

THE ALUMINUM INDUSTRY CEO AGENDA, 2013–2015

UNDERSTANDING THE CHALLENGES
AND TAKING ACTION



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INTRODUCTION

ALUMINUM IS A METAL characterized by abundance because of its availability as a naturally occurring element and its use in everything from sophisticated aerospace components to commonplace consumer products. This characteristic extends to the industry that produces aluminum. While industry executives enjoy an abundance of market opportunities for their product, they have also experienced an abundance of severe challenges in recent years.

Analyses of the aluminum industry's performance reveal the emergence of significant issues that are likely keeping many aluminum-industry executives awake at night. Chief among their concerns are the sharp decline in company valuations and profits and the depressed price of aluminum.

The market capitalization of the top international aluminum companies has dropped by about 65 percent over the past five years. Earnings before interest and taxes margins have decreased by about 5 percentage points, a disturbing trend for an industry that's among the world's most capital intensive. The copper industry needs to invest, on average, \$14,000 per ton of primary output from mine to metal, compared with \$8,000 per ton of aluminum for capital related to mines, refineries, and smelters. However, if the value of the produced metal is included in the calculation, aluminum is twice as capital intensive as copper (as well as steel). As margins dwindle, the aluminum industry sits on a very expensive asset base that needs higher profits to generate sufficient returns.

The decline in company valuations and profits was driven by a severely depressed price for primary aluminum. Compared with other metals, aluminum entirely missed the "commodity super cycle." Since January 2000, the price of primary aluminum has increased by just 20 percent, compared with more than 100 percent for steel and almost 350 percent for copper. When adjusted for inflation, aluminum is actually valued below its 2000 price, which is especially striking because prices for other raw materials have enjoyed a substantial premium in recent years. The gap is even more dramatic for the feedstock for primary aluminum: prices for both bauxite and alumina have increased by less than 20 percent since January 2000. In contrast, the price of iron ore is more than 600 percent higher today (it was more than 900 percent higher at the postcrisis peak in late 2011), and the price of metallurgical coal is about 250 percent higher.

To reignite the value creation engine and restore investor confidence, aluminum industry CEOs and their management teams must develop

and implement compelling action plans that will turn around the industry. Executives need a deep understanding of what caused the aluminum industry's crisis in order to develop a meaningful and deployable CEO agenda that addresses current challenges and captures new opportunities. These are the key questions:

- Why did aluminum miss the commodity super cycle?
- Is the industry's crisis temporary, or does it reflect a long-term structural change?
- To guide future actions, what could aluminum companies have done differently in recent years to avoid or mitigate the industry's performance issues?
- What strategies will be most effective to get the aluminum industry back on track?
- What specific actions should aluminum executives push forward in their companies?

Below we answer these questions and propose specific actions that aluminum executives can take—providing an aluminum industry CEO agenda for 2013 to 2015. By understanding the root causes of the crisis and taking the right actions to respond, aluminum industry executives have an opportunity to change their luck with element number 13.

WHAT CAUSED THE INDUSTRY'S CRISIS?

TO IDENTIFY THE UNDERLYING causes of the current crisis, we examined the challenges and outlook for the demand and supply of primary aluminum and the upstream and downstream segments of the value chain. (See Exhibit 1.)

Our analyses show that the industry's crisis cannot be traced back to an unexpected drop

in demand caused by the global economic downturn or to sudden, surprising changes in the upstream or downstream segments of the value chain. Instead, the crisis arose from the supply side, driven by China's strategy to increase its capacity for producing primary aluminum. Producers in the rest of the world did not predict China's moves and did not respond with sufficiently rapid strategic adjustments.

EXHIBIT 1 | Challenges and Outlook for the Global Aluminum Industry

Demand



- Chinese demand has grown at a rate of almost 16% per year since 2000 (now 45% of global demand), while growth in the rest of the world has been only slightly above 1% per year
- Outlook: China will continue to drive strong growth; demand is expected to expand by 8% to 9% per year, versus 1% for the rest of the world

Supply



- Oversupply led to huge physical inventories after the economic crisis (more than 10 million metric tons in 2012)
- Despite higher costs, China remained self-sufficient—while the rest of the world expected it to increase imports
- Outlook: China will remain self-sufficient, overcapacity will increase in the rest of the world, and the LME price will remain low because of supply-demand imbalance and high warehouse stocks

Upstream



- China has been self-sufficient in alumina, and bauxite is plentiful—thus, Chinese demand has not driven prices higher
- Outlook: China controls the value chain, imports will partially shift from bauxite to alumina, and prices will rise moderately as new supply regions—such as Vietnam and Laos—are developed

Downstream



- Chinese exports have increased by approximately 28% per year since 2000, reducing primary-aluminum demand in the rest of the world
- Lower processing costs have offset China's disadvantage in primary aluminum
- Outlook: Chinese exports will continue to rise but likely at a slower rate of 4% to 9% per year

Source: BCG analysis.

Note: LME=London Metal Exchange.

A Two-Speed World for Demand

Since 2000, primary aluminum has experienced particularly strong global growth in demand—nearly 5 percent per year. This is a significantly higher rate than that of global GDP during the same period and twice as strong as the metal’s average demand growth rate of 2.4 percent during the preceding 30 years. Aluminum’s annual demand growth since the turn of the millennium has outpaced that of copper (2.6 percent) and is similar to that of finished steel (5.3 percent).

But a purely global perspective does not reveal the most critical fact about demand: global consumption has been driven almost entirely by China, resulting in a “two-speed world” of aluminum consumption. Primary-aluminum consumption in China has grown at a rate of almost 16 percent per year since 2000, while growth in the rest of the world has been only slightly above 1 percent per year. (See Exhibit 2.) The differential was especially apparent during the global financial crisis. In 2009, consumption outside China dropped by 17 percent, whereas Chinese consumption increased by 15 percent. This

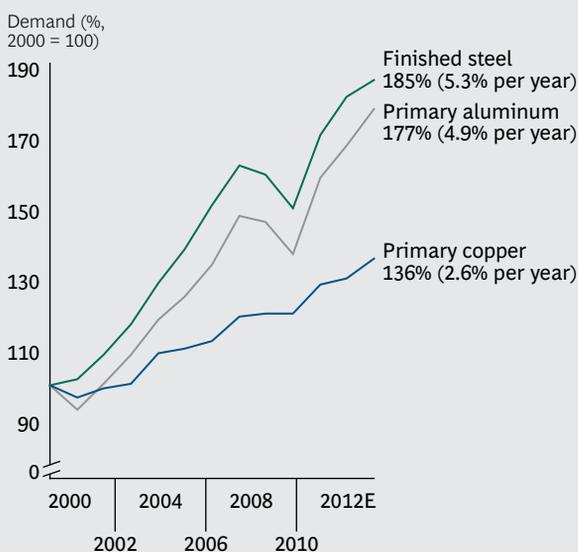
growth was driven by China’s massive investments in real estate and infrastructure, as well as by private consumption and exports of manufactured goods containing aluminum. As a consequence, China’s share of global aluminum demand increased from 14 percent in 2000 to 42 percent in 2011. Its share is expected to have reached approximately 45 percent in 2012. The two-speed pattern for demand in China versus the rest of the world also holds true for copper and steel.

The industry has failed to translate a demand surge into higher prices or profits.

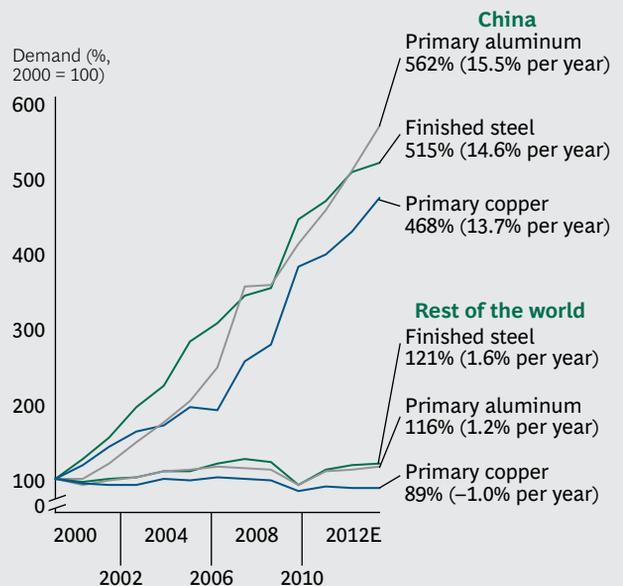
As is the case for other basic-materials industries, the aluminum industry has enjoyed a super cycle on the demand side. But in contrast to most of its peer industries, it has largely failed to translate that demand surge into higher prices or increased profitability.

EXHIBIT 2 | Strong Demand Growth in Aluminum Is Driven by China

Aluminum demand compared with other metals



Metal demand by region



Sources: World Bureau of Metal Statistics; World Steel Association; BCG analysis.

Note: 2012 values have been annualized based on the first eight months for aluminum and copper according to the October 2012 World Steel Association short-range outlook for steel.

Given the substantial benefits of aluminum and its use in key growth sectors such as transportation equipment, infrastructure, and consumer products, demand is expected to remain strong in the long term. Trends such as rising fuel prices and concerns about carbon dioxide emissions, for example, are likely to accelerate the substitution of aluminum for steel in the automotive industry. And due to the strong price increase in copper, aluminum has recently begun to be used as a substitute in selected electrical applications.

We expect global primary-aluminum demand to grow at an annual rate of 4 to 5 percent during the next five to ten years. This strong growth will continue to be driven by China, where demand is expected to expand by 8 to 9 percent per year. Demand growth in the rest of the world will likely be approximately 1 percent per year. In 2017, global demand for primary aluminum will reach 55 to 57 million metric tons (MMT) according to this forecast, with China consuming 28 to 30 MMT, or 51 to 53 percent, of global demand.

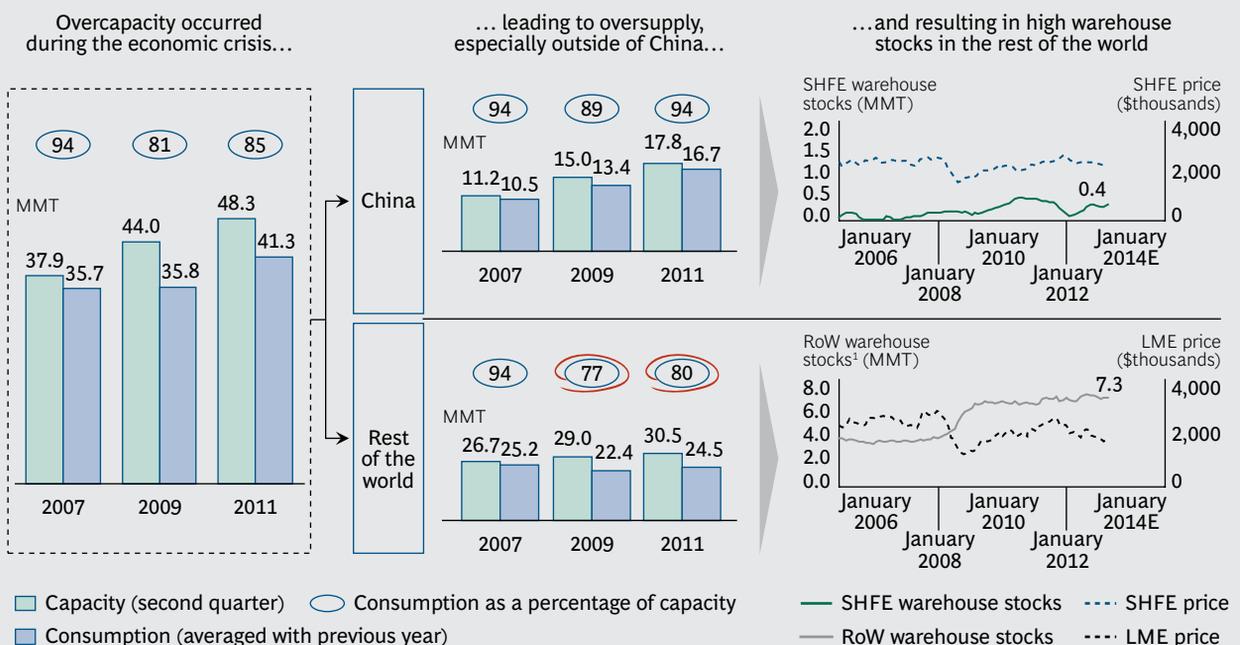
China's role as the growth engine of global aluminum demand does, in principle, present

a great opportunity for the industry—but the country is also a major pain point. Its substantial increase in demand triggered the development of massive Chinese production capacity—a phenomenon that did not occur with other commodities in China. This expanding Chinese supply is at the root of the global aluminum crisis.

The Rapid Growth of China's Capacity

In the second quarter of 2007, demand and supply for primary aluminum were still in balance. (See Exhibit 3.) The effective global smelting capacity was 37.9 MMT, and global consumption was 35.7 MMT, equal to 94 percent of capacity. At the height of the economic crisis in the second quarter of 2009, consumption was largely unchanged, but global capacity had increased to 44 MMT, reducing the ratio of consumption to capacity to 81 percent. Although the ratio rose to 85 percent globally in 2011, there is a stark contrast between China and the rest of the world. The ratio fully recovered to 94 percent in China, but was only 80 percent in the rest of the world.

EXHIBIT 3 | Sustained Oversupply of Aluminum Has Led to High Inventories



Sources: Harbor Intelligence; World Bureau of Metal Statistics; London Metal Exchange; Bloomberg; BCG analysis.
Note: All prices are based on month-end value. LME warehouse stocks are based on month-end value. SHFE warehouse stocks are based on month's average. LME=London Metal Exchange; MMT=million metric tons; SHFE=Shanghai Futures Exchange.
¹Includes LME, Japan, and some producer inventories; not all third-party inventories are included.

Whereas China's smelting capacity has increased in tandem with its aluminum consumption, supply and demand in the rest of the world continue to be severely out of balance. Instead of shutting down capacity on a large scale (and thereby stabilizing prices), smelters around the world continued to produce. As a result, huge inventories of aluminum have piled up in warehouses; 10 to 12 MMT (about 25 percent of expected 2013 global demand) is currently in storage. Increases in inventory have also been promoted by a strong contango situation in the aluminum futures market on the London Metal Exchange (LME) and by very low interest rates, a combination that has made aluminum financing deals attractive.¹

Western companies' most important misstep was underestimating the buildup of Chinese capacity.

Why didn't Western companies remove excess capacity when demand declined? Aluminum has high fixed costs, which make it difficult to shut down capacity. Smelters that lack a captive energy supply usually enter into long-term energy contracts that contain fixed off-take agreements—that is, the operator must continue to pay for energy even if it shuts down production. Regional governments often prevent smelter closures and offer subsidies in exchange for preserving jobs. In addition, high costs for shutting down and restarting operations often prevent companies from closing smelters temporarily. Finally, shutting down capacity in a global commodity business can be like a game of chicken. Because companies benefit if a competitor cuts production, they are inclined to wait for others to shut down capacity before doing so themselves.

This analysis, however, doesn't explain why capacity outside China increased so drastically beyond demand. Although the global economic crisis was not widely predicted, the fallout from the crisis only partially explains the overcapacity. Demand growth outside

China was slow even before the crisis—about 2 percent per year from 2000 through 2007.

Misjudging China's Expansion Plans

Western aluminum companies' most important misstep was significantly underestimating the buildup of Chinese capacity. Because China lacked sufficient amounts of high-quality bauxite and inexpensive energy, the conventional wisdom was that China would import primary aluminum to fuel the demands of its rapidly expanding downstream industry. Importing primary aluminum from regions that have a comparative advantage in smelting (such as the Middle East and Russia) seemed like the logical choice for China's "make or buy" decision—especially because China enjoys a comparative advantage in semifinished aluminum products and downstream aluminum fabrication.

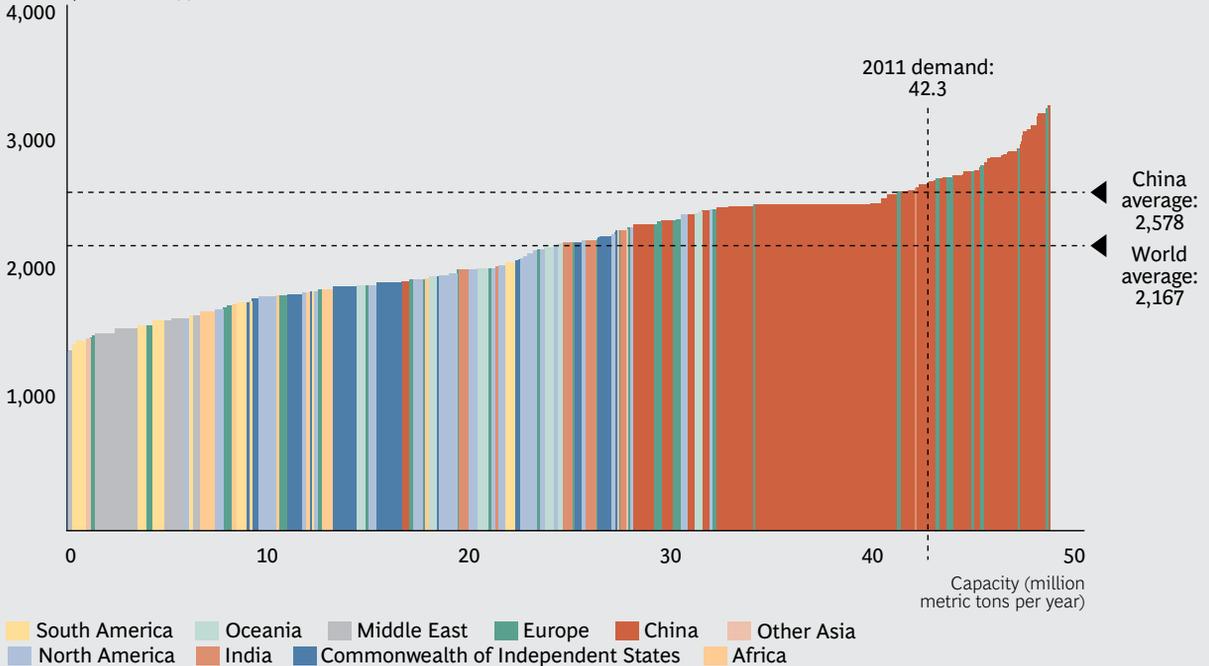
In 2000, China's imports of primary aluminum accounted for more than 25 percent of its consumption. In anticipation of rising Chinese imports, large-scale capacity expansion occurred in other parts of the world. Yet the anticipated rise in Chinese imports did not happen. Instead, China rapidly expanded its smelting capacity. Since 2007, imports have accounted for less than 2 percent of Chinese primary-aluminum demand, except for a brief period in 2009.

Why did China expand domestic smelting capacity so rapidly, contrary to the expectations of the international aluminum industry? China's decision to increase capacity may be hard for observers outside the country to understand, especially because the traditionally steep costs for primary-aluminum production push most Chinese smelters to the high end of the global supply curve. (See Exhibit 4.) Yet several motivating factors helped build a strong case for the decision to increase capacity:

- *Achieving the Goal of National Self-Sufficiency.* Along with steel, copper, and oil, aluminum has been a crucial ingredient in China's rapid economic development. China's ability to control the value chain for some of these commodities has been

EXHIBIT 4 | China Has Expanded Capacity at the High End of the Cost Curve

Cash costs per metric ton, second quarter 2011 (\$)



Sources: Harbor Intelligence; BCG analysis.

limited, and the government has stated that taking greater control is a top national priority. The benefits of no longer being at the mercy of a limited number of large-scale foreign suppliers of aluminum outweighed the higher costs of local production.

Moreover, this cost-benefit tradeoff will increasingly work in China's favor. The cost premium for local production will shrink significantly during the next five years as aluminum production shifts to western Chinese provinces such as Xinjiang, Qinghai, and Ningxia. China's west is rich in stranded coal resources and has potential for further hydroelectric power. This would allow for the establishment of captive power stations to directly supply the smelters with cheap electricity. Whereas companies in central and eastern China mainly depend on power from the public electricity grid, smelters in western regions will benefit from lower costs as well as a secure and stable energy supply. In the medium term, new smelters in western China are expected to have lower cash costs than the average smelter

outside of China. In the short term, however, likely delays in the construction of the captive power stations will mean that smelters must use expensive power from the grid. Chinese companies will also need to overcome challenges such as a limited infrastructure for transporting raw materials and finished products, as well as a shortage of skilled labor.

- *Fulfilling Regional Economic Development Agendas.* For regional governments, the startup of an aluminum smelter can enable rapid economic growth, create jobs, and generate tax revenues. A smelter can also be a catalyst for the development of a more diverse downstream industry in the region. The planned expansion of smelting capacity in China's western regions will not only lower the average cost of aluminum but also contribute to the economic development of remote regions, such as Xinjiang.
- *Generating Returns from Lower Capex.* Capex requirements for aluminum production in China can be much lower (by up to 60 percent) than in other

countries, primarily because of lower-cost technology and construction. (See Exhibit 5.) Lower capex is an important advantage for Chinese producers, because it allows them to generate returns similar to those in other countries but from smaller margins. The situation will improve further as lower-cost capacity becomes available in western regions.

China's capex advantage will improve further as lower-cost capacity becomes available in western regions.

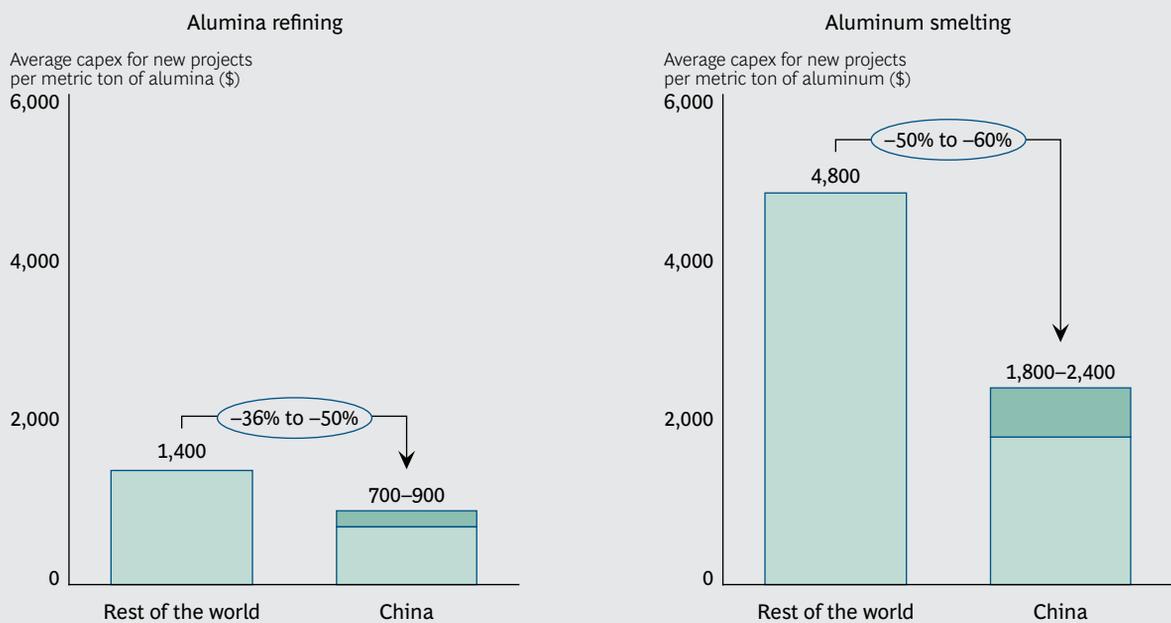
China's unique pricing dynamics also help to explain its low import levels. Whereas the aluminum market outside of China uses the LME price, China uses its own domestic price determined at the Shanghai Futures Exchange (SHFE). Imports are discouraged through an import tax of 5 percent, and exports are discouraged by an even higher tax of 15 percent. Within a band around the LME price (set by a value-added tax, or VAT, and import and export taxes), the SHFE price follows its own supply-demand dynamic. (See

Exhibit 6.) If the SHFE price leaves this band, arbitrage opportunities through imports or exports arise. This occurred in 2009, when Chinese demand remained strong while demand in the rest of the world collapsed, resulting in imports of primary aluminum by Chinese companies. But more recently, pricing dynamics have discouraged imports.

Outside of China, capacity could increase significantly if currently planned projects go forward. While some projects will be postponed or canceled if the aluminum price remains low, others will go ahead regardless. Smelter construction often enables countries, especially those in the Middle East, to attract the downstream industry and utilize domestic low-cost gas. This allows smelters to be cash-positive even when many of them are losing money in other parts of the world. And because the extraction of shale gas outside of the Middle East has decreased export prices, the use of natural gas in local aluminum smelters has become even more attractive.

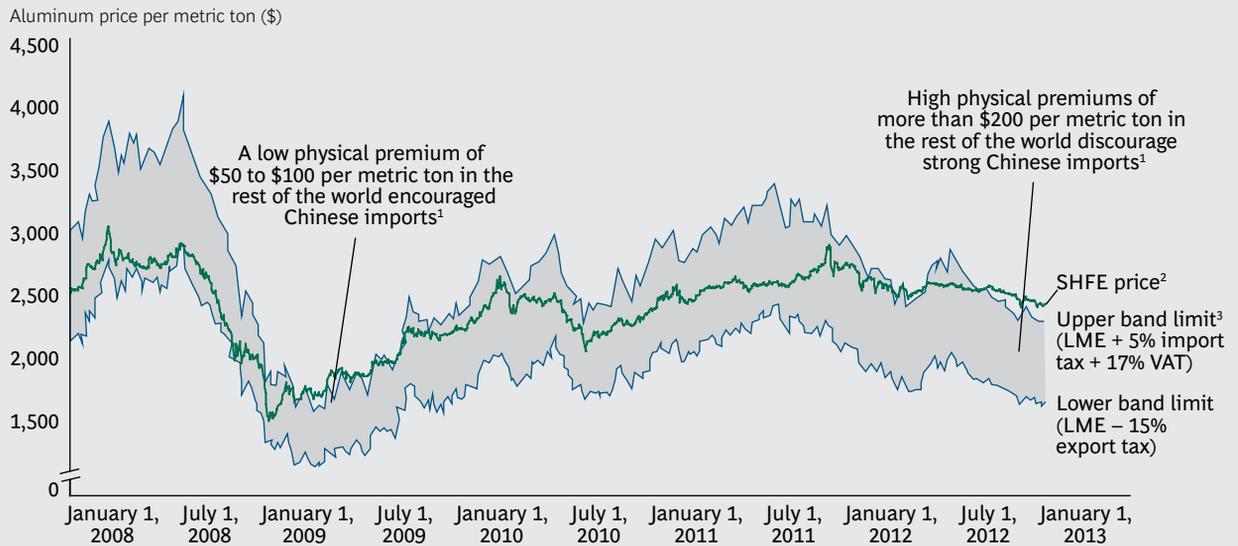
By 2017, up to 6 to 7 MMT of smelting capacity is expected to be added outside of China. This includes newly constructed capacity plus "capacity creep" (productivity improvements relating to existing capacity, estimated to be

EXHIBIT 5 | Chinese Players Benefit from Lower Capex



Source: BCG analysis.

EXHIBIT 6 | The SHFE Price Is Set Within a Narrow Arbitrage Band Around the LME Price



Sources: London Metal Exchange; Shanghai Futures Exchange; broker reports; BCG research and analysis.

Note: LME=London Metal Exchange; SHFE=Shanghai Futures Exchange; VAT=added-value tax.

¹Northwestern Europe delivered duty paid; U.S. Midwest Ingot price; Japan cost, insurance, and freight.

²SHFE price one month forward.

³Physical premiums, which would further increase the upper limit, are not included owing to regional differences.

0.5 percent per year). Without the large-scale closure of existing capacity—and assuming China remains largely self-sufficient—the total smelting capacity of 36 to 37 MMT will result in overcapacity even beyond the levels seen in the 2009 crisis.

In this scenario, the price of aluminum will remain at low levels. Any price increase from the small-scale closure of smelting capacity will be limited by high warehouse stocks, which will remain above precrisis levels for years unless China increases imports significantly.

Whether China will remain self-sufficient is thus of crucial importance to the aluminum industry in the rest of the world. It seems unlikely that the enormous warehouse stocks and excess production from outside China will find their way to China's downstream industry. Current capacity-expansion plans put China on a course for sustained self-sufficiency and increased cost competitiveness as western China adds new capacity to the left side of the global supply curve. An additional 14 to 15 MMT of capacity (new capacity plus capacity creep) could be operational within China in 2017. Taking into account the closure of about 1 MMT of existing high-cost ca-

capacity, and assuming that primary-aluminum demand grows at 8 to 9 percent annually through 2017, China's industry would be self-sufficient without significant overcapacity. In contrast, overcapacity in the rest of the world will likely worsen. (See Exhibit 7.)

There is, however, one fundamental challenge that could cause China to abandon its current path of self-sufficiency: an inability to secure enough bauxite and alumina to feed Chinese aluminum smelters, forcing downstream producers to import primary aluminum.

Sufficient Alumina and Bauxite Despite Resource Nationalism

Historically, the price of alumina has been contractually linked to the price of aluminum. It is thus often assumed that the low price of aluminum is the main cause of the low price of alumina, but China's near self-sufficiency in alumina is the more fundamental reason underlying the low prices. For other raw materials, such as copper concentrate or iron ore, China is dependent on imports from a limited number of multinational mining companies, which have been able to raise prices and reap extremely high profits. This has not been the case for alumina, China's net imports of

EXHIBIT 7 | By 2017, Oversupply Outside of China Will Likely Worsen If No Action Is Taken



Sources: Harbor Intelligence; World Bureau of Metal Statistics; BCG analysis.

Note: 2017 capacity assigns probability between 0 percent and 80 percent for “present, upcoming, and potential projects” listed by Harbor Intelligence; we also assume capacity creep of 0.5 percent per year.

which have declined sharply. (See Exhibit 8.) In addition to building sufficient smelting capacity to meet domestic aluminum demand, China has had enough alumina refining capacity to lower alumina imports from levels that represented 43 percent of demand in 2001 to only 3 percent in 2011.

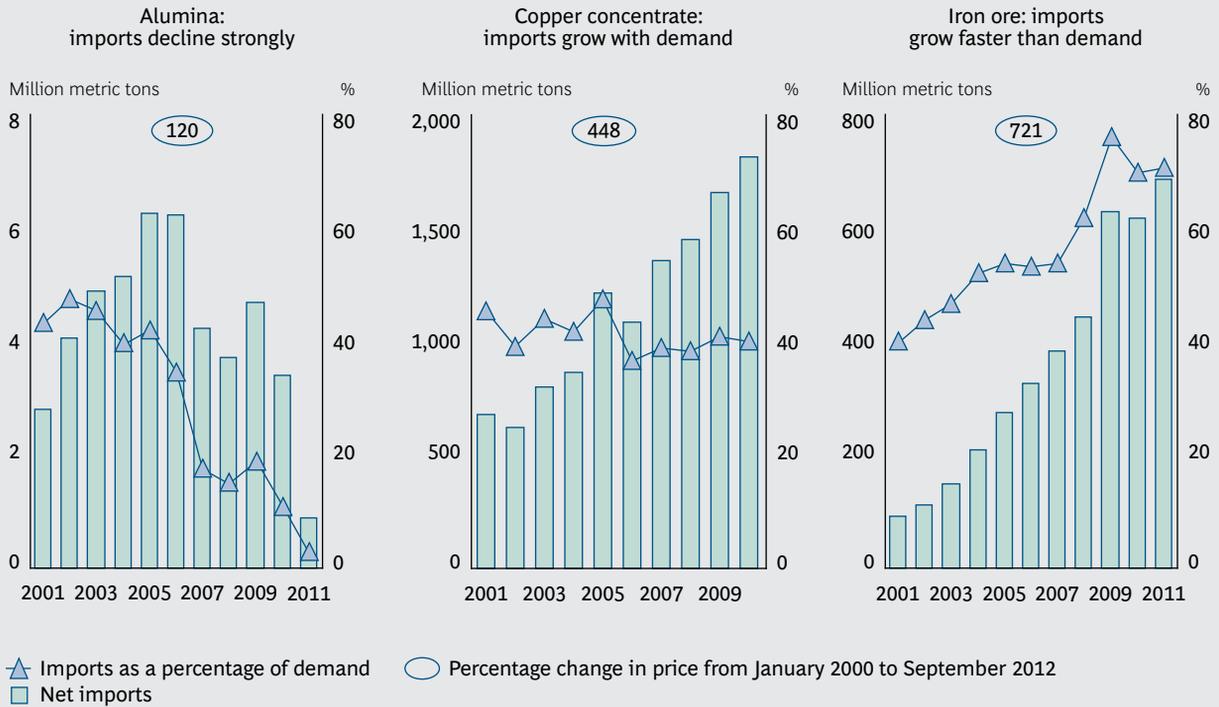
But China has not managed to secure self-sufficiency one step further up the value chain; the increase in domestic bauxite mining from 9 MMT in 2001 to 36 MMT in 2011 was not nearly enough to feed China’s alumina refineries, which produced more than 34 MMT of alumina in 2011. At the same time that China has had to rely increasingly on bauxite imports, Indonesia has become a major exporter of low-cost bauxite. Indonesian bauxite production increased from just 1 MMT in 2005 to 36 MMT in 2011, nearly all of which was exported to China.

Some industry observers believe that China will not be able to meet its bauxite demand because of restrictions recently announced by Indonesia. That country significantly altered

the upstream market in May 2012 by introducing a 20 percent tax on bauxite exports, revoking a large number of export licenses, and threatening to ban all bauxite exports beginning in 2014. If this happens, bauxite and alumina prices will increase, raising costs for Chinese aluminum producers (but not necessarily for the major Western producers, which are largely self-sufficient in bauxite) and potentially resulting in a significant increase in Chinese imports of primary aluminum. A surge in Chinese imports would lower warehouse stocks, which would, in turn, support the LME price and rescue the aluminum industry outside of China.

This scenario is unlikely, however. What is more probable is that Indonesia will impose only a moderate version of its proposed export ban. This would allow China to gradually shift its feedstock from imported bauxite to alumina, while, in the medium to long term, it could increase imports of bauxite and alumina from owned sources in Vietnam, Laos, and other countries. China would thereby remain largely self-sufficient in primary alumi-

EXHIBIT 8 | China's Net Imports of Alumina Have Declined, While Net Imports of Other Raw Materials Have Increased



Sources: UN Commodity Trade Statistics Database; International Copper Study Group; World Bureau of Metal Statistics; BCG analysis. Note: For copper concentrate, no reliable 2011 data were yet available.

num and maintain control of the upstream value chain, causing alumina prices to increase only moderately. But even if this were the case, significant uncertainty would remain with regard to projects and expansion plans in the short to medium term.

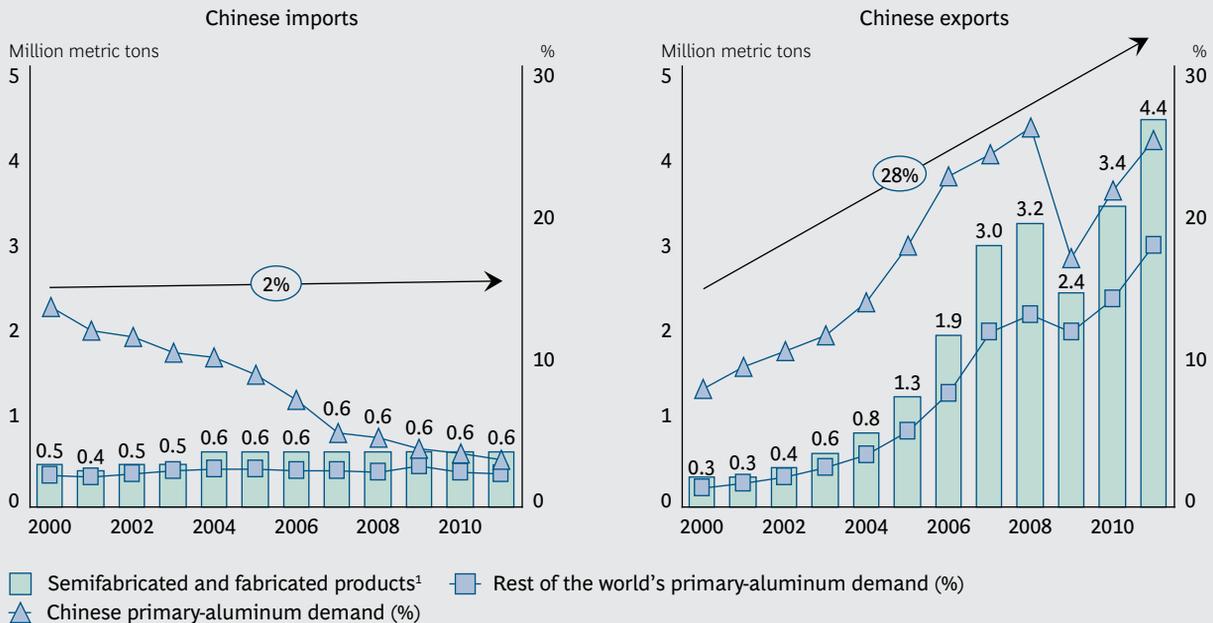
How China Got into the Downstream Game

Since 2000, Chinese imports of semifabricated and selected fabricated aluminum products have remained constant in absolute terms, but they have decreased significantly relative to Chinese aluminum demand (from 14 percent in 2000 to 3 percent in 2011). This reflects the country's ability to produce an ever-increasing range of products at low cost. For example, as recently as 2009, China had to import almost all the aluminum sheet used for beverage cans, because no Chinese company was able to produce the sheet specifications required by beverage companies. By 2011, however, 40 percent of the aluminum sheet used for beverage cans in China was produced domestically.

China's exports of downstream products have increased even faster than domestic consumption. Exports of semifabricated and selected fabricated aluminum products have increased from 0.3 MMT in 2000 (equivalent to 10 percent of Chinese primary-aluminum demand) to 4.4 MMT in 2011 (more than 25 percent of primary-aluminum demand). This has resulted in an extraordinary 28 percent annual growth over 11 years. (See Exhibit 9.) Some downstream products of which exports have likewise increased significantly (such as automotive wheels) are not even included in these numbers because of the unavailability of sufficiently detailed data.

In fact, Chinese exports of semifabricated and fabricated products are a critical reason for the slow growth in demand for primary aluminum outside of China. If not for Chinese exports of semifabricated and fabricated products, demand for primary aluminum in the rest of the world would have been at least 4.4 MMT higher in 2011, and the compound annual growth rate of primary-aluminum demand from 2000 to 2011 would

EXHIBIT 9 | Chinese Downstream Exports Have Grown by 28 Percent Annually Since 2000



Sources: UN Commodity Trade Statistics Database; International Aluminum Institute; BCG analysis.

Note: Some significant finished-aluminum-product categories, such as aluminum wheels, are not included in this analysis.

¹Based on UN Comtrade codes 7603 through 7616.

have been 2.5 percent or more instead of 1.1 percent.

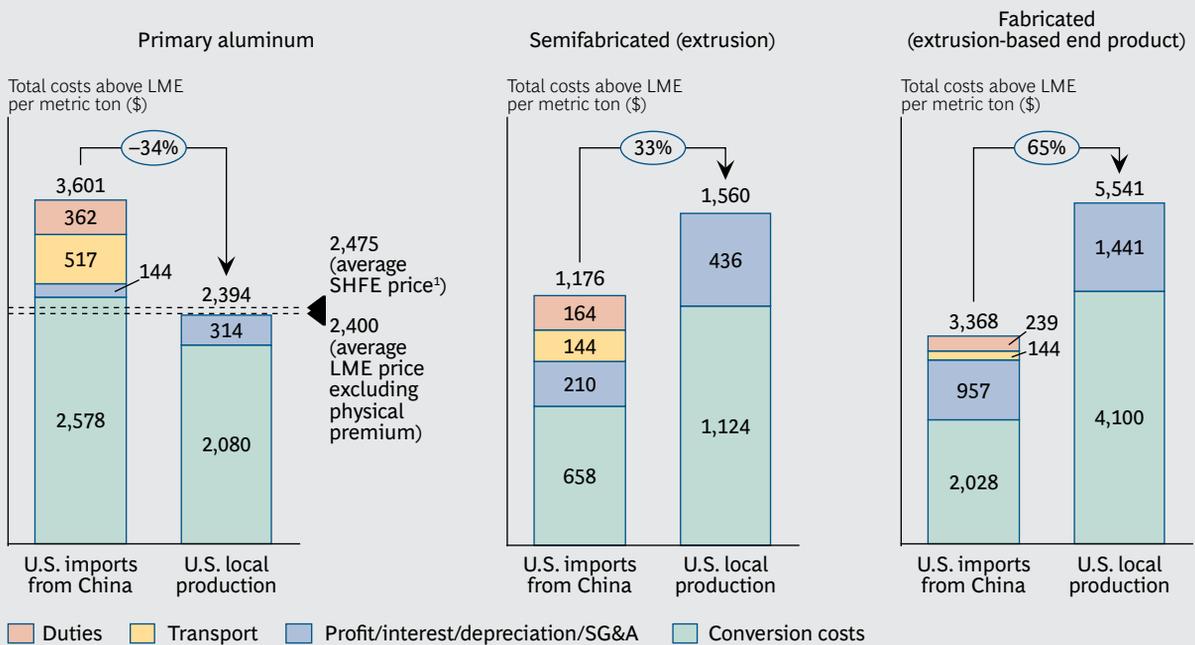
Four circumstances have promoted the significant increase in Chinese downstream exports:

- Chinese companies have managed to maintain their low cost base. They still enjoy significant labor-cost advantages over downstream producers and fabricators in mature markets. Although labor costs represent a small share of costs in the production of primary aluminum, their share increases for semifabricated products and can be very high for many finished products. In addition to the labor cost advantage, Chinese producers often enjoy substantially lower sourcing costs for nonaluminum components and services, as well as efficient, low-cost logistics chains for exports.
- Chinese companies benefit from a huge domestic market, allowing them to generate structural advantages from economies of scale throughout their sourcing, production, and distribution ecosystem.

- While exports of primary aluminum are discouraged by export taxes, the Chinese tax system favors the export of semi-fabricated and fabricated aluminum products through a VAT rebate.
- Chinese downstream companies can enjoy significant advantages in capital expenditures and capital costs, just as upstream companies do. This allows them to sell at very competitive prices, because lower margins are required to generate equal levels of returns. Consequently, Chinese companies can often offset the energy-driven cost disadvantage in the production of primary aluminum through significant downstream cost advantages. These advantages are evident in a comparison of the costs of U.S. imports of Chinese semifabricated and fabricated products with those of products manufactured in the U.S. (See Exhibit 10.)

Chinese downstream exports are expected to grow, albeit at a slower rate of 4 to 9 percent per year through 2017. By 2017, the export volume will reach 6 to 8 MMT (excluding several finished-aluminum products). This vol-

EXHIBIT 10 | China's Cost Competitiveness Increases Further Downstream



Sources: Harbor Intelligence; BCG analysis.

Note: LME=London Metal Exchange; SHFE=Shanghai Futures Exchange; SG&A=selling, general, and administrative expenses.

¹Average price for second half of 2010 and first half of 2011.

ume is equivalent to 22 to 30 percent of the primary-aluminum demand outside of China.

As this trend continues, China is becoming an aluminum products powerhouse in areas such as aluminum-based building and construction products, infrastructure systems, transportation equipment, and consumer products. Its rise as a downstream producer could also change the competitive dynamics of many product subcategories.

China's downstream moves will increasingly affect the world's downstream producers. During the past few years, Chinese companies have come to dominate the global market in many categories of products that contain aluminum. For example, in equipment for wind power, an application with significant aluminum content, the top three Chinese companies control a combined 26 percent of the global market, compared with only 3 percent in 2006.

The country's massive and increasingly cost-competitive supply base for primary alumi-

num will further drive growth of Chinese exports—especially of finished aluminum-based products. This growth will have a significant impact on global aluminum trade in semifinished and finished products and will cause aluminum converters and fabricators in developed markets to rethink their production and market strategies.

NOTE

1. Contango is the condition in which futures prices are trading higher than expected settlement prices at contract maturity.

TAKING ACTION AT THE INDUSTRY AND COMPANY LEVELS

THE CONDITIONS UNDERLYING THE aluminum industry's challenges are unlikely to abate in the years ahead. Despite strong demand from specific countries and sectors, aluminum consumption will probably remain sluggish in developed markets. At the same time, significant capacity from new primary-aluminum smelters will become operational outside of China. In the Middle East, in particular, competitive cost levels and national economic agendas that create industry clusters and zones will promote development along the entire aluminum value chain. And China is expected to be very well-supplied with domestically produced primary material, much of it coming from smelters with cost positions that are significantly better than historical averages. Low interest rates will ease the burdens of carrying large inventories and financing the construction of new capacity.

The answer is for industry players to align capacity rapidly and on a sufficient scale.

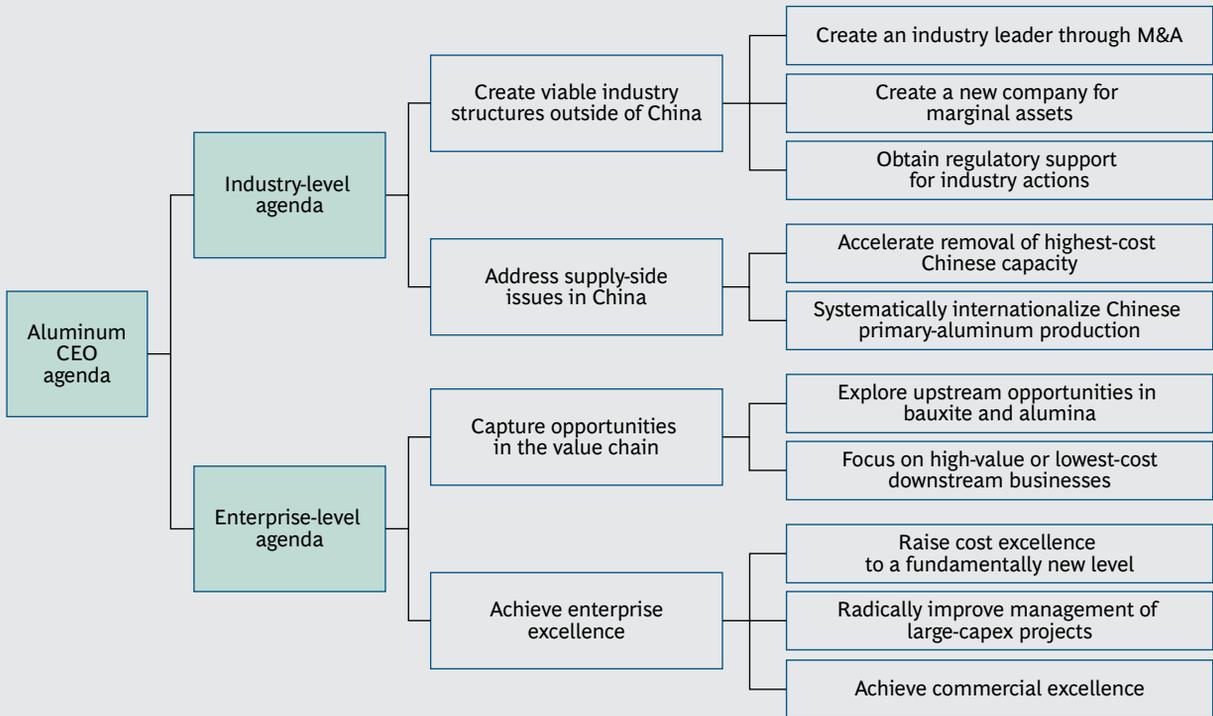
In this environment, the aluminum industry must adopt a more aggressive approach to confronting its challenges so that companies can become profitable and generate attrac-

tive returns for their shareholders. This more-aggressive approach must be implemented on the industry level as well as the company level:

- On an industry level, the structural issue of overcapacity must be addressed by taking concerted actions outside and within China. The scale of the problem is too daunting to be resolved by individual companies acting independently and in their own self-interest. It requires the collective action of the key industry players (including governments in critical markets) to align capacity rapidly and on a sufficient scale.
- On the level of individual aluminum companies, the CEO agenda should include initiatives that range from more systematically capturing new opportunities upstream and downstream along the value chain to achieving new levels of excellence in multiple aspects of performance. The appropriate actions will vary significantly depending on a company's regional footprint, relative cost position, and role in the value chain.

To help the overall industry and individual companies address the current challenges, BCG has developed a comprehensive aluminum-industry CEO agenda comprising ten actions items. (See Exhibit 11.) This

EXHIBIT 11 | Ten Action Items for the Aluminum Industry CEO Agenda



Source: BCG analysis.

agenda provides a comprehensive and practical starting point for setting the priorities of industry executives as well as government policymakers whose national or regional economies are influenced by the industry's performance.

Taking Concerted Action Globally and in China

Industry-level actions involve concerted interventions to manage primary smelting capacity outside and inside China. To make the necessary changes happen, new forms of coordination will be required among primary producers outside of China, as well as among Chinese stakeholders and their counterparts in the rest of the world.

Creating Viable Industry Structures Outside of China. The aluminum industry outside of China faces challenges that primarily stem from significant structural issues that can only be addressed through a wide range of industry-level actions. In recent years, some companies have added capacity while not removing unprofitable and only marginally

profitable smelters from the market. In the aggregate, strategies that seek to optimize individual businesses can weaken the overall industry if they create overcapacity that promotes price erosion. Indeed, optimization efforts aimed solely at the company level pose a major threat to the industry.

Understandably, no company wants to be the first to significantly reduce capacity, because it cannot predict how its competitors will respond. A first mover's actions (whether to reduce capacity or slow the pace at which it adds capacity) could ultimately be advantageous to the competition, which will reap the benefits without sharing the costs. In the aluminum industry, there is neither a high level of trust in companies' collective ability to resolve the structural issues nor a strong sense of shared responsibility for dealing with the issues head-on.

In addition to taking an aggressive approach to shutting down capacity, the industry must take a more proactive approach to managing the addition of new capacity. The sluggish economy in many regions will no doubt re-

sult in the delay or even cancellation of some projects. Even accounting for the probability of delays and cancellations, however, up to 6 to 7 MMT of additional smelting capacity could be added outside of China by 2017, as noted above. Much of this capacity will have a competitive cost position; some of it is intended to serve purposes beyond smelting, such as attracting the downstream industry or promoting economic diversification and job creation. As a result, we expect that any efforts to significantly reduce planned capacity buildup will be difficult to undertake. Nonetheless, companies should make concerted efforts to best align future additions to capacity with the realities of the market.

Governments and regulatory bodies should help the industry in its restructuring efforts.

Leaders will have to adopt innovative approaches in order to implement a significant restructuring of capacity throughout the industry. Three action items on our CEO agenda address this imperative:

- *Create an industry leader through M&A.* In times of reduced demand, an industry is better off if a clear market leader removes excess capacity instead of participating in a ruinous price war with other companies. The world's largest steelmaker, for example, has successfully assumed a stewardship role in its industry. During the recent economic crisis in Europe, this industry leader removed much more capacity than its competitors, thereby helping to prevent an even greater decrease in steel prices. In contrast, the aluminum industry lacks a clear market leader—each of the top three primary-aluminum companies has roughly a 15 percent market share. Consolidation through M&A—whether through one transaction or a series of deals—could create a company with the market leadership required to undertake capacity rationalization efforts autonomously. As with any M&A deal, the consolidation must make

economic sense for the entities involved and must create value. The cost savings through synergies and the revenue uplift through improved pricing will need to exceed the costs of completing the M&A transaction and shutting down capacity.

- *Create a new company for marginal assets.* The financial services industry has addressed its significant issues related to nonperforming assets by creating so-called bad banks, which acquire these assets at market price. By transferring its nonperforming assets to a bad bank, a financial institution removes the assets from its balance sheet and takes a write-down. Companies in the aluminum industry could apply a similar strategy by creating a new business in order to acquire marginal assets. Before using this approach, organizations would have to address several issues, including the ownership structure of the new company, the means of transferring and valuing the assets, and the exit strategy for the new company.
- *Obtain regulatory support for industry actions.* Governments and regulatory bodies should help the industry in its restructuring efforts by creating legal constructs that allow the burden of capacity reduction to be spread among different companies. An example of such a construct on a national level is Germany's "structural crisis cartel," which succeeded in removing structural overcapacity from the country's steel and shipbuilding industries. The aluminum industry must also convince national and local governments that capacity cuts are unavoidable and that previous approaches—such as providing additional energy subsidies to keep inefficient, high-cost plants marginally profitable—aggravate capacity problems rather than solve them. To make the required measures politically acceptable, stakeholders must develop approaches to address the needs of workers who will lose their jobs.

Addressing Supply-Side Issues in China. To address challenges arising from China's abundance of smelting capacity, the global

industry should seek to hasten the removal of the country's high-cost capacity while also encouraging Chinese companies to relocate their capacity to other countries.

China has been modernizing its aluminum industry in recent years by taking out of service many of the small, subscale smelters operating with outdated technologies. It is replacing these with large-scale smelting operations run by professional enterprises in accordance with world-class standards. Even so, there remains a substantial opportunity to shut down more of the old, inefficient smelters still operating throughout China. These smelters could be replaced, in part, with substantially lower-cost capacity within China or elsewhere.

Accelerating the removal of high-cost capacity will require significant concerted action by the Chinese central government in close cooperation with regional and local governments. For example, these governments would need to work together to enforce higher operating standards for aluminum smelters. This could be accomplished through additional tax levies on smelters that operate above specified levels of cost or carbon dioxide emissions. (High-cost smelters typically have the highest emission levels.) Governments could also withdraw incentives provided to keep marginal capacity in business, thereby raising these smelters' costs even further so that their operations were no longer financially viable. The central government must be prepared to address strong opposition to plant closures from local government officials under pressure to preserve and promote employment and economic growth. Previous smelter closures in China, as well as in mature economies such as Germany, present lessons for mitigating negative regional impacts, such as through workforce redeployment initiatives.

While overcapacity is a more significant issue outside of China than within, China could be an important part of the solution. China is expected to remain self-sufficient in primary aluminum and to control as much of the value chain as possible. However, a clear distinction with regard to self-sufficiency should be made between operations within China's na-

tional boundaries and the operations of Chinese companies globally. China's alumina-sourcing and production strategy is a good example of this distinction. China will likely become more dependent on imports, but these imports will be provided mainly by companies that are owned and controlled, at least in part, by Chinese companies.

The same scenario could be applied to primary aluminum. Although some projects in western China will have very competitive cash costs, other planned smelters will still have far higher costs than the global average outside of China. Instead of building these high-cost smelters, Chinese companies could redirect part of their primary-aluminum investments to lower-cost regions outside of China, where local aluminum companies may welcome international coinvestors. If Chinese companies invested in smelters abroad that have already been planned, they could avoid building additional capacity within China, thereby reducing the amount of new capacity globally.

China can be an important part of the solution to the issue of global overcapacity.

This scenario could promote a win-win situation for all stakeholders, since the industry as a whole would benefit from less overcapacity. New smelters outside of China would get immediate access to the large Chinese market and its highly diverse customer base. And, by reducing their dependence on domestic capacity, Chinese companies would diversify their regional exposure and the related risks. Because they would still control the value chain, Chinese companies could capture the full value created by a domestic industry that converts and fabricates downstream aluminum.

To make this opportunity a reality, foreign governments and the aluminum companies operating within their countries will need to involve their Chinese counterparts in multilateral discussions to identify potential opportunities for Chinese companies to invest

in smelters abroad. International stakeholders must be prepared to demonstrate to Chinese officials that China will benefit from diversifying its ownership and control of aluminum capacity internationally. To be persuasive, international players must present a compelling long-term value proposition. A useful model could be Japan's success in investing internationally while it was reducing domestic smelting capacity. These stakeholders must also develop a master list of projects in which China could participate, including both ongoing and future projects. In addition, the parties will need to clearly define China's role and that of the other partners in international projects.

Capturing Opportunities and Achieving New Levels of Business Excellence

Individual aluminum companies will need to take radical steps to improve their own performance while alleviating the industry's crisis. Companies should regard bauxite and alumina as offering very attractive growth opportunities, while the downstream market could provide attractive opportunities for emphasizing high value and superior capabilities or low costs and superior service. All companies, irrespective of their position along the value chain, will be forced to take a fundamentally new look at opportunities for quantum-leap improvements in cost reduction, capex management, and commercial excellence.

New Opportunities Upstream and Downstream. Until the global overcapacity of smelting is reduced, companies will struggle to earn high returns in this part of the value chain. The upstream and downstream markets could offer particularly fertile ground for value creation. What actions should industry executives consider in order to capture these opportunities?

In the near term, the upstream segments of the value chain will be more attractive than smelting. The supply of bauxite and alumina will continue to be more constrained than the supply of primary aluminum. Because bauxite mining and alumina refining are also relatively concentrated industries, they are

more likely to have better industry discipline with respect to capacity and pricing. Moreover, the price of alumina is becoming increasingly decoupled from the price of primary aluminum. Until recently, pricing in most alumina contracts was based on a formula that applied a percentage of the LME price of aluminum, but pricing is now increasingly based on alumina spot indices that are not tied to aluminum's LME price. As a result, pricing dynamics of alumina will develop on the basis of the material's own strong market fundamentals, not those of the oversupplied aluminum market.

Because current supplies will not be sufficient to satisfy China's increasing demand for bauxite and alumina, large investments in new capacity will be required worldwide. While Chinese primary-aluminum companies are expected to continue to pursue backward integration in the value chain, Western companies should seek new opportunities to supply Chinese smelters with alumina or to engage in joint mining and alumina projects with Chinese partners.

The upstream and downstream markets offer fertile ground for value creation.

Large traditional aluminum players have particularly strong expertise in bauxite mining and alumina refining, including experience in exploration, mine operations, and logistics—as well as in working effectively with the host governments of rapidly developing economies (RDEs). Their expertise will make it possible for large companies to overcome the following upstream-market challenges that create entry barriers to other players:

- More stringent licensing procedures in many countries have made it harder to obtain access to bauxite deposits.
- Higher licensing fees, among other factors, have increased the cost of operating bauxite mines.

- Capex required to develop new mines and refining capacity have increased.
- Governments of bauxite-rich nations require mine operators to participate in national programs for infrastructure investment and economic development in return for obtaining access to their national resources.

Smelter operators as well as mining and refining companies can pursue initiatives to capture upstream opportunities.

Smelter operators should conduct a thorough review of their alumina-supply strategy with an eye toward pursuing backward integration. By increasing their ownership of mines and refineries, smelters can better manage their exposure to supply risks and reduce their need to negotiate contracts with powerful suppliers in the concentrated upstream market. They can also capture value from the more attractive market conditions that favor upstream businesses. The objective is to create a supply portfolio with the optimal mix of owned and contracted sources and exposure to country-specific risks. The strategic review should consider both existing contracts with suppliers and current supply streams from owned mines and refineries. Smelter operators should compare the prices they will pay for alumina given their current portfolio of owned and contracted sources with a forecast of those prices under different scenarios. The output of the review should guide future contract negotiations and investment decisions.

Owners of mines and refineries should develop a supply-and-demand model for the alumina market over the next ten years. This should include determining an updated forecast of alumina demand for both China and the rest of the world, identifying alumina consumers globally, and assessing the extent to which these consumers will own or buy alumina supplies. Executives should also identify the locations of potential new mining operations.

Companies can use this market model as the starting point for defining their strategy. The strategic agenda should include planning for expansion, determining a competitive cost base, and identifying opportunities for joint

ventures with customers (such as Chinese companies). Companies should also use the market model to determine the investment model and ownership structure of future mining and refining assets.

Additionally, upstream operators should address their cost base more aggressively and systematically. As noted above, mining has become increasingly expensive. This creates the need to manage costs more aggressively in order to ensure the competitiveness of products. Players in the upstream part of the value chain can capture the greatest potential from cost management because they have typically been the least forceful in this area.

Upstream operators need to manage costs aggressively to ensure competitiveness.

Finally, mining and refining companies should accelerate their efforts to decouple the prices of alumina and aluminum by enforcing an independent alumina-pricing mechanism. This will allow them to capture the full upside from the favorable market conditions discussed above. They should use this independent price in transfers among mines, refineries, and smelters.

Opportunities in the value chain's downstream segments also warrant close attention. In recent years, operations in low-cost countries have redefined the global production-and-supply landscape of many downstream products. Multinational companies active in flat-rolled products, extrusions, and castings have diversified their production networks to include an increasing number of manufacturing sites in cost-advantaged regions such as China, Eastern Europe, and Latin America. These facilities were established to enable sales in fast-growing domestic economies, as well as to provide lower-cost supply hubs for global export markets.

At the same time, domestic producers in RDEs are increasingly exporting their products in order to compete head to head with

incumbent suppliers around the world. These challengers are constantly improving their technical and commercial capabilities to serve markets globally, while buyers are increasingly willing to source from them.

As we have discussed, China has established itself as a major force in the global supply of downstream products—not only semifinished products but also end products. Examples of China’s reach into the global market include aluminum extrusions for architectural projects; aluminum foil for household, commercial, and industrial applications; and finished products such as garden furniture, picture frames, and automotive wheels.

The globalization of downstream products creates challenges and opportunities.

Some countries have restricted low-cost imports; for example, the U.S. has limited imports of aluminum extrusions from China. However, these trade-related interventions are not likely to stop the globalization of downstream supply, especially as multinationals from mature economies increasingly set up production in RDEs. For many aluminum-product segments, downstream businesses will no longer be operated on a local or regional basis.

The globalization of downstream aluminum products creates substantial challenges and opportunities for incumbent players. To succeed, these companies must either develop the most competitive offering for commoditized products that do not benefit from having production located close to customers or maximize the differentiation of their products, services, and brands. Companies based in RDEs must substantially strengthen their capabilities in order to mature from international challengers to global leaders.

Both incumbents and challengers should assess their strategies for capturing opportunities in the changing downstream landscape.

Incumbents should conduct a thorough review of their current and future competitive landscape, assessing the international threat and potential opportunity for each line of business, product family, region, and customer relationship. This should include the extent to which sales and profits are or will be challenged by companies from RDEs, as well as the nature of the threat in terms of superior cost, differentiated products, and differentiated sales and marketing. Companies should also identify lines of business that appear to be safe from competitive threats and determine how these lines can position themselves as the best suppliers to meet customers’ needs.

These established companies should fine-tune their strategies on the basis of this assessment and define the appropriate implementation initiatives. The assessment could confirm that the current business model is competitive and suggest ways to improve it for long-term sustainability and resilience. Alternatively, it could trigger a radical overhaul of the strategy so that the company can significantly improve cost competitiveness (including international low-cost options) or focus on a substantially different product mix that better enables competitive differentiation.

Challengers from RDEs will need to substantially upgrade their business models to fully capture international growth opportunities. Although many of these companies already sell products abroad, few are properly set up for aggressive global expansion. To position themselves, they must develop and systematically deploy a well-defined international growth strategy and design a product portfolio fine-tuned for the international market. They must also define a robust supply-chain model that meets the service requirements of the international customer base, as well as a go-to-market approach that will reach the right buyers. Often, the biggest challenge is creating an organization truly equipped for international business development, including senior managers with significant international business experience and a culture that will ensure global success.

Achieving Enterprise Excellence in Three Dimensions. To achieve and sustain a competitive advantage, companies must substan-

tially raise their game in three critical dimensions of business performance: operating and overhead costs, capex management, and commercial activities.

Aluminum companies must deploy truly rigorous and holistic lean programs.

The objectives of continuously reducing operating and overhead costs, improving energy efficiency, and increasing the productivity of capacity are central to the performance culture of every operator throughout the aluminum value chain. Companies that make their operations leaner can also achieve the flexibility required to align production with market needs and are often able to provide superior service and quality levels.

However, most aluminum companies have already captured the opportunities available through the traditional means of achieving operational excellence. Only a few companies have been able to create sustainable world-class operations. Some companies attain only limited benefits from lean operations because their programs are overly broad and lack the required depth. In many cases, the necessary capital, manpower, and analytical tools to apply lean operations effectively are not available. Even when companies achieve dramatic improvements initially, they may struggle to sustain momentum. To raise operational excellence to a new level, aluminum companies must deploy truly rigorous and holistic lean programs—from the production floor to the head office and from short-term campaigns to initiatives designed to achieve significant and lasting change. This should entail taking a close look at other industries to ensure that the company is adopting the leading practices for operational excellence.

In BCG's experience, companies can reach an advanced level of lean operating performance by refocusing on fundamentals and pursuing smaller and faster initiatives. Given the severe financial pressures that aluminum companies currently experience, it is vital to

rapidly achieve visible impact. A quick lean health check can identify a handful of focused changes that will significantly improve costs and performance. Companies can see major savings in specific areas within months.

Based on our experience along the aluminum value chain, the best opportunities for improvements can typically be found in the following areas:

- *Procurement*, by optimizing and renegotiating the contracts for major consumable categories and service contracts
- *Repair and maintenance*, by redefining the related requirements and procedures, and improving sourcing costs and process productivity
- *Inventory management*, by setting the right levels of buffer stocks, streamlining materials flows, and improving operations planning and demand forecasts
- *Logistics*, by boosting warehouse productivity and minimizing freight costs
- *Overhead costs*, by eliminating, consolidating, or streamlining administrative functions in plants and in regional, business unit, and headquarters offices

The key is to pick the most effective improvement levers by weighing the tradeoffs among them and deciding which ones to tackle immediately. Given the situation's urgency, it is important that aluminum companies focus on a small number of areas that are easy to analyze, that can typically be addressed without major capital investments, and that almost always have room for improvement no matter how much attention was paid to them in the past. (See *Lean in Industrial Goods: Driving to Breakthrough Performance*, BCG report, September 2011.)

In addition to managing operating costs, aluminum companies (especially those from mature markets) need to find ways to significantly reduce their capex. Aluminum operations are far more capital intensive than copper or steel plants and are among the most expensive to build—requiring capi-

tal investments of \$5 billion to \$10 billion in the case of new smelters. Western companies suffer from a distinct disadvantage regarding capex levels, as their Chinese counterparts often only require half as much capital to build plants with similar levels of capacity and operating efficiency. What's more, operating profits must be higher year after year to offset unnecessarily high capex during a project's development phase. To ensure the competitiveness of an asset base that will last for decades, Western companies should take all possible steps to close the gap between their capex levels and those of Chinese companies.

To improve their execution of large-capex projects, some companies have implemented quality control programs, issued more frequent project-status updates, and transferred a larger component of the risk to outside contractors. While such measures can help, they often do not address the core need for a new approach to project management.

Comprehensive risk management for large-capex projects is increasingly important.

BCG has identified eight levers that companies and contractors can apply to ensure that their large projects are completed at competitive capex levels, on time, on budget, and within required quality parameters. (See *Eight Key Levers for Effective Large-Capex-Project Management: Introducing the BCG LPM Octagon*, BCG report, October 2012.) For aluminum companies, three of these levers are especially important for making fundamental improvements to large-capex-project management: minimizing capex needs, rigorous risk management, and securing scarce resources and local content:

- *Minimizing Capex Needs.* Companies should make their value requirements clear to contractors and equipment providers to ensure that the technical specifications and proposed solutions are truly aligned with the project's needs. This

includes the use of value engineering to ensure that new facilities are not over-designed and that the full range of possible technology and equipment options (including providers in low-cost countries) are being considered.

- *Rigorous Risk Management.* Comprehensive risk management for large-capex projects is increasingly important because many new aluminum plants are built in remote locations and global supply chains, and vendor arrangements for engineering, procurement, and construction have become increasingly complex. Clear guidelines should be set to define acceptable levels of risk exposure and ensure that portfolio policies are aligned with the strategic vision (such as the maximum size of projects, capex per year, and other metrics). A clear ranking according to risk and value will help optimize investment decisions. At the project level, the company should exercise ultimate control over risks even when a contractor is in charge of implementation. This entails understanding risks at each step of the project, classifying them by severity and likelihood, determining options to mitigate each risk, and implementing a forward-looking reporting system to allow proactive intervention.
- *Securing Scarce Resources and Local Capabilities.* Most industrial sectors expect sustained growth over the next decade, and companies are developing many large projects, often located in the same regions of Asia, Africa, the Middle East, and Latin America. As a result, companies have to compete for skilled human capital, natural resources, infrastructure, and critical equipment. Securing access to scarce resources and local capabilities, especially in areas with a high concentration of projects, will be essential.

Traditionally, aluminum companies' performance culture has centered on the manufacturing function. Companies evaluate their level of excellence based on manufacturing KPIs, such as costs, tonnage produced, productivity, and uptime. At the same time, they have devoted scant attention

to understanding how to best serve their customers' needs.

To improve their overall performance in today's business environment, aluminum companies must follow the lead of consumer goods companies and transition to a culture that emphasizes understanding customers' evolving needs and quickly tailoring offerings to meet these needs. Companies that successfully adopt a "customer back" approach can use value-added offerings and premium services to free themselves from the constraints of selling a commodity. They will be able to set price premiums to reflect the value of tailored offerings and increase market share by achieving higher levels of customer satisfaction and loyalty. The objective is to develop a premium brand that is recognized for providing a better solution and more value, not just a quantity of aluminum.

Commercial excellence requires creating a customer-focused mindset and a professional marketing and sales function with capabilities in researching customer insight. To inform decision making, marketing and sales must understand what customers consider important, the problems they need to solve, the sources of their satisfaction or dissatisfaction with current offerings, and what makes them loyal. These insights can then be fed back into the product design and manufacturing process to create customized offerings that capture the value of improved service. Companies should also gather competitive intelligence to understand how well competitors are meeting customers' needs, as well as the opportunities for better meeting these needs.

Companies must design KPIs and incentives relating to areas that promote customer satisfaction, such as delivery speed, reliability, and flexible service. They also need to create forums and processes for cross-functional collaboration that enable the manufacturing and marketing and sales functions to integrate their activities. And the marketing and sales team must build stronger external ties with customers' procurement teams to develop long-term strategic relationships as a supply chain partner.

Leading aluminum companies have already begun to transition to a customer-centered culture. They have created customer insight teams similar to those used by consumer goods companies, and they have developed sophisticated pricing schemes that reflect the higher value of specific service offerings. In addition, they have created market sector teams to consider the specific needs of, for example, automotive, industrial, or packaging customers, so that they can tailor offerings to these customers' different needs.

SETTING THE AGENDA ALONG THE VALUE CHAIN

COMPANIES THROUGHOUT THE VALUE chain must set a new strategic agenda in response to the fundamental changes in the aluminum industry landscape. This does not mean that they should assume an exclusively defensive posture. All companies have an opportunity to play offense by identifying and capturing opportunities that arise from the industry's crisis.

Upstream: Pursue High-Value Opportunities in Bauxite and Alumina

To benefit from the attractive opportunities in the upstream segment, executives should identify ways to capture value in bauxite mining and alumina refining and design initiatives for putting the strategies into practice. As a first step in setting the agenda, executives should consider the following questions:

- Do we clearly understand how China's aluminum strategy will affect our access to bauxite and alumina and the price of these raw materials?
- Do we have a strategy in place that enables us to capture the full upside of the future opportunities in bauxite and alumina while protecting us from possible downsides?

- For smelters: have we assessed whether it is beneficial to integrate backward by acquiring mines and refineries or expanding our existing upstream investments?
- For mines and refineries: given the uncertainties about China's upstream strategy and the alumina needs of non-Chinese smelters, what is the right investment strategy? How much upstream capacity should we invest in, at what cost, where, and with whom?

Smelters: Take Bold Actions to Ensure Long-Term Viability

To ensure the long-term viability of their part of the value chain, smelter operators must make radical moves to achieve a significant industrywide turnaround and substantial improvements in company performance. The following questions can guide the agenda-setting process:

- Do we have an actionable strategy for our smelter portfolio as a whole and for each location, enabling us to address the challenges and capture the opportunities at hand?
- Do we clearly understand the implications of China's aluminum-industry strategy for our business over the next five to ten years?

- What is the shape of the future cost curve and where are our assets positioned on this curve? How competitive are we under different supply-and-demand scenarios?
- Which costs have the most potential for substantial short-term reduction? How can we capture the full cost-reduction potential quickly?
- What improvements can we make beyond operating costs? How can we effectively manage our capex? What are the opportunities to optimize the top line by focusing on what customers are willing to pay for?
- How can we contribute to implementing meaningful concerted industry actions? How can we become active in M&A, international partnerships, and government lobbying?
- Which lines of business appear to be protected from these threats and why?
- Which products or services do customers consider to be truly important in our more secure lines of business? How can our company best position itself as their supplier?

Executives of challengers from RDEs should consider the following:

- How long will our current competitive advantage over incumbent players last before it erodes because of labor cost increases, for example?
- How can we gradually move from our current product portfolio to higher value-added products? Which products are the most promising?
- Beyond our home market and current regional reach, which locations are the most promising for expansion given our current competitive advantages?
- What are the specific customer needs in these potential new markets and how can we develop the capabilities required to serve them successfully?

Downstream: Capture New Upside Opportunities While Safeguarding the Baseline

The downstream market faces a crossroads, as incumbent companies in developed markets and challengers from RDEs compete for dominance. Incumbent companies must assess threats and take action to capture new opportunities while protecting their current lines of business. Challengers must elevate their international growth strategies and capabilities organizationwide to grow their businesses internationally.

Executives of incumbent players should consider these questions:

- Which lines of business, sales, and profits are or will be threatened by challengers from RDEs?
- Does the threat from these challengers relate to superior cost, innovative products, distinctive sales and marketing, or other issues?

For all companies along the value chain, the answers to these questions will point to opportunities to make significant course corrections in their strategic agenda. The resulting performance improvements will provide a critical source of competitive advantage for individual companies and help to reorient the aluminum industry's outlook from crisis to prosperity.

FOR FURTHER READING

The Boston Consulting Group has published other reports and articles on the topics covered by this report that may be of interest to senior executives. Examples are listed here.

Taking the Long-Term View in Turbulent Times: Value Creation in Mining 2012

A report by The Boston Consulting Group, January 2013

Capital Procurement: The Cornerstone of Successful Projects

A Focus by The Boston Consulting Group, October 2012

Eight Key Levers for Effective Large-Capex-Project Management: Introducing the BCG LPM Octagon

A Focus by The Boston Consulting Group, October 2012

Lean in Industrial Goods: Driving to Breakthrough Performance

A Focus by The Boston Consulting Group, September 2011

NOTE TO THE READER

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