

CLIMATE CHANGE AND ENERGY



LAFARGE
Building better cities™

INTRODUCTION



Climate change is a defining challenge for the 21st century and for the construction sector as a whole.

Over the last few years Lafarge has developed a comprehensive climate and energy strategy. As a major emitter of greenhouse gases, with direct emissions of 89.8 million tons in 2014 and an additional 11.3 million tons from energy purchased and emissions associated with the transport of our products, we are aware and accept our responsibility to minimize and offset these emissions through our actions.

Cement is a key ingredient in concrete, the most used material on earth after water, vital for the construction of housing and infrastructure and, therefore, a cornerstone of socio-economic progress. Part of the reason for the high levels of CO₂ emissions associated with cement production is the sheer volume of cement required to produce concrete: an estimated 3.7 billion tons in 2012 alone*.

At the same time, cement and concrete can make a positive impact towards meeting the challenges of climate change, working towards net zero CO₂ emissions (within the 'two-degree threshold') by providing energy efficient construction solutions that contribute towards more compact, connected and durable cities, which are of vital importance in the context of increasing urban development.

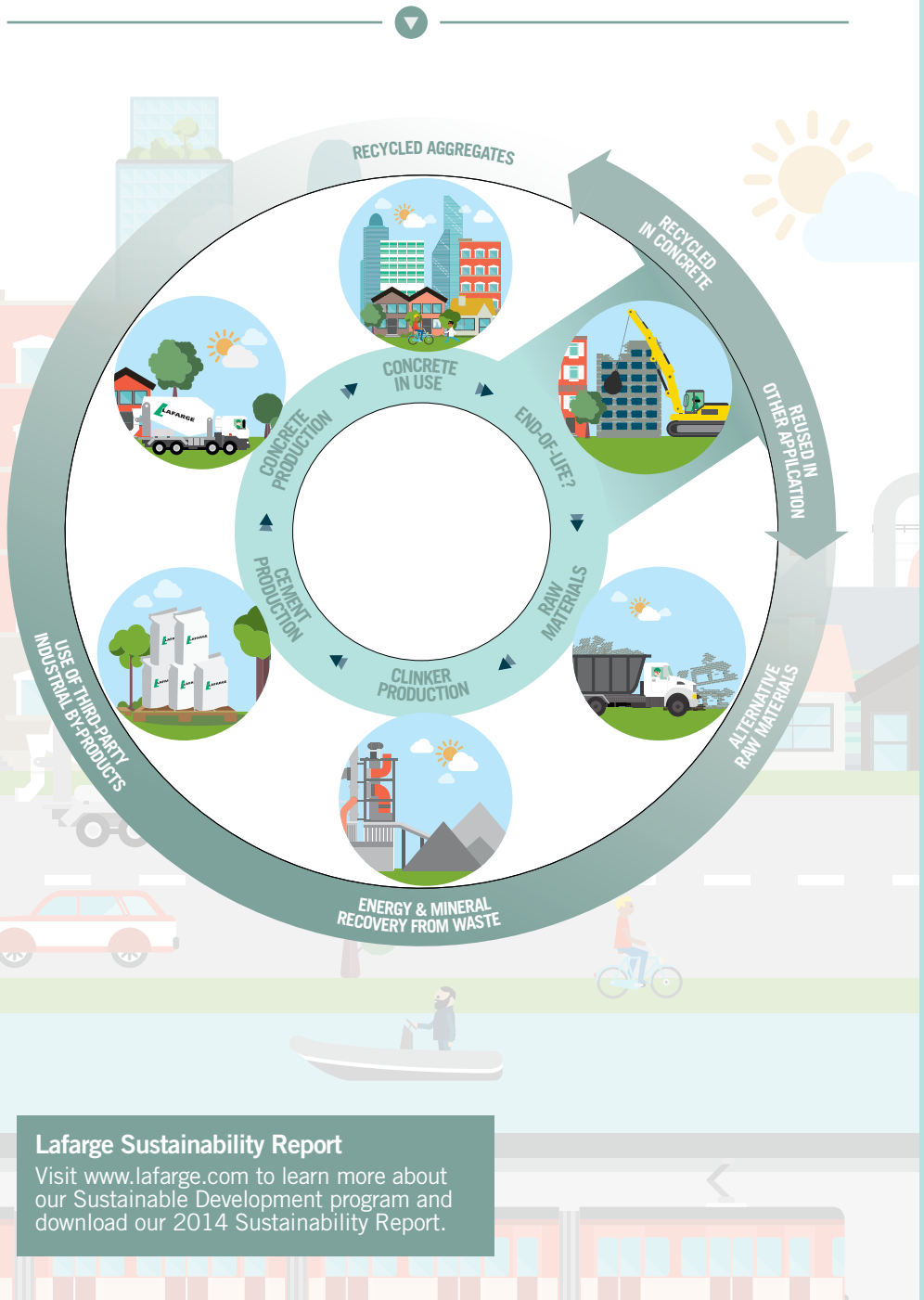
Our climate change and energy strategy revolves around the following three areas:

- Contributing to the reduction of society's overall emissions, through construction solutions to **improve building energy efficiency**;
- **Reducing our direct emissions** per ton of cement, through industrial performance programs and R&D to develop lower-carbon solutions; **and also our indirect emissions**, by using more renewable energy and lower-carbon transport;
- **Promoting responsible energy and climate policies** by business and governments.

There is an increasing focus on not only limiting climate change but also adapting to the effects of climate change that are unavoidable and already present today. Concrete is very resilient to extreme weather conditions and our product mix designs are optimized to develop concrete with the capacity to withstand the potential effects of climate change.

* Source: Global Cement magazine

CEMENT AGGREGATE CONCRETE CIRCULAR ECONOMY



Lafarge Sustainability Report

Visit www.lafarge.com to learn more about our Sustainable Development program and download our 2014 Sustainability Report.

IMPROVING BUILDING ENERGY EFFICIENCY

Buildings today account for 40%* of energy use and around one-third of carbon emissions worldwide. Buildings consume 90% of their total energy during usage through heating, lighting and air-conditioning; only 10% of consumption is linked to the manufacture of building materials and the construction phase.

With existing technologies, including cement and concrete-based solutions, it is possible to reduce this energy consumption by 60-80%. As a leading building materials manufacturer, we have developed a number of solutions, including:

- New products, such as our Thermedia® range of structural, insulating concrete,
- Our Efficient Building™ construction systems, such as double-skin concrete walls or UHPC lightweight insulated facades,
- Energy-efficient buildings such as the ABCD+ positive energy house, developed in partnership with French individual home-builder Cécile Robin,
- Solutions for sustainable cities, such as the Zenata 'eco-city' project in Morocco, for which we are working in partnership with Reichen & Robert, the urban planning agency, and Novec, the engineering design firm.

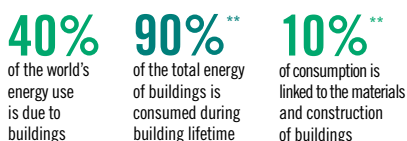
In all these examples we have collaborated with actors across the construction value chain to transform the approach taken. The implementation of energy efficiency measures can often be frustrated by non-technical factors such as lack of awareness and transparency, technology inexperience, decision-making and operating complexities and investment uncertainty.

As a result, Lafarge is leading initiatives such as EEB (Energy Efficiency in Buildings), launched under the auspices of the World Business Council for Sustainable Development (WBCSD) and co-chaired with United Technologies. Bringing together players from across the construction sector – investors, regulators, architects and engineers, material and equipment suppliers, and end users of solutions – this project is focused on developing new forms of collaboration to achieve an 80% reduction in building energy consumption by 2050.

As a signatory to the Manifesto for Energy Efficiency in Buildings, we are also committed to reducing our own buildings' energy consumption. Following audits at 20 offices across 15 countries, which represent 85% of the Group's total office floor space, we implemented energy saving measures that enabled a 12% reduction in energy consumption across these offices in one year, as part of our program 'My Low Energy Office'.

* IEA website

** Concrete Sustainability Hub, MIT



REDUCING DIRECT AND INDIRECT EMISSIONS

We have been reducing our carbon footprint since 1990. Our voluntary commitment to reduce CO₂ emissions per ton of cement – the first company in the sector to do so – was made back in 2001 and the target was met ahead of schedule. Our objective today is to reduce our CO₂ emissions per ton of cement by 33% by 2020 (compared to 1990 baseline). By 2014 we achieved a 26.4% reduction.

Scope 1

We have focused on three established levers to reduce emissions: improving kiln energy efficiency, substituting fossil fuels with other energy sources and using additives, such as slag, fly ash and pozzolan, to produce less carbon-intensive blended cements.

- In order to reduce the energy required to produce cement, we are deploying a world-class operating model (POM 2.0) at all cement plants. Covering all phases of plant operations, POM 2.0 contributes to improved production expertise and more reliable, energy efficient plants. This supplements ongoing initiatives that result in year-on-year improvements in energy efficiency.

- A key lever for increasing sustainability is the replacement of conventional fuels with those manufactured from industrial, household or agricultural waste. Our use of these alternative fuels has progressed significantly in the past years, reaching an average substitution rate of 20.7%* in 2014, resulting in a CO₂ reduction of 6.3 million tons. Using processed waste as a fuel for cement kilns reduces our environmental footprint, secures energy supplies over the long term and improves plant competitiveness. It can also contribute to more efficient and safer waste management in countries where processing capabilities may be inadequate or non-existent and generate local economic activity and jobs.

An important aspect of this program concerns the use of renewable biomass as fuel. Our biomass fuel use has increased considerably in the last three years, particularly in Sub-Saharan Africa, where we have established local agricultural projects that can also generate biomass residues such as coffee, rice and corn husks for our kilns. The biomass content accounted for 38%* of overall alternative fuel use in 2014, significantly higher than the 30% we targeted in our 2020 Sustainability Ambitions program.

A COMPLETE STRATEGY		
Scope 1	Scope 2	Scope 3
Scope 1 emissions: industry 3 traditional levers: <ul style="list-style-type: none">• Improving kiln energy efficiency• Substituting fossil fuels with other energy sources• Producing less carbon-intensive, blended cements	Scope 2 emissions: electricity generation <ul style="list-style-type: none">• Leadership in the use of renewable energies• Capturing the excess heat generated by production to generate electricity	Scope 3 emissions: transportation of products <ul style="list-style-type: none">• Optimize transportation• Use rail and water transports

- As the vast majority of our greenhouse gas emissions are associated with the production of clinker – the key ingredient to make cement – the environmental footprint of the product can be lessened by reducing the quantity of clinker used. Continuous improvements have been achieved, in the context of meeting customer requirements.

In addition to addressing industrial performance, we are also harnessing R&D to develop new lower-carbon cements. The objective of this research is not only to reduce the footprint of specific products, but also to provide solutions that can be manufactured on a large scale through potential adaptations of existing production facilities. R&D can also result in beneficial performance characteristics (in some countries, Lafarge advocates for changing building codes, norms and standards to accept new low-carbon innovative products).

- Our teams are currently engaged in pre-industrialization work for a new generation of lower-carbon Aether® cements. These cements provide similar performance performance to ordinary Portland cements in a range of applications, but with an overall carbon footprint reduced by 25-30%. The high dimensional stability of Aether® cements makes them a particularly promising alternative in low-shrinkage applications. In 2014 Aether®-based screeds were tested at our research facilities and on client sites.
- In partnership with US start-up Solidia Technologies, work is underway to industrialize a new solution that could reduce the carbon footprint of precast concrete by up to 70%. Following a trial to confirm the industrial feasibility of Solidia Cement™ at our Whitehall plant in the US and a series of tests at precast clients in autumn 2014, preparations are underway for commercialization of the product.

Improvements across the entire range of products and solutions enable market requirements to be met. For instance, the worldwide trend of urban growth can be supported through the development of taller, more efficient tower buildings or bridges and infrastructure that are as refined as they are solid.

Scope 2

Our responsibility also extends beyond CO₂ emissions generated from industrial process (scope 1 emissions) to include indirect emissions. Reducing CO₂ emissions linked to electricity generation (scope 2 emissions) can be addressed through increased use of renewable energy, although as a large power consumer it has been difficult to tackle this issue at the scale required: adding renewable power to a cement plant will increase capital costs by 25 to 30% and in many emerging countries the power infrastructure is not sufficient to support the backup load requirements of a cement plant.

We have some experience with successful projects, particularly at our Tetouan plant in Morocco where a wind farm capable of meeting all of the plant's power needs has been established since 2005. However, due to the capital intensive nature of such projects, our investment has been prioritized on improving production and efficiency capabilities rather than replicating this model. As a result, the focus has remained on buying energy from more sustainable sources, where it is feasible and economically viable.

Scope 3

CO₂ emissions reduction linked to product and materials transportation (scope 3 emissions) is progressed through optimizing distribution towards rail and water transport, which tend to be less energy intensive. Again, our approach has focused on country-led projects, including established supply hubs developed around the Great Lakes region in the US and in the Ile-de-France region around Paris and the introduction of biodiesel for operating and distribution vehicles. Currently, there is no group-wide policy to accelerate progress beyond successful country-led projects.

** Consolidated according to financial standard IFRS11*



PROMOTING STRONG CLIMATE AND ENERGY POLICY

#climattitude /

It's the mindset that brings together a range of our initiatives to fight climate change.

Lafarge is a strong advocate of responsible energy and climate policies, particularly through participation and leadership in associations such as European Round Table of Industrialists (ERT) and WBCSD.

Through association participation, as well as in policy papers and day-to-day contacts with authorities in different markets, we have supported the introduction of policies that eliminate subsidized fossil fuels, establish a meaningful price on carbon while avoiding 'carbon leakage', and promote long-term price stability to avoid volatility in carbon markets that would be detrimental to investment. We also promote economic policy to incentivize the R&D necessary to achieve net zero CO₂ emissions by 2100*.

In 2014 we signed the World Bank initiative 'Putting a Price on Carbon', a manifesto that recognizes the importance of aligning carbon pricing to incentivize reduced energy use. To this end, Chairman and CEO of Lafarge, Bruno Lafont, participated in the Private Sector Forum at September 2014's UN Climate Summit, which brought together heads of state and leaders of international and civil society businesses to

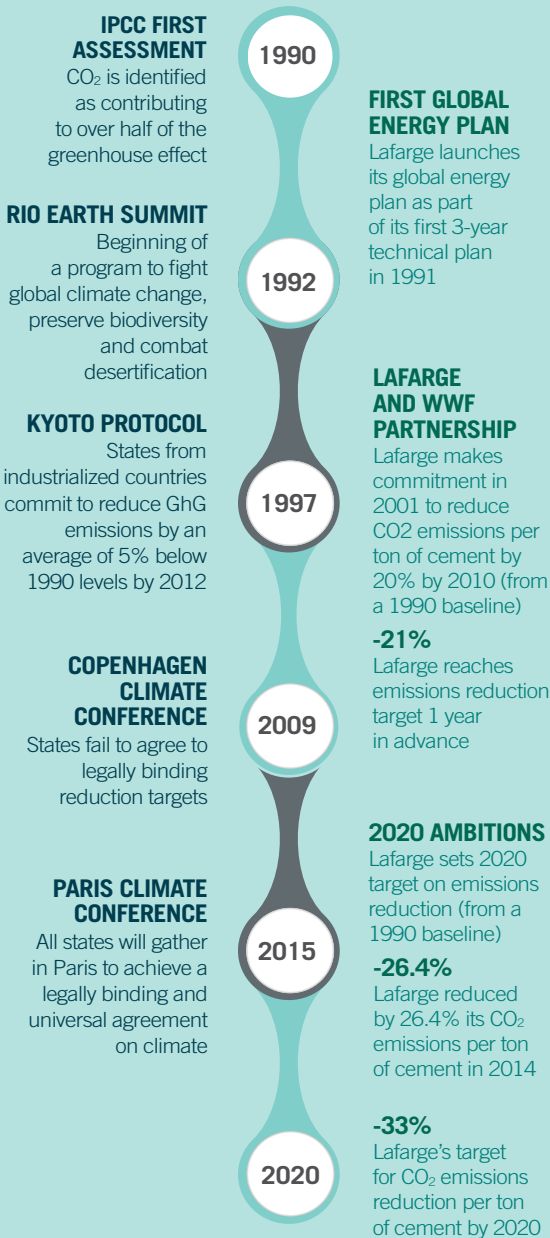
discuss the role that the private sector can – and should – play in the development of solutions to fight climate change, in the build up to UN's Climate Change Conference (COP21) that will be held in Paris in December 2015. It is through participating and leading in these types of events, including the WBCSD's climate and energy program that we contribute towards solutions such as carbon pricing.

We also believe that policies should not be limited to targets for CO₂ emissions reduction and should also encourage energy efficiency and innovation in the value chain - especially in the building sector. For example, codes and norms focusing on buildings' energy performance, rather than use of specific materials, would facilitate more potential for innovation and, therefore, lead to greater reductions in CO₂ emissions.

**UNIPCC report, November 2014*



CLIMATE CHANGE POLICIES 1990~2020



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