

# WWF Climate Savers innovation cases: Lafarge



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Climate Savers

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# Lafarge: Focus on Sustainable Construction

Starting out in 1833 as a limestone mining company, Lafarge now operates in 78 countries, employs 76,000 people and has 1,963 production sites worldwide. The Group is a world leader in cement, takes the second world position in aggregates, and is third worldwide in both concrete and gypsum. Lafarge creates high value-added solutions encouraging creativity whilst leaving a lighter trace on the world. ‘A



new take on construction’, is more than just a slogan for Lafarge. The time has come to develop ‘sustainable buildings’ which take into account ecologically sound materials, advances in construction techniques, and respect for the environment. From 1990 to 2010 Lafarge had achieved 20% reduction of CO<sub>2</sub> emission. Reduction of dust, SO<sub>2</sub> and NO<sub>x</sub> respectively by 35%, 20% and 20% from 2005 to 2012.<sup>1</sup> All plants have an internal environmental audit at least once every four years. All plants are built with industrial water recycling system and control solid wastes within 1%. 85% of Lafarge quarries have rehabilitation plans.

This case investigates Lafarge sustainable experience with a particular emphasis on China. That country that recorded double-digit growth in demand for cement in the past five years, with continuous increase forecast until 2014.

## Introduction

The Lafarge story begins at a place called ‘Lafarge’ (the forge) near the village of Teil in the Ardèche region.<sup>2</sup> Joseph-Auguste Pavin de Lafarge founded a business there, quarrying limestone. His two sons, Edouard and Léon, developed the family company, which became known as Lafarge Frères in 1848. In 1864 Lafarge won the ‘contract of the century’ in Egypt, providing 200,000 tons of hydraulic lime in wooden barrels to build the piers of the Suez Canal.

Lafarge was ranked 6th in the Carbon Disclosure Project and entered the Dow Jones Sustainability Index in 2010 in recognition its sustainable development actions. With the world’s leading building materials research facility, Lafarge places innovation at the heart of its priorities, working for sustainable construction and architectural creativity.

In 2007, Lafarge Group launched worldwide its Sustainability Ambitions 2012 programme, striving to become an exemplar in environmental protection, social responsibility and corporate management. Lafarge chose to concentrate on areas where it has major environmental and social challenges and where

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<sup>1</sup> Any cement plant may emit stack dust, NO<sub>x</sub>, SO<sub>x</sub> persistent pollutants which might lead to acid rains.

<sup>2</sup> Source: [http://www.lafarge.com/02182009-group-lafarge\\_timeline-uk.html](http://www.lafarge.com/02182009-group-lafarge_timeline-uk.html)

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it can make a real difference, leading to a positive influence throughout the industry. The Group set the deadlines and ambitions for:

- management (i.e. safety, fair competition, local communities, satisfied customers);
- social impact (such as increasing the female population in senior management);
- environmental impact (employee skills, health, HIV/AIDS, environmental audits, quarry rehabilitation, biodiversity, CO<sub>2</sub> and other missions).<sup>3</sup>

As Lafarge Chairman and CEO Bruno Lafont comments:

Today's rapidly changing building materials industry is undergoing tremendous transformation and change of global economic development, population growth, emerging environmental and social issues – given us as well new responsibilities. We are accelerating the pace in order to better predict these changes and respond to new challenges in our business model to become the industry model. All of our global business areas are to promote best practices; also we focus on innovation activities, and close cooperation with the construction industry partners.

In line with the Group's Sustainability Ambitions 2012, Lafarge Group is also committed to sustainable development in China. In this case Lafarge is becoming an industrial model for sustainable development in China. We tell four stories from Lafarge experience in the Chinese market, namely: internal cleanup, industrial ecology (based on the Chongqing Nanshan plant), the Green Chongqing programme and the Cement Sustainable Initiative.

### **Lafarge in China: Strategy Overview**

Lafarge entered China in 1994 and has developed rapidly since then. As part of its development strategy, in November 2005 Lafarge established a joint venture with Hong Kong Shui On Construction and Materials Ltd. (SOCAM), called Lafarge Shui On Cement Ltd, or Lafarge Shui On, with headquarters in Beijing. Lafarge has a 55 per cent stake in this venture. Lafarge Shui On has grown to be a leading company in the cement industry in southwestern China. At the time of writing the group has thirty-seven plants, including twenty cement plants, seven aggregates and concrete plants and ten cement mills. The cement plants alone have more than 10,000 employees and an annual capacity of 30 million tons. Lafarge Shui On's major business units are located in Beijing, Chongqing, Sichuan, Guizhou and Yunnan.

In joint ventures and other collaborations, Lafarge insists that management follow its own sustainability concept and framework. This framework directs collaborative activity towards value creation, respect for people and local culture, environmental protection, protection of natural resources and energy.

In China Lafarge adheres to strict management measures to achieve energy conservation and environmental protection. These measures include quarry rehabilitation, the shutting down of backward production lines, the use of recycled resources, the development and utilization of alternative fuels and raw materials to conserve natural resources and improve production efficiency. Additionally, Lafarge China establishes dust, nitrogen oxides and sulfur dioxide emission reduction targets. These are aligned with the Lafarge Group's global goals. 'Emerge unstained from the filth' is the Lafarge China

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<sup>3</sup> For full details of Sustainability Ambitions 2012 please SEE pages 42 and 43 of the Sustainability Report 2006: [http://www.lafarge.com/05032007-publication\\_sustainable\\_development-report2006-uk.pdf](http://www.lafarge.com/05032007-publication_sustainable_development-report2006-uk.pdf)

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environmental policy.<sup>4</sup> Group Vice President Christopher Boyd says in this regard: ‘For our company, environment is a strategic issue and a policy. We are convinced that unless we are concerned about the environment and communities in social development, in the long term, we won’t survive. Our environmental policy is to make sure that all the factories perform the same environmental standards. When we buy an old factory, the first thing we do is spend some time making sure that the plant will address our uniform environmental standards.’

Lafarge’s environmental policy includes protection of cultural monuments as well. For example, in 1998, a series of historic kilns dating back from the Song Dynasty, 800 years ago, were discovered during the construction of the Lafarge Dujiangyan Plant in Sichuan Province. To protect this valued heritage, Lafarge stopped construction, invested RMB 6.2 million<sup>5</sup> to restore the relics and built a museum named the Lafarge Shui On Jinfeng Kiln Museum.

### **The manufacturing process**

The manufacturing of cement by Lafarge Shui On generally involves the following steps:

- ⇒ **Quarrying and blasting:** the raw materials that are used to manufacture cement are blasted from the quarry.
- ⇒ **Transport:** the raw materials are loaded into a dumper.
- ⇒ **Crushing and transportation:** the raw materials, after crushing, are transported to the plant by conveyor. The plant stores the materials before they are homogenized.
- ⇒ **Raw grinding:** the raw materials are very finely ground in order to produce the raw mix.
- ⇒ **Burning and cooling:** the raw mix is preheated before it goes into the kiln, which is heated at a temperature of up to 2,000 degrees C. The raw mix burns at 1,500 degrees C producing clinker which, when it leaves the kiln, is rapidly cooled with air fans.
- ⇒ **Finish grinding:** the clinker and gypsum are very finely ground giving ‘pure cement’. Other secondary additives and cementitious materials can also be added to make a blended cement.
- ⇒ **Storage, packing, dispatch:** the cement is stored in silos before being dispatched either in bulk or in bags to its final destination.

Lafarge Shui On has set 6 priorities: safety, people development, energy saving and emission reduction, quarry rehabilitation, optimized production and customers, and corporate social responsibility.

### **Internal cleanup**

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<sup>4</sup> This is a famous Chinese phrase from a traditional poem; the metaphor of a lotus describes a noble personality.

<sup>5</sup> RMB, Renminbi (sign ¥; code CNY) is the official currency of the People’s Republic of China (PRC).



*Photo: The current view of rehabilitated Dujiangyan quarry*

Faced with oversupply in the sector, the government introduced environmental controls that shut down a number of old kilns, with the assumption that if the market gets better these old kilns would be used again. Lafarge decided to destroy old kilns completely instead of merely shutting them down. From 2005 Lafarge Shui On closed down 41 obsolete kiln production lines and has invested over four billion RMB in upgrading technology and building new kilns, which resulted in a significant contribution to Lafarge's net CO<sub>2</sub> emission reduction.

Thus by removing inefficient capacity from their balance sheet, Lafarge have been able to synchronize their responses to local market conditions and global emissions targets. Another mechanism for encouraging this kind of benefit is the Clean Development Mechanism (CDM)<sup>6</sup> introduced by Kyoto protocol.

As explained by Xiaohong Fan, Environment VP of Lafarge Shui On:

To fulfill the Kyoto protocol, developed countries have to find absolute reductions in their emissions. Energy efficiency of industry in the developed countries is generally very high, so there are few opportunities for significant efficiency gains. However investments in less developed countries can deliver rapid improvements from fairly straightforward improvements to older, less efficient technology. These efficiency gains lead to profits for the parent company, and also reportable energy savings and emissions reductions.

This mechanism (the CDM) is commonly available to multi-national companies; however because Lafarge Shui On is a French and Hong Kong joint venture, the company is not eligible for CDM reporting. Despite this, Lafarge continues with its investment in waste heat recovery. Its current dry kiln production lines and new ones to be built in future will all operate with Waste Heat Recovery (WHR).<sup>7</sup> At present, four plants are operating within the Lafarge WHR project: Chongqing Nanshan Plant, Special Plant, Yunan Kaiyuan Plant and Sichuan Dujiangyan Plant. RMB 60-90 million were invested by Lafarge in each WHR project. WHR needs large capital investment, but can result in major emission reductions and cost savings in the form of energy bills. For example, 70k-90k tons of CO<sub>2</sub> emission have been saved by each WHR project each year, which is significant emission reduction.

Lafarge Group has set a target of cutting worldwide net CO<sub>2</sub> emissions per ton of cement by 20 per cent by the end of 2010 as compared to 1990. This target had been reached by 2009; in 2010 the figure amounted to a 21.7 per cent reduction. As Xiaohong Fan says:

In China, the target has been exceeded ahead of schedule and we have reduced net CO<sub>2</sub> emissions by 28% compared to 1990. The first important reason that we can get such great performance is that we have acquired a great number of old factories and old kilns and shut them down.

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<sup>6</sup> The CDM allows industrialized countries to invest in emission reductions wherever it is cheapest globally.

<sup>7</sup> In traditional cement production process, approximately 45% of the waste heat is discharged via the waste gas chimney at the kiln head and end, which results in energy waste and pollution. Lafarge Shui On embarked on an initiative to improve energy efficiency by recovering and utilizing general heat as an alternate source of energy.

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Compared to traditional kilns, the dry kiln has advantages such as low energy consumption and low emissions. The dry kilns can better realize recovery of unused heat and convert it into electricity, which is consistent with the energy conservation and environmental protection.

It should be noted that Lafarge products have significantly different cost structures. Raw materials from quarries contribute relatively little to the cost of cement. Energy costs are a significant element, accounting for 32 per cent of the cement cost structure. In order to improve energy efficiency Lafarge designed a special information system. For example, the Group has data and control experience as part of an information expert intelligent system called 'Lucie', which is helpful for optimizing the operation plans. Lafarge's information technologies include:

- Lafarge's Lucie expert system which uses automatic control guided by artificial intelligence instead of manual control, and is able to create and implement optimal operation control plans fast and accurately;
- The Maximo system, which helps to keep the equipment at its optimum level of performance by optimizing maintenance;
- The T-One project which builds central finance, purchasing, sales and logistics platforms for all Lafarge companies and plants.

Central purchasing aligns plant inventories, avoiding waste of resources. While using the Lucie system to apply intelligent control to plant production, Lafarge Shui On Cement plants also apply online monitoring of dust and SO<sub>2</sub> emission through Central Control Room according to the local requirements for environmental protection, and to quickly identify and correct incidents to ensure stability and compliance with standards. Lafarge has developed a sustainable development database system to record and analyze safety and environment indicators of its global plants on a monthly, quarterly and yearly basis, to timely identify abnormal data and implement corrective actions. It provides an online tool to calculate corporate CO<sub>2</sub> emissions and a plant CO<sub>2</sub> emission, which helps managers at various levels to simulate, calculate and benchmark CO<sub>2</sub> emissions within their scope of management, providing a reliable basis for setting emission reduction targets for the following year.

To ensure authenticity and reliability of data, Lafarge employs an independent third party auditor to verify and correct the database every year. Additionally, a cleaning contest in packing workshops and housekeeping has fully mobilized employees' enthusiasm and creativity in order to improve the work environment. Dust fugitive emissions were effectively controlled and the cleanliness of factory environment was further improved. Taking advantage of ISO14001 environmental management system tools, Lafarge has managed environmental problems systematically to continuously improve its environmental performance.

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Lafarge Shui On Cement was selected by the Ministry of Industry and Information Technology<sup>8</sup> (MIIT) as one of 60 pilot companies<sup>9</sup> for integrating the information technology in order to promote energy saving and emission reduction. Recommended by the Information Centre of China Building Material Federation, Lafarge Shui On Cement's documents were highly praised and all experts were impressed by the Group's sustainable development practice and energy saving and emission reduction performance. One example of best practice is the Chongqing Nanshan plant.

### **Industrial ecology: the story of Chongqing Nanshan Plant**

First established in 1935, Lafarge Chongqing Nanshan plant was called Chongqing Cement plant, which became a state-owned enterprise after 1949. From 2003 it became part of the joint venture with Lafarge. Originally there were 3,800 people working at the plant. Today there are only 300, but production capacity has doubled. Environmental protection has also been improved significantly. To begin with, to reduce high energy consumption Lafarge has eliminated a number of obsolete production capacities like cement mixing piles. Dust collectors were also inadequate and had low efficiency, and Lafarge invested in more and better dust collecting equipment.

According to Wei Zhao, the Nanshan plant manager:

Previously, the sludge in the sewage treatment plant needed to be buried or incinerated, but this is no longer allowable. So the sewage sludge has long been a major problem to Chongqing government. Our cement plant deals with that sludge using our cement high-temperature calcinations process in which the maximum temperature may reach 1450 degrees. There is no any harm to the environment and we help the local community to solve a big problem.

Sludge<sup>10</sup> is a by-product of sewage treatment plant and contains large quantities of heavy metals therefore not suitable for being used as agricultural fertilizers. Lafarge disposes the sludge into the production process using it as a secondary raw material. The sludge contains high percentage of water. The kilns calcinate it with heat. The water evaporates and other biogenic substances are decomposed by the high temperature. Remaining contents are similar to cement raw materials plus heavy metals. Lafarge made some R&D and analyzed that there was no impacts on manufactory process and the production capacities could easily reach the standards. Now through the laboratory tests, Lafarge can manage the process.

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<sup>8</sup> In order to further intensify its efforts to ensure the realization of the targets of the 11th Five Year Plan on energy saving & emission reduction, MITI launched in May 2010 an assessment of the work of these pilot companies on Integrating Information Technology into Industrialization for the Promotion of Energy Saving and Emission Reduction.

<sup>9</sup> The 60 pilot companies covered 12 key industries: petrochemical, steel, nonferrous metals, building materials, information, light industry, textiles, equipment, logistics, coal, electricity and platform services. Many large state-owned enterprises like China National Petroleum Corporation, China Petrochemical Corporation, China Aluminums, BaoSteel, Anshan Iron and Steel were included.

<sup>10</sup> Research shows that the production of cement with sludge and without sludge has similar impact on the environment. However other treatments (burial and incineration) of sludge have significant negative impact on environment.



Photo: Sludge unloading

Social responsibility dictates that Lafarge must dispose of the sludge in a way that reduces the impact on the environment. ‘We had to adjust the formula ratio of raw materials and reverse our operators’ mindset’, says Wei Zhao. ‘The cement companies in Chongqing and from other cities and the construction committee all came to visit us to see our work. They thought that disposal of the sludge would be smelly. But our environment is very clean, and you can smell nothing. We are a model in Chongqing. We are thankful that the Chinese Government has given us some subsidies here.’ The Chinese Government is now increasing the amount of subsidy to encourage the whole cement industry to use this sludge treatment. But, Wei Zhao foresaw that the sludge will soon become a commodity due to the high demand and the government won’t need to subsidize.

In one of the Chinese Cement Industry Exchange Meetings, Lafarge proposed the concept of zero emissions and reducing energy consumption, and suggested Lafarge Shui On as an example of best practice. At present, in China cement producers are still using some low quality coal. These producers also calcinate more clinkers, which leads higher carbon emissions. Lafarge is trying to minimize the use of clinkers, increase the use of mixed additives and thus reduce the use of materials and therefore energy and emissions. For additives, initially the Group used materials such as natural gypsum but now Lafarge is looking for alternatives in industrial waste such as steel slag, desulfurized gypsum and sulfuric acid residue. This will help to both reduce emissions and produce less waste.



Photo: Sludge storage silo

to  
raw



Photo: Sludge pump

In China these scrap materials were a headache to steel and power stations and were originally free of charge. When Lafarge started to use them, other cement producers followed and as a result there emerged a market for such solid waste. Now, says Wei Zhao, as more and more producers have started to use this technology and resource,

Chongqing Tang Jia Tuo sewage treatment plant uses heavy steel slag, steel slag and sulfuric acid residue, and we are exploring their use also. To add to this, we are trying to find other alternatives to minimize the use of coal. We are also looking for dry sludge. And our Doujiangyan plant has started to use mushroom compost, which has calorific value and could be used as a secondary fuel.

The mushroom compost contains some soil. Some tissue in the roots of mushrooms contains carbon, which contains calorific value. Lafarge Chongqing Nanshan plant started using dry sludge from the beginning of 2011. The wet sludge contains 70% to 80% water. The dry sludge contains

less water and has some calorific value. It can be mixed with coal. In 2012 Lafarge is targeting at direct usage of dry sludge to replace part of the coal. After three months of piloting in 2011 and getting satisfactory results, coal replacement is becoming the main project for 2012.



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Additionally, Lafarge Chongqing Nanshan is trying to minimize the emission of sulphide and dioxides. This project is at R&D stage and only the Nanshan plant has installed the new desulfurization and denitrification facilities. Other Lafarge Shui On Cement plants have not started adopted these technologies. The Chongqing Environmental Protection Bureau has been very encouraging and supportive. The Nanshan plant is now the model for best practice in the area, and if its desulfurization and denitrification programme succeeds, the Chongqing Environmental Protection Bureau will require all cement plants to adopt similar programmes.

As Wei Zhao says:

We started doing waste heat recovery in Chongqing early in 2008. In other cities, there were plants already doing this, but not in Chongqing. Previously, high-temperature gases were discharged into the air and had great impact on the atmosphere. This also wasted a lot of energy. Waste heat recovery can prevent heat lost and use it to generate electricity. We use 7.5MW waste heat generators, which save energy and reduce CO<sub>2</sub> emission. Because we use less electricity, this generates considerable economic benefits.

All the electricity generated in this way is used directly in Nanshan kilns and mills and reduces dependence on purchased electricity. It is equivalent to a small power plant. The goal set by the environmental protection bureau is now that all the cement plants in Chongqing do waste heat recovery.

All Lafarge plants including Chongqing Nanshan have achieved significant environmental performance. From 2005 to 2009, the production capacity of all Lafarge plants in China increased by 30 per cent. Meanwhile, the overall dust, NO<sub>x</sub> and SO<sub>2</sub> emissions were cut by 87 per cent, 34 per cent and 71 per cent respectively. Dust, NO<sub>x</sub> and SO<sub>2</sub> emissions were cut by 90 per cent, 49 per cent and 79 per cent respectively in the production of per tonne of clinker in cement plants. Compared to 1990, by 2009 Lafarge had cut CO<sub>2</sub> emissions per tonne of cement by 29 per cent. Lafarge China's emission reduction targets were met ahead of schedule. Meanwhile, the average energy consumption per unit of product has met and exceeded the advanced level recommended by China's national standard (GB16780-2007: The norm of energy consumption per unit product of cement. Today, Lafarge is able to dispose of 34,000 tons of sludge annually and received over 100 RMB Yuan subsidy for disposing one tons of sludge, however they made no profit out of it. This is "solely for the benefit of the society" according to Qing Wang, one of the industrial directors of Lafarge China. This could also reduce the consumption of natural resources and Lafarge is doing R&D on industrial ecology and residue alternative materials.

All Lafarge plants are looking for available alternative resources. For example, Lafarge is looking at using municipal waste as a form of fuel. After garbage has decomposed, some impurities have calorific value that can be used by cement producers. Some successful experiments have already been carried out.

### **Green Chongqing programme**

Following on from all these projects, Lafarge China has started the 'Green Chongqing Project'. The idea is to introduce environmentally friendly construction materials and concrete blocks which are much lighter and consume less cement. As part of this project, some industrial wastes are considered and used to meet heat insulation and thermal insulation requirements.

On 23 September 2011 Lafarge announced the opening of its Sustainable Construction Development Lab in Chongqing and signed the Alliance Agreement with Chongqing University on the occasion of Chongqing Mayor's International Economic Advisory Council (CMIA). Located at Lafarge Shui On's

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Nanshan plant in Chongqing, the Sustainable Construction Development Lab is the first such facility opened worldwide in Lafarge Group. As an extension of its R&D Centre in Lyon, France, the Lab is fully equipped with Lafarge's cutting-edge technologies. The mission of the Lab is to develop new and advanced construction materials products and solutions for its customers in China, based on local materials and conditions. A 1000 square-metre building houses 30 technicians and is a base for experts from the Lafarge R&D centre and others from outside Lafarge to work together.

The Lab will focus on co-developing new products with Chongqing University. Joint projects include the development of innovative construction materials and products and also training and research programmes with PhD students which will focus on the development of advanced construction materials. As Liao Qingxuan, Deputy Secretary-General of Chongqing Municipal People's Government said in the opening ceremony, 'as a municipality of over 30 million people, it is critical for Chongqing to develop itself in a sustainable way in various areas including construction field. Lafarge, being a good model in sustainable development in the building materials industry, has brought to China, especially Chongqing many of its good experiences and concepts in the past years.'

The construction sector is responsible for about 40 per cent of global energy consumption and 30 per cent of global greenhouse gas emissions. Meeting these challenges means taking into account the whole lifespan of the building, from the mining of materials to the recycling of a building and including its construction, use and demolition worldwide. Lafarge dedicates more than €150 million each year to R&D, technology and innovation in products, systems and industrial processes globally. More than 60 per cent of this budget is dedicated to sustainable construction.

Lafarge Group and Chongqing Municipal Government have also signed a strategic cooperation agreement to further promote the sustainable development of Chongqing because it saw that infrastructure and municipal construction were developing particularly fast in the region. The agreement covers all of Lafarge's business in China, including cement, aggregates and concrete, and gypsum building materials. The agreement reaffirms the Chongqing Municipal Government's mission to promote sustainable urban development and create a harmonious society, and also expresses the Lafarge Group's intent to use its extensive global experience in building materials to provide innovative solutions and to provide the public with safer, more comfortable buildings and a high-quality environment. Through the establishment of this strategic partnership, Lafarge will cooperate with Chongqing Municipality in several areas:

- Waste heat recovery
- Sewage sludge treatment
- Other solid waste disposal and utilization

A deeper cooperation is expected to jointly promote the Chongqing region and China's sustainable development, and to actively promote 'green building' to save energy and improve resource utilization. Executing the strategic cooperation agreement, Lafarge initiated the 'Green Chongqing Project'. Lafarge wanted to contribute to the sustainable development of Chongqing. Other bodies have joined the Green Chongqing Project including the Architectural Design Institute, Forrest Administration and Bureau of Landscaping of Chongqing Municipality. The project has now been extended to green hotels. Lafarge is providing some experience for the energy saving plan and it is already looking like a chain of reaction. The next step is to develop solar energy as a source of electric power for buildings. Currently, Lafarge

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is contracting local construction companies and Architectural design institute to put as much as green buildings and green materials into use as possible with contemporary technologies.

### **Cement Sustainable Initiative**

Lafarge Group actively promotes communication on sustainable development in the cement industry through the Cement Sustainability Initiative (CSI). This is a sustainability programme developed by the world's leading cement businesses within the framework of World Business Council for Sustainable Development<sup>11</sup> (WBCSD). The purpose of this initiative is to (<http://www.wbcscement.org/>):

- explore what sustainable development means for the cement industry;
- identify and facilitate actions that companies can take as a group and individually to accelerate the move toward sustainable development;
- provide a framework through which other cement companies can become involved;
- provide a framework for engaging external stakeholders.

There are 24 major cement enterprises involved, which together account for more than 40 per cent of the world's cement production. CSI is one of the largest sustainability projects launched by a single industry. CSI's main working areas include (<http://www.wbcscement.org/>):

- CO<sub>2</sub> and climate protection
- fuel & raw materials use
- employee health and safety
- pollution reduction and monitoring
- impact on local land and communities
- reporting and communications
- concrete recycling
- sustainable development of advantage of concrete

To promote the sustainable development of China's cement industry, which represents 50 per cent of the world's cement production capacity, in June 2009 Lafarge co-organized the China Top Cement Enterprise CEO roundtable with the China Cement Association. This brought together CEOs from fifteen of China's top cement manufacturers to share Lafarge's experience and strategy of sustainable

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<sup>11</sup> World Cement Sustainability Initiative Action Group (Cement Sustainability Initiative, referred to as CSI) is a branch United Nations World Business Council for Sustainable Development (WBCSD) and is an independent non-governmental organization. Its aim is to work together to promote the sustainable development of the world's cement industry and fulfill its obligations to the society.

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development with. These leaders all signed the China Top Cement Enterprise Declaration on sustainable development, the first joint commitment on sustainable development made by the Chinese cement industry. Following this meeting, the China Building Materials Group, Materials Group, China Resources Group, Tianrui Group Yatai Cement Group Co., Ltd and five major Chinese cement producers have joined CSI. The China Cement Association (quasi- non-governmental organisation, on behalf of government regulating the cement industry) was also invited to establish a partnership.

To further strengthen Chinese sustainable development capability building, in June 2010 a CSI seminar on climate and safety was held in the city of Dujiangyan in Sichuan province. Lafarge not only contributed to the organization of the seminar but also providing live demonstration of safety training. The safety measures and environmental management of the Dujiangyan plant made a deep impression on the delegates. All agreed that there were still a lot to learn about sustainable development.

Along with its environmental programme, Lafarge is collaborating with Ministry of Environment to set environmental standards and produce a label for low-carbon cement. Lafarge is one of the biggest technical supporters of this process. It is expected that regulations will be published shortly. The environmental label will become an official certification registered by the Ministry of Environment, and as such it will have impact on the entire industry in China.

In 2009, Lafarge invited ten of China's largest cement companies to Chengdu to share experience in sustainable development, and invited them to join the CSI and WBCSD.<sup>12</sup> Areas for discussion included CO<sub>2</sub> emission reduction, quarry rehabilitation, reduction of pollution, rational use of resources, impact on communities, employee health and safety and how to recycle construction waste.

Terry Qiao, Communications Vice President for China Lafarge, believes that “implementing these programmes could build a positive image for us. Governments, business partners, clients and our employees all believe that Lafarge is a responsible company. Lafarge does not only speak about responsibility, but really puts it into action.” Xiaohong Fan comments that “Lafarge is the leader in the industry. It is just like being the ‘the big brother’ in a family. You have to do your duty and cannot mislead other brothers. For the community, you have a responsibility. For the industry, it is a kind of protection. If all of us do not care about our responsibilities, this industry will die.”

As the industry leader, Lafarge thinks not only about the present but also about future development. CSI members have worked together to calculate the CO<sub>2</sub> emission of each company, developing a special tool to state explicitly how much CO<sub>2</sub> emission a company generates in each process. For assistance here, CSI has turned to WWF.

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<sup>12</sup> CSI was established in 1999 and now has 18 cement production enterprise members, divided into ordinary members and core members, in over 100 countries. CSI builds a platform and create a common language for cements producers to share knowledge and practical experience. Through various forums, CSI collaborates with NGOs, government institutions and international institutions and promotes a proactive approach to deal with environmental issues. CSI runs workshops and annual meetings for members to discuss such issues as climate change, the use of alternative raw materials, fuel, mining recovery, employee health and safety issues and pollution.

## Cooperation with WWF ‘Climate Savers’

Lafarge Shui On defines WWF as ‘experts who have a strong specialized in Carbon management’. Xiaohong Fan comments

WWF gives us advice on Chinese policy and some forward looking idea on carbon management. They have a wider vision than we do.

They do not concentrate on only one industry but see the broader picture. They promote environmental protection in many areas. To sum up, they are very professional, they have vision, and they have international background and have international experts to support us.



team that:

Lafarge China’s cooperation activities with WWF China are partially financed by Lafarge group. The Group has admitted the great significance of doing environmental protection in China and they started from Chongqing. Lafarge Shui On aims to focus on green hotels. The Group has already designed some plans to transform the hotels into green. Next, Lafarge Shui On is targeting systematic research on green policies. Additionally, the Group together with WWF will provide technical support to the setting of industrial CO2 emission standards. Also, Lafarge relies on WWF experience with making more plans on the energy reduction – the industry is still energy consuming.

Yun Jiang, Senior Corporate Relationship Manager of WWF China, states WWF’s perspective on the cement industry’s sustainable development, which promotes a cross industry cooperation and says:

In terms of sustainable development, you may focus on water resource. WWF may more care about the downstream environment. For example, in terms of sustainable construction initiatives, we hope water and other raw material could be all considered. Together with estate developers, cement companies may form a sustainable development chain. The whole construction emission has accounted for 40 percent of all the emission. If you want to reduce the construction emission, cement, glasses and steels companies all have to work together to make it possible, not only estate developers.

## Lafarge Sustainable Innovation: Barriers, Enablers and Lessons Learnt

Working in China since 1994, Lafarge has found both advantages and disadvantages, sometimes even barriers, when working in the Chinese market. It is evident that the company has a good reputation ‘The Chinese cement companies are very respectful of Lafarge’, says Xiaohong Fan. ‘When I meet peers, they will all mention what we have done for them. Actually, it is just like being a man. If you are behaving well, everyone will respect you.’

However, as a foreign enterprise, Lafarge has to solve the funding problems mostly by using its own money. In heat waste recovery, Chinese enterprises could get CDM funding which represented a considerable amount of financial support. Lafarge had to invest its own capital into shutting down all old production lines. Lafarge is very positive in this regard and as Xiaohong Fan says, thinks that it ‘doesn’t matter who is paying a big price for closing down the obsolete production capacities – us or the government. This has to be done.’ But the side effect is that when closing down old factories, Lafarge also has to deal with social problems such as the community impact of job losses. Though, the Chinese government is very clear about environmental policy, in the words of Terry Qiao “it may take time to smoothly implement these good ideas and follow these guidelines or standards during the implementation process.’

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Being an environmentally friendly company Lafarge also feels pressure and price competition from non-environmental-friendly players.<sup>13</sup> In China there are still many factories with obsolete kiln production lines which are competing with Lafarge ‘unfairly’ as they have very low costs. Lafarge has invested so much in the environment and safety that its costs are much higher. At the same time, Lafarge feels that the government considers it is the best example to follow and a model for everyone to learn from. The Chinese government is very open here and consults with Lafarge in regard to environmental standards in the industry.

As Terry Qiao says, ‘we hope that the government will promote fair competition sooner than later. The government has required us to reach certain standards in CO<sub>2</sub> emission, which we are working on. Meantime, we think the government could push local companies to reach the same standards rather than closing their eyes to what those local companies are doing.’ However, the government has to deal with social issues and the challenge is to determine which is the most important at the moment.

Another challenge is to work out what to do next. Having achieved a certain level of sustainability, the next step for Lafarge is to extend sustainable activities to its supply chain, for example in the construction industry. Lafarge is certain that it may also take time for the whole industry and related industries to increase awareness and take action together. Terry Qiao continues:

If you have a talk with the Cement Association, they will definitely tell you that Lafarge is an expert in environmental protection. Within the cement industry, different standards are adopted. Lafarge entered the Chinese market in 1994. After our joint venture company was established in 2005, enormous man power and material resources has been invested to close down the previous obsolete kiln production lines. We did many basic transformations. In terms of the whole cement industry, the Eleventh Five Year Plan has been well completed. However, in some markets such as the southwest, there is still a considerable amount of unused production capacity. The situation is different in the east. Especially after the Sichun earthquake in 2008, many unused production facilities in the southwest market were supposed to be shut down. However, they remained in production because market demand was estimated to grow significantly. So in terms of the entire industry and productivity, levels vary.

To add to institutional barriers, there is also is the problem of a limited talent pool in southwest China. The technology is getting more and more complicated and qualified people who can work with this technology are very scarce in southwest China. ‘People from Beijing and Shanghai are simply not willing to come to Chongqing’, explains Terry Qiao.

#### *....and the last word....*

This case tells how Lafarge Shui On supplies the construction industry and makes the products used to build the houses people live in; the offices, shops and factories people work in; and the hospitals, schools and infrastructures, roads, railways, airports, bridges, harbours that people use. Aiming to become one of the leaders in the Chinese cement industry, Lafarge Shui On implements very strict environmental management during its entire operations, including R&D, sourcing, production, goods and services.

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<sup>13</sup> Cement market is very localized and Lafarge Shui On sells only inside the Chinese market. Deliveries at far distance would result in price increase. The price of cement in China is very low and the cement factories can be found everywhere. Lafarge market is mainly in Southwest and the general cement sales radius is 50 to 100 km.

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Taking a step forward towards creating a better future, Lafarge Shui On sees technical innovation as its mission, and driving development throughout the industry as its responsibility. The combination of localization and globalization in Lafarge Shui On instills a refreshed dynamic to the company which is dedicated to building a solid foundation for the sustainable development of the Chinese cement industry. In 2009 Lafarge received more than 50 sustainability awards in China.