Cappadocia, Turkey.

Turkey's GROWING MARKET

Bulent Kolanci, ABB in Turkey, examines Turkey's cement sector and discusses a supply contract for the largest greenfield cement project in the country.

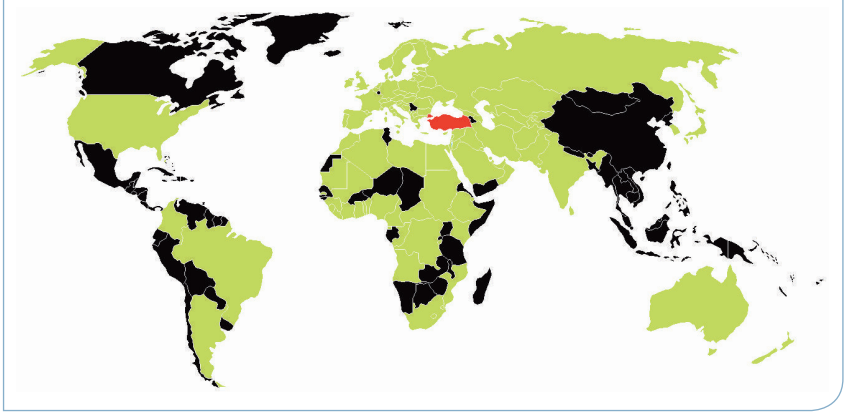
Country profile

Turkey has the world's 17th largest GDP and a population of 75 million.

After the collapse of the Ottoman Empire, the new republic was officially proclaimed in 1923 in Ankara, the country's new capital. During the first six decades of the republic, between 1923 and 1983, Turkey generally adhered to a quasi-static approach with strict government planning of the budget and government-imposed limitations over private sector participation, foreign trade, flow of foreign currency

Figure 1. Map of cement plants in Turkey.

Figure 2. Turkey's export markets (marked in green).



and foreign direct investment. However, in 1983, the government initiated a series of reforms designed to shift the economy from a static, insulated system to a more private-sector, market-based model.

Turkey has gradually opened up its markets through economic reforms by reducing government controls on foreign trade and investment, the privatisation of publicly owned industries and the liberalisation of many sectors to private investors.

Turkey's economy is becoming less dependent on agriculture and more dependent on industry in major cities, mostly concentrated in the western provinces of the country.

Turkey's total exports were valued at US$101 billion in 2009, US$113 billion in 2010, US$135 billion in 2011 and US$152 billion in 2012. (Main export partners: Germany 9.3%, Iraq 7.7%, Iran 7%, UK 6.2%, UAE 5.8%.) However, in 2012, larger imports, which amounted to US$236 billion, threatened the trade balance. (Main import partners in 2009: Russia 11.3%, Germany 9%, China 9%, USA 6%, Italy 5.6%, Iran 5.1%.)

Turkish cement industry

The Turkish cement industry began production in 1911 with 20 000 tpa capacity. In the 1950s, production reached 370 000 tpa, but it did not meet local market demand until the 1970s.

The country's cement industry, with export volumes rising every year, has gained increasing importance in the economic structure of Turkey, while also providing a significant level of employment.

Today, the Turkish cement sector includes a total of 69 cement plants (48 integrated plants and 21 grinding-packing plants), employs 15 000 people and generates an annual turnover of US$4 billion.

Production

In 2011, production capacity reached 65 million tpa of clinker and 106 million tpa of cement. Realised production rates are 54.2 million tpa of clinker and 63.4 million tpa of cement.

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Table 1. Production and export projection for 2010 – 2020 in Turkey

Year	Cement production (million tpa)	Potential export volume (million tpa)
2010	61.5	17.3
2012	66.5	18.7
2014	71.3	20
2015	73.5	20.6
2020	85.2	24

Table 2. Average cost breakdown in cement production in Turkey

Turkish cement industry cost items	Average cost (%)
Fuel	38
Electric	21.1
Raw materials and auxiliary materials	9.6
Labour	9.4
Depreciation	7
Other fixed expenses	13.1
Others	1.8
Total	**100**

There are considerable infrastructure and housing gaps in the country and the construction industry has a promising future. Domestic cement demand was expected to grow by around 4 – 5% in 2012.

Over the next 10 years, the sector is expected to grow in the domestic and export markets, while reaching a production volume of 100 million tpa.

According to cement industry projections for 2013 – 2023, in terms of values for 2023, production is expected to reach 99.8 million t and consumption 78.9 million t.

Exports

A total of 3.6 billion t of cement was produced globally in 2011, the leader of which continues to be China, which produced 2.063 billion t. European countries follow with 273.6 million t, India with 223.3 million t, the US with 68.4 million t, followed by Brazil and Turkey, with 63 million t each. Excess capacity remains a problem worldwide, although many countries have been trying to overcome this by increasing public investments and placing greater focus on exports.

Turkey's cement industry relies on domestic resources and raw materials to meet its production needs and increases its share of exports each year, with the majority going to Iraq, Syria and Russia.

At the moment, Turkey's cement industry has no difficulty in meeting domestic demand, and has become the largest cement exporter in Europe, with US$913 million or 14.4 million t exported in 2011.

While producing cement in accordance with EU norms, Turkish cement producers face rising energy costs, which can put it at a disadvantage to the cement industries of some other countries.

It currently exports to more than 100 countries and, especially after the crisis of 2008, continues to seek new markets such as the West African States.

According to cement market professionals, potential markets for Turkey include:

- North: Russia, Bulgaria, Georgia.
- MENA: Iraq, Syria, Israel, Egypt, Libya.
- Traditional: Italy, Spain.
- New: Nigeria, Angola, Sudan, Cameroon, DR Congo, Liberia.

Within the next 10 years, potential export volumes are expected to reach about 20 million t.

Strength and opportunities

Turkey's cement industry has a number of strengths, some of which are outlined below:

- Products of competitive quality (CE Mark).
- High raw materials resources.
- Proximity to the export markets, particularly when compared to Southeast Asian countries.
- Trained manpower.
- Updated production technologies.
- Export potential due to long coastline.
- The sector is fully adapted to the European norms for production, environmental and health and safety issues.
- The majority of its plants have Quality Management and Environmental Management Systems (ISO 9001 and ISO 14000 certificates).
- High requirement for housing and infrastructure investments.
- With the beginning of an alignment process with the EU, public investments are expected to increase.
- Concrete roads to be applied on heavy traffic routes.

Efficiency and energy

With the help of cost-cutting modernisation investments, the Turkish cement industry is the largest in Europe, and has now become the fourth biggest consumer of domestic energy consumption.

According to a study carried out by the Turkish Cement Manufacturers Association (TCMA) in 2011, Turkish cement plants consumed about 6.8 billion kWh of electrical energy.

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Production chain efficiency

ABB offers a comprehensive package of solutions, products and services for the complete primary production chain for the cement industry. The efficiency of a cement plant is not only influenced by its major mechanical and electrical installations; the appropriate planning, selection and engineering of the required overall infrastructure also plays a critical role.

Viewed as an integrated entity, the plant's infrastructure also includes items such as optimised substation and electrical room layouts, cable engineering, earthing systems, fire detection and protection, air-conditioning and ventilation systems and communication systems.

A plant's automation partner should ensure the selection of the right technologies, their correct dimensioning and smart positioning, all of which leads to savings and adds up to a significant enhancement in a plant's economy over its lifecycle.

Case study

The ABB plant-wide automation strategy searches for the optimal operation point while maximising product quality and productivity, at the lowest energy consumption and with the least environmental impact. This is achieved through a combination of variable speed drives (VSD), advanced process control, energy monitoring and reporting. Electrical energy savings of up to 70% can be achieved by using VSD over a fixed-speed motor and damper. The multi-drive solution provides the optimised drive solution for the grate cooler. The control and optimisation of the kiln will reduce thermal fuel consumption by up to 8%. When this is combined with the automated collection, organisation and distribution of production, quality and energy reports, fast decisions and interaction to reach the goals of energy management are achieved. Due to the fact that electric energy is a significant cost factor in cement production, new technologies are well accepted in Turkish cement manufacturers' modernisation and investment projects.

As an example, Medcem Cement, a newly established cement manufacturing company within Eren Holding, has selected ABB as the provider of electrification and automation systems.

ABB, as the leading power and automation technology group, received an order to provide electrification, automation and drive solutions for Medcem's greenfield cement plant project in Turkey. The contract was awarded in July 2012.

The new plant will be located in Mersin, on the Mediterranean coast. With an estimated 10 000 tpd of clinker, the plant will have the largest production line capacity in Turkey. Production startup is planned for March 2014.

ABB's scope of supply for the greenfield project includes its state-of-the-art control System 800xA, Expert Optimizer process optimisation software, medium and low voltage electrical motors, ACS800 series low voltage drives, ACS1000 and ACS6000 series medium voltage drives, ZS1 series medium voltage cubicles, MNS series low voltage cubicles, site erection, installation, commissioning and services. The equipment will provide high availability of the complete production process and raise efficiency through high-quality production at a low energy consumption.

Medcem Mining & Building Materials Inc. is part of Eren Holding. After beginning its commercial activities in 1969 in the textile sector, Eren Holding and its affiliates are now also operating in the energy, paper, packaging, retail, cement, textile and tourism sectors. By adapting a growth strategy based on equity, the group became one of the leading business conglomerates in Turkey.

ABB's well established relationship with the Eren Group, the ability to provide all solutions as single source supplier, as well as its extensive cement engineering experience and knowledge of local electrical regulations were major factors for winning this project.

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