Burning these fuels produces fewer emissions of sulphur, heavy metals, and particulates compared to coal (Mackes and Lightburn 2003). While Environmental Compliance Approvals must be obtained, there are no scientific concerns with using railway ties or utility poles in cement kilns as all of the organic components are completely consumed,

although the operator must keep chloride and chromium levels below the allowable limits (0.76 kg/t and 0.1 kg/t, respectively) (Environment Canada 2004). The Lafarge Low Carbon Fuel project is considering construction and demolition waste, railway ties, and utility poles, in addition to asphalt shingles (a low-biomass alternative fuel that is also included in construction and demolition streams).

Another change is Lafarge Canada’s increasing corporate focus on *Community Development and Outreach*. As noted in their 2013 annual report (Lafarge 2013), the company recognizes that their success is closely tied to the communities around their sites. A key focus for 2013 was embedding stakeholder engagement within the Lafarge organization. As described on the next page, the Bath Plant development of a Low Carbon Fuels Project is a good example of stakeholder engagement at the local level, and development of the project involved many of the tools that Lafarge has employed in other projects in countries around the world, particularly in the form of education and partnerships.

On the following page, a short timeline of the Low Carbon Fuels project to date is provided.



*Construction and demolition waste
after a rough sort, before milling and screening
October 2014 (Photo by W. Mabee)*

TIMELINE – “LOW CARBON FUELS PROJECT”, 2012 - PRESENT

2010 Lafarge established their ‘energy farm’ to start assessing the potential to grow biomass feedstock for the express purpose of energy production. At the same time, test burns are carried out to assess the potential to burn straw in the kiln (Lafarge 2013). Early work was funded by NRCan and the Asia Pacific Partnership. At this point in time, Queen’s University became involved as a major partner with responsibility for carrying out arms-length, independent assessment of the environmental benefits of using these fuels.

2012 Lafarge launches a new alternative fuels initiative called the ‘Low Carbon Fuel’ project and applies for permits to demonstrate construction and demolition waste, railway ties, asphalt shingles and utility poles. Under the permits, the fuels can be used in the kiln at ratios of up to 10% of the total fuel requirement, with monitoring to assess the effects on emissions and clinker quality (Schliesmann 2012). The long-term goal of the company is to reach 30% fuel switching to low carbon fuels. At the same time, Lafarge applies for joint funding under the ecoEnergy program (Natural

Resources Canada) and the Carbon Management Canada agency with Queen's University, WWF Canada, Scott Environmental, Rail Link, and the Canadian Cement Association. Approximately \$2,680,000 of funding is awarded from ecoEnergy, and \$400,000 is awarded from Carbon Management Canada, in order to support the pilot plant for the project (Government of Canada 2014).

2014 Lafarge completes the infrastructure upgrades required to implement the low carbon fuels system at its Bath Plant. The plant can handle 75 tonnes of feedstock per day, which allows them to substitute alternative, low carbon fuels for about 10% of their current coal and petroleum coke fuel.



WHAT'S DIFFERENT?

Rob Cumming, Manager of Environment and Public Affairs, summarizes the key differences between the two projects as follows:

- Going slower, doing an Environmental Assessment Review Process
- Including Queen's and Environmental NGOs each step of the way
- Full transparency commitment
- Do a test first, then move to permanent use
- Include cumulative effects in assessments
- Independent researchers and independent funding
- Focusing on fuels that produce clear benefits
- Applying a sustainability model

IMPLICATIONS FOR HEALTH AND SAFETY

Lafarge identifies health and safety performance as their number one priority (Lafarge 2013). The Lafarge corporate Health and Safety program focuses on three major pillars: noise, dust, and ergonomics. The development of the Low Carbon Fuel project has created a new source of potential problems on site. Dust control in particular is essential, as this material is extremely flammable and can cause human health issues if inhaled. The new low carbon fuel handling facility is equipped with state-of-the-art dust control in order to ensure that these problems do not become an issue. These issues are being monitored in order to ensure that this problem does not adversely impact health and safety of Lafarge employees and contractors.

LOOKING TO 2015

The plant is in the midst of analyzing the results of a first demonstration of low carbon fuels in the kiln. This was a 10% mix with petroleum coke and coal making up the difference. Emissions are being measured by a third-party company, and will be validated by Queen's University. Baseline tests undertaken in 2010 and again in 2014 provide the basis for analyzing these fuels. If there are changes in the character or amounts of emissions, the tests will highlight them. Thus, any potential risks associated with the combustion of low carbon fuels will be highlighted.

At the same time, a full environmental assessment review is underway and reports will be submitted by early 2015. Part of these reports will be a full life cycle assessment (LCA) of the low carbon fuels, including their collection, storage, transport, and combustion. The LCA will highlight potential problems that may arise during the various stages of low carbon fuel sourcing. It will also provide a comparative analysis of the ability of low carbon fuels to actually reduce fossil carbon emissions by a significant amount.

QUESTIONS

1. What do you think of the concept of low carbon fuels? What would be the key arguments for using these fuels, and are there reasons you would not want to use these fuels in the cement industry?
2. Is there information not present in this report that would be required to make a decision about the use of low carbon fuels in a cement plant?
3. What do you think of the concept of social licence to operate? Using the conceptual graph on page 5, describe where Lafarge might fit and how they might move towards a stronger social licence for the low carbon fuel project.
4. Some feel that social licence is impossible to obtain. How much emphasis should a company like Lafarge put on obtaining such a licence? What are your opinions on the concept?
5. Did Lafarge take the right approach during the earlier Alternative Fuels Project? What mistakes do you think the company might have made? Are the decisions that have been made about the current Low Carbon Fuels project sufficient to address issues that might have applied to the previous project? What might you do differently with the Low Carbon Fuel Project in order to ensure that community support for the project was forthcoming?

ASSIGNMENT

Prepare a summary presentation, which describes a strategy for obtaining social licence for the Lafarge Bath Plant operations. You must highlight the mechanisms you will use to engage with various groups, including communication strategies.