



Executive Insights

Capitalising on Opportunities in Cementitious Materials Disruption

Cementitious materials — particularly but not exclusively coal/fly ash and blast furnace slag — play a key role in keeping concrete affordable and reducing the industry's carbon footprint.

However, the rise in demand for these materials is increasingly being met with decreasing supply, driven by the decline in fly ash production in particular. This supply/demand imbalance is expected to continue increasing, due to multiple drivers.

We believe market participants — both suppliers and customers — can create value and sustainable competitive advantage by anticipating this continued shift and actively preparing for it.

Mounting supply/demand tensions

Medium- to long-term demand for cementitious products is expected to grow sharply, driven by long-term growth in demand for concrete and by regulatory tailwinds. Despite the current recession, the medium- to long-term outlook for concrete remains positive, thanks to:

- Continued global population increase
- Urbanisation
- Significant need for infrastructure development in emerging markets

- Significant infrastructure maintenance and repair needs in developed economies

In the short term, this demand might materialise through infrastructure stimulus plans, which have been [gaining traction in major economies such as the US](#), western Europe and China (e.g. China's transportation construction spending increased by 27% year-over-year in Q2 2020,¹ while France announced a €100 billion stimulus plan in September 2020, with a significant infrastructure component).

Perhaps even more important, new European Union carbon dioxide regulations, along with a growing willingness to reduce CO2 emissions in many regions of the world, are expected to act as powerful drivers of cementitious product demand in the long term — and may ultimately lead to a focus on low-CO2 cementitious sources. This is a result of cementitious materials being considered as waste materials carrying no CO2 cost (e.g. fly ash, slag) or generating significantly less CO2 than cement as part of their production process (e.g. ground limestone).

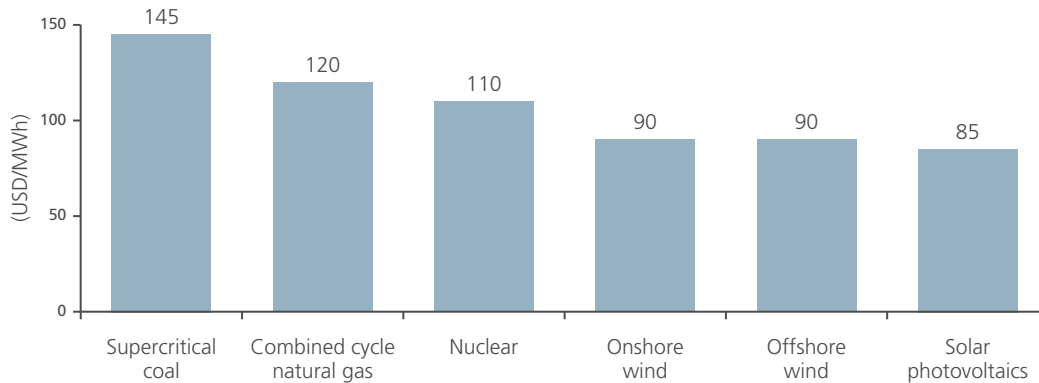
Traditional sources of cementitious products,² particularly fly ash, are tightening across the board in developed countries.

In the US, coal is now the least economically competitive power source, largely as a result of gas power, onshore wind and solar costs decreasing significantly over time (see Figure 1).

Capitalising on Opportunities in Cementitious Materials Disruption was written by **Frédéric Dessertine**, Partner; **Maxime Julian**, Partner; **Lucas Pain**, Managing Director; and **Olivier Asset**, Senior Manager. Frédéric and Maxime are based in Paris, and Lucas and Olivier are based in Chicago.

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Figure 1
Levelised cost of electricity in the EU — by source



Source: IEA

This has led to a sharp decline in coal use since 2008, made worse by emission regulations that led coal plant operators to accelerate closures in order to avoid additional capital expenditures (see Figure 2). In addition to this long-term decline, coal's lack of competitiveness has caused it to lose its 'base capacity' status in a number of regions, making it extremely vulnerable during economic downturns. As of April 2020, year-to-date electrical generation from coal sources was down over 33.5%, while total electrical generation was down only 4.1%.³

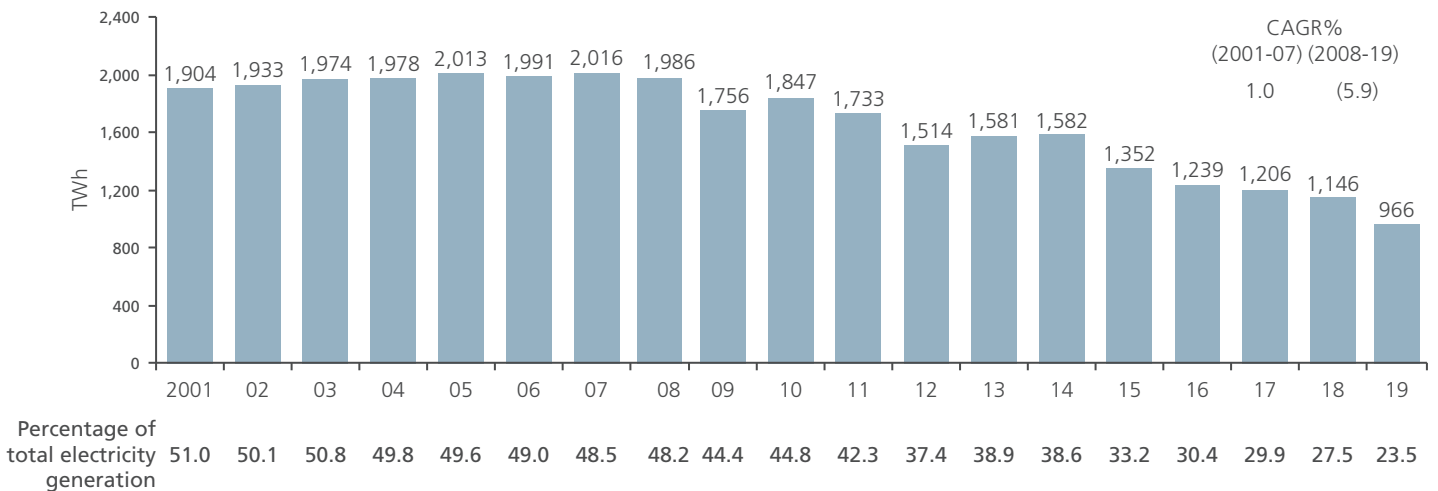
In Europe, 55% of current coal capacity is expected to shut down by 2030, as European countries are aggressively moving away from fossil fuels (see Figure 3).

Initial signs of tension and potential disruptions ahead

Those supply/demand tensions have already rippled into the world's cementitious markets.

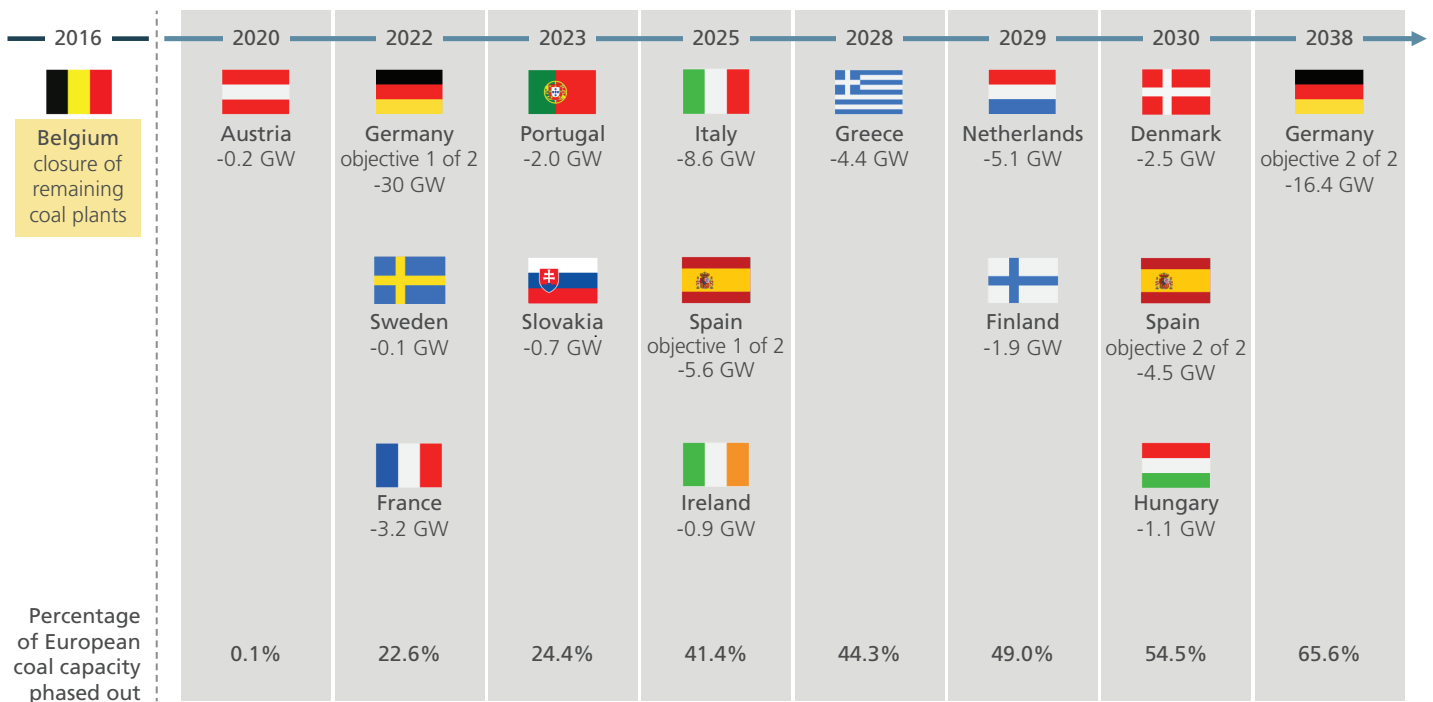
In Europe, countries such as France and Spain have witnessed repeated fly ash shortages in the past few years, with local traders unable to serve some of their customers. Meanwhile, some of Europe's steel producers have become increasingly aggressive in maximising the value they extract from their slag — by marketing it directly to ready-mix concrete players in regions where they had only traded with cement makers, or by going as far as developing their own ability to produce and sell CEM III.

Figure 2
Electricity generation in the US — coal (2001-19)



Source: US Energy Information Administration

Figure 3
Phaseout of coal within EU-27 countries



Source: L.E.K. research and analysis

Although long-distance imports of cementitious materials into the US remain limited, market participants recently reported an increase in fly ash imports by highway contractors, particularly in the mid-Atlantic and Southeast regions.

Meanwhile, new sources of cementitious materials are on the horizon. These sources have the potential to disrupt existing market players.

In the Europe, Middle East and Africa region, Turkey alone is expected to build 19 new coal units within 100km of a seaport by 2030, creating significant new fly ash capacity in a country with existing overcapacity (see Figure 4). The quality and consistency of the fly ash these plants will generate remain uncertain, but the historically low level of the Turkish lira creates strong incentives to export. This has the potential to impact western European markets, but also the East Coast of the US if cement price differentials with southern European countries remain as high as they have been over the past decade.

In Asia, flows of Japanese fly ash shipped to South Korea at negative prices could be wound down as new South Korean coal plants come online and political tensions between the two countries continue to boil. This, combined with new capacity

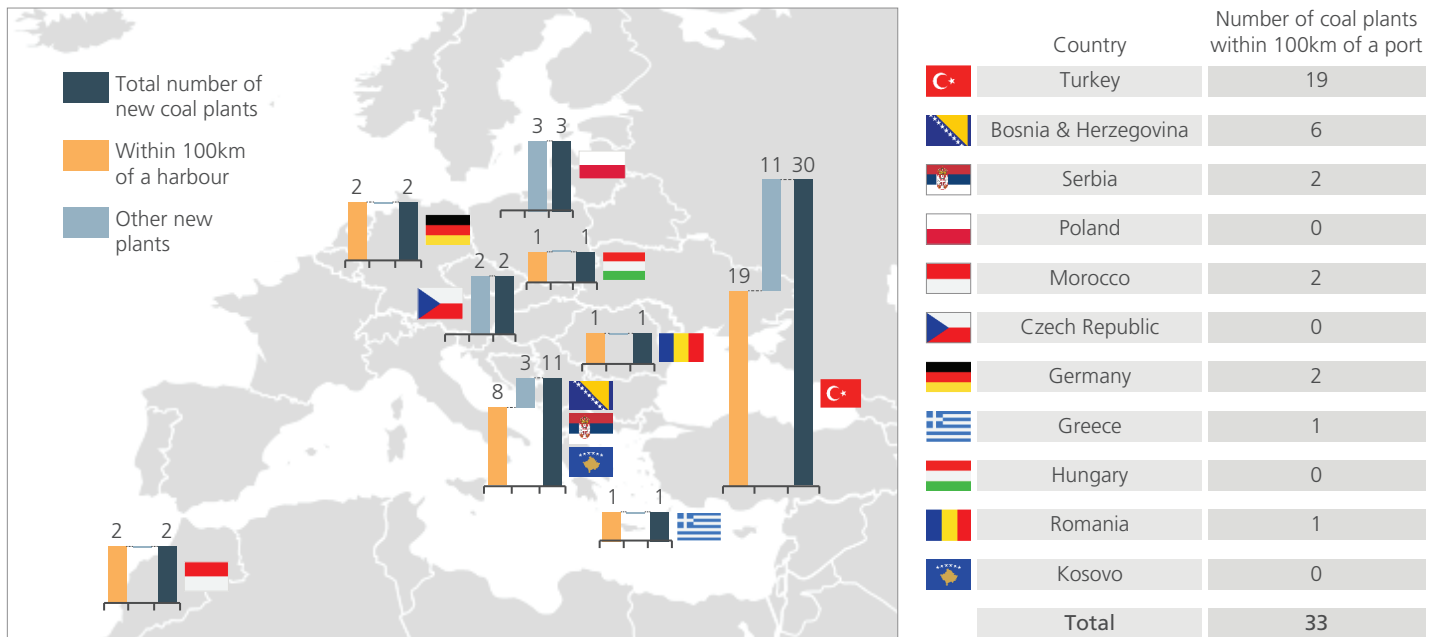
additions and increasing clarity on the future of Japan's overall power mix, may lead Japanese exporters to turn to long-distance exports — potentially as far as the West Coast of the US. This could lead to increased competitive pressure in that region and limit cement price upside potential.

Opportunities for market participants

Going forward, there are opportunities for market participants not just to minimise the adverse effects of cementitious product disruption, but also to generate differentiation. We believe the following steps are critical to capture these opportunities:

1. **Understand the current market equilibrium and plant-by-plant inflexion points.** Modelling supply/demand balance at the regional level and proportion at which inclusion in cement makes sense is a critical first step of analysis.
 - L.E.K. Consulting has developed a decision-making approach using approximately 10 key cost and market metrics that will point to the optimal cementitious integration option for each cement plant, but also flag the inflexion points in cementitious prices that should lead to a decision change.

Figure 4
Number of new coal-fired plants*



*Includes planned and in-construction plants
Source: European Beyond Coal Database

2. Anticipate macro trends and their regional impacts, including the major shifts in supply and demand, as well as the economics of production, inland logistics and trade that will underpin potential market disruption.

3. Get ahead of the curve on securing new cementitious sources by leveraging the detailed understanding of regional economics to zero in on the most attractive sources.

4. Revisit alternative cementitious options. Pozzolana and metakaolin have long been used as cementitious products, but increasing cementitious shortages call for renewed analysis of their sources and production costs. As part of investigating these alternatives, cement players should consider the market potential of their applications outside of building and construction.

5. Make the most of ternary mixing options as the pressure to loosen concrete standards in specific countries may open the door to an increased use of finely ground limestone in cement mixes.

6. Consider the potential impact of further vertical integration in regions where cementitious providers are aggressively leveraging their increasingly strong bargaining power.

7. Investigate other ways to offset the environmental footprint and support governments' environmental objectives — including through construction waste management and recycling.

¹China Beige Book

²Inclusive primarily of fly ash (from coal power plants), blast furnace slag (from steel mills), natural pozzolanas, metakaolin and calcinated shale or clay, ground limestone, and silica fume (from silicon or ferrosilicon alloy plants)

³EIA

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