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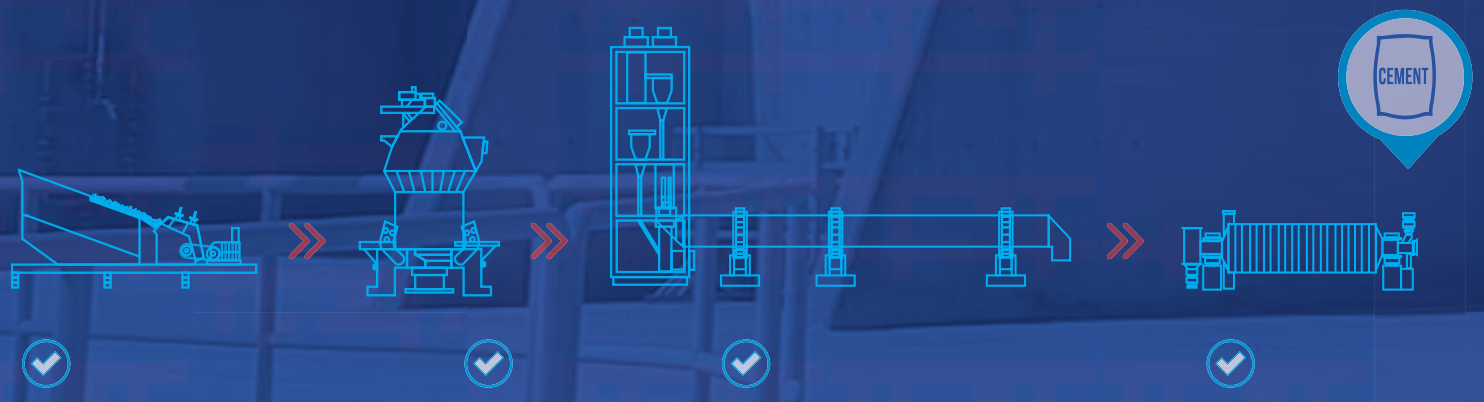

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LM 72.4+4 CS performance test with brilliant results: One of the largest cement mills was purchased by DG Khan Cement Pakistan with the vision to curtail power consumption vis-a-vis keep minimum inventory due to commonality and interchangeability of spare parts between raw mill and cement mill. In September 2018, LOESCHE has successfully completed its performance test at the HUB cement plant in Pakistan. The LOESCHE mill type LM 72.4+4 CS has easily produced 460 tph of OPC Cement with 5% Gypsum and 95% Clinker at a product fineness of 3300 Blaine. Outstanding results have been achieved with regards to low specific power consumption. The total consumption of the mill, classifier and fan was 24.4 kwh/t. This marks a historic milestone in the operation of very large cement mills. Those values represent LOESCHE's highly efficient mill operation and LOESCHE's philosophy of giving very conservative guarantee values. Loesche is highly obliged to the owner, CEO and Management of DG Khan Cement Pakistan for once again placing a high level of confidence and trust in Loesche's innovative technologies.

Dear readers,

Welcome to the November 2018 issue of *Global Cement Magazine* - the world's most widely-read cement magazine! This issue has something of an environmental focus, with contributions on dust control (Page 20), CO_2 capture (Page 18) and, from Dalmia Cement CEO Mahendra Singhi, a detailed exclusive on his company's extensive CO_2 mitigation efforts to date (Page 14). Dalmia Cement already emits 40% less CO_2 per tonne of cement than the global average. It now boldly aims to become CO_2 negative (consuming more CO_2 than it produces) by 2040.

Whether CO_2 neutrality is possible within the cement sector is a matter of debate. The development of CO_2 capture and storage (CCS), which Singhi admits is required to hit Dalmia Cement's target, would almost certainly be required, but opinions are divided as to its viability. Is it better to plan for a future without CCS and then be pleasantly surprised if it becomes viable? Or is it better to 'develop the hell' out of CCS as a major pillar of CO_2 mitigation efforts? What about alternative cements? The reality is that we could choose to do all three (and more besides), which is probably what the UN Intergovernmental Panel for Climate Change (IPCC) would recommend in light of its recent (and somewhat alarming) report.

Climate change efforts were also a major theme at the 600-strong 8th *International VDZ Congress* in Düsseldorf, Germany which is reviewed on Pages 34-38. "Climate protection, digitalisation and the cement plant of the future: these are the key issues for the future of our industry, issues we are *greatly committed* to tackling," said VDZ President Christian Knell in his opening address. These are positive noises but, if the IPCC report is to be believed, we need more than just noises. On the face of it, the cement sector appears to be shifting towards a genuine interest in climate change mitigation.

What will *your* company do?

Peter Edwards
Editor

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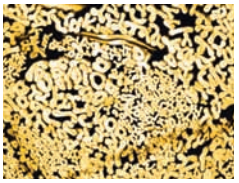

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Amjad Waqar, Lucky Cement Ltd

Due diligence in the cement sector: An art

Amjad Waqar has hands-on experience of conducting and leading several due diligence procedures and acquisitions, as well as of handling post-acquisition processes, especially in the cement sector. In this article he explains the importance of due diligence and why it is required, discusses key areas of due diligence and highlights the key points in due diligence reports.

Above: Amjad Waqar is a financial and business expert with more than 15 years of professional experience in streamlining operations, driving performance, reducing costs and transforming organisations. Formerly Chief Financial Officer (CFO) of Pioneer Cement Ltd, he played a pivotal role in transforming the fortunes of the company, for which the company won an Award at the CFO Conference 2014 in the Cost Reduction and Efficiency Improvement category.

There are several steps and procedures involved in any business acquisition. However, proper due diligence (DD) is one of the most important things to carry out properly, as there is a very large number of factors to take into account. In terms of an acquisition, a DD exercise is conducted to evaluate the respective company / business unit / plant / other asset in order to understand and assess its true market value. This finds the price at which the acquisition is viable once all tangible and intangible factors have been considered. It also confirms all facts and information about the company / plant.

A cement plant can be acquired either by the acquisition of the company that runs it or by the acquisition of assets (land, plant, machinery, etc) owned by the company. In either case, it is essential to conduct thorough DD. This should:

- Provide an estimated valuation / price;
- Highlight the preferred acquisition method;
- Highlight potential liabilities that may arise post acquisition (legal, contractual or otherwise);
- Identify legal and other matters that may affect acquisition and post-acquisition processes;
- Provide pathways to make the plant more efficient and effective. The DD process also highlights areas where improvements to efficiency, production and profitability are required.

A DD exercise provides the confidence that the amount invested is 'safe,' without the risk of any surprises further down the line. All risks and rewards should be identified so that the buyer can ascertain whether it will make returns that it finds acceptable.

Key areas of due diligence

A team of experts (technical, financial, legal, commercial and taxation) is engaged to conduct DD, the scope of which varies on case-by-case basis. Here, I discuss some of the key areas that need to be addressed / reviewed during the process.

Plant and machinery: Areas to review include: The type of plant, its make, sourcing, year of manufacture, years in use, years idle (if any) and details of any major overhauls; Plant capacity certification and details of any major subsequent changes to the plant; Available useful life, under the same terms and conditions; Details of owned, leased and out-sourced plant, machinery and other equipment; Details of synchronisation between plant (from raw material extraction to grinding unit) in term of capacity and output; Production bottlenecks and upgrading options; Planned future capital investment in the plant and associated machinery; Plant yield – drop test; The number of breakdowns, unplanned shutdowns and reasons for the same; History of casualties (if

any); Preventive maintenance plans; Asset listing and cross checking of assets with fixed asset listing, and; Details of any assets being used by a third party.

Quarry areas: Areas to review include: The type and condition of mining equipment and its ability to operate at the current and higher rates; Reserves of limestone and other raw materials, for example clay, gypsum, etc.; Expected period over which raw material will last under the current production volumes and desired / future volumes; Quality and status of mineral concessions; Validity of licenses and renewal process and conditions; Review of transportation arrangement from quarry to yard / crusher / plant.

Land: Areas to review include: Review of legal land titles, its ownership, terms of use and understanding of restrictions (if any); Detail of any obligations for use of land (if any); Review of lease period (if any) and its renewal process; Understanding the procedures to extend mining areas / purchase additional land for possible expansion; Summary of any obligations for land and use of land; Details of any public rights of way / access issued / granted / in use.

Environmental and social: Areas to look at include: Reviewing all environmental permits and licenses available / granted; Understanding the plant's obligations of the licenses / permits and towards society in general (as per past practice); Review of correspondences, notices and files related to regulatory authorities; Environmental audit details (if any) for each property owned / leased by the company; Review of company policy and procedures with respect to environmental and social responsibilities.

Legal matters and other contractual obligations: Areas to review include: The company's ownership documents and share-holding structure; Legal suits in which the company is engaged; The legal requirements for operating the cement plant as per approvals, concessions, licenses and permits granted to company; All material contracts with all stakeholders; All guarantees and warranties issued by the company or that are in favour of the company; All confidentiality agreements that the company has entered into; All contracts for options, forwards and others; Distribution agreements, sales representative agreements, marketing agreements, and supply agreements; All loan, financing and security agreements, mortgages, indentures, collateral pledges, and other similar agreements; Understanding whether any right is surrendered by the company under any contract.

Financial and related matters: Matters to investigate include: A review of past five years' performance and an analysis of operational effectiveness and efficiency; The type(s) of fuel in use, availability, license

Right: Strengths, weaknesses, opportunities and threats can be identified with the help of thorough due diligence procedures.

Right: There are a lot of factors to consider when undertaking appropriate due diligence.

and costing; Electricity sourcing - self-generation or from the grid?; A review of the company's financial modelling, forecasts and available budgets; A review of liabilities and related terms and conditions; Understanding details of related party transactions, receivables and monies payable; For each category of fixed assets, intangible assets, provide segment-wise detailed description of assets and their cost, written-down value and rate of depreciation; Review policies of the company, namely capitalisation, impairment, revenue recognition and others; Review of the latest fixed assets valuation reports - If this is not available, a DD process is the perfect time to conduct one; Estimation of the value and age of stores and spares as well as identification of slow, obsolete and zero value stock; Segment-wise ageing and subsequent position of debtors and creditors; Detailed review of investments made by the company, the terms and conditions and return thereof; List of all bank accounts, detail of authorised signatories, bank reconciliations and terms of deposits if any; Details of sales by market/product/distribution channel for the past five financial years; Arrangements and terms agreed with key customers; Policies relating to discount rebates and returns; Breakdown of cost (production, operating, marketing and others) with its classification in fixed and variable components for each segment; Taxes: review of all notices, correspondence and payments for taxes; Penalties: Review details of each penalty paid by the company during the past five years; Insurance: Review all insurance policies, their appropriateness, claims, settlements and pending matters; Review of any hedging contracts in which the company may be engaged; Review of selling prices, margins, variances, dividends, etc.; Review growth and key indicators for growth and steps to be taken for achieving future growth targets.

Human Resources: Aspects to investigate include: The company's personnel handbook and a schedule of all employee benefits, holiday and sick leave policies; Review all employment, consulting, or non-competition agreements between the company and any of its employees and contractors; Details and terms and conditions of the top management; Details of retirement plans and obligations; Details of any disputes with employees, Unions or other parties; Stock options and any other rights granted to employees; Evaluation of appropriateness of number of employees at each level.

IT Infrastructure: Areas to investigate include: Details of hardware, software and networking arrangements in use and integration between different departments (from quarrying to dispatch) and reporting systems; Review of licenses and terms of use; IT contingency plan and the resources dedicated to it; Third-party contracts for development and maintenance of IT infrastructure; Evaluate appropriateness for future use and integration of any group-wide system already used by the purchaser.

Right: The dopol (pre-heater) of kiln No 2 at the Titan Depano Achaias plant in Greece, viewed through nearby trees. **Source:** Paul Touliatos, Titan Cement Co, entrant to the *Global Cement Photography Competition.*

Key factors in a DD report

A DD report should answer fundamental questions under each of the above headings. Based on this, a strengths, weaknesses, opportunities and threats (SWOT) analysis of the company / plant / asset should be prepared to understand the economic benefits that could be derived from an acquisition.

Substantial answers

The DD report should provide the following substantial answers: That the seller possess the legal titles of all properties and has the ability to sell; A clear understanding of the ownership of all intellectual properties and the rights and obligations for each; That the condition of plant and machinery to be acquired and capital expenditure needed to keep production at current levels (and the potential for expansion and growth) is understood; The sufficiency

of raw material for the targeted life of the acquisition and availability of alternative sourcing and pricing is known; All financial obligations associated with acquisition are identified and there are no hidden obligations that will be acquired with the acquisition; Legal and contractual requirements / obligations for operating plant in the relevant jurisdiction are understood; Legal suits, claims, possible liabilities and the likelihood that these may arise as the result of legal judgements are well understood;

All environment and safety requirements; Identification of cash flows required for improvement (if any), modernisation etc, are understood; Financial performance and evaluation of financial feasibility of the plant, break-even and potential areas for improvement are understood; The rights and obligations under each contract are understood; Financing arrangements and requirement of any renewals after the acquisition are sufficient; The market, key customers, credit ratings and potential for growth are well understood, as well as the demand for other associated products that may be sold in same market; Procurement contracts raw material, fuel and others are understood; Potentials for cost saving opportunity that may exist in supply chain are identified; Key employees that are critical for the continuation of operations in the short and long term are understood, as well as plans for their succession.

Beside consultants, a team needs to be assembled, either in-house or out-sourced, that not only reviews the progress of the whole process of acquisition but also advises the DD consultants, finalises their scope of work, follows up and leads the DD process and complies with the legal and regulatory requirements of the acquisition.

There are several formalities (statutory, administrative and others) that need to be completed during the whole acquisition process, including but not limited to intimation to key stakeholders, that also need to be complied with.

Mahendra Singhi, Group CEO, Dalmia Cement

Envisioning a carbon negative footprint: A Dalmia Bharat perspective

"Dalmia Cement's vision is 'To be a leader in building materials and evoke pride in all stakeholders through customer centricity, innovation, sustainability and our values.' It's for this reason that we are playing a leading role in the global low-carbon transition. At Dalmia Cement, we have embraced this shift as we gear up to unlock innovation and create a sustainable, carbon-negative business of the future."

Above: Mahendra Singi, Group CEO of Dalmia Cement has a bold vision for the future.

Opposite: Net CO_2 emissions in kg/t of cementitious material. Based on Cement Sustainability Initiative (CSI) Getting the Numbers Right (GNR) data published in 2018. Dalmia Bharat carbon footprint based on CO_2 and Energy Protocol of CSI.

The sustainability journey at Dalmia Cement received a major push in the last 5-7 years, when we started integrating climate change into our risk assessment process. We adopted new ambitions and commitments to progress in a clean energy transition. As we were mapping out the future, one thing became clear: to be a leader, we needed to see climate risk as a business opportunity.

This process has made our stakeholders proud to be associated with Dalmia, including our employees. The motive for solving these challenges is to generate more revenue, reduce costs and increase profits in a responsible way for the growth of the organisation, its workforce and the wider population.

To get from where we were in 2011-2013 to where we are today required a change in the mind-set and the work culture of our people and stakeholders, in addition to a concrete plan to bring down CO_2 emissions year by year, while improving the bottom-line. A number of ambitious and innovative initiatives have so far helped us achieve the following:

- Alternative raw materials use has increased from about 1Mt in the 2013 Fiscal Year (FY2013, ended on 31 March 2013) to 6Mt in the FY2018;
- Our clinker factor has improved from 81% in FY2013 to 63% in FY2018;
- Our specific electricity consumption is about 70kWh/t of cement, compared to the global average of 104kWh/t;
- Green power generation through waste heat recovery from exhaust gases and enhanced use of renewable energy, including solar and wind;
- The adoption of Sustainable Development Goals (SDGs);
- We committed to the EP100 scheme, with the aim to **double our energy productivity by 2030.** We also joined RE100, **an ambitious campaign of global companies committed to using 100% renewable energy.** We are the first organisation globally to commit to both the initiatives;
- **Over the past five years, our efforts have avoided over 17.6Mt of CO_2 emissions;**
- Dalmia Cement has been ranked No.1 globally by CDP with respect to business readiness for the transition to a low CO_2 economy.

We have started to participate voluntarily to Dow Jones Sustainability Assessment Methodology. To strengthen our knowledge, take new initiatives and create a culture of pride arising from our

Right: Kapilas Cement Works (KCW) plant in Odisha.

sustainability efforts, we partnered with various like-minded associations, such as CDP, Cement Sustainability Initiative (CSI), We Mean Business, The Climate Group, the Cement Manufacturer Association of India, the National Council for Cement and Building Materials, India Business and Biodiversity Initiatives, and many more. Dalmia Cement is a regular invitee to annual COP (Conference of Parties) meetings of the United Nations.

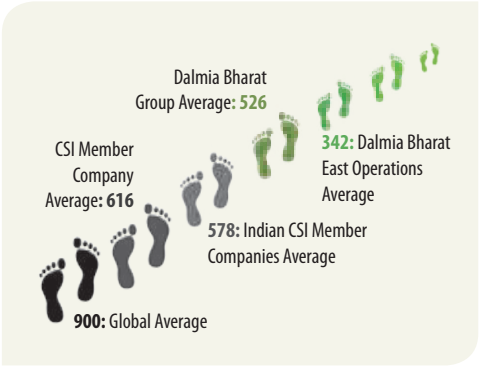
What have we achieved so far?

By harnessing this opportunity, we have found that we are able to both safeguard growth and play our part in delivering a zero-carbon future, faster. Today our carbon footprint is 40% lower than the global average for a cement company. At the same time, our profitability in terms of EBIDTA/t is one of the best in the Indian cement sector. This proves our philosophy that a clean and green company has a profitable and sustainable future.

Globally, one tonne of cement production emits an average of 900kg of CO_2, whereas CSI member companies have been able to reduce the CO_2 emissions by nearly a third, to 616kg/t. Since 2016, the Indian CSI member companies have brought it down to 578kg/t of cement.

At Dalmia Cement we have gone even further. Our CO_2 emissions are now down to the range of 526kg/t of cement on group average, and below 400kg/t of cement in our eastern operations. This radical shift didn't happen without planning, but through a combination of three approaches.

CSI member companies, of which Dalmia Cement is a member, were the first in the world to create a sectoral approach to climate action by



Above: A recreational area developed at a former captive limestone mine in Dalmiapuram, Tamil Nadu.

developing a Low Carbon Technology Roadmap, compatible with keeping global temperature increases below 2°C degrees. Having already begun to reduce our emissions through the Cement Sustainability Initiative (CSI), Dalmia Cement was in a strong position to take further actions for progressing on this roadmap.

To begin with, we focused on material and resource efficiency. This helped to conserve mineral resources like limestone and other raw materials. We produce high-blended cements with the best available technology and by using various industrial waste products such as blast-furnace slag, from the steel industry, and fly ash, from thermal power plants. This has enabled us to convert waste into wealth by reducing the clinker factor, which is aligned to the CSI roadmap. Today, we sell these high-blended cements as both premium and green products. They are technically superior and durable, as well as being lower CO_2 products.

Another lever to reduce both costs and carbon footprint was to increase our energy efficiency. **Our energy productivity has doubled compared to 2005 levels. To improve further, we joined the EP100 initiative, which means we are committing to double our energy productivity again by 2030. We are already nearly halfway there.**

A key part of our zero-carbon journey is switching to renewable electricity. We made the switch in order to prepare our operations for future energy costs and to tap into the opportunities of the clean energy transition. **We joined the RE100 initiative, the first cement company to do so. We are the first company globally to commit to both EP100 and RE100 initiatives.**

Further, we are switching to green fuels and renewable biomass to reduce our fuel-related CO_2 emissions. We have accelerated the use of industrial and municipal wastes to replace the use of fossil fuels in pyro-processing. We are also working on creating an energy crop plantation to enable using the renewable biomass as a fuel in cement kiln and captive power plants.

We are proud of the progress we have made – and the benefits to the business speak for themselves: we've achieved about 20% reduction in CO_2 intensity in five years. At the same time, our profitability has increased significantly. But we won't stop here. We need to always have one eye on the horizon, exploring new strategies and technologies to ensure that we are not only fit for the future, but an industry leader.

With this ambition in mind, in September 2018 we became the first Indian cement company to join the Science Based Targets initiative. Our science-based target will further specify our new ambitions on reducing the carbon footprint to play our part in keeping global temperature rises well below 2°C and thus future-proof our business.

Further, to insulate our group from physical risks of climate change, we took a challenge in 2014 to become a water positive cement group. By 2017 we had become 2.5 times water-positive. Motivated by this, we now aim to be five times water positive by 2020. We are also working on development of bird habitats for biodiversity conservation.

Towards CO_2-negative operations

We have scaled up our ambitions, and now seek to be carbon negative by 2040, meaning that overall our operations will be taking more CO_2 out of the atmosphere than we produce. To meet the scale of this challenge and achieve our ambitious goal, we are exploring a number of approaches, including: switching to 100% green fuels, including biofuels, biogas, compressed bio gas (CBG) and biomass; green power generation; reducing our clinker factor in incremental stages and optimising clinker heat consumption; switching over to solar drying for relevant raw materials; developing a new range of low-carbon cements; carbon capture and utilisation (CCU) technology; and carbon sequestration.

The cement industry can proactively collaborate and germinate CCU. Industry, academia and research organisations bear the responsibility to bring the promising ideas from lab scale to commercial scale by way of advocacy, support, collaboration or offering the plants/facilities. Deploying technology like CCU at an affordable cost will require a similar approach as that seen with solar power. A decade ago, solar was not in the picture compared to conventional power generation, but today it is the most discussed energy transition option. Similar success needs to be repeated for futuristic technologies like CCU.

Conclusion

Making the transition to becoming a CO_2-negative company means thinking not only about today, tomorrow, or next year, but about future generations. It will not only safeguard the interests of our current stakeholders but also those of the future. In the words of our Father of the Nation, Mahatma Gandhi, 'One must care about the world one will not see.'

Our achievements, the milestones we have set for ourselves, and current developments taking place in CCU gives us the confidence that CO_2 neutrality – and even becoming CO_2 negative – is achievable in the near future. We are determined to be part of the solution in global climate action. After all, it's too big a business opportunity to miss.

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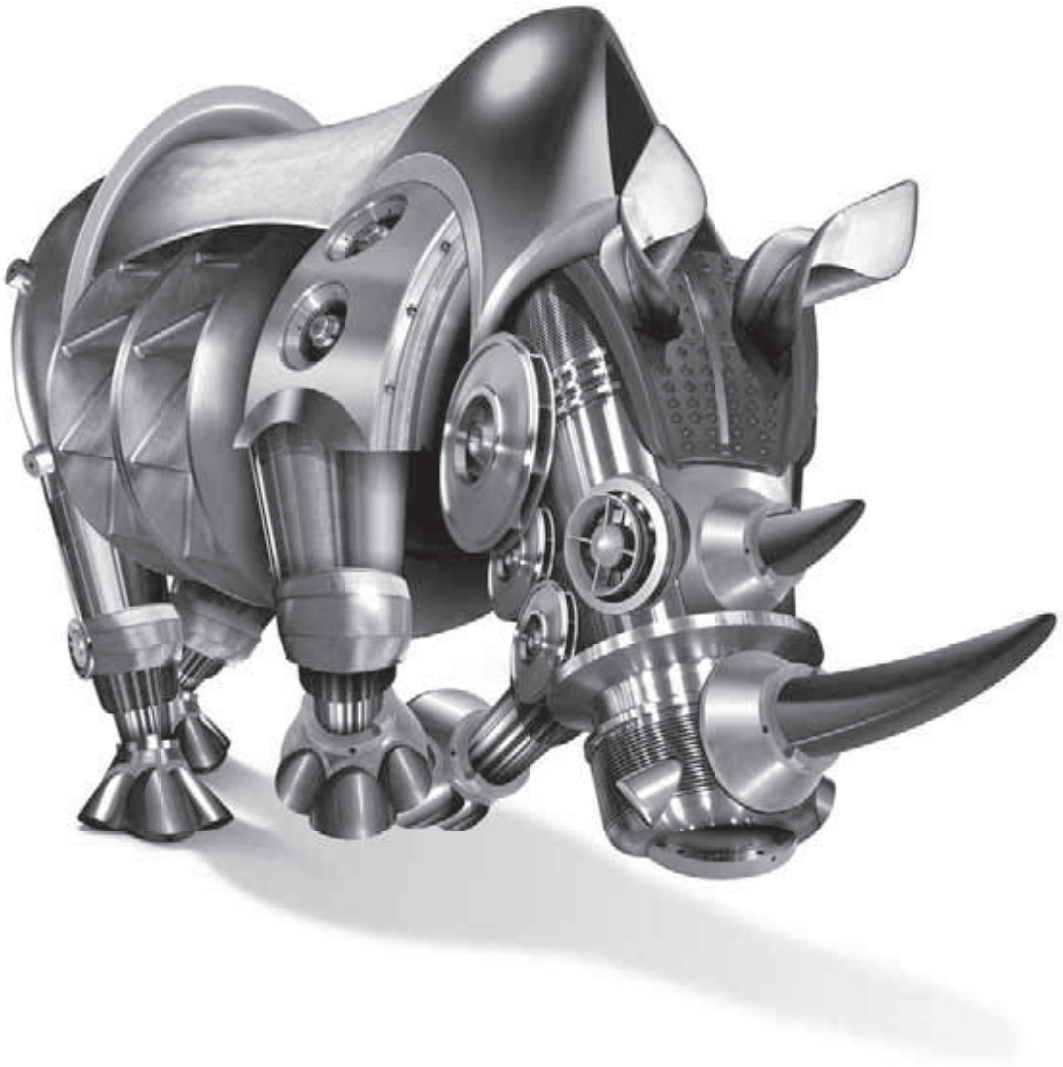

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Dr Geoff Nesbitt, Verditek

Easing the burden of CO_2 capture in cement and concrete production

Dr Geoff J Nesbitt, CEO at Verditek, looks at how Regenerative Froth Contactor (RFC) technology can reduce emissions in cement production, easing the burden commonly associated with mandatory carbon footprint reduction...

Above: Dr Geoff Nesbitt, CEO at Verditek.

Usually, associating the words 'concrete' and 'footprint' will conjure up images of perfectly preserved footprints pressed into setting concrete by small children or animals – a common and amusing fixture in many municipalities. However, as the most abundant man-made material on earth, conventional concrete does come with a significant emissions problem. Concrete's main by-product is CO_2, generated from cement production, which has a huge carbon footprint.

In fact, 6% of global man-made greenhouse gas emissions come from cement. In 2017, global cement production was responsible for a significant amount of CO_2 - approximately 1.8Bnt. In an ironic twist, dwindling CO_2 supplies have recently impacted various industries across Europe. This has sparked many conversations around the potential re-use of captured CO_2 by the affected industries.

While the re-use of captured CO_2 in industries impacted by its short supply could become a longer-term goal for cement producers, they should have already begun to explore CO_2 capture solutions that can empower them to react positively to intensifying pressure to reduce greenhouse gas emissions on a global scale.

Rising demand for greener processes

CO_2 capture technology will essentially provide cement producers in any country that is applying the COP21-Paris accord rules with a renewed license to operate. The 195 governments that signed the Paris Agreement in 2016 will be implementing COP21 as a regulation that forces their industries to take action. From the cement industry to oil, gas, manufacturing and beyond, industries must recognise COP21 as the official prompt to start budgeting for adjustments they must make to meet the increasing climate change targets and to explore solutions that will realistically aid them in meeting them.

It's not just governments that are demanding change from the industry. There is mounting demand for sustainability from the general public too. One survey conducted by YouGov on behalf of the Carbon Trust in the UK found that 55% of consumers would feel 'much more than positive' about a company that has reduced the CO_2 footprint of its products. Moreover, two thirds of consumers across the UK, France and Germany would now like to be able to recognise sustainable goods with a universal CO_2 footprint label displayed clearly on product packaging.

Right: Cities take up 2% of the world's surface but emit 70% of all CO_2 emissions.

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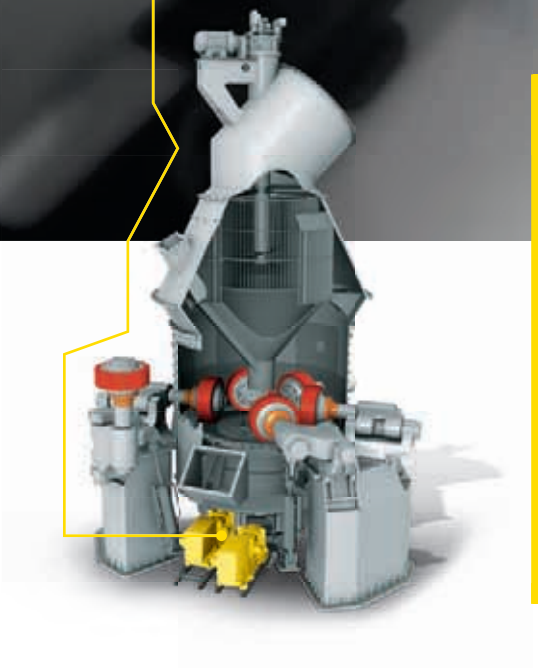

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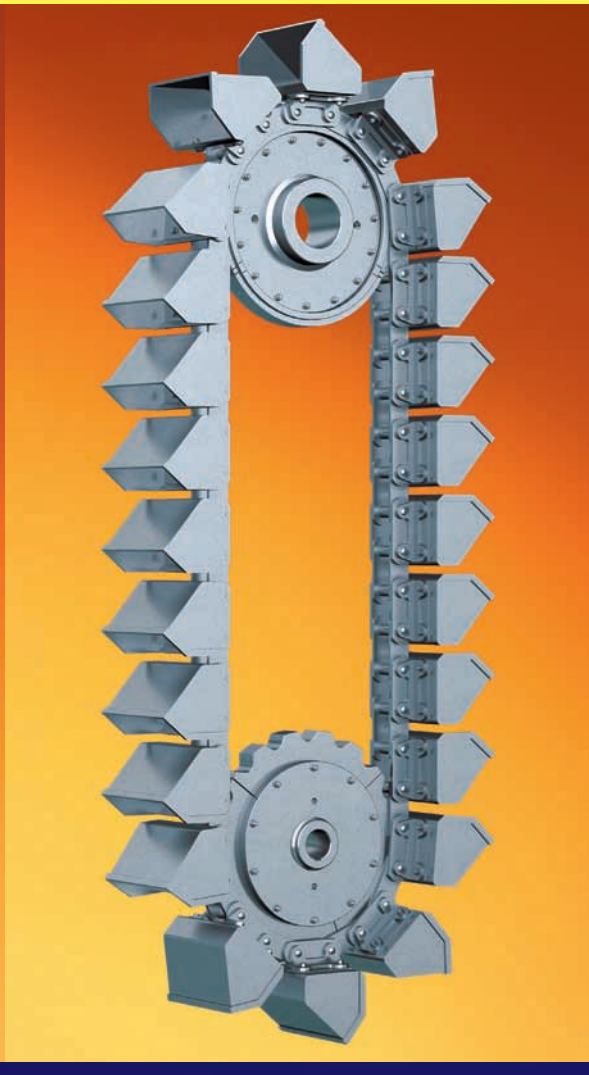

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Left: Clinker is CO_2-intensive. Regenerative Froth Contactor technology offers a way to capture CO_2 for re-use by other industries. **Source:** Krzysztof Burek, Caspi Cement LLP (HeidelbergCement Group), entrant to the *Global Cement Photography Competition*.

But it's not all about everyday products. The growing demand for sustainability is likely to extend to every aspect of the world that surrounds us, from eco-friendly materials that form our homes, workplaces and cities, to greener energy generation in housing, commercial buildings, infrastructure and public spaces. The significant uptake in hybrid and fully electric vehicle sales signifies a shift in people's attitudes towards their own impact on the environment and it's only natural that they are demanding businesses and industries begin to adopt the same attitude.

National Geographic reports that nearly 70% of the world's population will live in cities by 2050. That's a staggering 55% increase on today's figure. While cities currently cover just 2% of the world's land surface, they actually account for 70% of greenhouse-gas emissions. 30% of those emissions are generated by buildings alone. While there are viable alternatives to cement in residential construction with sections such as roofs, walls and floors prefabricated from either wood or MgO (magnesium-oxide based materials), commercial and industrial structures are subject to higher stresses and loads and will continue to rely on concrete or steel, both high emission industries.

Some producers have successfully introduced recycled aggregates into the cement mix. Yet producers can't realistically use any more than 10% of aggregate in a mix before the strength of the cement is compromised. The good news for cement producers is that the demand will remain, despite the rise of alternative materials. However, as the sustainability movement continues to develop, the pressure to reduce CO_2 emissions will become a growing challenge for cement producers.

A question of cost

Given the costs associated with implementing existing forms of CO_2 capture technology, it's hardly surprising that the global cement industry has been seeking subsidies or some form of financial relief from governments pressuring them to take on the burden of reducing the CO_2 output. While there is currently no offer of government subsidies, some governments have gone as far as introducing CO_2 credit schemes. Also known as CO_2 offset schemes, these see credits awarded for the reduction or removal of CO_2 emissions. However, such schemes have become subject to criticism for falling short of making a significant impact and, in some quarters, they are seen simply as a means for governments to capitalise on CO_2 emissions.

The cement industry would prefer not to be confronted with the expense of implementing any solution, but it cannot continue to vent CO_2 into the atmosphere without consequence. The only viable option for cement producers is to seek out emerging solutions that can achieve the same results as conventional contractors in a more affordable way. One such solution is Regenerative Froth Contactor (RFC) technology, which can actively reduce emissions in cement production, easing the burden commonly associated with mandatory CO_2 footprint reduction.

RFC technology is a relatively compact cost-effective technology for mixing gas with solvents, which is the primary method for washing CO_2 from flue gas. This presents the cement production industry with a realistic and affordable opportunity to meet growing sustainability demands without compromising the quality of the product and with zero disruption to the existing cement production process.

RFC technology has the potential to offer a more affordable method to strip the CO_2 from the cement factory's kiln exhaust thanks to the lower cost per tonnage of the equipment required. An RFC unit can be placed next to the exhaust chimney and the exhaust can then be routed to the contactor where an amine solvent reacts with the CO_2. The use of these solvents is established and well known to cement producers. However, the latest innovations in RFC technology are not yet widely known about, despite the significant advantage they can offer though a drastically diminished operating burden.

A step in the right direction

In comparison to conventional contactors, RFC is more robust and has the advantage of working with precipitating solvents. It could even be possible for producers to lease the technology instead of buying it outright, shifting the proposition to an operating budget, instead of a major capital purchase.

While the captured CO_2 will still need to be sequestrated or put to use elsewhere – perhaps in some of those industries across Europe that recently experienced CO_2 shortages – RFC provides the first step towards the re-use of CO_2 by enabling the cement producer to reduce the cost of meeting stringent regulations and the intensifying demand for CO_2 footprint reduction from all directions. This could be the global cement industry's opportunity to bring its operations in-line with modern environmental demands while maintaining its position as providers of one of the world's most relied upon building resources.

Elina Baltatzi, Donaldson Europe b.v.b.a

Dust collection: The key to cement production from beginning to end

Large flows of hard and abrasive dust particles are typical in all mining and mineral processing applications. This dust type rapidly wears out filter media, leading to frequent maintenance or, worse, filter leaks. Without effective dust emission control, equipment, processes, employees and the environment are put at risk and the plant's production can be halted. As a global leader in filtration solutions, Donaldson offers a quick dive into dust filtration during cement production...

Cement manufacturing offers particularly difficult challenges to dust collectors. Based on data from installations, it's been estimated that as much as 1% of mining throughput can be lost to the surrounding environment. For a 700t/hr quarry, that's about 7t/hr hour lost from conveyors, crushers and screens. That doesn't include losses from stockpiles.

Although mineral dust may look like any other dust and filtration techniques may appear to be straight forward, it is essential to carry out a more thorough analysis. The difference in selections between an effective and ineffective dust collector is often much narrower than in many other industries.

To understand filtration needs in cement production, and articulate relevant recommendations, we need to take a closer look at the specific application and at the dust itself.

Dust is generated during all phases of mineral exploitation and processing from fugitive sources. The main sources are: crushing, grinding, drilling, blasting and transport. Three parameters help us to measure the impact of dust emissions during cement production: **1.** Size (e.g. whether it is less than 2.5µm in diameter); **2.** Main components (e.g. silica, silicates, carbonates), and; **3.** Other mineral impurities and trace components (e.g. asbestos).

When it comes to dust control design, we must take into consideration the process and the form factor of extracted material to develop systems that capture diverse airflow patterns and are able to cope with high temperatures, high humidity and possible high dust load during a short time frame.

What are the main filtration challenges faced during cement production? As a single filtration source for mining and minerals, Donaldson can help cement plant operators to navigate the complex world of dust collection in the most efficient and environmentally-friendly way. Here are some tips:

Good design and equipment selection is essential

Dust collection is the ultimate controlling mechanism of dust emissions for the entire processing equipment spectrum, spanning across crushers, grinders and screens. In other words: dust collection is crucial for keeping production, employees, and the environment healthy. When it comes to dust control design, we must take into consideration the final use of extracted material and develop systems which capture diverse airflow patterns, by factoring in parameters such as incoming air velocity, dust distribution and air patterns within the collector.

Right: CPC: Top performance and efficiency. Thanks to PowerCore® technology and its excellent surface-loading, energy and maintenance costs are dramatically reduced.

Source or central?

A simple, linear layout for material-handling operations is necessary to reduce the need for multiple transfer points during extraction. Two basic strategies exist for applying dust control to the cement manufacturing process: **1.** Source collection, in which the dust collector is put at the source of the dust emission so collected dust can be deposited directly back into the


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process stream, reducing the need for ducting, and; **2.** Centralised collection, where the collector is put in a central location and dusty air is ducted and discharged as a separate process stream.

Source filtration reduces maintenance problems as fewer ducts or hoppers, which can block and / or bridge, are used. In addition, the shutdown of one unit may result in temporarily increased emissions in a single area but will be unlikely to necessitate a complete plant shutdown.

Limit dust dispersal

When it comes to moving process dust, procedures to limit the drop height of falling materials should be adopted. Cement dust is so abrasive that even prolonged contact with the equipment surface can cause extensive damage. Mobile and fixed-belt transport and conveyors are superior for transporting material by trucks through internal roads as they limit emission levels and reduce dust dispersal. For maximum efficiency, opt for closed rubber-belt conveyors in combination with flexible and effective filter mechanisms.

Operational savings

The harsh conditions of cement processing and the sticky, adhesive cement and lime dust can dramatically shorten filter life and increase the risk of production blockages, equipment abrasion and secondary dust emissions, increasing the cost of maintenance and material handling.

Donaldson's innovative technologies, such as Ultra Web® and Tetratex® filter media, provide high surface loading and superior dust release. It is proven that surface loading secures lower pressure drop and prolongs filter life.

As a result, Donaldson filters last up to three times longer than conventional filters and eliminate unplanned production shutdowns. Significant savings in power consumption can be achieved by maintaining the required airflow at a reduced filter ΔP. Surface filtration principles inhibit particle migration, resulting in increased cleaning efficiency.

The media's good cake release capability and low cake formation allows for reduced cleaning and lower mechanical stresses. This helps to prolong bag life and reduce filter changes.

Wide range of airflows and limited space for dust collection systems

When looking at cement production, we see a highly complex process that involves different types of trucks and machinery with diverse filtration needs. From robust modular baghouses to proprietary, lighter technologies such as PowerCore®, Donaldson offers a flexible product range in the market, covering from low to very high airflows.

Whether it is a new or an old installation, Donaldson has the experience and the technical capabilities to deliver solutions with lower costs over the operational lifetime. This:

- Increases the final output;
- Provides more uptime;
- Eliminates blockages;
- Allows better ambient dust control;
- Significantly increases filter life;
- Improves maintenance predictability;
- Saves energy by maintaining a lower operational ΔP and reduced compressed air use, and;
- Reduces emissions.

Right: DFE requires 40% fewer filters in comparison to other cartridge collectors and its proprietary design boosts filtration performance while saving energy.

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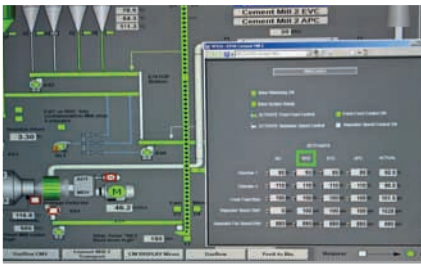

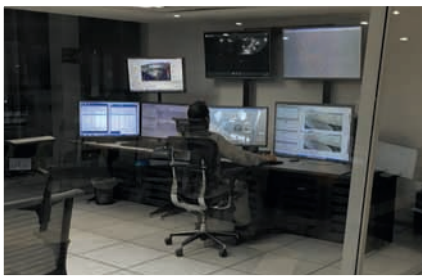

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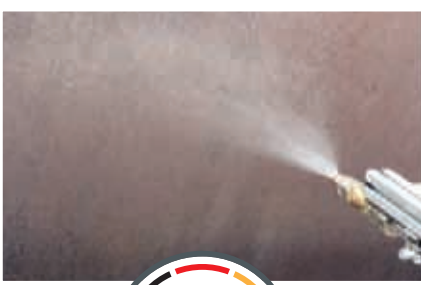

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Th. Scholten GmbH & Co. KG

Wear protection solutions in cement plants

Cement plants are among the industrial plants that suffer the most from high wear and its costs. The crushing, blending and the constant material transport of the hard raw material cause massive damage to the plant systems. Abrasion, impact, erosion, temperatures and fatigue stress the manufacturing process. For more than 70 years Th. Scholten GmbH & Co. KG has dedicated itself to the fight against wear in machinery and plant systems in the cement industry...

Wear is the permanent loss of material from the surface of a solid body due to mechanical causes. A distinction is made between different types of wear, which are summarised and explained in the tribological system, the theory of friction and wear. The most common types of wear are corrosion, abrasion, adhesion and impact wear.

It should be noted that wear is never to be considered individually, but always occurs in a so-called wear combination. This encompasses the interaction between the main body, counter-body and enveloping factors such as corrosion and temperature. Abrasive wear (the scoring action of the sliding or flowing goods parallel to the component surface) and impact wear (due to gravity, centrifugal or other forces), cause the largest material losses on surfaces and corresponding damage to machinery and equipment.

Factors that influence the wear of material on the component surface include the materials selected and the structural design of the plant's components. Furthermore, the properties of the bulk material (e.g. grain fraction, sharpness, moisture content and chemical aggressiveness), as well as the operating conditions such as conveying speed, throughput volume and drop height, also affect how rapidly components will experience wear.

All of these factors need to be precisely analysed and the wear protection system must be adapted accordingly to ensure the best resistance and component lifetime. This starts with the plant construction and ends with cement plant maintenance. Here, experience is of great value, as cement plant operators often have to learn the hard way and pay dearly for cheap solutions, since these may only achieve inadequate service life.

In addition, special responsibility applies here, in advance, to cement plant manufacturers. Some of these can lean towards economical solutions that are not necessarily fully thought through with regards to wear. Universal solutions are rarely the right path and ultimately cost cement plant operators more in the future than seeking out the most cost-effective solution from the outset.

From raw material processing and clinker production to actual cement production, almost all areas of a cement plant are affected by wear. In particular, the addition of blast furnace slag or fly ash dramatically increases wear. Particularly affected here are material transfers, chutes, mill housings and their classifiers as well as pneumatic conveying systems.

Th. Scholten GmbH & Co. KG supports almost all major cement manufacturers and plant builders

Right: Impact wear is a factor in many parts of a cement plant.

Far right: Chute with alumina-ceramic tailored component lining.

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Above: Project in Germany: Wear-resistant lining of cyclone with SC-WearStop®.

Above right: SC- WearStop® being applied to a component at the Th. Scholten factory in Wülfrath, Germany.

using its experience and mature wear protection systems. From consulting to delivery to final assembly, Th. Scholten GmbH & Co. KG covers all important areas of customer service.

In order to create the optimal wear protection system for the customer, the following factors are important:

- Precise analysis of the interaction of wear factors;
- Years of practical experience with other wear problems. (Wear and wear behaviour are not mathematically precisely determinable, as too many factors and mutual dependencies influence it);
- The creation of an individual concept, thanks to the knowledge of the individual materials and their targeted application.

For the protection of operating equipment against abrasive and impact wear in cement plants, Th. Scholten GmbH & Co. KG utilises, among others, the following materials.

- **SC-cast basalt:** The most widely used wear protection material with an excellent price / performance ratio. Mohs hardness of 8.
- **SC-hard ceramic:** Inexpensive wear protection, with excellent surface texture, which is often used to prevent adhesion. Mohs hardness of 7.
- **SC-alumina ceramic:** High-tech material with maximum service life. Available in a variety of formats and as tailored linings. Mohs hardness of 9.
- **SC-zirconia ceramic:** Ceramic blend with high alumina content. Good thermal-shock resistance. Mohs hardness of 9.
- **SC-silicon carbide ceramic:** Excellent properties for use in high-temperature applications. Highly resilient and available in a variety of formats. Mohs hardness of 9 to 9.5.
- **SC-WearStop®:** Wear protection material with excellent price / performance ratio. Flexibly adaptable to all plant systems. Joint-free installation of 15-50mm thickness. Mohs hardness of 7.5 based on the different material components.

SC-WearStop® is a ceramic cement mortar that can be applied to your plant components in Scholten's Wülfrath facility as wear protection. However, it can also be delivered in the form of bagged material for on-site processing. The company also offers complete assembly, in which specialist installers come to the plant site and apply the wear protection according to the client's requirements.

All materials are also offered in combination with elastomers for optimal use in the impact area. The combination of substrate and wear protection material has proven to be an economical solution in many cases.

In principle, all materials from Th. Scholten GmbH & Co. KG can be combined with one another in order to offer the customer the optimal wear protection system, taking into account the economic efficiency.

Conclusion

Wear is an expensive problem in cement production and it will never be possible to completely eliminate these costs for a cement plant. Nowadays however, due to the clever use of suitable wear protection materials, significant cost savings are possible.

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US: Terminal order for Siwertell

Siwertell, part of Bruks Siwertell Group, has secured an order from US-based GCCM Holdings LCC to supply a high-capacity ship unloader for South Texas Cement's terminal in the US port of Corpus Christi.

The Siwertell ST 640-M unit will have a continuous rated cement-handling capacity of 1500t/hr and will be able to unload ships of up to 60,000dwt.

"GCCM and South Texas Cement made the decision that their new terminal would be best served by a mechanical unloader," said Patrik Henryson, Sales Manager, Siwertell. "The factors considered by the companies during the decision process included unloading times, venting requirements, electrical demand, capital and lifetime maintenance costs, ship size and storage capacity."

"Siwertell's demonstrated ability was a large factor in the decision to choose them for this project," said Earl Ingram, President of GCCM Holdings and South Texas Cement. "Machine size and unloading rate were extremely important. This particular machine is well within the operational range of many other machines that Siwertell currently has in service, and when combining all of the deciding factors that led to choosing a mechanical unloader, it was apparent that Siwertell was the best fit for our needs."

The unloader is currently being built and will be delivered fully-assembled by heavy-lift ship to the port. Siwertell will supervise its commissioning and the unit is expected to go into operation in June-August 2019.

China: Three Loesche mills for Lubao

Lubao Cement has ordered three vertical roller mills from Germany's Loesche for a new 4500t/day plant that is being built at Bei Liu in Guang Xi. The project is being handled by Sinoma (Suzhou) Construction, part of Sinoma International Engineering and China National Building Material Group (CNBM) in turn.

Loesche will supply three mills for the project, one each for raw material, coal and clinker/slag. One four-roller mill with a capacity of 450t/hr will be used for grinding cement raw material to a fineness of 12% with a sieving residue of R 80µm. Another mill with a throughput of 200t/hr will be used for the subsequent grinding of cement clinker to a fineness of 3400 - 3600 Blaine. A large three-roller mill with a capacity of 42t/hr will be used for grinding fuel coal to a fineness of 2% and a sieving residue of R 80µm.

No value for the order has been disclosed.

Central America: FLSmidth moving ahead with contracts

Denmark's FLSmidth says it is moving ahead with two contracts for cement plants worth over Euro250m following the receipt of the agreed downpayment. One contract is for a new cement plant and the other is for an extension to an existing plant.

The cement plant engineering company has not released many details on the projects. However, both plants will be located in Central America and will supply cement mainly to their local markets. The expected commissioning is within 24 to 36 months and, once operational, the cement plants will have a capacity of 2000t/day and 3500t/day respectively.

Dominican Republic: Cemex is 'Go'

Mexico's Cemex has launched its Cemex Go platform in the Dominican Republic. The product allows customers to place orders, make payments, manage invoices and track deliveries in one place online. Cemex hopes to make the digital platform available in all of its territories by the end of 2019.

Denmark: Aalborg Portland signs five-year transport deal

Aalborg Portland has signed a five-year cement transport deal with Demstrup Autotransport and Silo Trans following a tendering process. The deal covers the producer's domestic cement distribution of over 1.25Mt/yr. This involves more than 33,000 movements per year. Demstrup Autotransport will be responsible for distribution in North and Central Jutland and Zealand. Silo Trans will handle distribution in Sønderjylland and in Funen.

Denmark: Sustainable technology grant for FLSmidth

Engineering company FLSmidth is working with insulation manufacturer Rockwool and the Technical University of Denmark (DTU) on a research project to develop sustainable process technologies that will increase the use of renewable fuels and raw materials and reduce CO_2 emissions. The project has received a Euro2.7m grant from Innovation Fund Denmark.

The project plans to investigate and optimise high-temperature processes throughout the entire production chain in both companies. The DTU holds experience in this field from the CHEC research centre at DTU Chemical Engineering, which has focused on combustion research and emission abatement in recent years. FLSmidth plans to explore using alternative cement formulae and production methods to enable the company to launch more efficient technologies for using renewable fuels and reducing emissions. Rockwool intends to lower CO_2 emissions and reduce its fuel consumption to make its production become more sustainable.

South Africa: Haver & Boecker JV with Portland Packaging

Germany's Haver & Boecker has entered into a joint-venture with Southport-based Portland Packaging. Through the joint venture, the Portland Packaging plant will start producing Haver & Boecker products and equipment alongside its own products, retaining the brands of both companies. The German company says that this is the first time a multinational full line packaging company has manufactured product for Africa, in Africa. It will be the minority partner in the joint venture.

Portland Packaging was founded in 2002 by Barry Buist, a former employee of a Haver & Boecker partner company in South Africa. It sells packaging machinery, parts and service to more than 100 customers across Africa and beyond, primarily in the cement industry.

Spain: Swings and roundabouts for sector as 'uncertainty and concern' remain

Demand for cement in Spain in the first half of 2018 was 8% higher than in the first half of 2017, according to the national cement association Oficemen. The rate of growth was down, however. The country recorded an 11% year-on-year increase in demand between the first half of 2016 and the first half of 2017. Oficemen had expected demand to pick up by 12% for the whole of 2018 but now expects an increase of 7% instead. If realised, this would mean sales of around 13.3Mt for 2018.

"At the beginning of the year, the Department of Studies of Oficemen expected to close 2018 with a 12% increase in domestic demand. Now, with public works almost paralysed, we are talking about lowering our forecasts by 5 percentage points," explained the president of Oficemen, Jesús Ortiz. "The weak recovery of the construction that began in Spain in 2017 depends on the building sector. Although it is growing at a good pace, it does so from absolute values that are still very low." It is estimated that 2018 will close with around 100,000 new homes started, a figure that, while ignoring the years of the construction boom, represents less than half of the average of the homes that were built in Spain in the period 1970-1995.

"Public investment in Spain remains at 63% of the average investment of Germany, the UK, France and Italy, which takes us dangerously away from our neighbours. There is a consequent loss of competitiveness for our country, especially in the most exposed sectors: exports, tourism, treatment and prevention of environmental risks, driver safety, and so on," added Ortiz.

Cement exports were also down year-on-year, for the 13th month in a row. Ortiz primarily blamed this on the devaluation of the Turkish Lira, which has helped Turkish cement exports advance their competitiveness compared to Spain. He also highlighted rising electricity costs, which are expected to be 20% higher at the end of 2018 than at the start. This will make electricity 28% more expensive than for German cement producers, according to Ortiz. "What has recovered in the domestic market in these two years, is being lost abroad, with production that remains stagnant at 20Mt since 2013, a figure that accounts for half of the installed capacity of our factories. Therefore, the uncertainty and concern for our industry is maintained," concluded Ortiz.

Switzerland: Deliveries marginally down on the year

Domestic deliveries by the Swiss cement industry declined by 1.7% in the third quarter of 2018 compared to the same quarter of the previous year. Over the course of the first nine months, the decline was 0.1%. The 0.8% growth rate in the first half of 2018 could not be maintained. The proportion of Swiss cement delivered to ready-mixed concrete plants has risen further to 72.2% of all deliveries. 20.6% of Swiss cement deliveries are made to in-situ concrete plants at major construction sites.

UK: LKAB to buy Francis Flower

Sweden's LKAB Minerals has signed a deal to buy Francis Flower. The acquisition is intended to bring a portfolio of sustainable products into LKAB Minerals' portfolio. Implementation of the agreement is subject to Austrian merger clearance. Both parties are confident that the merger control process will be completed by the end of November 2018. No value for the agreement has been disclosed.

Francis Flower recycles blast furnace slag from the steel industry for production of ground granulated blast furnace slag for use in cement production, among other offerings for industrial and agricultural use. It employs 130 people across four sites in the UK: Scunthorpe, Wicken, Gurney Slade and Runcorn.

LKAB Minerals in the UK has a similar size business across four sites and employs around 160 people. Its main operations are processing and marketing of minerals, primarily for the building, construction, polymer, coating, refractory and foundry industries.

Russia: Kavkazcement installing gas power plant

Eurocement is installing a 24MW captive natural gas power plant at its Kavkazcement plant in Chelyabinsk. The equipment was purchased from Finland's Wärtsilä for the Euro15.5m project. Construction of the buildings to house the power plant is expected to be completed in November 2018.

The project is part of an energy efficiency program that Mikhail Skorokhod, the president of Eurocement, signed with Rashid Temrezov, the head of the Karachay-Cherkess Federal Region, as part of the Russian Investment Forum, in 2018.

At present Eurocement has a power generation capacity of 150MW. It has built captive power plants at its Mordovcement, Sengileevskiy, Peterburgcement and Nevyansk cement plants. Upon the completion of the latest program the company is targeting a power capacty of over 400MW.

Turkey: Titan increases Adocim stake

Greece's Titan Group has reached an agreement to increase its share in its Turkish joint venture, Adocim Çimento Beton Sanayi ve Ticaret. At present the cement producer is a 50-50 joint-venture, operated with Cem Sak Group since 2008. The arrangement will see it buy an additional 25% share in Adocim and dispose of its 50% share of a grinding plant. The transaction is conditional upon approvals by regulatory authorities and is expected to be concluded by the end of November 2018.

Adocim owns an integrated cement plant with a production capacity of 1.5Mt/yr, a grinding unit with a production capacity of 0.6Mt/yr and three ready-mix concrete units.

UK: Barrington flue set for demolition

The chimney at the former Barrington cement plant in Cambridgeshire has been scheduled for demolition at the end of December 2018. The 56m chimney will be brought down to make way for 220 new homes that will be built by developer Redrow on the site of the former Cemex UK facility.

The Barrington plant was closed in 2008 after 90 years in operation. It has since become increasingly derelict and the chimney is reported by local residents to be unstable in high winds.

Russia: Mordovcement opens unit

Filaret Galchev, the chairman of Eurocement, and Vladimir Sushkov, the chairman of the government of the Republic of Mordovia, has officially opened a Euro65m grinding unit at the Mordovcement plant. The new grinding unit includes two ball mills with a production capacity of 2.6Mt/yr, a 50,000t clinker warehouse and rail and truck despatch silos. Eurocement used equipment from Christian Pfeiffer, Claudius Peters, Aumund and KHD for the upgrade project at its subsidiary.

World: GCCA grows to 20 members

Cement companies from Asia and North America are the latest to join the Global Cement and Concrete Association (GCCA), bringing the total number of member companies to 20. New members include Mexico's Grupo Cementos de Chihuahua (GCC), Israel's Nesher Israel Cement, India's Shree Cement and Taiwan's Taiwan Cement Corporation. The number of GCCA affiliates is also growing with the addition of the Cámara Nacional del Cemento in Mexico, the Federación Interamericana del Cemento (FICEM) in Colombia and the Union of Cement Producers – Soyuzcement in Russia.

GCCA members now include: Buzzi Unicem, Cementos Argos, Cementos Pacasmayo, Cemex, Çimsa Çimento, CNBM, CRH, Dangote Cement, Eurocement, GCC, HeidelbergCement, LafargeHolcim, Nesher Israel Cement, SCG Cement, Shree Cement Ltd, Taiheiyo Cement, Taiwan Cement Corporation, Titan Cement, UltraTech Cement and Votorantim.

The association added that further applications for membership and affiliate status have been received and are being processed.

Ireland: New directors for CRH

CRH has appointed Mary Rhinehart and Siobhan Talbot as non-executive directors. Rhinehart joined with effect from 1 October 2018 and Talbot will join with effect from 1 December 2018.

Rhinehart, aged 60 years, is chairman, chief executive officer (CEO) and president of Johns Manville, a building materials manufacturer. Over nearly 40 years with Johns Manville she has held a wide range of global leadership roles, encompassing responsibility for business management and strategic business development. Prior to being appointed as president and CEO in 2012, she held the role of chief financial officer.

Rhinehart was until recently a non-executive Director of Ply Gem Holdings and is currently a non-executive director of CoBiz Financial. She holds a Bachelor's degree in Finance from the University of Colorado and an MBA degree from the University of Denver.

Talbot, aged 54 years, is Group Managing Director of Glanbia, a global nutrition company with operations in 32 countries, a position she has held since 2013. She has been a member of the Glanbia Board since 2009 and was previously finance director, a role which encompassed responsibility for Glanbia's strategic planning. Prior to joining Glanbia, she worked with PricewaterhouseCoopers in Dublin and Sydney.

Talbot is a director of the Irish Business Employers Confederation. She is a fellow of Chartered Accountants Ireland and graduated from University College Dublin with a Bachelor of Commerce and Diploma in Professional Accounting.

Germany: Paderborn quarry expansion planned

HeidelbergCement is planning to expand the Atlas quarry of its Paderborn plant. The quarry area will be increased by nine hectares, according to the Neue Westfälische newspaper. The company says that the expansion is necessary to support the supply of raw materials to the plant. It has organised an information forum for local residents.

Turkey: WHR contract for CTP from Sanko Holding

Sanko Holding is planning to start a 7MW waste heat recovery (WHR) unit, supplied by Italy's CTP Team, at its Cimko Narli Cement plant in early 2019. CTP Team signed a turnkey contract for the WHR unit in March 2018. It will be the first unit in Turkey to use Organic Rankine Cycle (ORC) technology. The unit will provide approximately 12% of the current plant's electricity needs, with an annual uptime efficiency of 7920hr and energy of 36MWhr/yr.

"The project will be the first project based on ORC technology with a thermal oil loop in Turkey for heat recovery from the cement industry," said CTP Team Assistant General Manager Acelya Arik and Sales Director Marco Ernesto Donghi when the contract was signed. They added that since the project is the first ORC-based heat recovery plant in a Turkish cement plant it will be a milestone that will push further WHR projects in this field.

Russia: New despatch system for Slantsev plant

HeidelbergCement Russia has held an opening ceremony for a new despatch system at its Slantsev 'Cesla' plant in the Leningrad region. Mihail Polendakov, General Director of HeidelbergCement in Russia, Anton Hadjiiski, General Director of the plant, Mikhail Moskvin, Deputy Chairman of the Leningrad Region Government for Construction, and Deputy Prime Minister Leningrad Region - Chairman of the Committee for Economic Development and Investment Activities Dmitry Yalov attended the opening.

Following the upgrade, the plant now uses an automated loading system for its trucks. The investment for the project was around Euro13m. The unit has a cement production capacity of 0.8Mt/yr.

France: Green pilot plant to start commercial production in 2019

Hoffmann Green Cement Technologies' pilot plant at Bournezeau, Vendée, is set to start commercial production of low-CO_2 cement products in January 2019. Construction of the 50,000t/yr unit had been due to be completed in October 2018 at the time of going to press, with its inauguration scheduled for late November 2018. The plant will employ 10 workers initially and this will rise to 15 – 20 as production ramps up.

The producer intends to make cement products using metakaolin and blast-furnace slag. If the pilot plant is a success it then intends to raise funds to build a 0.5Mt/yr plant.

Global Cement staff

Review: 8th International VDZ Congress

The *8th International VDZ Congress 2018* has taken place successfully in Düsseldorf, Germany. Around 600 delegates from around the world heard 40 presentations on all areas of cement production on 26-28 September 2018, with a focus on sustainability and environmental protection. During the three-day event representatives from the cement industry, its suppliers and the fields of science and research discussed current technical challenges, future-related subjects and the issues facing tomorrow's cement industry. *Global Cement* was in attendance...

"Climate protection, digitalisation and the cement plant of the future: these are the key issues for the future of our industry, issues we are greatly committed to tackling," said VDZ President **Christian Knell** at the opening ceremony of the 8th *International VDZ Congress 2018* in Düsseldorf, Germany. "The *International VDZ Congress 2018* offers a unique forum to discuss the key questions on the future of cement production. We are delighted about the many valuable ideas and contributions presented by the participants."

The event had a particular focus on how digitalisation affects production processes and on how the development of innovative carbon abatement technologies can meet the 2050 climate goals. In terms of climate protection specifically, however, suitable boundary conditions would have to be created. Ongoing trends in European emissions trading and the rapidly increasing price of CO_2 are already leading to considerable costs for cement manufacturers. "To be able to realise our efforts in terms of climate protection and at the same time not lose competitiveness, we need research policy-related support for our investment in breakthrough technologies and the corresponding demonstration projects," said Knell. "The range of subjects is indicative of the global challenges we, as the cement industry, are facing. Our industry is well equipped to address these upcoming tasks proactively and play its part in shaping the future."

1: VDZ President Christian Knell gives his opening address to delegates at the *8th International VDZ Congress* in Düsseldorf, Germany.

2: HeidelbergCement's Albert Scheuer gave a detailed overview of the group's low-CO_2 projects.

3: Jérôme Stubler from VINCI Construction spoke on the topic of technical trends and innovation in construction.

4: Martin Schneider, CEO of VDZ, spoke about the cement sector's trajectory towards a low-CO_2 future.

5: TITAN Cement Group's Fokion Tasoulas, spoke about 'big data' analysis in the cement sector.

Keynote presentations

After Christian Knell's introduction, the Keynote presentations began. They examined innovation and technology trends in cement production

6: HeidelbergCement's Roman Lentz outlined the group's steps towards its 'digital transformation.'

7: Georg Locher, thyssenkrupp Industrial Solutions (left) and a colleague demonstrate a virtual reality headset, with a roller mill as an example, during a presentation on the industrial internet of things.

and in the construction industry as well as routes towards decarbonisation by means of carbon abatement technology.

The first keynote presentation was given by **Albert Scheuer**, HeidelbergCement, who presented on the topic of 'The cement plant of the future.' Scheuer's presentation included numerous HeidelbergCement projects, including its CO_2 capture projects at Norcem's Brevik plant in Norway. A decision on whether to build a 0.4Mt/yr demonstration plant could be made in 2020 or 2021. Scheuer also discussed: The Oxyfuel project at Colleferro, Italy; A project to use algae at its Safi plant in Morocco; Accelerated re-carbonisation of concrete and; Low temperature drying of alternative fuels. Smart cement plants and digitisation were also discussed.

VINCI Construction's **Jérôme Stubler** spoke on the subject of technical trends and innovation in the construction sector. The author requested that the content of the presentation not be published outside of the conference.

Prof Dr Robert J Flatt, from the Institute for Building Materials, ETH Zurich, provided an overview of concrete and its digital fabrication, focusing on 3D printing of layered concrete / mortars, as well as robotically-produced meshes that can be used to support 3D printed structures. Flatt also discussed the benefits of the 3for2 concept, which achieves space, material, and energy savings through integrated systems. Such an approach can be used to fit three floors into the same space as two floors in a conventional high-rise structure by eliminating the space needed for HVAC systems between floors.

8: Uwe Neumann (left) of Scheuch GmbH in discussion Luigi Buzzi from Buzzi Unicem.

Dr Martin Schneider, CEO of VDZ, next spoke on the topic of the route to a low-carbon cement

9: Delegates in discussion during a coffee break.

9: Frank Henning, Senior Expert Maintenance Environment and Operational Technology at VDZ (right) and Caroline Woywadt, Gebr. Pfeiffer (left).

11: Philipp Fleiger, VDZ, during his report from the VDZ's working group for grinding technology, which was co-authored with Michael Müller-Pfeiffer.

12: HeidelbergCement's Bernd Haegermann spoke on the topic of NO_x abatement in the German cement sector.

13: Dyckerhoff's Rüdiger Matheis spoke about operational experiences of HD-SCR at the Göllheim plant.

14: Caroline Woywadt from vertical mill manufacturer Gebr. Pfeiffer giving her presentation on the operational results of MVR mills.

15: Winfried Ruhkamp from Loesche provided results of grindability investigations using its vertical roller mills.

16: Nuh Çimento's Ilker Avci spoke about his plant's recent upgrade with KHD roller press technology.

17: Schwenk Zement's Jürgen Thormann spoke about the company's emission reduction systems, including Xmercury, sludge drying and the DeCONO$_x$ system from Scheuch.

18: Stefan Seemann from VDZ, grinding session chairman.

future. Schneider's presentation highlighted that, while there is still a lot of effort needed to reduce cement-derived CO_2 emissions, concrete structures already benefit the environment through structures like hydropower plants / dams, wind turbines and energy storage facilities. Schneider discussed waste heat recovery, already prevalent in much of Asia, as a way to rapidly increase cement plant efficiency. He described the rise of alternative fuels and the steady reduction in clinker factor, although there remain massive regional differences in practice. Schneider

19: The September 2018 issue of *Global Cement Magazine* was distributed at the event.

20: SICK's Felix Bartknecht outlines process gas and mercury emission monitoring using the company's technology.

21: Karen Scrivener, from the École polytechnique fédérale de Lausanne presented on the topic of Ternocem - A Belite Yeélimite cement.

22: Holcim (Deutschland)'s Florian Trele spoke about five years of operating the prototype Prepol StepCombustor from thyssenkrupp Industrial Solutions.

23: Nils Bodendiek, VDZ, presented on the topic of alternative fuel firing in the main burner.

24: Sui Tongbo, Sinoma, presented on the topic of Calcium sulphoaluminate cements in China.

25: Duna Drava's Zsolt Szilágyi presented retrofits at the Vác cement plant for higher alternative fuel usage.

26: Cimpor's Francisco Leitão presented on the topic of drying high moisture refuse-derived fuel at the Souselas plant in Portugal.

provided a look at the opportunities for carbon capture and storage, highlighting the North Sea as a potential location that offers potential, and discussed the wide range of alternative cements and binders that could disrupt traditional cement production processes.

The final keynote presenters were **Frank Rossini** and **Benjamin Sporton** of the Global Cement and Concrete Association (GCCA), a new organisation that was established in January 2018 by 10 of the world's leading cement producers. The GCCA's objectives is to be the single voice of the global cement and concrete industries. It aims to gain recognition of cement and concrete as innovative and locally / globally strategic sectors that offer the sustainable building materials of choice. The GCCA's first meeting will be on 22-23 November 2018 in London, UK.

Technical presentations

A total of 35 other presentations over the course of the following two days covered new technology processes for reducing emissions, the latest trends in cement grinding, kiln technology and the development of new and innovative cements. A selection of the presentations are shown in these pages.

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Brazil: Vicat acquires majority Ciplan stake

France's Vicat Group has acquired a majority share in Cimento Planalto (Ciplan). It has signed a binding agreement to buy a 65% share for Euro290m through a reserved capital increase. Ciplan will use the proceeds of the share sale to settle the 'vast majority' of its existing debt. Vicat noted that the transaction will be debt funded and its closing is subject to the fulfilment of 'certain' conditions.

Ciplan operates a 3.2Mt/yr integrated plant at Sobradinho in Bahia near to Brasilia. It also runs nine ready-mixed concrete plants and five aggregates quarries.

Vicat says that this acquisition is intended to support its targeted external growth and geographical diversification strategy. In order to 'capture' the Brazilian market, the company plans to leverage an industrial asset base, strong brand awareness, abundant quarry reserves and a competitive position in its local markets.

Brazil: Votorantim focusing on diversification strategy

Walter Dissinger, the chief executive officer of Votorantim Cimentos, says that the company's diverse geographical spread and its products protected it from turbulent markets, especially at home in Brazil since 2015. Dissinger made the comments in an interview to the Valor Econômico newspaper ahead of a company meeting to plan its strategy for the next five years. He forecast that the local cement market is likely to decline for the fourth consecutive year in 2018, with a drop in consumption of 2%.

He mentioned expansion plans in the US and upgrade projects in Argentina. Six new mortar plants are also planned over the next four years with an investment of US$30m. These units will generally be built next to existing integrated cement plants. The company is expanding its limestone business with an investment of US$54m. Dissinger added that the company's Nobres plant in Mato Grosso is making more revenue from limestone products than from cement. The company is also cutting fuel costs by replacing petcoke imports from the US with refuse-derived fuels. It is also exploring biofuel options.

Chile: Bío Bío starts clinker imports

Cementos Bío Bío has started importing clinker at the Port of Ariqueño to support the start-up of its new grinding plant at Arica. The company unloaded 8000t of clinker, according to Arica al día. The 0.15Mt/yr grinding unit was previously scheduled to start production in September 2018.

Mexico: Holcim celebrates 90 years

Holcim Mexico, a member of LafargeHolcim, is celebrating 90 years since the founding of its earliest incarnation, Compañía Mexicana de Cementos Portland Apasco, S.A. in Apaxco, State of Mexico. The company was founded on 6 October 1928, initially with a capacity of 36,000t/yr.

In 1964, after decades of growth and success, the Swiss group Holderbank became interested in a Mexican presence and bought the company, renaming it Cementos Apasco. In 1970, Holderbank added Cementos Veracruz to its Mexican portfolio and the company continued to expand in the 1980s and 1990s. The company renamed the operations Holcim Mexico in 2003 and they became part of LafargeHolcim in 2015.

Mexico: Cementos Fortaleza building grinding plant in Merida

Cementos Fortaleza has started to build a new 0.25Mt/yr grinding plant at Merida in Yucatan. The project has an investment of US$30m, according to the El Economista newspaper. The plant is scheduled to open in July 2019. It will create 50 direct jobs.

US: New Managing Director for Max-AI

Bulk Handling Systems (BHS) has appointed Matthias Erdmannsdoerfer as managing director of Max-AI. Prior to this new role, Erdmannsdoerfer worked for over six years as the president of National Recovery Technologies, a developer of optical sorting technology and BHS unit.

Argentina: Cement shipments down in September

Data from the Asociación de Fabricantes de Cemento Portland (AFCP) reveals that cement shipments in September 2018 in Argentina came to 1.02Mt. This figure represents a 9.1% decrease compared to August 2018 and a 9.9% fall compared to September 2017. The AFCP stated that the month's results were influenced by a lower number of working days, as well as adverse weather conditions.

Regarding internal consumption, shipments including imports also reached 1.02Mt, a decrease of 9.3% with respect to the previous month and 10.6% lower than in September 2017.

Despite the September slow-down, Argentine shipments of cement in the first nine months of 2018 are still 2.2% ahead of 2017 at 8.8Mt.

Above: The Obelisk in Buenos Aires, the capital of Argentina.

Puerto Rico: Cement sales rising

Cement sales in Puerto Rico continued to expand in September 2018. According to Cemex, cement sales were 268.2% higher than in September 2017, at 46,900t. September 2017, of course, was affected by the damage caused by the hurricanes Irma and María. Even so, the Economic Intelligence Research Unit (EIRU) has concluded that September 2018 would have registered 'a moderate increase in sales' in any case.

Between 1 January 2018 and 30 September 2018, 468,588t of cement was sold, an increase of 33.3% compared to the same period of 2017. EIRU states that, at the moment, the growth in the sector is due to the money sent by the US federal government for reconstruction, but adds that it will begin to 'normalise' in the coming year.

US: LafargeHolcim upgrades terminal in West Virginia for oil well cement market

LafargeHolcim has upgraded its terminal at Weirton in West Virginia following a 10-year furlough. The site will be used to store and distribute oil well cement products for markets in the Appalachian region.

"We have made a significant investment in the Weirton terminal in direct response to the growing needs of our energy industry customers. Demand for access to our oil well cement has increased dramatically, yet existing distribution channels had grown congested," said Jamie M Gentoso, chief executive officer (CEO) of US Cement operations.

The upgrade project included expanding the site, building a new water-based off-loading facility and restoring its silos. During the work LafargeHolcim collaborated with the Army Corps of Engineers, the West Virginia Department of Commerce, the Business Development Corporation of the Northern Panhandle and the local community. In addition, the company worked closely with the West Virginia Department of Environmental Protection and Environmental Protection Agency to assure all operating and environmental permits were in place. As part of this collaboration, LafargeHolcim has also been granted additional funding for surrounding site infrastructure improvements and build-out through the conditional grant program known as the West Virginia Industrial Access Road Program (IAR).

Bolivia: Ecebol plant to open in February 2019

Victor Hugo, the governor of Oruro, says that Empresa Publica Productiva Cementos de Bolivia (ECEBOL) is preparing to open its new 1.5Mt/yr cement plant at Caracollo in February 2019. Hugo told the La Patria newspaper that the unit was 98% complete. Over US$300m has been spent on the project.

US: McInnis opens Bronx terminal

Canada's McInnis Cement has officially opened its terminal in the Bronx, New York. The terminal can store up to 44,000t of cement and most of this will be delivered by ship. City Council Member and Land Use Committee Chair Rafael Salamanca, Bronx Community Board 2 Chair, Bobby Crespo and members of several Bronx organisations and the local business community joined McInnis Cement executives to celebrate the opening of the unit, the first new industrial maritime project built on the South Bronx waterfront in more than 50 years.

Peru: Bío Bío exits joint venture

Chile's Cementos Bío Bío's has sold its 50% share in Cementos Portland (Cempor) for US$14m. The cement producer originally purchased a stake in the company in 2010. The Chilean company had previously intended to build a cement plant in Lima in a joint venture with Brazil's Votorantim, but this was delayed by legal opposition from Unacem.

Canada: Tyre trial finally approved

The Canadian Environment Department has approved plans by the Lafarge Brookfield cement plant to burn tyres in its kiln in a one-year pilot project. The company will be obliged to conduct air quality, groundwater and surface water monitoring in the area during the trial, according to the Canadian Press newspaper. Industrial approvals are normally issued for 10 years but the shorter period will allow the authorities to scrutinise the situation more closely. Lafarge Canada plans to burn up to 5200t/yr in the pilot.

The decision to allow the pilot to go ahead follows local criticism of the project. A previous attempt by the cement producer to co-process tyres at the plant was blocked in 2007. The provincial Supreme Court dismissed a residents' group's bid for a judicial review of the pilot in March 2018.

US: Elixsys completes pilot test on coal ash extraction technology

Elixsys has completed a 100hr continuous pilot test to extract ammonium sulphate and calcium carbonate from flue gas desulphurisation solids at a coal-fired power plant in Pennsylvania. Products made using the company's proprietary process meet the specifications for fertiliser-quality ammonium sulphate and technical-grade calcium carbonate.

The company intends to start a commercial-scale project of its technology in 2019 once it finds a utility partner. Full-scale operations are planned by 2022. The company is also starting pilot testing on another process to extract metals from coal ash.

Trinidad & Tobago: New director at Trinidad Cement

Trinidad Cement has appointed Claudia Emmanuel as a director of the company to fill a casual vacancy. Emmanuel will hold the position until the company's next annual general meeting, whereupon she will be eligible for re-election.

India: CMA complains over imports

Shailendra Chouksey, president of the Cement Manufacturers Association (CMA), has complained about imports of cement from Pakistan damaging the local industry. He told the Indo-Asian News Service that cement from Pakistan was up to 15% cheaper than that of Indian cement. There has been no customs duty on cement imports from Pakistan since 2007, making it competitive in comparison to local production, especially in states that neighbour Pakistan. By comparison, Indian cement exports to Pakistan face a duty of 11%.

Data from the Directorate General of Foreign Trade shows that 1.68Mt of cement was imported into India during the 2017-2018 financial year, which ended on 31 March 2018. 1.27Mt or 76% of this total was imported from Pakistan.

Indian producers have also complained about the high rate of the local Goods and Services Tax (GST) in the country. They are hoping to reduce the rate to 18% from 28% at present.

India: Oil price hits packaging prices

High crude oil prices are forcing packaging costs to rise for cement producers. Data sourced from Capitaline shows that Ambuja Cements' packaging material cost rose by 19% year-on-year in the 2018 financial year. Similarly, Shree Cement's packaging costs rose by 9%. Both companies use high-density polyethylene bags, which are affected by the cost of oil. Crude oil prices have risen by around 24% to far in 2018 to above US$80/barrel.

India: Court to hear pleas by producers as fine repayment schedule continues

The Supreme Court has agreed to examine a plea by cement producers about a charge of cartel-like behaviour made by real estate developers and upheld by the Competition Commission of India (CCI). However, the court has insisted that the payment schedule of the fine imposed will have to be upheld while the appeal proceeds. The accused cement producers have been ordered to deposit 10% of the fine.

10 cement companies – including India Cements, Ramco Cements, Nuvoco Vistas Corporation, Ambuja Cement, ACC, Jaiprakash Associates, Century Textiles and Industries and UltraTech Cement – were accused by the Builders' Association of India and the CCI in 2010 of cartel-like behaviour. They were then fined US$905m or 0.5% of their net turnover. The producers first tried to appeal with the National Company Law Appellate Tribunal (NCLAT) but the tribunal dismissed their plea against the CCI finding in late July 2018.

Australia: Adelaide Brighton seeks damages from former credit manager

Adelaide Brighton is seeking damages from a former credit manager over US$9m in missing funds. The cement producer has accused former employee Glenda Ivy Burgess of the embezzlement following an internal audit. Burgess worked for Adelaide Brighton for 18 years but was dismissed in February 2018. The allegations include misallocating customer payments, falsifying accounts, increasing customer credit limits without authority and providing false information.

The construction company launched a civil lawsuit against Burgess at the same time that a police investigation was ongoing. This has subsequently led to a clash between civil and criminal proceedings, as the accused successfully petitioned the Supreme Court to delay the civil case while the criminal investigation continues.

Indonesia: Terminal for Anhui Conch

China's Anhui Conch is looking for finance to support a US$105m terminal it wants to build in Palembang. Yu Jun, a project manager at the cement producer said that the project will be able to import and export 0.4Mt/yr and it will have a berth for ships of 3000dwt, according to Inside International Industrials. The company hopes to secure funding by the end of February 2019.

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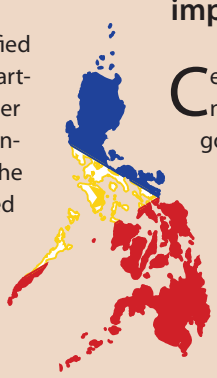
Philippines: WTO notified over imports

The Department of Trade and Industry has notified the World Trade Organisation (WTO) that it is starting a preliminary investigation to examine whether increased imports of cement are causing or threatening to cause serious injury to the local industry. The cement covered by the investigation is classified under AHTN Codes 2523.2990 and 2523.9000. The investigation will look at the period from 2013 to 2017. The ministry has cited the Safeguards Measures Act as part of its probe.



Philippines: Cemex assesses impact of mining ban

Cemex Holdings Philippines (CHP) is running an assessment to see how a local government order to stop mining operations in Naga will affect its business. APO Land & Quarry has been requested to stop quarrying operations in Naga City, Cebu following landslides. APO Land & Quarry supplies raw materials to CHP's subsidiary Apo Cement, and it is indirectly 40% owned by Mexico's Cemex.

Azerbaijan: LafargeHolcim increases stake in local unit

LafargeHolcim has increased its stake in Holcim Azerbaijan to 76% from 66%. The move followed the decision by the European Bank for Reconstruction and Development (EBRD) to sell its 10% equity stake in the cement producer. Remaining shares in the company are held by individual shareholders.

Pakistan: Flying order for Loesche

The Flying Cement Company has ordered a vertical roller mill from Germany's Loesche for a new 7000t/day production line in Lahore. The raw material mill will be used at Flying Cement's plant at Mangowal, where it will grind 600t/hr. The plant is mainly used to produce Ordinary Portland Cement (OPC).

Along with the mill, the scope of supply also includes a Hurriclon system from A TEC, a member of the Loesche Group, for separating finished material from the gas flow leaving the mill. Commissioning is expected to take place at the end of 2018.

TAIHEIYO CEMENT

Dow Jones Sustainability Indexes

Japan: Taiheiyo on DJSI Asia Pacific

Taiheiyo Cement has been selected to be part of the Dow Jones Sustainability Asia Pacific Index for the fifth consecutive year. The company was first chosen in 2014. The index is the Asia Pacific version of the Dow Jones Sustainability Indices and it serves as a benchmark for socially responsible investment.

India: JSW starts grinding plant build

JSW Cement has started building a 1.2Mt/yr cement grinding plant at Kalinganagar Industrial Complex in the Jajpur district of Odisha. The unit will be used to produce Ordinary Portland Cement and ground granulated blast furnace slag (GGBS), according to Projects Today. The project had been on hold since 2016 due to issues with the land. The unit is expected to be operational by September 2020.

Australia: Grinding plant for Geelong

Boral Cement's proposed 1.3Mt/yr grinding plant at Geelong in Melbourne is expected to be operational by 2020. Construction work on the US$94m unit is planned to start soon, according to the Geelong Advertiser newspaper. The plant will be connected to Lascelles Wharf at the Port of Geelong via a conveyor system.

The cement producer and the port have signed a 25-year agreement supporting the facility. Boral has operated at the port for the last seven years. The new grinding plant is intended to allow Boral to reduce the cost and time of transporting its products from its Waurn Ponds plant. It will also support an anticipated growth in infrastructure demand in Victoria.

India: Shree orders flue gas desulphurisation gypsum dryer from Gebr. Pfeiffer

Shree Cement has ordered a TRT 5000/8.0 Triplex dryer from Germany's Gebr. Pfeiffer. The dryer will be used to dry flue gas desulphurisation (FGD) gypsum from a captive coal-power plant for use in cement plants. In the planned dryer plant the moisture of the FGD gypsum will be reduced to a residual moisture of <2%. Artificial gypsum from the dryer will be used at other cement grinding plants in the country. The 50t/hr dryer will be installed at the end of 2018 and is expected to start commercial operation in mid-2019.

Gebr. Pfeiffer is also planning to partially calcine the gypsum in future installations of the dryer. The TRT Triplex dryer uses the uniflow principle, where both material and hot gases flow in the same direction and pass through the dryer tubes from the centre outwards. Testing at the Gebr. Pfeiffer test station have yielded 'positive' results and further installations in other plants are being considered.

Above: A TRT Triplex dryer of another customer in operation.

China: Anhui Conch signs sale contract with Jiangsu Conch

Anhui Conch has signed a cement sale and purchase agreement with Jiangsu Conch Building Materials with a value of up to around US$230m. Subsidiaries of Anhui Conch based in east China will sell a total of 3.5Mt of cement products to Jiangsu Conch, a non-wholly owned subsidiary of Anhui Conch. The contract will last until the end of 2018.

The agreement has been set up for a relatively short time period as a pilot scheme to test the market. The intention is to allow the direct Anhui Conch subsidiaries to focus on production and to enable Jiangsu Conch to concentrate on using its 'centralised sales advantage.'

India: NCL's cement production rises to 1Mt in first half of year

NCL Industries' cement production rose by 36% year-on-year to 1.02Mt in the half year to the end of September 2018 from 0.75Mt in the same period in 2017. Its cement despatches increased by a similar amount to 1.02Mt from 0.75Mt. The company operates in cement, cement-based boards, ready-mixed concrete, prefabricated structures and hydroelectric power.

India: Star imports 1200t of fly ash

Star Cement has imported over 1200t of fly ash from NTPC Kahalgaon in Bihar. The ash was transported by the Inland Waterways Authority of India (IWAI) via Bangladesh to Pandu Port in Assam, according to the Financial Express newspaper. The water route was chosen due to a lack of railway links in India's north-eastern states.

Myanmar: Political group blocks cement plant project

General Saw Johnny, chief of staff of the Karen National Liberation Army (KNLA), says that the group has not granted permission for Yadanar Sai Kaung Myat Kyaw Company to build a new cement plant at Hnget Pyaw Taw near Hlaingbwe. The representative of the military wing of the Karen National Union, a local political organisation, said that it had met with the company but that no final decision had been made, according to Burma News International. Yadanar Sai Kaung Myat Kyaw Company plans to build a 10,000t/day plant with an investment of US$760m. It intends to pay compensation to the owners of farmlands and plantations that are included in the project area and it has reached an initial agreement with respective state ministries to build the plant.

Malaysia: New CMS chairman

Cahya Mata Sarawak (CMS) has appointed Abdul Rashid bin Abdul Manaf as group chairman with effect from 1 October 2018. He succeeds Mahmud Abu Bekir Taib, who returns to the post of deputy group chairman.

Rashid started his career in 1970 in the Malaysia Judicial and Legal Service and served as magistrate, president, sessions court and Senior Federal Counsel to the Income Tax Department. He left the government in 1997 to pursue his career as a lawyer and subsequently in business. Notably he became one of the principal legal advisers to the Renong Conglomerate, with involvement in various Federal Government transactions.

Peter Edwards, Global Cement Magazine

Getting the Numbers Right in India...

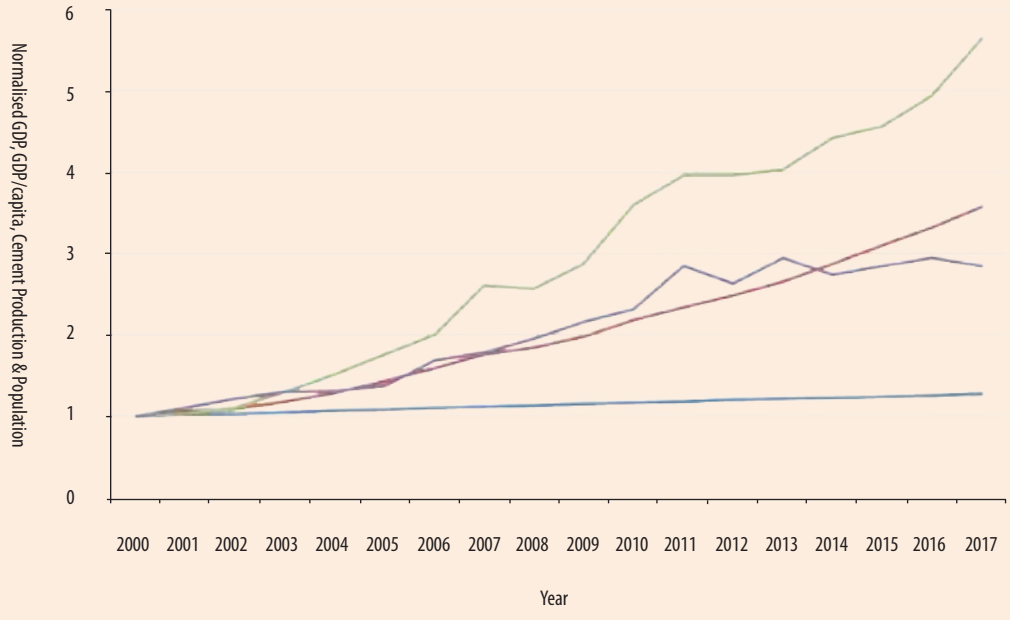
Here *Global Cement* reviews the massive and ever-changing cement sector of India...

Right: A busy street scene in Kolkata, the capital of West Bengal and India's seventh most populous city. **Source:** Radiokafka / Shutterstock.com

The Republic of India has been independent from the UK since 1947. It is the second most-populous country in the world after China, with 1.32bn inhabitants in 2016. India had the world's sixth-largest economy by GDP in 2017, with US$2.61tn according to the International Monetary Fund (IMF). However, its very large population means that it ranked only 122nd in terms of GDP/capita in 2017 at US$7174.[1]

Traditionally dominated by agriculture, the Indian economy is now biased to the service sector, which provides 61.6% of GDP. Industry brings in 23% of GDP and agriculture brings in 15.4%. The workforce, however, is still predominantly engaged in agriculture (47%), with industry employing 22% and services employing 31%.[1]

Despite the economy growing by a factor of nearly six so far in the 21st Century (See Figure 1), income is very poorly distributed in India. The country ranked just 135th out of 197 countries for equality in 2017.[2] As of November 2016 the richest 1% of Indians owned 58.4% of the country's wealth and the richest 10% owned 80.7%.



Right - Figure 1: Normalised growth curves for Indian GDP, GDP/capita, cement production and population in the 21st Century. **Sources:** World Bank Data Indicators website (GDP, GDP/capita & Population), Cement production (United States Geological Survey).

= GDP
= GDP/capita
= Cement production
= Population

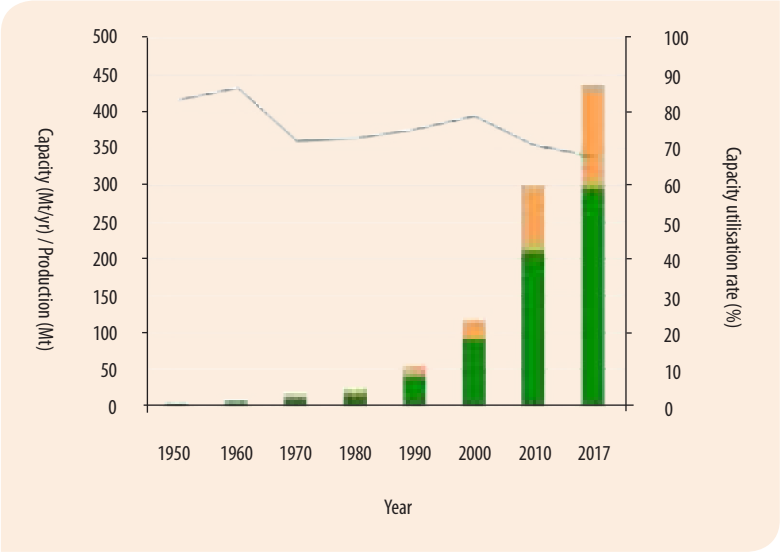
A look at the background

The first cement plant in India was located at Porbundar, Gujarat.[3] It was constructed in 1912-1913 and came online in 1914 with a capacity of just 10,000t/yr, 33 years before independence. The sector grew steadily to a capacity of 6.0Mt/yr by 1950, 9.0Mt/yr in 1960, 19.8Mt/yr in 1970 and 25.5Mt/yr in 1980.

From independence the government controlled the cement sector. However, the sector was decentralised in 1986, which led to a great spurt in new capacity. Installed capacity more than doubled between 1980 and 1990 to 57.0Mt/yr, with a further doubling to 119.3Mt/yr by 2000. Capacity then nearly tripled to around 300Mt/yr by 2010 and in the seven years to 2017 it expanded by a factor of nearly 1.5 to hit 446Mt/yr.

Alongside the rapid expansion since the mid 1980s, cement production has similarly exploded. From just 18.6Mt made in 1980, production rose to 42.9Mt in 1990 before racing to 94.2Mt in 2000, 213.2Mt in 2010 and 298Mt in 2017. Production has grown by a factor of seven since 1990.

However, a closer look at the situation shows that Indian cement capacity has increased at a far faster rate than production. The national capacity utilisation rate was 83.3% in 1950 but has since slumped to 67.9%. There is more than 140Mt/yr of cement capacity that, on the surface, appears to be superfluous. The development of the over-capacity situation can be seen in Figure 2 and Table 1.

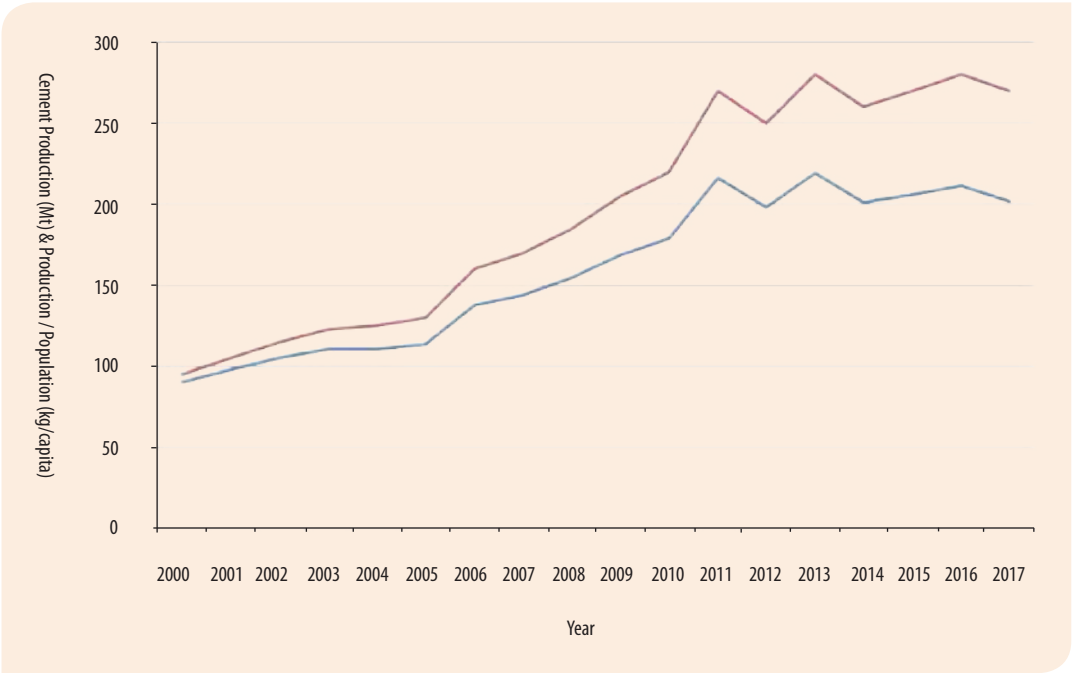


Year	Capacity (Mt/yr)	Production (Mt)	Δ (Mt/yr)	Capacity Utilisation (%)
1950	6.0	5.0	1.0	83.3
1960	9.0	7.8	1.2	86.7
1970	19.8	14.3	5.5	72.2
1980	25.5	18.6	6.9	72.9
1990	57.0	42.9	14.1	75.3
2000	119.3	94.2	25.1	79.0
2010	300.0	213.2	86.8	71.1
2017	446.0	298.0*	148.0	67.9

Above - Figure 2: Indian cement capacity, production and capacity utilisation rate for the period 1950 - 2017.[1]

Capacity (Mt/yr) =
Production (Mt) =
Utilisation (%) =

Left - Table 1: Source data for Figure 2.[3] Capacity utilisation rate has been calculated. * = For 2018 fiscal year to 31 March 2018.



Left - Figure 3: Indian cement production (Mt) and production per capita (kg/capita) in the 21st Century.

Production (Mt)
Production per capita (kg/capita)

Sources: Population (World Bank Data Indicators website), Cement production (USGS).

A look at the states

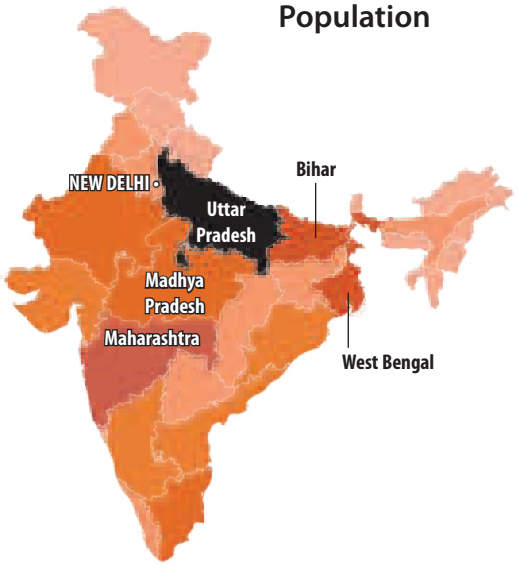
Figures 4-8 show Indian states by population, cement production capacity, limestone production, cement capacity/population and GDP/capita. In each map the states are colour-coded according to the state with the highest figure; the closer the state's value to the maximum, the darker it is. The top five states are highlighted in each and they are shown in Tables 2-6.

Figure 4 is a breakdown of population by state. It clearly highlights that Uttar Pradesh, close to the capital New Delhi in the central northern region, has the highest population by some distance. It has 205 million inhabitants, almost twice as many as second-place Maharashtra (112 million) in the central west. The third and fourth most populous states, Bihar (104 million) and West Bengal (91.3 million) are also in the north east. Madhya Pradesh (72.6 million), the fifth most populous state, is situated between Uttar Pradesh and Maharashtra.

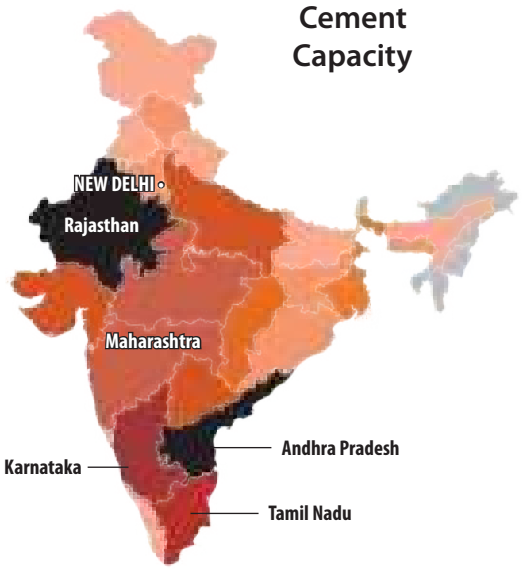
The top five states are home to 480 million people, around 43% of all the country's inhabitants. India's least populated states are in the far north and far east. There is also a band of lower population density running through the country, from the north east to the centre of the south.

Unlike in a number of major markets, most cement production capacity (Figure 5) is not predominantly found within the most populous states in India. This is due to the relatively uneven distribution of limestone production (Figure 6). There are close similarities between the limestone production volumes in each state and that state's cement production capacity. This should not be surprising, as 92% of limestone produced in India's 2016-2017 fiscal year was used in cement production. Of the 242.5Mt of limestone produced, more than 223Mt was used for cement.

Combining Figures 4 (population) and 5 (cement capacity) leads to Figure 7, a map of how much cement production capacity there is in each state divided by the population that lives there. This is capacity per capita, not production per capita nor consumption per capita. It shows that, once populations are taken into account, India's cement plants are more appropriately located than Figure 5 would suggest by itself. The most notable exception to the more even picture in Figure 7 is Meghalaya, which has an apparent capacity / population ratio of 2793kg/capita. The national average is around 550kg/capita. Notable other states with high capacities compared to their population include Himachal Pradesh (1617kg/capita), Andhra Pradesh (1213kg/capita), Chhattisgarh (906kg/capita) and Rajasthan (832kg/capita).



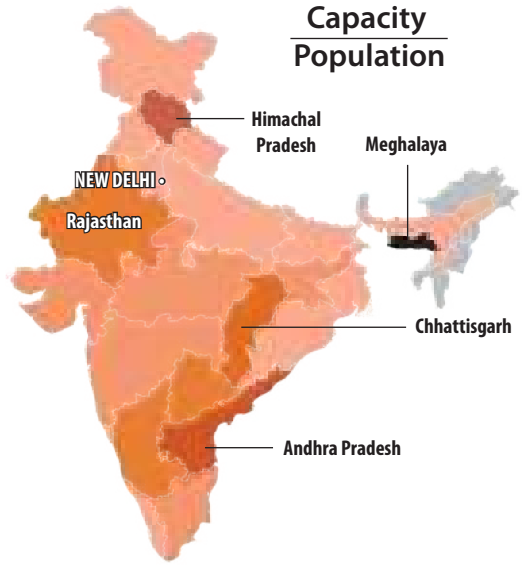
Right - Figure 4: Indian states colour-coded by Population. Top five states highlighted.
Source: Indian Census 2011.



Far right - Figure 5: Indian states colour-coded by cement capacity in 2018. Top five states highlighted.
Source: Research conducted towards *Global Cement Directory 2019*.

Legend for Figures 4-8

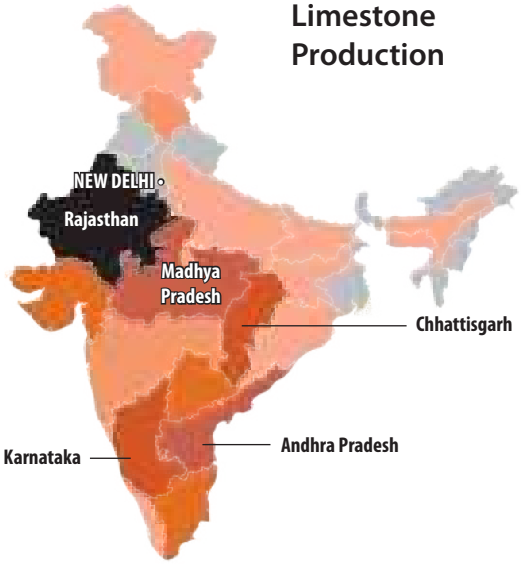
- 91 - 100%
- 81 - 90%
- 71 - 80%
- 61 - 70%
- 51 - 60%
- 41 - 50%
- 31 - 40%
- 21 - 30%
- 11 - 20%
- 0 - 10%
- None

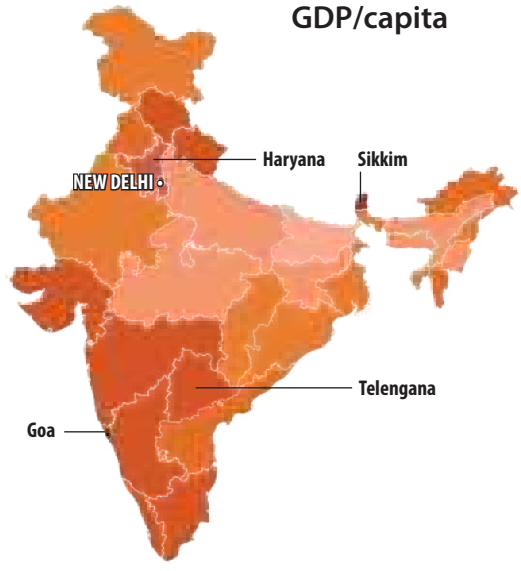


Right - Figure 7: Indian states colour-coded by Cement capacity / Population. Top five states highlighted.
Source: Calculated from Figures 4 & 5.

The states with the lowest ratios are Jammu & Kashmir (64kg/capita), Bihar (25kg/capita) and Kerala (18kg/capita). These states, and others like them, receive cement from neighbouring states with higher cement capacities.

Finally Figure 8 shows India broken down by GDP/capita. This highlights Goa as the richest state by this metric (US$21,140/capita), followed by Delhi (US$18,520/capita), Sikkim (US$16,760/capita), Haryana (US$11,090/capita) and Telengana (US$10,200/capita). There are some limited similarities between the distributions shown in Figures 7 and 8, reminiscent of the general positive correlation between GDP/capita and cement *consumption* that can be seen across groups of countries.





Rank	State	Population
1	Uttar Pradesh	204.2
2	Maharashtra	112.3
3	Bihar	103.8
4	West Bengal	91.3
5	Madhya Pradesh	72.6
	Mean	40.4
	Median	29.4

Left - Table 2: Top five Indian states by population (millions). **Source:** Indian Census 2011.

Rank	State	Cement Capacity
1	Andhra Pradesh	59.9
2	Rajasthan	57.1
3	Karnataka	43.6
4	Tamil Nadu	39.6
5	Maharashtra	32.1
	Mean	14.7
	Median	6.9

Left - Table 3: Top five Indian states by cement capacity in 2018 (Mt/yr). **Source:** Research conducted towards *Global Cement Directory 2019*.

Rank	State	Limestone Prod'n
1	Rajasthan	67.1
2	Madhya Pradesh	35.8
3	Andhra Pradesh	35.3
4	Chhattisgarh	31.9
5	Karnataka	29.8
	Mean	10.4
	Median	0.8

Far left - Figure 6: Indian states colour-coded by Limestone production in the 2016-2017 Indian fiscal year. Top five states highlighted.[4]

Left - Table 4: Top five Indian states by limestone production in 2016 (Mt).[4]

Rank	State	Capacity / Population
1	Meghalaya	2793
2	Himachal Pradesh	1618
3	Andhra Pradesh	1213
4	Chhattisgarh	906
5	Rajasthan	832
	Mean	554
	Median	283

Left - Table 5: Top five Indian states by Capacity / Population (kg/capita). **Source:** Calculated from Figures 4 & 5.

Far left - Figure 8: Indian states colour-coded by GDP/capita. Top five states highlighted.[5]

Rank	State	GDP/capita
1	Goa	21,140
2	Delhi	18,520
3	Sikkim	16,760
4	Haryana	11,090
5	Telengana	10,200
	Mean	7843
	Median	6995

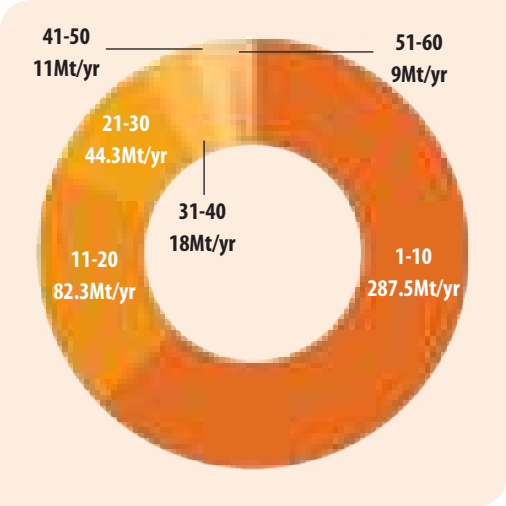
Left - Table 6: Indian states colour-coded by Capacity / Population (kg/capita). **Source:** Calculated from Figures 4 & 5.

A look at the owners

Using research conducted towards the publication of the forthcoming *Global Cement Directory 2019*, it is possible to break down the Indian cement sector by producer. There are 71 companies that operate integrated cement production facilities in the country. There are 36 that operate grinding plants, six of which do not have integrated capacity. The integrated plants account for 328.6Mt/yr of the country's total capacity of 446Mt/yr.

The top 10 cement producers in India are listed in Table 6. Combined, they control 287.7Mt of cement capacity, around 64% of the national total. The top 20 operate 361Mt/yr, around 81% of the total. The remainder of capacity is shared by the 51 other players, which is broken down in Figure 9.

The Indian cement sector is predominantly served by domestic players, with relatively few international players. Around 79% of capacity (352Mt/yr) is Indian-held. The main international players are LafargeHolcim (65.0Mt/yr), HeidelbergCement (19.6Mt/yr) and Vicat (11.8Mt/yr). These operate through well-established local brands such as ACC (LafargeHolcim), Ambuja Cement (LafargeHolcim) and Bharathi Cement (Vicat). CRH also operates 6.7Mt/yr of capacity via acquisitions it made as part of the Lafarge and Holcim divestments prior to their merger.



Right - Figure 9: The Indian cement sector is becoming increasingly concentrated. The pie chart shows the installed capacity held by successively smaller groups of 10 cement producers.
Source: Work towards *Global Cement Directory 2019*.

Rank	Company	Integrated (Mt/yr)	Grinding (Mt/yr)	Total (Mt/yr)
1	UltraTech Cement	59.2	25.1	84.3
2	LafargeHolcim	41.4	23.6	65.0
3	Dalmia Bharat	17.4	6.5	23.9
4	Shree Cements	8.0	12.2	20.2
5	HeidelbergCement	12.1	7.5	19.6
6	Ramco Cement	13.0	4.1	17.1
7	Chettinad Cement	14.8	2.0	16.8
8	The India Cements	13.0	3.7	16.7
9	JK Cement	7.9	4.2	12.1
10	Vicat	11.8	0.0	11.8
Top 10 Total		**198.6**	**88.9**	**287.5**
Indian Total		**328.6**	**117.4**	**446.0**

Right - Table 7: Top 10 cement producers in India by installed capacity.
Source: Work towards *Global Cement Directory 2019*.

Recent results - Top 5 Producers

1. UltraTech Cement's consolidated net sales rose by 27% year-on-year to US$1.3bn in the quarter that ended on 30 June 2018 from US$1.01bn in the same period of 2017. However, its profit after tax dropped by 30% to US$92m from US$131m.

2. LafargeHolcim subsidiary ACC saw its sales rise by 14% to US$1.06bn in first half of 2018 from US$934m in the same period in 2017. Its net profit after tax rose by 8% to US$125m from US$108m. Its sales volumes of cement increased by 8% to 14.4Mt from 13.3Mt.

Meanwhile, LafargeHolcim's other Indian subsidiary Ambuja Cement saw its sales benefit from more infrastructure projects, improved sand availability and increased government spending in the first half of 2018. Its sales volumes of cement grew by 6% year-on-year to 26.9Mt in the first half of 2018 from 25.4Mt in the same period in 2017. Its net sales increased by 10% to US$1.89bn from US$1.72bn and its operating earnings before interest, taxation, depreciation and amortisation (EBITDA) rose by 7% to US$328m from US$306m.

3. Dalmia Bharat announced that it sold 17.0Mt of cement in the Indian fiscal year to 31 March 2018. It saw an income from operations of US$1.2bn, EBITDA of US$284m and a profit after tax of US$89.5m. The profit was 88% higher than in the previous fiscal year.

4. Shree Cement reported revenues of US$1.4bn in the 12 months to 31 March 2018, with an operating profit of US$398m and a net profit of US$192m.

5. HeidelbergCement announced a record year in 2017. In India revenues with external players came to Euro516m.

Recent ownership changes

The Indian cement sector is becoming increasingly concentrated at the moment, due to ongoing pressure from the overcapacity situation discussed above. In recent years the sector has seen the merger of Lafarge and Holcim, which eliminated one major international player, as well as the absorbtion of Italcementi into HeidelbergCement, which reduced the multinational count a second time.

UltraTech Cement then purchased six cement plants and five grinding plants from Jaiprakash Associates for US$2.5bn in 2017. The acquisition marked the end of the long-running negotiating process between the companies.

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Announced	Company	Location	Capacity (Mt/yr)	Integrated / Grinding	Completion date
February 2018	Ambuja (LH)	Rajasthan	3.1	I	Second half of 2020
May 2018	Dalmia Bharat	Odisha	1.7	I	Mid 2020
May 2018	Unknown	Odisha & Andhra P	-	I	Not stated
July 2018	Bharathi Cement	Vizag	-		Not stated
August 2018	Wonder Cement	Maharashtra	2.0	G	March 2020
August 2018	FCI Aravali Gypsum	Himachal Pradesh	0.3	White - I	Not stated
August 2018	Birla Corp	Maharashtra	3.9	I	Early 2022
August 2018	OCL India	Odisha	-		Not stated

Above - Table 8: Non-exhaustive list of greenfield cement plant projects in India. **Source:** News on *GlobalCement.com.*

Completed	Company	Location	Project	Capacity added (Mt/yr)	Integrated / Grinding
January 2018	JSW Cement	Salboni	New plant	2.4	G
February 2018	Shree Cement	Rajasthan	New plant	3.6	G
March 2018	NCL Industries	Telangana	Expansion	2.8	G/I
April 2018	UltraTech Cement	Madhya Pradesh	New plant	2.5	I
April 2018	UltraTech Cement	Madhya Pradesh	New plant	1.8	G
June 2018	Shree Cement	Karnataka	New plant	3.0	G
August 2018	Kalburgi Cement	Mumbai	New terminal	1.2	N/A
September 2018	JK Lakshmi Cement	Gujarat	Expansion	0.5	G
September 2018	JK Lakshmi Cement	Maharashtra	Expansion	0.5	G

Above - Table 9: Non-exhaustive list of recently-completed expansions and new plants. **Source:** News on *GlobalCement.com.*

Below - Table 10: Non-exhaustive list of recently announced expansions and new plants. **Source:** News on *GlobalCement.com.*

Announced Expansions	Company	Location	Project	Capacity added (Mt/yr)	Completion date
January 2018	Sanghi Cement	Gujarat	Grinding and clinker expansion	4.0	-
February 2018	JK Cement	Rajasthan	New clinker line	3.0	2022
March 2018	Anjani Portland	Telangana	New clinker line	1.1	-
March 2018	Kalburgi Cement	Karnataka	New clinker line	2.3	2023
March 2018	Kalburgi Cement	Andhra Pradesh	New grinding plant	1.8	2022
June 2018	My Home	TBA	Expansions and / or new plants across the group	5.0	-
July 2018	Orient Cement	Telangana	New clinker line	4.5	-
August 2018	Rain Cement	Andhra Pradesh	Grinding capacity upgrade at integrated plant	0.8	First half of 2019
August 2018	Not stated	Himachal Pradesh	New plant	-	Build began September 2018

In early 2018 Dalmia Bharat agreed to acquire Murli Industries at a cost of US$62.4m. Murli owned a 3Mt/yr integrated cement plant. As per the resolution plan, Dalmia Bharat cancelled most of the equity of Murli Industries and paid its lenders US$54.6m. This is 80% below what Murli owed the banks.

In August 2018 the Competition Commission of India (CCI) approved UltraTech Cement's acquisition of Century Textiles & Industries, the cement production subsidiary of BK Birla Group. The company holds three integrated plants in Madhya Pradesh, Chhattisgarh and Maharashtra respectively with a combined production capacity of 11.4Mt/yr, as well as a 1.0Mt/yr grinding plant in West Bengal. The takeover has been arranged via a demerger process whereby Century Textiles' shareholders will be given shares in UltraTech Cement.

Dalmia Bharat is the current frontrunner to buy Kalyanpur Cement, following an auction for the Bihar-based cement producer. The bidding process follows a debt resolution plan for Kalyanpur Cement. Dalmia Bharat's winning bid has been submitted by the creditors to the Kolkata bench of the National Company Law Tribunal for approval. Kalyanpur Cement owes more than US$94m to its creditors and it was declared bankrupt in May 2017. It operates a 1.0Mt/yr cement plant at Banjari.

Finally, ACC and Ambuja Cements, the two Indian subsidiaries of LafargeHolcim, have put their merger plans on hold. ACC said that its board was of the opinion that there were 'certain constraints' blocking its merger plan. However, it added that a merger was its 'ultimate' objective.

Plant projects and plans

There have been numerous greenfield cement plant projects announced so far in 2018. A non-exhaustive list is supplied in Table 8. A non-exhaustive list of recently completed projects is shown in Table 9 and known forthcoming projects and expansions are presented in Table 10.

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Above: Wonder Cement's plant at Tehsil, Rajasthan.
Source: Ajitkumar Koshti, entrant to the *Global Cement Photography Competition.*

Getting (most of) the numbers right

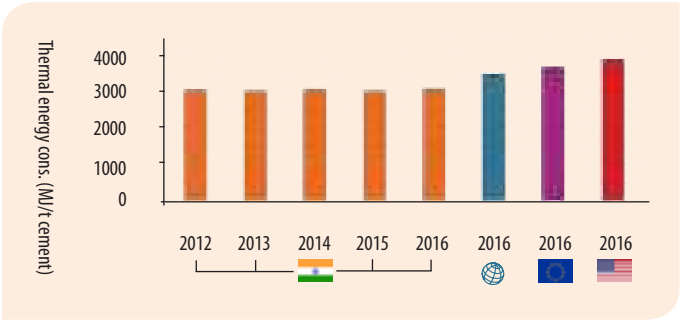
Much of India's cement capacity has come online since the industry was liberalised. This, combined with the sector's sheer scale and skilled technical staff in the plants, means that Indian cement production is among the most efficient in the world.

The Indian sector's specific thermal energy consumption is substantially below the global average, according to the data from the Cement Sustainability Initiative's (CSI) Getting the Numbers Right (GNR) database.* The Indian sector's average thermal energy consumption in MJ/t for the years 2011 - 2016 is shown in Figure 10, along with 2016 reference values for Europe, the US and the weighted global average. India's 3090MJ/t in 2016 is considerably lower than the global average (3520MJ/t), the EU28 (3690MJ/t) and the USA (3920MJ/t).

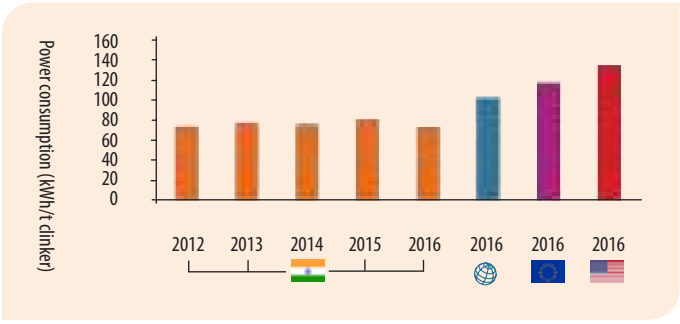
The thermal efficiency of India's cement plants is set to improve in the near future with several new waste heat recovery (WHR) plants at existing facilities and announcements of the same. In January 2018 Nirma Group's subsidiary Nuvoco Vistas announced plans to invest US$157m on captive power plants and WHR systems for three of its cement plants in Chhattisgarh, Jharkhand and Rajasthan. The cement producer plans to save around US$15m from the upgrades over the next two to three years.

In February 2018 Gujarat Sidhee Cement commissioned a 5.5MW WHR plant at its Sidheegram plant in Gujarat at a cost of US$10m. Power generated from the unit is expected to save the plant US$2.6m/yr, giving a payback time of less than four years. Also in February 2018, the board of Mangalam Cement approved plans to build a 11MW WHR unit at its Morak plant in Rajasthan.

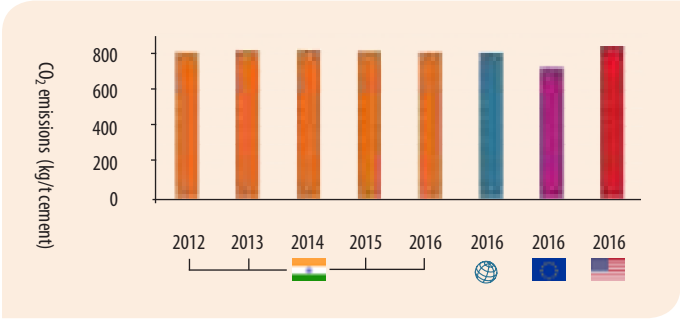
More recently, UltraTech Cement announced plans to build five waste heat recovery (WHR) units at a total investment of US$72.6m in July 2018. The new WHR units will have a capacity of 63MW and they will take the company's total WHR capacity to 121MW. It is anticipated that the cement producer will be able to meet half of its power requirements from its WHR plants.



Right - Figure 10: Average thermal energy consumption of Indian cement sector per tonne of cement, 2012 - 2016, plus global, EU28 and US values for 2016.
Source: CSI GNR database.



Right - Figure 11: Average electrical power consumption of Indian cement sector per tonne of cement, 2012 - 2016, plus global, EU28 and US values for 2016.
Source: CSI GNR database.



Right - Figure 12: Average CO_2 emissions of Indian cement sector per tonne of clinker, 2012 - 2016, plus global, EU28 and US values for 2016.
Source: CSI GNR database.

* The GNR database only includes data for CSI member companies. Capacity of members as a percentage of national / regional totals in 2016 were as follows:

India = 49%
EU28 = 90%
World = 19%
US = 73%

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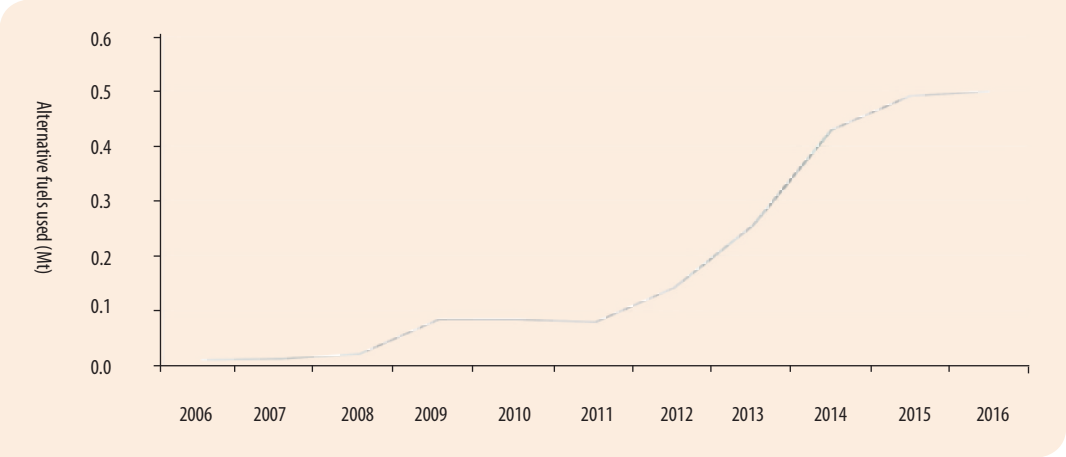

Right - Figure 13: Total volume of alternative fuels used by the Indian cement sector, 2006 - 2016.
Source: CSI GNR database.

Metric	India	World	EU28	US
Thermal energy consumption (MJ/t cement) (GNR Metric 25aAG)	3090	3520	3690	3920
Power consumption (kWh/t clinker) (GNR Metric 33AGW)	75	103	118	135
Net CO_2 emissions (kg/t cement) (GNR Metric 71AG)	818	810	730	843

Right - Table 11: Thermal energy consumption, electrical power consumption and net CO_2 emissions for India, World, EU28 and US in 2016.
Source: CSI GNR database.

The GNR database also contains information on the electrical power used to produce a tonne of clinker in each country / region (See Figure 11). This shows again the superior performance of the Indian cement sector compared to the 'old' markets in Europe and the US. India used only 75.9kWh/t of clinker in 2016 against a global average of 103kWh/t. The EU28 used 118kWh/t on average and the US used 135kWh/t.

However, despite its relatively new technology, India performs less well with respect to CO_2 emissions per tonne of cement (See Figure 12). At 812kg/t in 2016, it is very similar to the global average of 810kg/capita. In reality, the comparative lack of coverage by CSI in developing regions may mean that this average (as well as the others) is in fact skewed to a relatively low value that may not reflect the true nature of the global cement sector away from the markets that CSI covers.

Alternative fuels on the rise

In any case, the relatively high CO_2 emissions compared to the US and the EU are in part down to India's lower use of alternative fuels. Until recently, the country did not make great use of these. However, their use is beginning to take off. Figure 13 shows that the sector used around 0.6Mt/yr of alternative fuels as of 2016. This is more than 50 times the level the sector consumed in 2006. When corrected for the increase in cement production of CSI members in India over this period, the amount of alternative fuel burned per tonne of cement produced increased from 0.15kg/t in 2006 to 5.1kg/t in 2016.

Below: The Orient Cement plant at Chittapur, Karnataka.
Source: FLSmidth, entrant to the *Global Cement Photography Competition*.

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Future

According to the International Monetary Fund (IMF) the Indian economy is expected to grow by 7.3% in its (current) 2019 fiscal year and by 7.5% in the 2020 fiscal year. This follows growth of 6.7% in the year to 31 March 2018 and 7.1% growth in the year to 31 March 2017.

In many markets, such growth would indicate big opportunities for cement producers. Indeed, the credit rating agency ICRA has said that the demand for cement in India is likely to grow by around 6% in the current fiscal year. In its latest report on the sector from July 2018, it said this would be due to a pick-up in the affordable and rural housing segment and infrastructure, primarily in road and irrigation projects.

However, India has significant oversupply issues, which are likely to further play into the hands of the largest and most geographically diverse cement producers. In January 2018, ICRA Ratings' senior vice president and group head said that he expected 'the capacity overhang and the moderate demand growth to continue to keep the industry's capacity utilisation level at 60-65% over the medium term.' That's an admission that over 150Mt/yr of *existing* cement capacity is surplus to requirements.

In the face of this situation, smaller producers are likely to continue to be sidelined, unless they happen to be in a particularly strong local market. They face a triple-whammy of rising overcapacity, rising fuel prices and increasingly well-priced imported cement from neighbouring countries. Conditions are ripe for larger players to continue to snap up smaller ones.

The oversupply situation in India is not unusual in global terms but the sheer size of the sector means that it is particularly unwieldy. Market forces dominate the sector, so Chinese-style capacity closures and campaign operations are not feasible. The consolidation of the Indian cement sector will continue to be a case of 'survival of the fittest,' and it will take a little while yet.

Right: The Ramco Cements Salem plant. **Source:** K Sathya Prakash, entrant to the *Global Cement Photography Competition*.

Metric	2017	2018
India*	7.3%	7.5%
Developing	4.9%	5.1%
China	6.6%	6.4%
Eurozone	2.2%	1.9%
US	2.9%	2.7%
World	3.9%	3.9%

Right - Table 12: GDP growth forecasts for 2018 and 2019. *Data for India is for fiscal year ending the following 31 March (i.e.: Figure shown for 2018 is for 12 months to 31 March 2019). **Source:** IMF July 2018 forecast.

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Right: Sunset over the Presidential Palace in New Delhi, capital of India.

Egypt: Exports risk being uncompetitive due to higher energy prices

Medhat Istvanos, head of the cement division of the Chamber of Building Materials, affiliated to the Federation of Egyptian Industries, says that exports from the country are being made uncompetitive due to the government's decision to raise energy prices in June 2018. He said that the local exchange rate had aided exports but that "the government's bureaucracy has eliminated export hopes," according to the Daily News Egypt newspaper. The local industry exported cement worth US$57m during the first half of 2018.

Istvanos said that the industry has a production capacity utilization rate of 60% with a production capacity of 84Mt/yr but consumption of only 54Mt/yr. He added that the decision to build the new 12Mt/yr Beni Suef cement plant was "not based on precise information" and that it had harmed local production.

Kenya: IFC still considering ARM move

The International Finance Corporation (IFC) says it is still considering investing in ARM Cement, which entered administration in late August 2018. IFC Kenya Country Manager Manuel Moses said that the World Bank institution was waiting for the outcome of the administration process to complete to see if a 'good proposal' would emerge, according to the Standard newspaper. Moses made the comments while unveiling the IFC's investments in Sub-Saharan Africa in 2018.

The Kenyan cement producer has been placed into administration for 12 months to attempt to solve its debt problems. The IFC was previously set to take over loans worth US$120m at ARM Cement in July 2018 and was also interested in an equity stake.

Tanzania: Minister inaugurates gas connection project for Dangote

Energy minister Medard Kalemani has inaugurated a new natural gas connection project to Dangote Cement's plant at Mtwara. The project is being implemented in two phases, with a new power plant planned that will generate up to 45MW. The upgrade will cost around US$875,000. Phase two of the project will see the construction of a 2.7km pipeline to the cement plant as well as supporting infrastructure. This was expected to be completed by the end of October 2018 at the time of going to press. Using natural gas is expected to significantly reduce the running costs of making the cement, which has been using diesel generators.

Cameroon: New plant in early 2019

Cimencam has assured Ernest Gbwaboubou, the Minister of Mines, Industry and Technological Development, that the first bag of cement will be despatched from the Nomayos grinding plant in the first quarter of 2019. The comments were made during a visit by Gbwaboubou to the unit. The minister also noted that the compensation process for residents affected by a power line to the plant had yet to be completed.

The new plant will have a production capacity of 0.5Mt/yr. The project has an investment of around US$40m. The plant will source pozzolans from a quarry at Foumbot.

Kenya: EAPCC managing director questioned by parliament

Simon Ole Nkeri, the managing director of East African Portland Cement Company (EAPCC), has been questioned by the National Assembly Trade, Industry and Cooperative committee of the Parliament of Kenya. He told the committee that the company has considered the almost US$14m it owes it workers, but he was unable to provide a payment schedule.

In August 2018 the Labour Court allowed the Kenya Chemical and Allied Workers Union to recover the money owed to over 400 workers. In late September 2018 the Court of Appeal gave the EAPCC 30 days to make a deposit of the owed funds. However, the company resorted to legal means to delay paying the deposit, as it would 'cripple' its business operations.

Yemen: Imports from Al Jouf Cement

Saudi Arabia's Al Jouf Cement says it has completed its first export to Yemen. It transported 9000t of cement. The financial impact of the shipment will be recorded in its financial report for the third quarter of 2018.

Zimbabwe: Cement shortage woes blamed on foreign exchange issues

Edith Matekaire, the commercial director of Lafarge Zimbabwe, has blamed a backlog of foreign currency exchange as the cause of a shortage of cement. The US$2m backlog has caused plant maintenance shutdowns to take longer than they normally would, according to the Herald newspaper. Due to the lack of adequate funding, the shutdowns have been forced to take place during periods of peak production, causing effects in the market.

Despite this, Matekaire said that the local cement sector has more than enough production capacity to meet customers' needs. Demand is 1.3Mt/yr and cement production is 2.4Mt/yr. Demand is only expected to exceed production capacity from 2020 onwards.

Zimbabwe: Lafarge sues haulier

Lafarge Zimbabwe is suing Gramiso Investments for an outstanding debt of over US$200,000. The cement producer and transport company entered into a prepayment agreement in which the cement manufacturing giant advanced US$500,000. However, Gramiso Investments allegedly only paid back just over half of this amount. Lafarge Zimbabwe has taken the lawsuit to the High Court.

Guinea: GI Cement plant doubles in size

La Société Guinée Industries (GI) Ciment has doubled the production capacity of its plant at Kagbélen near Dubréka to 1.4Mt/yr. The upgrade is intended to support cement consumption in the country. The work was originally scheduled for completion in July 2018. The capacity boost has increased the unit's workforce by 17% to 450 direct employees. Around 1500 indirect jobs are associated with the plant.

Guinée has four cement plants, including grinding plants, operated by Cemenco, a subsidiary of HeidelbergCement, in Conakry and by Ciments de l'Afrique (CIMAF) in Dubréka. LafargeHolcim Guinée also runs a unit locally. GI Ciment reports that it operates the largest plant in the country.

Rwanda: ARM to auction Kigali plant for a second time

Kenya's ARM Cement is set to auction off its Kigali Cement plant in Nyarugenge District for a second time, following a first attempt. The company forced a legal postponement to the first auction when offers for the unit failed to reach a level it deemed acceptable. The only bid it received was for US$113,000 a figure significantly short of the estimate US$1.4m market value of the plant. Kigali Cement operates a 0.1Mt/yr plant.

Kigali Cement plant is being sold in order to pay its creditor, Rwanda Enterprise Investment Company (REIC) in a long running dispute between the companies. ARM Cement owns Kigali Cement but REIC has held shares in it since 2008. ARM Cement acquired a stake in Kigali Cement in 2010 and later took over the management of the company in 2014. Meanwhile, ARM Cement entered administration at home in Kenya in late August 2018.

Mozambique: Compact Metal fails to buy plant

Singapore's Compact Metal Industries has failed to buy a majority stake in a partially built cement plant at Salamanga, Bela Vista in Maputo Province. Compact Metal Industries was planning to pay US$30m for a 51% stake in the plant in a deal with SPI and Guhavam. The arrangement would have also seen Compact Metal Industries settle the project's debts to suppliers and contractors to a value of US$55m.

Gabon: Strong first half for CIMAF unit

Ciments de l'Afrique (CIMAF) Gabon's sales have grown due to 'strong' demand for cement following a ban on imports since July 2017. Its turnover grew by 37% year-on-year to US$22.8m in the first half of 2018 from US$16.7m in the same period in 2017, according to Direct Infos Gabon. Its sales of cement rose by 42% to 0.18Mt from 0.13Mt. Its production also rose by 38% to 0.18Mt from 0.13Mt. Previously, the cement producer said it was planning to start a new production line at its Cimgabon integrated plant by November 2018.

Ghana: Takoradi plant for early 2019

Brice Houeto, the new country head of Dangote Cement in Ghana, says that the company expects to open its new grinding plant in Takoradi by end of 2019. The incoming manager made the comments to the Daily Graphic newspaper. The new unit will have a production capacity of 1.5Mt/yr. It is expected to create 1000 new jobs in the Western Region.


Arab Union for Cement and Building Materials
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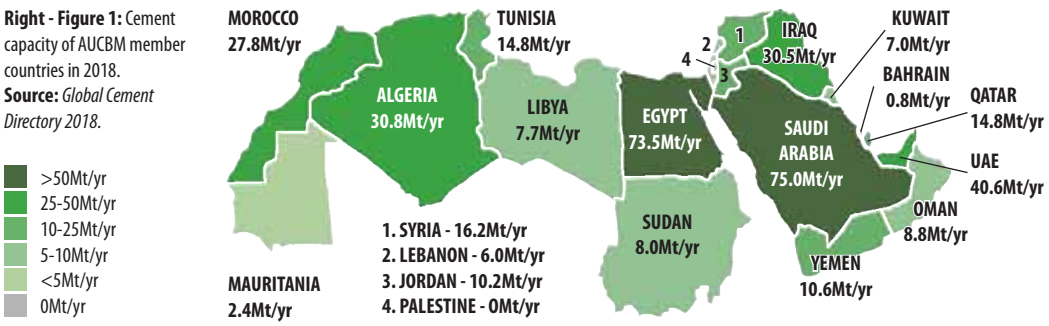
Peter Edwards, Global Cement Magazine

Jordan and the Middle East

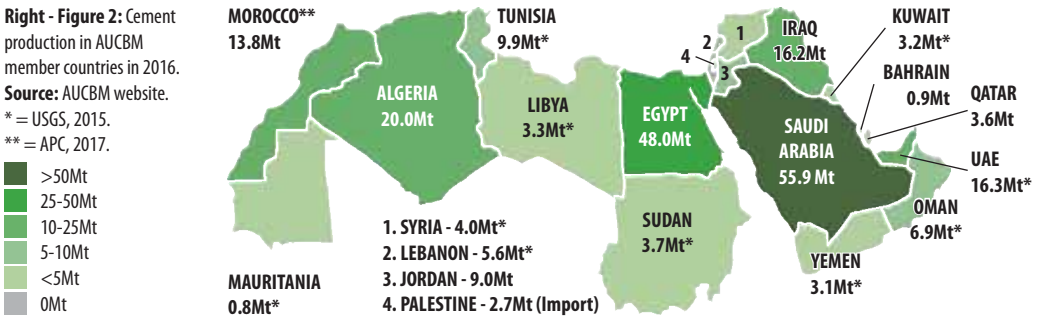
The Arab Union of Cement and Building Materials (AUCBM) hosts the *23rd Arab-International Cement Conference & Exhibition* in Amman, Jordan on 20-22 November 2018. To fit in with the location of the conference, *Global Cement* switches its attention to the AUCBM's 19 member countries, with a focus on conference host Jordan...

The 19 AUCBM member countries share a total installed cement capacity of around 386Mt/yr, including integrated and grinding plants, although individual national capacities range from 0.8Mt/yr (Bahrain) to 75Mt/yr (Saudi Arabia). Capacities for each country can be seen in Figure 1. The amount of cement made in each is shown in Figure 2. Figure 3 shows relative wealth according to GDP/capita.

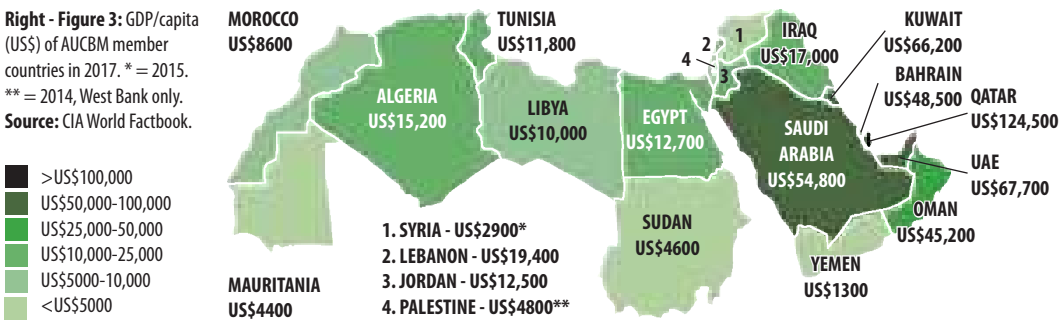
Right - Figure 1: Cement capacity of AUCBM member countries in 2018.
Source: *Global Cement Directory 2018.*



Right - Figure 2: Cement production in AUCBM member countries in 2016.
Source: AUCBM website.
* = USGS, 2015.
** = APC, 2017.



Right - Figure 3: GDP/capita (US$) of AUCBM member countries in 2017. * = 2015. ** = 2014, West Bank only.
Source: CIA World Factbook.



Above - Table 1: Cement production, capacity and apparent capacity utilisation rate in AUCBM member countries.
Production source: AUCBM website, * = USGS, 2015, ** = APC, 2017.
Capacity source: *Global Cement Directory 2018.*
Apparent capacity utilisation rate has been calculated.

Country	Production (Mt)	Capacity (Mt/yr)	Capacity Utilis'n (%)
Bahrain	0.9	0.8	113
Lebanon	5.6	6.0	93
Jordan	9.0	10.2	88
Oman	6.9	8.8	78
Saudi Arabia	55.9	75.0	75
Tunisia	9.9	14.8	67
Egypt	48.0	73.5	65
Algeria	20.0	30.8	65
Iraq	16.2	30.5	53
Morocco	13.8	27.8	50
Sudan	3.7	8.0	46
Kuwait	3.2	7.0	46
Libya	3.3	7.7	43
UAE	16.3	40.6	40
Mauritania	0.8	2.4	33
Yemen	3.1	10.6	29
Syria	4.0	16.2	25
Qatar	3.6	14.8	24
AUCBM	224.2	385.5	58

Calculated capacity utilisation rates, which may not be true reflections of the actual use due to disparities in the differences in the age of the data collected, are also shown in Table 1.

By this metric, the region appears to be suffering from overcapacity, with an average capacity utilisation rate of 58%. On the Arabian Peninsula it is 57%. Indeed, two of the countries perceived to be among the most rapidly-growing, the UAE and Qatar, have among the largest apparent overcapacities.

Cement producers

There are around 115 cement producers that operate in the region covered by the AUCBM. The vast majority of them, 105, are controlled by local or regional players. They control 268Mt/yr of the region's 386Mt/yr of capacity, around 69%. The remaining 31% of capacity is held by 10 multinational players that are based in Europe, the Americas and India. On average, each of these players is around 4-5 times larger than the locally-based players, 82 of which each operates a single plant. 79.1Mt/yr of the foreign-held capacity is held by just two firms, LafargeHolcim and HeidelbergCement, as shown in Table 2 (Page 66).

Right - Table 2: Top 10 cement producers in the region covered by AUCBM. **Source:** *Global Cement Directory 2018.*

Rank	Producer	Capacity (Mt/yr)
1	LafargeHolcim	61.2
2	HeidelbergCement	17.9
3	Arabian Cement	11.2
4	ASEC Cement	11.0
5	Qatar National Cement Company	8.9
6	Yemen Corporation for Cement	7.4
7	Cemex	7.6
8	Arkan Group	7.1
9	Union Cement	6.6
10	Southern Province Cement	6.4
	TOTAL	145.3

New plants and announced projects

UAE: In July 2018 India's JSW Cement announced plans to invest around US$150m in a new 1.0Mt/yr integrated cement plant in Fujairah. The company expects to commission the new plant by December 2019. The project is part of the group's target to reach a production capacpty of 20Mt/yr by 2020.

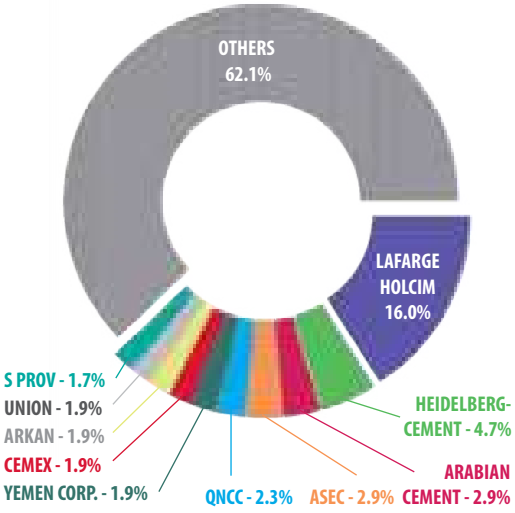
Egypt: Egyptian President Abdel-Fattah Al-Sisi inaugurated a cement and marble production complex worth US$1.1bn to the south of Cairo on 15 August 2018. The 500-hectare industrial complex is located 12km north of the Upper Egyptian governorate of Beni Suef.

It took 21 months to complete the complex, which includes three cement plants with a combined annual production capacity of 12Mt/yr. Egypt, through the Armed Forces Engineering Authority, worked together with 20 local and international companies on the project.

Qatar: Qatar National Cement Company (QNCC) signed a provisional acceptance certificate with France's Fives for the construction of new production line at the Umm Bab plant in July 2018. The new 5000t/day line is the fifth at the site.

Algeria: China Triumph International Engineering (CTIE) announced it was set to start procuring equipment for a US$211m production line at STG Engineering and Real Estate Development's plant at Adrar in July 2018. The line will be the second production line at the site and it will have a production capacity of 4200t/day of marine cement. CTIE is the engineering, procurement and construction contractor for the project and its subsidiary Beijing Triumph International Engineering will manage the engineering design work.

Oman: In June 2018 it was reported that Suhar Cement, Oman's third cement plant after Oman Cement and Raysut Cement, would come into operation 'later in 2018.' The new facility, featuring a cement-grinding unit with a capacity of around 240t/hr, is being developed by a partnership between Sohar Cement (70% of the equity) and UAE-based Fujairah Cement Company (30%). The commencement of operations has not been announced as yet.



Right - Figure 4: Distribution of cement capacity among top producers in the region covered by the AUCBM. **Source:** *Global Cement Directory 2018.*

Tunisia: Ciments de Bizerte was reported to be planning to upgrade the cement grinding capacity of its plant in Bizerte by 20% in June 2018. Other anticipated upgrades include the installation of a new 10,000t cement silo and a captive wind farm.

Libya: German investors met with the mayor of Al-Bayda to discuss building a cement plant in Cyrenaica in May 2018. The planned plant will have a production capacity of 4000t/day and will be to the south of Al-Bayda.

Below: The Port of Oran has become a hub for Algerian cement exports since the start of 2018. Major producers, including GICA and LafargeHolcim, have begun exporting to West Africa and Europe, as the country's capacity growth outpaces demand. With another three plants due to come online in the next couple of years, this trend looks set to continue.

Morocco: China's CBMI has signed a contract with LafargeHolcim to build a cement grinding plant near Agadir in April 2018. The deal for the SSS 13 & 14 Grinding Plant EPC Contract was signed on 21 March 2018 at the LafargeHolcim Technology Centre in Lyon, France.

Algeria: China's CBMI signed a contract with ASEC Cement to build a 4500t/day clinker production line at ASEC Cement's Djelfa plant in April 2018. The unit was originally partially built by ASEC Egypt in 2008 and had completed 90% of civil work before it was suspended due to the financial crash. Local company ETRHB Haddad and the Algerian subsidiary of China State Construction Engineering Corporation (CSCEC) took control of ASEC Cement in 2017, allowing the Djelfa project to continue. The plant could now be operational by the end of 2019.

Egypt: Khaled Fahmy, the Minister of Environment, opened a new production line at Arabian Cement Company's Ain Sokhna plant in Suez in April 2018. The line uses FLSmidth's Hotdisc combustion device to allow it to use up to 70% alternative fuels.

Saudi Arabia: In March 2018 Al Baha Cement announced plans to build a 6000t/day plant that will manufacture sulphate-resistant Portland cement (SRPC). The project is expected to cost US$100m, which will be raised from banks.

Oman: Raysut Cement inaugurated a new packing unit at its Salalah cement plant in March 2018. The upgrade doubles the plant's packing capacity and allows the company to export an additional 1.0Mt/yr of bagged cement to markets in Yemen, Somalia and elsewhere in East Africa. The company spent ~US$4m on the project.

Morocco: Germany's thyssenkrupp Industrial Solutions (TKIS) won a contract in February 2018 from LafargeHolcim to supply a new 3500t/day cement plant in Morocco. The project will cover the engineering, procurement and construction (EPC) of the new plant. The line will be built in the Souss Massa region near Tidsi. Start-up of the plant is scheduled for the first half of 2020.

Algeria: In February 2018, ETHRB Group ordered an integrated cement plant from FLSmidth for a site at Relizane. The order has a cost of over Euro100m and it includes engineering, equipment supply, construction supervision, commissioning, and training. The deal comes from a partnership between FLSmidth and Beijing Triumph International Engineering Company, a subsidiary of China National Building Material Group Corporation, which will be responsible for the construction of the cement plant. The plant will mainly supply cement to the North African market. Once completed, the cement plant will have a capacity of 12,000t/day. Commissioning is scheduled for late 2020.

Algeria: In January 2018 Biskra Cement started the flame on the kiln of its second new production line at its plant in Biskra. The 6000t/day line was supplied by China's Sinoma.

Other recent news

Syria: The long-standing investigation into the activities of the former Lafarge Syria between 2011 and 2014 developed further in October 2018. French press reported that senior former executives had money confiscated from them. Bruno Lafont, the former CEO of Lafarge, reportedly had Euro2.5m of his Euro8.4m severance package taken, with money also removed from Bruno Pescheaux and Frédéric Jolibois, the former directors of Lafarge Syria, and Christian Herrault, a former deputy regional manager with oversight for Syria.

Lafarge SA, a subsidiary of LafargeHolcim, has been placed under judicial investigation over its actions in Syria between 2011 and 2014. It has been accused of complicity in crimes against humanity and financing terrorism, including the IS group. Eight former executives have so far been charged in connection with the investigation.

Egypt: Medhat Istvanos, head of the cement division of the Chamber of Building Materials, affiliated to the Federation of Egyptian Industries, complained that exports from the country were being made uncompetitive in September 2018 due to the government's decision to raise energy prices in June 2018. He said that the local exchange rate had aided exports but that "the government's bureaucracy has eliminated export hopes," according to the Daily News Egypt newspaper. The local industry exported cement worth US$57m during the first half of 2018.

Morocco: Cement consumption in Morocco was higher in July 2018 than for any July since 2012 at 1.3Mt, a 0.1Mt (7.8%) year-on-year increase. The upturn was reported by local press as having been expected by cement companies, which now hope to finish the year level or even slightly up on 2017, if conditions remain favourable.

Egypt: The Ministry of Public Business Sector shut down the National Company for Cement due to mounting losses in September 2018. Hisham Tawfik, the Minister of Public Business, said that the plant's losses had reached Euro43m over the past 12 months.

UAE: In July 2018, India's Shree Cement completed its acquisition of Union Cement by purchasing a 97.61% stake in the company. The plant represents the company's first acquisition outside of India.

Saudi Arabia: In July 2018 a report by Al Rajhi Capital found that cement sales volumes in Saudi Arabia fell by 16.7% year-on-year in April and May 2018. 15 cement companies reported falling sales volumes, led by Riyadh Cement and City Cement with 44.1% and 37.5% declines respectively. Only Tabuk Cement and Hail Cement reported growth.

In the first quarter of 2018, cement sales fell by 11% year-on-year due to a continued slow down in the local construction sector. To get around this issue, a number of Saudi-based companies have signed export deals so far in 2018, including Al Jouf Cement (February), Najran Cement (April), Yanbu Cement (April) and United Cement Company (May).

Egypt: Titan Cement Egypt announced plans to build an US$8m, 8MW solar power plant next to its Beni Suef cement plant. Surplus energy from the unit will be sold to the national grid.

Right: Titan Cement Egypt will build a captive solar plant for its Beni Suef cement plant.

Focus on Jordan

The Hashemite Kingdom of Jordan gained independence from the UK in 1946, first as the Hashemite Kingdom of Transjordan, in the aftermath of the Second World War. Today it is a parliamentary constitutional monarchy under King Abdullah II and has a mixed legal system comprising elements of Islamic, British and Ottoman law.

Jordan's central position in the Middle East, combined with its relative political stability compared to its immediate neighbours, has led to it having a leading role in the region regarding refugees. As well as 2.1 million Palestinians, there has been an influx from Syria since the start of the civil conflict there in 2011. As of 2015, the UN High Commissioner for Refugees reported 4.3 million non-Jordanian 'persons of concern' within Jordan. This has put significant pressure on the country, which is one of the most water-scarce in the world. Additionally, Jordan does not have the massive oil reserves often associated with countries in the region.

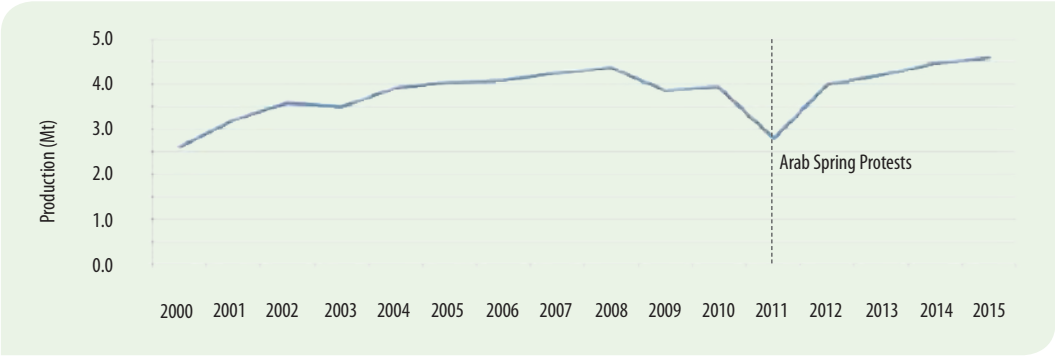
Population	10.3m (69% native)
GDP (2017, PPP)	US$89.1bn
GDP/capita (2017)	US$12,500
Cement Capacity	10.2Mt/yr
Capacity / Population	990kg/capita

Left - Table 3: Summary statistics for Jordan. **Sources:** Population, GDP and GDP/capita from CIA World Factbook. Cement capacity from *Global Cement Directory 2018.*

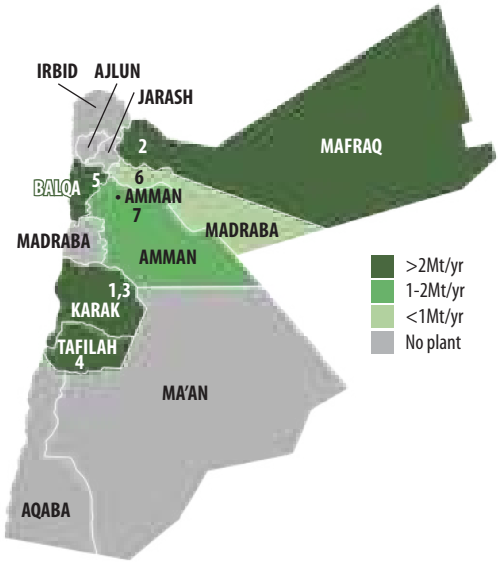
Cement sector

Much of the Jordanian cement sector was state-owned during the 20th Century, but economic reforms, including privatisation of key industries, from 1999 onwards led to rapid economic growth that was only halted by the 2008 global financial crisis.

Privatisation of the cement sector opened up the market to new entrants, resulting in an increase in cement production. Around the turn of the 21st Century, Jordan consumed around 2.2-2.6Mt/yr of cement. The bulk of this was produced by The Jordan



Right - Figure 5: Cement production in Jordan, 2000 - 2015.
Sources: United States Geological Survey.



Right - Figure 6: Cement plants in Jordan in 2018. Governorates are colour-coded by cement capacity. All plants are integrated facilities.
Sources: Research towards *Global Cement Directory 2019*.

1. Manaseer Cement Industry, Siwaqa, 1.1Mt/yr.

2. Cementra, Mafraq, 2.4Mt/yr.

3. Qatrana Cement, Karak, 1.6Mt/yr.

4. The Jordan Cement Company (50.28% LafargeHolcim), Rashadiyah, 2.0Mt/yr

5. The Jordan Cement Company (50.28% LafargeHolcim), Fuheis, 2.0Mt/yr (Mothballed)

6. Arab White Cement Company, Khaldeya, Zarqa, 0.1Mt/yr

7. Northern Cement Company, Muwaqqar, 1.0Mt/yr.

Lafarge Fuheis winding down?

After halting clinker production in 2013, the Jordan Cement Company Fuheis plant attempted to place all of its workers on a three month paid holiday in March 2017. It has been trying to lower costs of keeping the plant mothballed but was prevented from doing so by the Labour Ministry.

The Jordan Cement Company previously proposed turning the site into a US$2.8bn urban development in 2016.

Cement Company, which was still the country's sole producer of grey cement at that time. This company has been partly controlled by LafargeHolcim, and previously Lafarge, since 1998.

Cement production grew rapidly post 2001, as shown in Figure 5. In the early 2000s cement production increased to around 3.6Mt/yr on the back of home-construction initiatives, major redevelopment in central Amman and the development of a new city as part of the Zarqa New Garden City project. By 2005 Jordan's cement production was over 4.0Mt/yr, which was supported mainly by utilisation of Jordan Cement Company's previously unused 4.5Mt/yr cement production capacity. In the rest of the 2000s production stabilised at 4.0Mt/yr (± 10%). Production took a hit in 2011, down to 2.8Mt. This coincided with the 'Arab Spring' series of events across the region, which saw protests in Jordan and a general shift towards democratic reforms from King Abdullah II.

Since 2011 production has once again risen to around 4.5Mt/yr in 2016, the most recent year for which the USGS has data. This has been due to new entrants providing extra capacity. New plants in Mafraq, Muwaqqar and Karak came online between 2007 and 2011.

Jordan's cement plants are shown in Figure 6. All are in the western, more fertile regions of the country close to the River Jordan, which is also where the vast majority of the country's inhabitants live.

Price hike shocks construction sector

On 22 July 2018, Jordan's five grey cement producers simultaneously increased the price of cement from US$53.52/t to US$104.23/t, an overnight doubling of the price. The decision was made in order to end the accumulative losses being made by the companies. Prices had been as high as US$131/t in recent months before Jordan closed various borders on security grounds. At present, all exports have been halted, except for a few thousand tonnes heading to the West Bank in Palestine.

Right: Bags of Cementra cement on a flat-bed trailer.
Sources: Cementra website.

Here *Global Cement Magazine* presents its monthly review of global cement prices, in US$ for easy comparison. Additional price information is only available to subscribers to *Global Cement Magazine*. Subscribe on Page 72. In this issue subscribers receive more price information from Egypt, as well as Kazakhstan, South Africa, Gabon, India, Mauritius and Tanzania.

Prices are for metric tonnes (Mt), unless stated otherwise. US$ conversions from local currencies are correct at the time of original publication.

China: The average national cement price rose in the week to 9 October 2018, up by 0.2%, according to Digital Cement. The price increase areas were mainly in Liaoning, Hebei, Henan and Hubei, Fuyang, Suizhou and Shiyan, where prices rose within a range of US$1.45-7.23/t.

Cement prices in northern China have risen sharply. In Beijing, Tianjin and Tangshan they rose by US$7.23/t from 1-9 October 2018. Cement prices in Shijiazhuang, Baoding, Handan and Xingtai areas in Hebei have risen by US$2.89-4.34/t.

In the southwest, the price of cement also increased. Some enterprises in Guang'an announced that the price was raised by US$4.34/t. Some enterprises in Chongqing and Minxi in Chongqing also raised prices by the same amount.

The price of cement in Central and South China continued to increase. The increase in the Pearl River Delta region in Guangdong was US$0.72-2.17/t. The price of cement in the Fuyang, Shiyan and Suizhou regions in Hubei Province rose by US$7.23/t. The cement producers in Henan also increased prices by US$7.23/t.

The price of cement in Northeast China has increased slightly. In Shenyang and surrounding areas it increased slightly by US$1.45/t, rising to US$40.48-41.93/t. The ex-factory price for clinker rose by US$2.89-3.61/t to around US$41.93/t.

China: All-China cement prices according to sunsirs.com: 6-7 October 2018 = US$ 65.93/t; 8 October 2018 = US$65.86/t; 9 October 2018 = US$66.00/t; 10 October 2018 = US$66.15/t; 11 October 2018 = US$66.36/t.

Ghana: A group calling itself the Northern Development Forum (NDF) has called on the government to put in place a cross-subsidy policy that would regulate and ensure price uniformity of building materials nationwide, including cement. They report that prices are almost 33% higher in the north of Ghana than in the south.

They report that the price of cement costs US$6.12/bag (50kg) in Accra, but costs US$8.16/bag in Zebilla, Upper East and Tumu, Upper West. The north of Ghana is less developed than the rest of the country and the NDF says that the higher prices are exacerbating the difference. Major Albert Don-Chebe (Rtd), Chairman of the NDF, said "A building in the north will cost at least 25% more than the same building in Accra. So, the poorest people are compelled to pay 25% more for their physical infrastructure in Ghana."

Egypt: Ordinary Portland Cement prices as of 12 October 2018: Arabian Cement (Al Mosalah) = US$47.66/t; Arabian Cement (Al Nasr) = US$51.87/t; Cemex = (Almuhandis) = US$53.72/t; Building Materials Industries Company = US$50.37/t; Wadi El Nile Cement (Al Masry) = US$50.20/t; Medcom Aswan Cement = US$49.54/t; Arish Cement (Alaskary) = US$49.82/t; Arish Cement (Askary Beni Suef) = US$49.82/t; Sinai Cement = US$49.82/t; Suez Cement = US$47.03/t; Tourah Portland Cement = US$53.27/t; Helwan Cement = US$53.27/t; Misr Beni Suef = US$50.36/t; El Sewedy Cement = US$53.437/t; Misr Cement Qena = US$49.53/t.

Do you have your finger on the cement price pulse where you are?
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How can we live 'the good life?'

Peter Edwards Editor, ***Global Cement Magazine (peter.edwards@propubs.com)***

'*The Good Life*' was a 1970s British sit-com with a simple premise.[1] Fed up with his meaningless job designing plastic toys for the insides of cereal packets, Tom Good decides to quit on his 40th Birthday. Escaping the rat-race, he and his wife Barbara turn their suburban home into a small-holding in an attempt to become self-reliant. They only have themselves, the weather, their land, animals and whatever machinery they can cobble together. Of course, being a sit-com, they also have to navigate the rapidly-changing social landscape of 1970s Britain while knee high in pig manure. 'Comedy' then ensues, much of it derived from the ongoing love-hate relationship between the Goods and their materialistic neighbours Jerry and Margo.

In some ways, *The Good Life* was ahead of its time. The 1980s, when a lot of ordinary people turned into 'consumers,' were just around the corner. Now, however, as sustainability issues become ever more evident, a lot more people are asking: *How can I lead the good life?*

There's a lot of tips out there and, while different groups may assign different priorities, common ideas emerge. Many are pretty obvious, some are very easy to do and a lot will save you money: Walk, cycle or take public transport rather than drive. If you do drive, drive an electric car and share it. Don't fly - If you do, offset the emissions. Turn down your thermostat and wash your clothes in cold water. Recycle. Avoid single use plastic. Get a smart meter and use it. Switch to a green energy tariff. Put solar panels on your roof. Insulate draughty rooms. Eat less meat, certainly if it's red. Buy less food, waste less food and grow your own.

I consider myself to be fairly active in some of these areas, but I think I do just four or five of those 10+ things. I'd like to do more, but it can be tricky. Self-denial is a recurring trend in The Good Life. Just as Tom and Barbara stare longingly through the window at their neighbours' microwave dinner and wine, it's very easy to be tempted by the take-away, the drive to the shops, the new phone, new clothes and so on. But, as anyone who has seen *Wall-E* will tell you, this insatiable trend is only headed in one direction.

To help engage the wider public in the realms of sustainability, climate change mitigation, water use, resource management and others, the World Business Council for Sustainable Development (WBCSD) recently released *'The Good Life Goals,'* in collaboration with Futerra and the United Nations' 10 Year Framework of Programmes on Sustainable Consumption (UN 10YFP).[2] Under the banner of 17 emojis, including Save Water, Use Clean Energy, Act on Climate and Clean our Seas, the Good Life Goals *'highlight the vital role of individual action in achieving the ambitions of Sustainable Development Goals. They were created to be relevant, easily understood and accessible to individuals all around the world. Simple, positive, and engaging by design, the Good Life Goals detail the things that people can do to have a tangible impact.'*

This sounds much like the phrase 'climate optimism' that has been getting some traction of late. The thinking behind both approaches is clear: Banging on about doomsday scenarios is unlikely to get a response other than vague fatalism / acceptance; Give an alternative future that isn't doom-and-gloom and action becomes more likely. Like a smoker trying to give up, it's better to highlight the benefits of not being out of breath, getting fewer illnesses and living longer than it is to tell them they're naughty and showing them pictures of lung cancer.

Sustainability issues are, of course, not just for individuals. Businesses will have a massive influence on how the future looks, something we have tried to highlight in these pages in 2018. As well as frequent new alternative fuel projects, captive solar and wind plants have been increasingly common themes in the news. We've also featured: Smart buildings; The impacts of climate change legislation, which seem to now be leading to European plant closures; CO_2-neutral cements; CO_2 capture and utilisation (CCU); The Paris Climate Targets; Microgrids; Concentrated Solar Power; Our climate change survey and; Dalmia Cement's vision to be CO_2-negative by 2040 (Page 14). This last article, which I have also highlighted at the front of this issue, is a very interesting read. Admittedly reliant on CCU, Dalmia's vision is bold and laudible. Some will say that CCU will never be economically viable and so the company's goals are doomed to fail. However, there are hopefully enough people working on CCU that they'll have something to show for their effort. To not work on CCU and other areas would be tantamount to giving up. A positive attitude is what the Good Life Goals are all about. As Tom Good might say, "It's not tricky when you try, Margo. You just have to get stuck in!"

1. https://en.wikipedia.org/wiki/The_Good_Life_(1975_TV_series).

2. https://www.wbcsd.org/Programs/People/Sustainable-Lifestyles/News/Personal-actions-that-everyone-can-take-to-support-the-SDGs.

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