

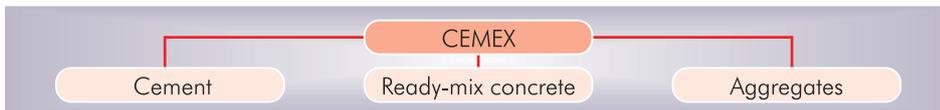
Sustainable performance in the construction industry

Introduction

Cement was invented in England in 1824 and is a key ingredient in concrete. Every year the average family uses one tonne of cement without even knowing it. No house, school, bridge or road would be built without it.

Concrete is the second most consumed substance in the world after water. It is made from aggregate, cement and water and can be mixed on building sites or supplied ready-mixed from a concrete plant. The UK's first readymixed concrete plant was set up by a company called Ready Mixed Concrete (RMC) in the 1930s. In 2005, CEMEX acquired RMC.

Today CEMEX is one of the world's largest building materials companies. It is a leading supplier of **aggregates** (sand, gravel and crushed rock), cement and readymixed concrete. It also produces asphalt, concrete blocks and mortar and has a significant share of those markets. It operates in more than 50 countries and employs over 60,000 people. CEMEX UK has two cement plants, more than 80 quarries, nearly 50 asphalt plants and over 200 readymix plants. CEMEX's customers range from multinational building companies to individuals building their own homes.



In the UK, CEMEX generates £1 billion in annual sales. The expanding UK economy has seen an increase in the demand for roads and buildings. CEMEX plays an essential role in contributing to creating Britain's **infrastructure**.

This case study examines how CEMEX locates and carries out its operations in a sustainable way. Sustainable means being socially, economically and environmentally responsible to safeguard the needs of future generations. This helps it fulfil one of its main **aims** - 'to be the preferred and most efficient building materials company in the country'. It needs to ensure a good financial performance for the business. However, at the same time, it has a commitment to balancing the need for minerals against the effects of **extraction** and processing on both people and the environment.

Sectors of industry

There are three main sectors of industry:

- primary – involves extraction, processing and use of raw materials from the earth
- secondary - manufacturing finished goods and construction activity.
- tertiary – providing services to business and consumers, e.g. retail, finance and transport.

CEMEX's business covers all three sectors of industry:

Primary	Secondary	Tertiary
Extraction of raw materials, e.g. sand, gravel, crushed rock, limestone and clay	Manufacturing of construction products from the raw materials for customers.	Selling and distributing end products to construction customers.
<ul style="list-style-type: none"> • Quarrying – drilling or blasting a rock face to extract the raw materials. 	<ul style="list-style-type: none"> • Washing, grading and crushing of aggregates • Making cement, readymixed concrete, asphalt and concrete products in dedicated plants 	<ul style="list-style-type: none"> • Business to business sales • Transportation via road, rail, sea and river



CURRICULUM TOPICS

- Sectors of industry
- Location of industry
- Sustainable location
- Business resource

GLOSSARY

Aggregates: the mineral materials, such as sand or stone, used in making concrete.

Infrastructure: the assets whose shared use enables firms to operate effectively e.g. roads, bridges, power supply.

Aims: the end goals that a company sets out to achieve.

Extraction: the process of removing raw materials from the earth.



GLOSSARY

Dredging: to remove material from the bottom of a river, lake, the sea.

Logistics: the orderly movement and storage of goods throughout the supply chain i.e. from raw materials to finished goods.

Market: the range of means by which consumers can buy a particular product or alternative to it.

Sustainable locations: locating a business in a way that meets the needs of the business, society and the environment.

Profits: money which is earned in trade or business, especially after paying the costs of producing and selling goods and services.

Automated: to make a manufacturing process run without the intervention of people.

In its primary activities, CEMEX extracts raw materials from the land or at sea. The process of extracting mineral deposits has to fit in with the government’s Regional Minerals Plan. This specifies how much material needs to be extracted to ensure a fair balance across the country. Before extraction can begin, CEMEX must obtain permission from local authorities. Its plans must include sensitive ways of working, restoration and after-care of sites. This ensures the quality of the environment is maintained and improved once extraction is complete.

CEMEX’s marine aggregates business involves extracting sand and gravel from the sea bed by **dredging**. Dredged aggregates are vital for the future development and maintenance of our hospitals, schools, housing and transport infrastructure. They also help to replenish Britain’s beaches and protect the coastline from erosion. The UK government regulates marine dredging to minimise impact on the environment.

As part of its secondary activities, CEMEX has three plants making cement. Heating clay and chalk fuses the raw materials together. The resulting materials are ground to powder as cement. The cement plants need permits from the industry regulator, the Environment Agency. CEMEX also produces readymixed concrete, asphalt and concrete products in specialist plants. These require planning permission from local authorities and are also regulated by the Environment Agency.

In the tertiary sector CEMEX is one of the UK’s top 20 **logistics** operators. It makes more than four million deliveries each year by road, rail, sea and inland waterways. CEMEX distributes raw materials and finished goods to customers for the construction of houses, schools, hospitals, bridges, offices and transport links:

- Aggregates provide the base for all types of construction products.
- Cement is sold in bulk to make readymixed concrete and concrete products production and in bags to builders’ merchants for individuals to buy.
- Readymixed concrete and concrete products are sold to residential, commercial and public contractors.

Location of industry

Industries usually locate in places where they are close to their customers or to raw materials. This allows them to reach their **market** easily and to keep transport costs low. Examples include coalmines on coalfields or shipbuilding on the coast. It is important that industries locate in the most sustainable locations. This means that industries need to find **suitable locations** that minimise any harmful effects on the environment. These could be where the industry produces the least amount of waste or makes minimum journeys of the finished products to distribution centres. All these factors help to protect the environment. They also give a business benefits by reducing its costs and increasing its **profits**.

CEMEX has operational sites across the UK. It is a constant challenge to identify the most sustainable and efficient means of production across all parts of its business. This includes getting its goods to market effectively, that is, in the most sustainable and cost-effective way. Wherever possible, CEMEX locates its plants close to where the raw materials are.



CEMEX has a national supply network in the UK with close to 500 locations. This ensures that quality building materials are available to customers locally. It aims to locate quarrying and manufacturing facilities in the most appropriate locations to meet local market needs. The majority of readymixed concrete and asphalt plants are sited near quarries to ensure speedy supply and to save time and travel costs.

However, large construction projects sometimes require a different approach. This was the case with the construction of the new Wembley Stadium. CEMEX located its readymix concrete plant on the construction site to improve efficiency. As the readymixed concrete operation is **automated**, this required limited staff resources while still ensuring a steady supply. It also minimised environmental impact by reducing lorry journeys. A similar plant was set up for the development of a wind farm in Scotland.



Sustainable location

Quarries can only be located where the mineral occurs. However, the business can make decisions where to locate its secondary activity. For example, a readymixed concrete plant could be close to its raw materials (on a quarry) or close to its markets (in a city). CEMEX's awareness of how its choice of location has an impact on the local environment is vital to its long-term business performance.

CEMEX adopts a sustainable approach wherever possible:

- It transports over two million tonnes a year of aggregates, cement and coal by rail. This is about 10% of the total materials it moves each year. CEMEX is committed to use of rail as these journeys give five times fewer emissions than similar journeys by road.
- CEMEX uses water transport where possible to help minimise its **carbon footprint**. It transports products via sea, rivers, conveyors and underground pipelines. The longest pipeline is 57 miles long. This saves more than 400 lorry journeys per day and supports the UK Government's objective of getting trucks off the road wherever possible. It uses barges to transport aggregates on the River Severn, where one barge can carry 350 tonnes, the equivalent of 18 HGV loads or 36 lorries.
- Making cement is energy-intensive. Since 2005, CEMEX UK has increased by more than 75% the use of alternative fuels such as chipped tyres and treated household waste to heat its kilns. This has dramatically reduced emissions including CO₂.
- It replaces a proportion of the **cement clinker** in the concrete-making process with **by-products** from other industries. These include slag from the steel industry and fly-ash from coal fired power stations. This helps to preserve scarce minerals for future generations. Using this method reduces the carbon footprint of cement production by 50%.

As a global business, CEMEX needs to focus on financial returns to ensure long-term business sustainability, but these are not its only measure of performance. The company believes strongly all goals need to be in balance. This is set out in its position statement: *'CEMEX is dedicated to building a better future and couples financial achievements with a firm commitment to sustainable development.'*

Over the past three years, CEMEX has invested more than £60 million per annum across the business. This includes the modernisation of equipment and plants to deliver environmental improvements. For example, in 2007, a £6.5 million bag filter at Rugby Cement plant in Warwickshire helped cut emissions of dust from the chimney by 80%.

Benefits and impacts

CEMEX has identified seven indicators to achieve a balance between its operations and the environment.



CEMEX has realised that achieving sustainable performance requires moving the company **culture** forward. This means it needs to change the way its people and its operations behave. To achieve change requires action in each of the seven areas.

CEMEX UK invests over £30 million a year in environmental sustainability projects to support these seven key areas, with a focus on improving efficiency, reducing use of energy and working with communities.

GLOSSARY

Carbon footprint: total amount of CO₂ and other greenhouse gases emitted or created by a business in a given time period.

Cement clinker: the hardened lumps which are formed in the kiln, where intense heat transforms the raw materials of chalk and clay. Clinker is then ground to the powder we know as cement.

By-products: something that is produced as a result of making something else.

Culture: the patterns of behaving and doing things in a company.





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GLOSSARY

Biodiversity: the variety of living things e.g. plants and animals in the world or in a particular habitat.

Site of Special Scientific Interest: an SSSI is primarily a legal mechanism to protect sites that are of particular conservation interest because of the wildlife they support, or because of the geological features that are found there.

Example of project	Benefits for CEMEX	Benefits for the community
Increasing use of alternative fuels, e.g. Climafuel. (This looks like shredded paper and is made from household and commercial waste, such as old carpet, paper, cardboard, wood and textiles.)	<ul style="list-style-type: none"> A low cost energy efficient fuel. Recovers energy from waste Reduces emissions 	<ul style="list-style-type: none"> Less waste goes to landfill. Provides a safe way of disposing of household waste. Saves fossil fuels for future generations
Planting 30,000 - 50,000 trees every year	<ul style="list-style-type: none"> Helps screen operations Key to restoration of quarries Improves public opinion 	<ul style="list-style-type: none"> Trees provide habitat for a wide range of wildlife Important for global warming. Over the next 100 years, these 50,000 trees will absorb more than 15,000 tonnes of CO₂

Where possible, CEMEX aims to keep its business in harmony with the environment. CEMEX is careful about how it protects and restores its sites. For example:

- CEMEX Angling consists of restored sand and gravel pits. It has 60,000 members and is the largest commercial angling association in the UK. It offers over 70 mature, fish-filled lakes and 20 stretches of river.
- Eversley Quarry in Hampshire shows how the restoration of a mineral extraction site can provide benefits to the local community. Eversley now has a wide range of leisure and **biodiversity** developments, including a nature reserve, a golf club, playing fields and water sports. The restored quarry has won national and international recognition and major awards.
- At Barrington in Cambridgeshire, the entire quarry is now a geological **Site of Special Scientific Interest** (SSSI). A number of restored quarries have SSSI status. This does not prevent quarrying but ensures interested parties can gain access to the site. The site also contains Cambridge Greensand deposits, which are rare and rich in fossils. The SSSI status means that CEMEX must ensure that these remain exposed when the quarry is restored.

Conclusion

CEMEX provides building materials that are essential for the development, quality of life and creation of sustainable communities. Its work covers the primary, secondary and tertiary sectors of industry. It extracts and processes aggregates, produces cement, readymix concrete, asphalt and concrete products and is involved in the distribution of its products to market.

CEMEX takes its responsibilities towards the environment seriously. It locates its business near to raw material sources or to its markets. This is cost-effective and contributes to reducing adverse impacts on the environment. Where not possible, it adopts a sustainable approach to finding alternative solutions. CEMEX has made major investments to improve its sustainable performance. It focuses on seven key areas of activity across its operations and communities to achieve a balance between its business and the environment.

Questions

- Describe the main differences between the primary, secondary and tertiary sectors. Give examples of how CEMEX carries out work involving each of these three sectors.
- Explain what is meant by sustainable location and evaluate some of the actions being taken by CEMEX to locate in a sustainable way.
- Give two examples of how CEMEX is contributing to sustainable performance. Show what the benefits are to the company and the environment.
- Evaluate why a business should locate close to its raw materials and end market. Explain your answer by referring to quarries, dredging activities and ready mixed concrete.



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