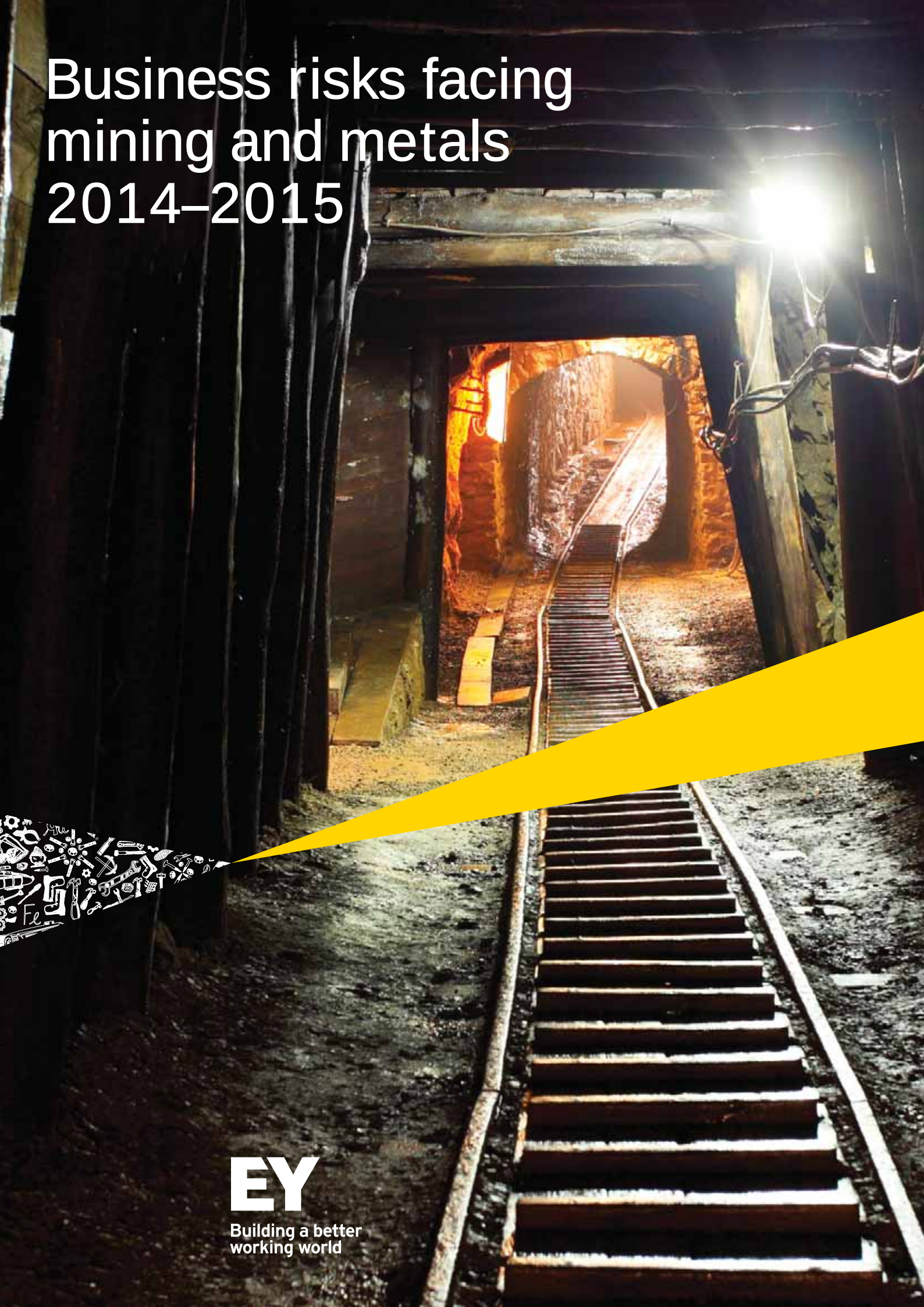
Business risks facing mining and metals 2014–2015

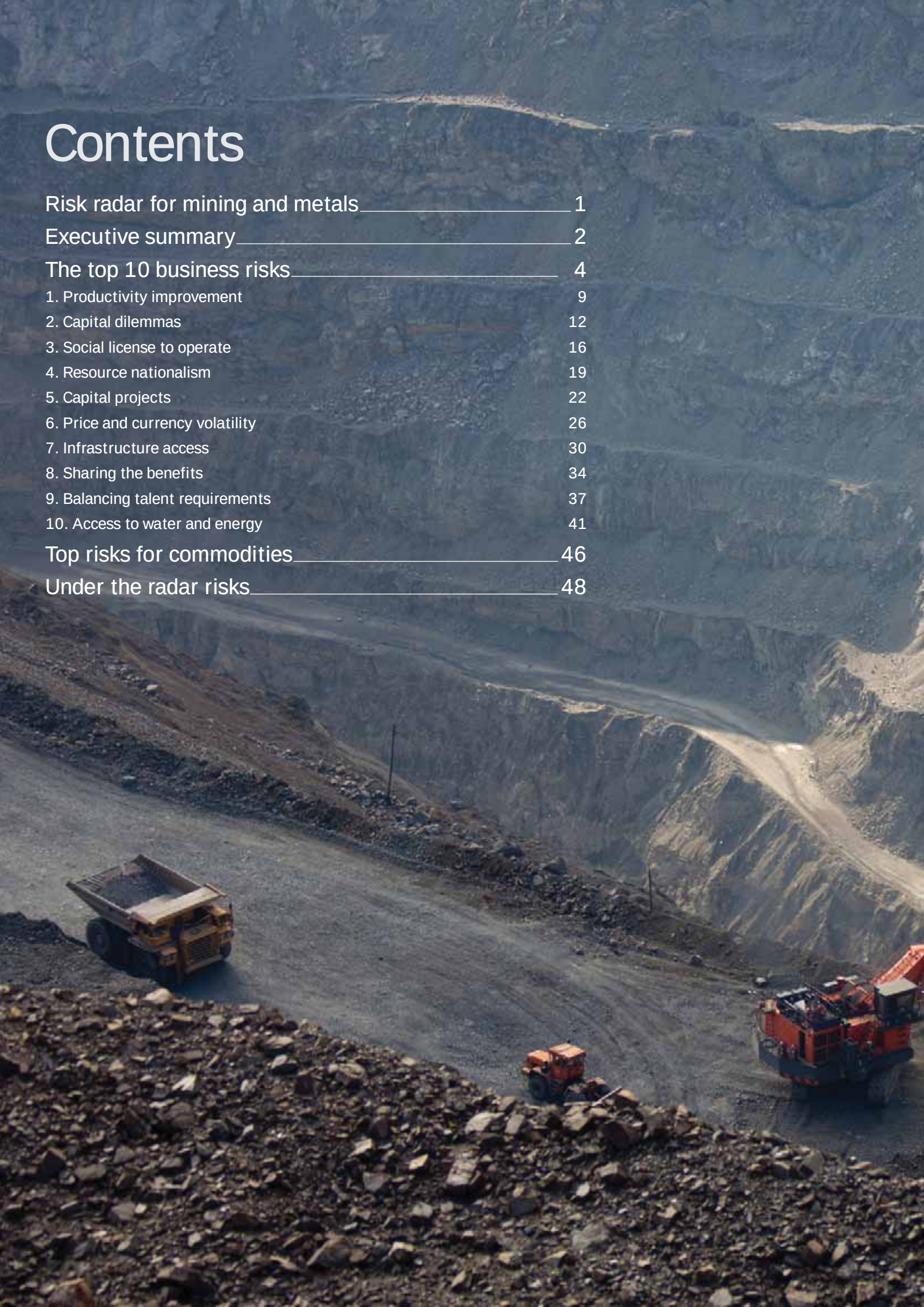


EY

Building a better working world

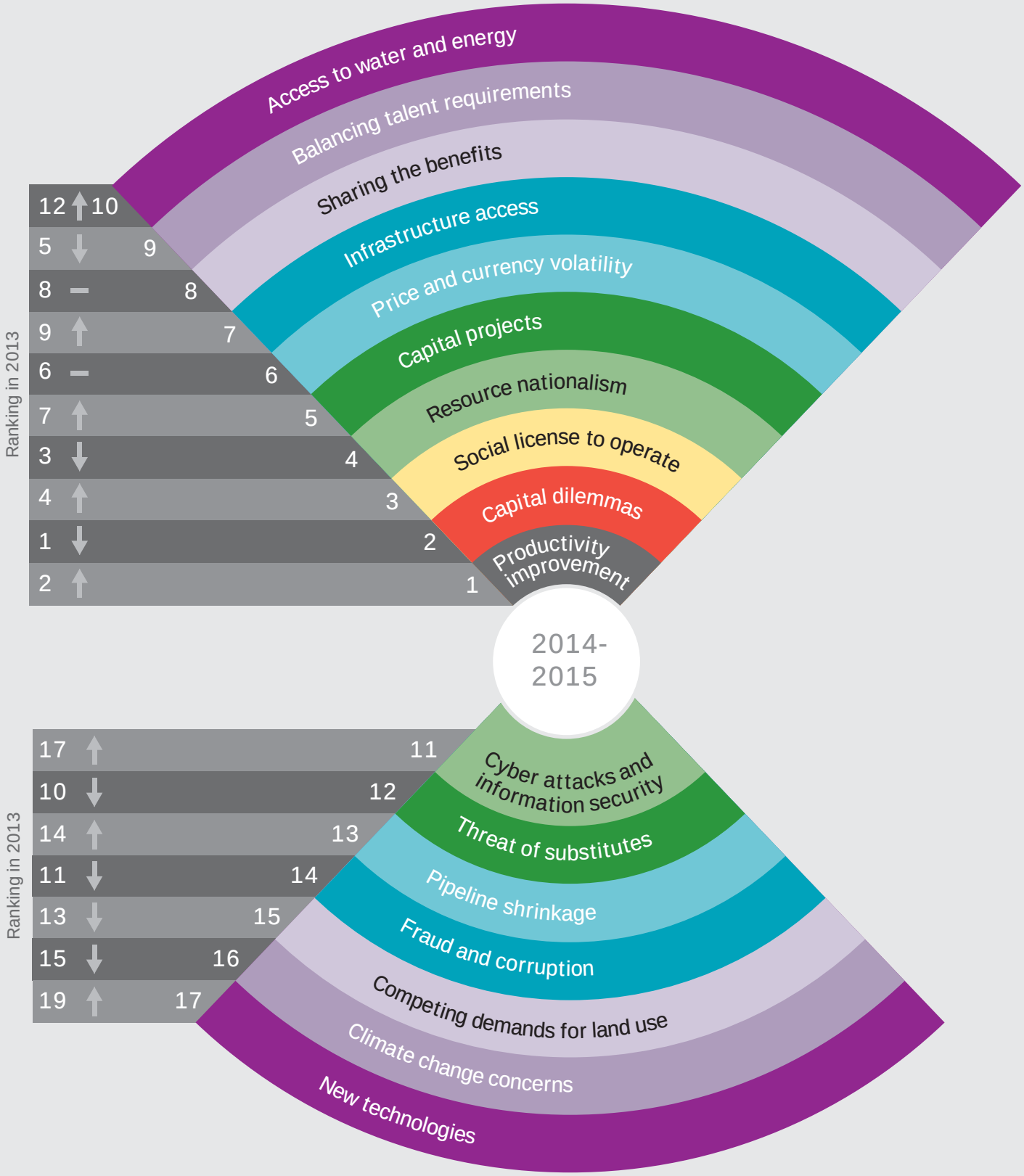
Contents

Risk radar for mining and metals 1
Executive summary 2
The top 10 business risks 4
1. Productivity improvement 9
2. Capital dilemmas 12
3. Social license to operate 16
4. Resource nationalism 19
5. Capital projects 22
6. Price and currency volatility 26
7. Infrastructure access 30
8. Sharing the benefits 34
9. Balancing talent requirements 37
10. Access to water and energy 41
Top risks for commodities 46
Under the radar risks 48



Risk radar for mining and metals

Top 10 business risks



Under the radar business risks

Up from 2013 Down from 2013 Same as 2013

Executive summary

The need to address the decade-long decline in productivity due to the sector's quest for growth during the supercycle has pushed productivity to the top of EY's risk ranking. The effects of extremely weakened productivity across the business are now most obvious as commodity prices continue to soften, margins have been cut and there is nowhere else to look for profitability.

The supercycle altered the DNA of mining companies to adapt the processes, performance measures and culture solely toward growth. The transformation has occurred by stealth and the counter-transformation will need to be far more radical. Boards and CEOs are now realizing that regaining lost productivity and gaining new ground is critical for long-term profitability and achieving an adequate return on capital employed, and requires a whole-of-business response. This broad transformational approach is essential and is yet to be applied effectively by any one sector participant. This huge step change is why this risk is top of the ranking.

Although the top risks have shifted around in the ranking, there has not been a substantial shift in priorities. The risks themselves have evolved greatly over the year with the prolonged commodity price dips which have thrown up many issues for the miners. Moving up into the top 10 this year is access to water and energy, which is becoming an increasing issue as demand rises, costs increase and availability diminishes.

Capital allocation and access – diverging and unique challenges

The capital allocation dilemmas have fallen from last year's top spot, reflecting progress made during the year in addressing this challenge. Steady progress has been made by the majors on capital management and optimization following a spate of asset write-downs in 2013. Capital discipline is expected to continue, but the question now facing companies is what form the next phase of investment will take, and when stakeholders will begin pushing for this. However, little has changed in the past 12 months for many juniors and explorers and they remain cash-starved and focused on survival.

Social licence to operate – engaging powerful communities

This risk has climbed the ladder to third position because the growing influence of communities to stop or slow projects, no matter how exemplary a company's track record is with social engagement. The frequency and number of projects being delayed or stopped due to community and environmental activists continues to rise. Organizations cannot rest on their laurels nor assume that acceptance provided by the community and its stakeholders will always be maintained. They should be integrating the activities required to obtain and maintain a social licence into the

Top 10 risks

2014

01	Productivity improvement
02	Capital dilemmas – allocation and access
03	Social license to operate (SLTO)
04	Resource nationalism
05	Capital projects
06	Price and currency volatility
07	Infrastructure access
08	Sharing the benefits
09	Balancing talent needs
10	Access to water and energy (new to top 10)

Over 7 years

2008 (peak of supercycle)

01	Skills shortage (now balancing talent needs)
02	Industry consolidation
03	Infrastructure access
04	Social license to operate
05	Climate change concerns
06	Rising costs
07	Pipeline shrinkage
08	Resource nationalism
09	Access to secure energy
10	Increased regulation

Remained on the risk radar over seven years

"Improving productivity is undoubtedly the best and most strategic way for organizations to boost efficiency and profitability in an environment of muted pricing. And it's not a simple fix for a few projects. It is transformational and takes a lateral and broad-thinking management to pull it off successfully."

Mike Elliott
Global Mining & Metals Leader

broader strategic plan of a more sustainable business.

Resource nationalism – both retreating and advancing

Maintaining its spot in the top five risks, there remain waves of resource nationalism by countries keen to gain a greater share of shrinking returns from the sector. On the one hand, some countries have changed mining tax policies to become more attractive to mining investment in a lower investment environment. At the same time, other countries have introduced mandated beneficiation, invoked use-it-or-lose-it and increased state ownership. Resource nationalism is very popular with the population of producer nations, and in many countries an increase in moves to instil mandated beneficiation has come in the same year as major elections. Emotive arguments promoting resource nationalism can only be overcome with meticulous and transparent revelation of the facts.

Capital projects – a conservative approach

This risk has moved into the top five due to the long trail of mega projects commenced during the boom that still need to be fully delivered, and with a view to the next cyclical upswing, mining and metals companies are beginning to plan the next wave of projects. While the public capital markets still do not have an appetite for investment in new supply, mining and metals companies are beginning to quietly prepare for the inevitable investment as reserves need replacing and the cycle changes. Mining companies do not want to make the same mistakes they made during the supercycle, and boards will be demanding much more robust capital project management to avoid the failures of the past. In addition, with softening commodity prices, many companies are looking to extract more for less through increased productivity. As supply shortages for many commodities start to reappear in the next few years and investments get the green light, this risk will be high on CEO and board agendas.

New entrant – Access to water and energy

Accessing affordable water and energy is an essential part of operations for mining and metals companies and has become increasingly difficult, especially in countries in South America and Africa. Burgeoning energy costs and competing water demands in many mining regions around the world are starting to have a bigger impact on costs and the ability to operate. With global demand for energy expected to increase 36% by 2025, and with falling ore grades, this risk is compounding year by year, with the sector facing higher energy prices and volatility. Similarly, water scarcity is an issue demanding a strategic and practical response. The criticality of this issue in many countries has raised this risk into the top 10.

Megatrends

The top 10 business risks are the 1-2 year priorities of the mining and metals sector as influenced by the global megatrends that are impacting business, society, culture and the economy. These include:

- Digital transformation
- Changes in the way we work
- The global marketplace
- The urban world and its demands on infrastructure
- A resourceful planet allocating scarce resources
- Health re-imagined to meet growing needs

The megatrends by their nature are medium to long term in relevance.

The top 10 business risks

Productivity – a case for broad transformation

01

The significant decline in productivity over the last 10 years was a by-product of a choice by industry participants to pursue volume growth at almost any cost during an unprecedented boom in commodity prices. Many companies have been attempting to deal with the resulting drop-off in productivity through a series of cost-cutting exercises or point solutions. However, the problem is too large for point solutions to solve on their own as they often simply move the problem further down the supply chain.

The need to boost productivity is threefold - to regain ground lost over the supercycle, to continue to innovate to recover lost competitive advantage and to counteract rising real wages. To put the issue into context, labor productivity in Australia has declined by roughly 50% since 2001 and in the US coal sector, labor productivity declined by nearly 30% from 2009 to 2012. The same is being seen globally, in both developed and emerging markets, and the issue has been escalated to the CEO agenda of mining companies.

The size of the entrenched nature of the problem is too large for conventional solutions, such as cost cutting, to deliver the sustainable improvements required. Real productivity gains will only come from a whole-of-business, end-to-end transformation. Real and sustainable productivity improvements may require significant adjustments including changes to mine plans, reassessment of mining methods, changes to equipment fleet and configuration, and increasing automation. Most of these have been untouched by cost-reduction exercises. The quest needs to be long term and requires a change in attitude across the organization from the boardroom to the pit.

Capital dilemmas – allocation and access

02

The twin dilemmas of capital access and capital allocation encapsulate the diverging fortunes of the industry's major producers and juniors in 2014.

Capital allocation: The majors have shown tremendous commitment to capital discipline over the last 12 months, positioning them well for future growth. Effective capital allocation is not a once-in-time reaction to changed market conditions, but a continuous cycle of review and action that informs strategy and impacts all areas of the business. A renewed focus on return on capital employed will be with the sector for many years to come. We see the sector now at various junctures along a path of capital transformation, one that can broadly be divided into capital management, capital optimization and capital growth. Most importantly, the capital discipline lessons learned over the last couple of years need to stay front of mind and continue to be embedded in robust investment appraisal processes, regardless of where we sit in the cycle.

Capital access: Access to capital remains a critical challenge for junior miners. For many juniors and explorers, little has changed over the last 12 months, and they remain cash-starved and focused on survival. The juniors are still subject to widespread investor risk aversion which is impeding their ability to raise equity. Consequently, cost and capital management remains essential. M&A will continue to play an important role in financing the junior sector, albeit on a selective basis. Acquisitions (minority or full takeover) or consolidation to pool resources may be the only realistic growth or exit option for many. For many early-stage companies, the only available scenario is to halt exploration, lay off staff, close premises and maintain only skeletal operations – a form of "corporate-induced coma".

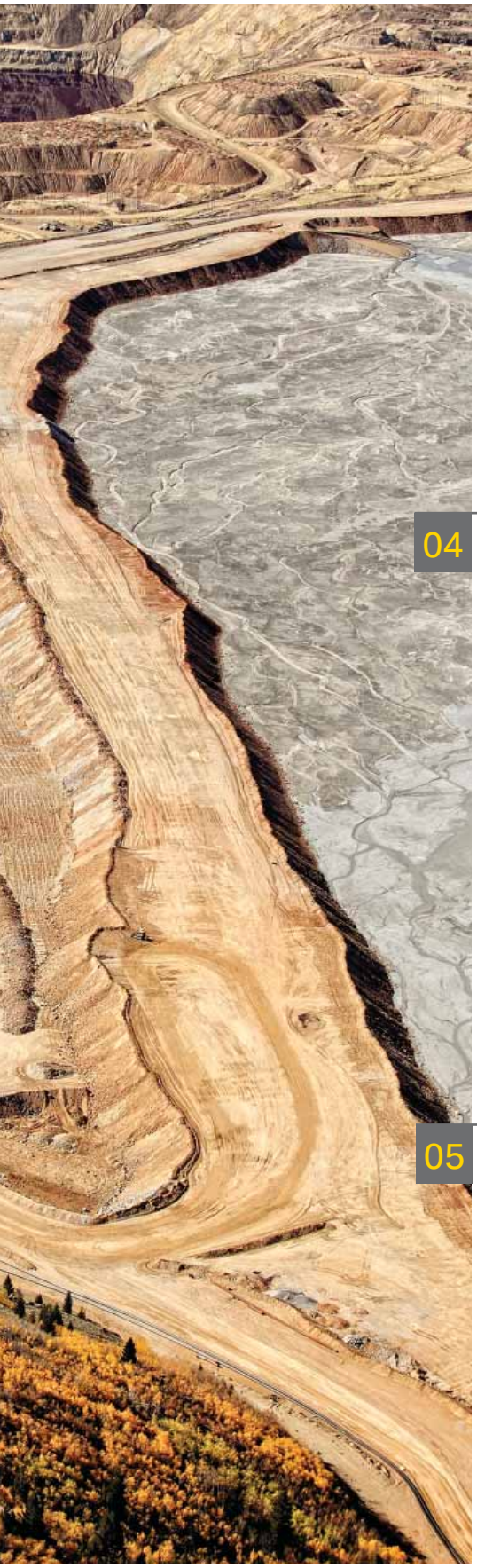
Social license to operate – walking the talk with your stakeholders

03

Losing a social license to operate (SLTO) is a very real and potentially very expensive risk to a business. Research shows that community conflicts over environmental and social concerns can incur costs up to US$20m a week in lost value for large-scale operating mines.[1] The challenge for operators is balancing immediate stakeholder demands and the inherent value in being a socially and environmentally reliable operator with

1. "Cost of Company-Community Conflict n the Extractives," Harvard Kennedy School, 2014.

for mining and metals



controling costs, lost production time, reputational damage and overflow impacts to other operations.

An additional challenge to an operators ability to gain acceptance is the increasing volume and variety of stakeholders plus a broadening definition of what it means to have a social license to operate now that the concept has entered popular psyche. With growing public understanding of the wider impacts of extractive industries plus improved ability to access and disseminate information through technology, miners need to address criticisms and concerns about their operations on more fronts than in the past.

Of course there remains an obvious wider economic benefit in accepting these challenges. Miners have the opportunity to help create opportunities for social and economic growth through their investment into infrastructure, power and utilities, support for local businesses and contributions to schools, hospital and related social services. This is a very powerful win-win opportunity to help sustain the community long after the mine is closed, in addition to being a fair recompense for the value the company derives from being in the community. Companies with the foresight to pre-empt, acknowledge and address community concerns stand in better stead than those that wait for stakeholders to raise concerns. After trust is broken, support can almost never be bought off.

04 Resource nationalism – advancing and retreating

The new world of resource nationalism is a balancing act between promoting investment and maximizing in-country benefits. With shrinking investment, some governments have begun to promote initiatives to attract mining investment into their jurisdictions. At the same time, despite declining commodity prices, we are still seeing waves of resource nationalism by countries keen to gain a greater share of shrinking returns from the mining and metals sector. The most dramatic example of recent resource nationalism activity has been mandated beneficiation and state ownership. Mandated beneficiation is very popular politically as governments seek to extract greater value from their resources by mandating that minerals are processed in-country prior to export. However, the long-term fallout of this policy is unclear, and it can swing either way: significant investment can occur in downstream investment if the country invests to create competitive advantage or mining moves elsewhere. Greater state ownership comes from the desire to take direct equity exposure to mining investment development and production.

Mining and metals companies need to continue to educate governments on the impact of resource nationalism on investment decisions, whether that is taxes, use-it-ot-lose-it or in-country processing requirements. Companies need to continue to demonstrate effectively the benefits of mining and metals to the broader community and enhance the understanding that raising the cost of doing business may scare away investment and jeopardize those benefits for the government and the community.

05 Capital projects – delivering value in the next wave

As new supply requires increasingly complex and large investments, the failure to keep them on time and on budget can cost a company their reputation and future ability to invest. Calls for greater capital discipline and greater return on capital deployed in the last two years ushered in an era of caution and restraint in capex. Numerous high-profile projects have been scrapped, shelved or sent back to the drawing board for replanning. Although total investment in the sector may have peaked, it must still deliver value on a large number of committed projects worth a record US$791b of investment, as of December 2013.[2]

2. "E&MJ's Annual Survey of Global Metal-mining Investment," *Engineering and Mining Journal*, 6 January 2014, http://www.e-mj.com/features/3674-e-mj-s-annual-survey-of-global-metal-mining-investment.html#.U6AlmPmSx1Y, accessed 5 April 2014.

The next wave of projects are currently being planned – although quietly as the capital markets are highly resistant to new spending initiatives. Therefore, their success can provide a competitive edge and enhance an organization's enterprise value. Governments and local communities have a keen interest in such projects as they have the potential to drive a region's economic development.

Consequently, high levels of transparency and assurance will be required to ensure that these projects can be delivered on time and on budget. Shareholders, capital providers and other stakeholders will all demand it. With a new understanding of better practices around these projects and knowledge of the consequences of bad management, it will be time for management to start putting these practices in place.

06 Price and currency volatility – diving for cover or riding the wave

Companies are now experiencing a time of extreme volatility created as the market tries to return to equilibrium following years of price stimulus which encouraged new supply. Mining and metals companies now realize that they can't sit on the sidelines and wait for the volatility to pass as it will continue for a number of years. Working in volatility is the new normal and companies need to adapt. Primarily they need to place more emphasis on volatility risk management. The rise in volatility has also been accompanied by the increase in availability of derivatives that can be used to manage these risks.

As the sector becomes more customer-focused, they are responding to customers who want to avoid this volatility. Changes in customer buying preferences have impacted the way in which this volatility has been tolerated by companies, with many customers seeking suppliers that can provide greater price certainty. As such, they are either directly or indirectly entering the derivatives markets to hedge those inputs. Many companies can appropriately incorporate physical and derivative trading into their core operations. Some of the larger producers are referring to this as a "revenue enhancement" strategy as they seek to extract some of the option value created by volatility and their naturally long position. This mirrors the convergence of traders that are increasing their exposure to commodity production.

We expect continued volatility in the sector in the medium term because of increased regulation, divergent central bank policies, geopolitical risk, provision of credit to traders and the withdrawal of banks from commodity markets. Living with volatility for long periods of time requires mining and metals companies to build in coping mechanisms that guard against the negatives of volatility, while taking advantages of the opportunities that only present themselves during this time, such as flexibility in varying levels of production.

07 Infrastructure access – A new world of ownership and financing

Current stakeholder attitude around infrastructure financing, ownership and access is leading to more fragmentation of the interest they have and the roles they may play in future infrastructure projects. In some cases, the cost of developing the infrastructure is almost 75% of the total project cost. Developing large infrastructure projects requires coordination among a number of stakeholders, such as users (miners, communities), government(s) and capital providers (financial institutions, customers). The divergent priorities of these stakeholders make it difficult:

- Mining and metals companies want integrated mining and infrastructure which ensures control of infrastructure but does not lower their return on capital employed (ROCE) by using their own capital
- Governments prefer infrastructure to be developed on a shared-use basis to ensure maximum economic benefit
- Capital providers want commensurate returns from risk taken in the project but avoid commodity price risk and construction risk

The trend is toward shared access and shared value.

We see innovation in financing, and a change in the ownership model and the operation of infrastructure, as a large number of future projects will consist of a cluster of mines rather than just a single large-scale mine.

Companies should view infrastructure development from a sustainability perspective in that it provides social and economic benefit to local communities and businesses. Infrastructure development leads to monetization of otherwise stranded deposits and has a multiplier effect on the region.

08 Sharing the benefits – managing expectations through the commodity price cycle

Carving up benefits of mining and metals is the reality, ensuring all stakeholders see it similarly based on relative contributions is the challenge. Recently, some stakeholder demands, such as those of suppliers and governments, have largely rebalanced as it has become clear that companies are grappling with reduced profitability. However, other stakeholder demands lag economic reality. Companies that do not effectively manage the competing needs of stakeholders (governments, communities and employees) run the risk of damaging their corporate reputation, enduring project approval delays, runaway costs and being subject to protests or violent opposition, and accelerating the move away from a mineral rights ownership model.

Managing multiple stakeholders can be done through embracing a multi-stakeholder model, communicating a broad view of shared value and benefits, and owning transparency and accountability. As commodity prices recover, mining and metals companies need to work to build credibility and trust with all stakeholders now to manage how these increased benefits are best shared. Transparency initiatives will be part of this and are being enacted in the EU, the US and elsewhere.

09 Balancing talent needs – a two-needs economy

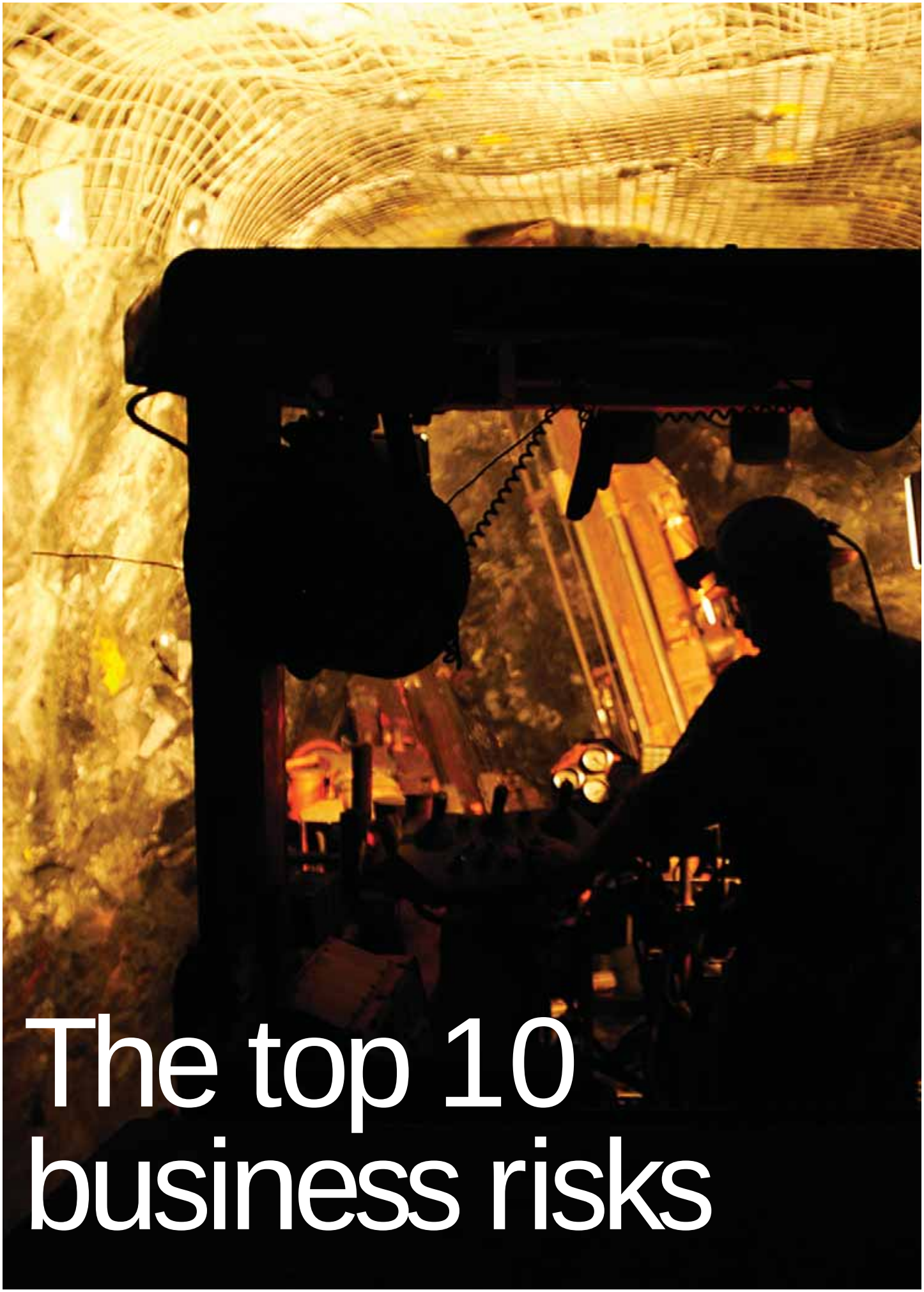
The nature of the risk has changed and is focused more on skilled than unskilled workers. With the increased focus on improving productivity and a move toward automation, mechanization, data analytics and contract negotiation, there is an increasing level of sophistication in the operations of mining and metals projects and the skills required. In addition, there has been a more proactive approach toward stakeholder management that has seen the introduction of roles, such as government relations and community engagement. Finding the right people to fill these roles is compounded by the high rates of employee turnover in the sector and the time it takes to fill jobs at middle and senior management.

The skills shortage risk has become more complex and is no longer a universal concept across the sector. It is now a matter of balancing the needs of an advancing industry against the skills that exist and investing in those of the future to avoid it becoming acute in the next cycle. A solution to the issue is beyond the control of an individual company, and it requires industry participants to think whole-of-sector when investing in future skills pipelines. The key is to learn from the last upswing and plan ahead, using a more holistic framework that involves all stakeholders.

10 Access to water and energy – competing or depleting

Accessing water and energy is an essential part of operations for mining and metals projects, and is becoming increasingly difficult. Companies are up against unreliable power supply from the grid and rising energy costs. In emerging and frontier countries, the risk is amplified as companies compete with both governments and communities for these scarce resources, with failure to manage a mine's use of water and energy likely to jeopardize the industry's SLTO.

Managing costs sustainably is a priority. As the cost of renewable energy declines and conventional energy increases, the mining and metals industry will increase its reliance on renewables. The shift toward a resource-efficient and low-carbon operation can ensure community acceptance, but this will come as the economics are proven. Water scarcity is an issue that demands a strategic and practical response from businesses to develop and implement solutions to benefit all stakeholders. This means assessing dependence on water and future supplies, and developing plans to cope with increased prices and possible shortages.

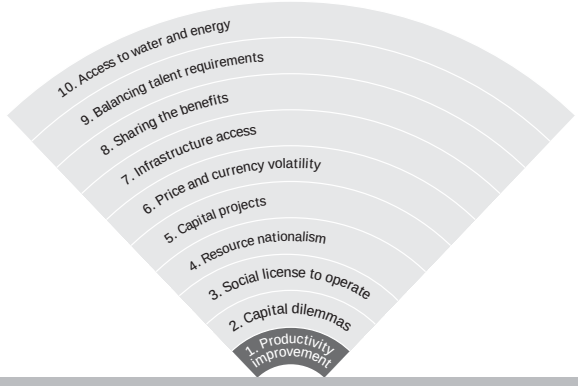


The top 10 business risks

01

Productivity improvement

(2 in 2013)



Key thought

The size of the problem is too large for conventional solutions to work. Real productivity gains will only come from a whole-of-business, end-to-end transformation. A narrow focus on point solutions or continuous improvement won't solve the problem and could even be counterproductive.

A case for broad transformation

Productivity has been declining significantly in the mining industry over the past decade. This was a conscious choice by industry participants to pursue volume at any cost during an unprecedented boom in commodity prices. Mines were developed to get product out as quickly as possible, not as efficiently as possible. Many companies have been dealing with this substantial drop-off in productivity through a series of cost-cutting exercises or point solutions. However, the size of the problem is too large for point solutions to solve on their own as they often have the effect of simply moving the problem further down the supply chain. We believe that real and sustainable productivity gains will only come from broader business transformation.

Why the need to boost productivity?

- To regain ground lost over the supercycle: To remain competitive now that supply exceeds demand for many minerals, miners need to readdress inefficient practices that crept in during the last growth cycle. Behavioral change will be a large component of this, given many mine managers, engineers and operations supervisors have never operated in a margin-constrained environment.
- To continue to innovate to recover lost competitive advantage: Many miners recognize that during the supercycle very little investment was made in research and development and now that commodity prices are at all-time lows, there is a realization that investment in innovation is key. We are already beginning to see signs of this. For example, AngloGold Ashanti's new boring technology which CEO Srinivasan Venkatakrishnan says is "a game changer, or a paradigm shift. If we do nothing, the gold industry is in terminal decline." Also, many mining economies (such as Australia, Chile and South Africa) have relied on currency movements to retain comparative advantage. Exchange rates have generally been positively correlated to metals and mineral prices; however the massive quantitative easing that central banks have used to reboot economies has upset this relationship. With lower prices and stubbornly sticky exchange rates, producer countries have begun to lose their comparative advantage, and hence producers in these countries need to innovate to become more competitive and to reach new levels of productivity.
- To counteract rising real wages: In the developing markets, low-cost labor gave miners a comparative advantage in the past. With both the strengthening of unions, and the skills shortage of the past decade, increases in real wages have significantly exceeded the rate of inflation in these markets, and without significant productivity gains, mine plans of many operations will no longer be sustainable in these markets.

What's the size of the problem?

Productivity is often ill-defined as more output for fixed input, or the same output for less input. In our opinion, productivity gain should be measured as a form of optimization, i.e., the highest ratio of output to input, which could in fact mean achieving higher productivity and hence profitability with lower input.

Over the broad spectrum of different mining operations, it is difficult to define the size of the productivity problem. To overcome this, economists typically measure productivity across a range of factors referred to as multifactor productivity (MFP). The Australian Bureau of Statistics measures MFP as output per unit of combined inputs of capital and labor in conjunction with other technological and organizational factors, which show mining productivity (in Australia) has declined by roughly 50% since 2001.

What makes matters worse is that this decline has been over a period when we have seen:

- Great improvements in equipment technical efficiency and reliability
- Investment in the sector by original equipment manufacturers (OEMs)
- Engineering advancements in the sector

Labor productivity has been declining in both developed and emerging markets. Some of this decline can be attributed to the inadequate skills mix brought on by the skills shortage in the boom time, but also by the real wage increases which have exceeded inflation rates in many markets.

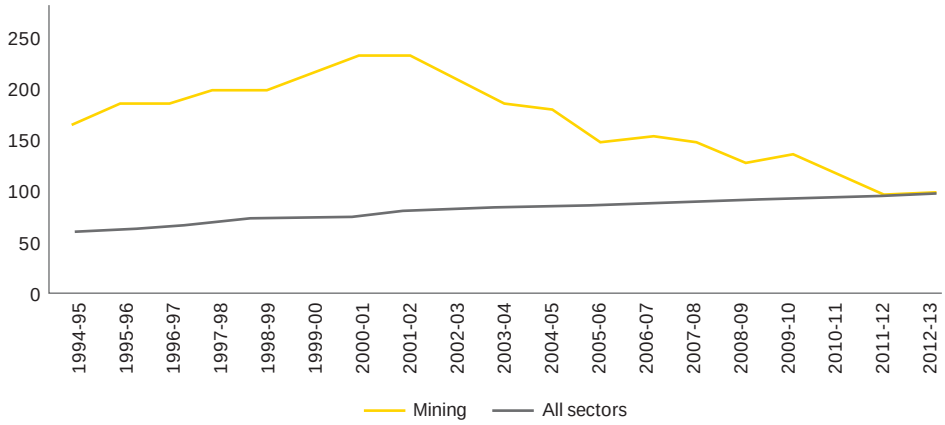
Capital productivity is clearly impacted by the long lead times between investment and production, but has also been affected by factors such as ineffective portfolio management, issues with capital allocation decisions, poor training and skilling of operators, and poor project execution causing schedule delays and cost overruns.

The burning platform – a need for broader transformation

Given the cyclical nature of the mining industry, economists will say that the decline in productivity will correct itself. At a macroeconomic level, this may be correct as macro factors will assist, particularly as commodity prices normalize and as new capacity and projects come on line with greater technology. However, individual producers in the sector cannot afford to wait – ultimately, those who cannot keep up will go out of business.

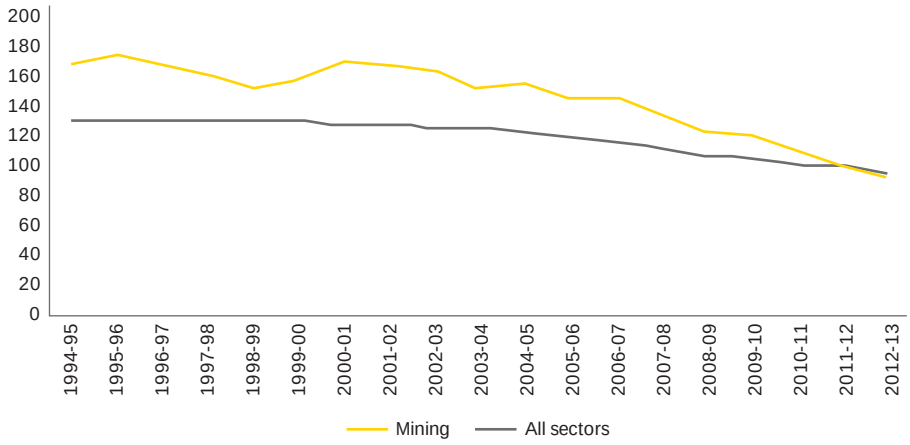
As efforts to improve productivity have failed to get the right results, the productivity issue has rightly been escalated to the CEO's agenda. The supercycle lasted for so long it had the impact of altering the DNA of mining companies to adapt the processes, performance measures and culture solely toward growth. The size and scale of the problem is too large for conventional single point solutions to work. To attain the improvements needed for sustainable productivity gains at profitable growth levels requires broad business transformation.

Mining labor productivity in Australia declined by roughly 50% since 2001



Source: Australian Bureau of Statistics

Capital productivity also in a dramatic decline over the same period



Source: Australian Bureau of Statistics

What does broad transformation mean?

New ways of thinking need to be considered to analyze and assess the level of improvements the industry needs. This involves having one view of the world:

- A clear strategy based on a broad set of value drivers
- An operating model that is aligned with the strategy
- Integration and alignment across the value chain through process integration
- Standardization of work procedures
- Aligned planning, budgeting and performance measurement

Real and sustainable productivity gains require a holistic, top down approach that aligns productivity activities to their strategic value and contribution, and they need to be planned and executed in a coordinated way across the value chain. It is critical that all the systems, processes, interfaces and interlinks are well understood so informed decisions can be made. There is a need for a focus on longer-term initiatives, which, while harder to execute, will have more impact on improving overall productivity as shown below:

The most successful companies in addressing the productivity challenge have the following traits:

- Are bold and not incremental
- Have a long-term vision and plan
- Take an end-to-end view
- Look for broad solutions
- Eliminate silos
- Align objectives to strategy
- Set consistent performance measures for productivity that create value
- Address the behavioral and cultural settings necessary for sustainability
- Learn from history, but be open to innovation
- Are deliberate in planning and executing their initiatives

We believe that to really address the productivity issue requires a whole of business or end-to-end focus. This will drive a multifunctional response to problems, break down silos and ultimately deliver unprecedented productivity improvements. It's about the systems and processes, it's taking a holistic view of the different parts and how they fit together. This isn't as easy as it sounds. Typically, the information and data needed to bring about this understanding is spread across the organization and differs greatly in terms of:

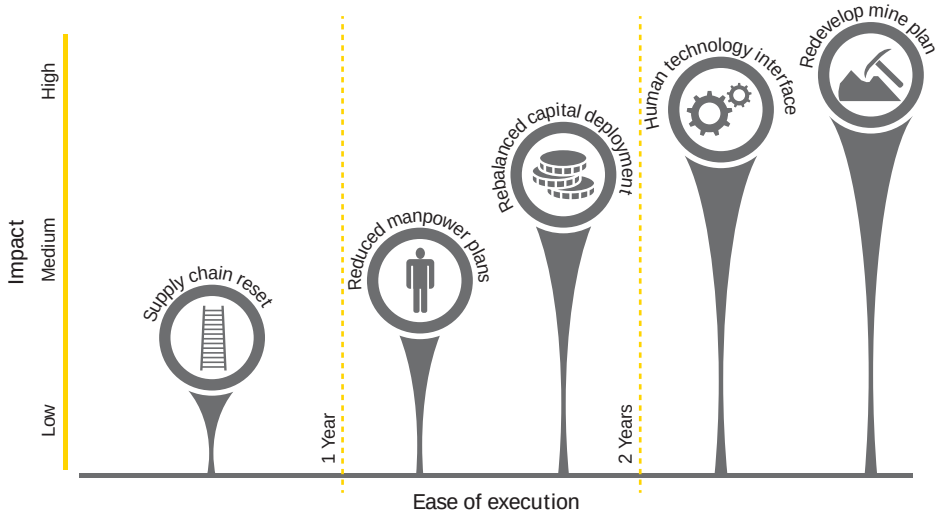
- Volume – how much data
- Variety – the type of data
- Veracity – how much it can be believed
- Velocity – how quickly it is generated

Many organizations are struggling with each of these measures, and in particular lack the means to cope with the sheer scale of data flowing into the business and with the diverse nature of structured and unstructured data.

Considerations

- Are you improving or transforming?
- Are your initiatives adding to the long-term bottom line or just moving the problem?
- Are you thinking about the problem conventionally or with a value chain view?
- If you are considering achieving higher productivity with lower input, do not forget to consider the impact on cash flow and profit. Reducing output may boost certain productivity measures but may negatively impact, e.g., ROCE.

Need for a long-term focus



02

Capital dilemmas

(1 in 2013)

Key thought – Dilemma A

Collectively, the majors have shown tremendous commitment to capital discipline over the last 12 months, positioning them well for future growth. While this discipline is expected to continue, the questions they now face are what form the next phase of investment will take and when shareholders will begin agitating for management to execute on it.

Diverging and unique challenges

The twin dilemmas of capital access and capital allocation encapsulate the diverging fortunes of the industry's producers and juniors in 2014. Much like the economies of many developed nations today, the wealth gap appears to be widening, and in turn, the nature and severity of the prevailing risks.

Capital allocation is fundamental to the majors throughout the cycle, but steady progress has been made along a journey of capital management and optimization following a spate of asset write-downs in 2013. However, for many juniors and explorers, little has changed over the last 12 months, and they remain cash-starved and focused on survival. Many are existing in the corporate equivalent of "suspended animation." This has provided opportunity for the funds forming around the sector, however, their challenge is not necessarily the access and availability of capital, but the strategy around deploying this capital.

Dilemma A: Capital allocation

The capital allocation dilemmas have fallen from last year's top spot, reflecting progress made during the year in addressing this challenge. Companies have begun to embed improved processes and methodologies into strategy and risk management; confidence is tentatively being restored and results are being delivered. However, this is not to undermine the enduring criticality of the challenge. Effective capital allocation should not be a singular reaction to changed market conditions, but a continuous cycle of review and action that informs strategy and impacts all areas of the business. A renewed focus on ROCE will be with the sector for many years to come.

Capital transformation

We see the sector now at various junctures along a path of capital transformation, one that can broadly be divided into three stages: capital management, capital optimization and capital growth. Progression along this path is sequential but dependent on sustained success at each stage. Each stage increases optionality. So, how far have we come?

Stage one: Capital management

In the wake of weaker prices and shrinking margins, the industry has refocused its immediate attention on capital management and discipline – increasing financial strength and flexibility through deleveraging and margin improvement. This has been achieved to a large degree through:

- Closing high-cost operations
- Growing productivity-led volume with a focus on higher-margin operations
- Reducing cost base through cutting of opex budgets and offshoring/outsourcing
- Refinancing existing debt to push out maturities and reduce cost of capital
- Rebasing budgets for sustaining or maintenance capital expenditure

A comparison of FY 2013 and FY 2012 balance sheets indicates the extent to which they have been restored to relative health in the last 12 months. Gearing among the major diversifieds has decreased, while cash flow coverage appears to have improved for both major and mid-tier producers.

	Major diversifieds			Mid–tiers		
	2012	2013		2012	2013	
EBITDA US$b	66.3	75.7	14%	12.8	11.7	-9%
Net debt US$b	80.8	83.8	4%	34.3	36.2	6%
Cash from operations US$b	49.5	61.2	24%	10.0	10.9	9%
Capex US$b	61.4	52.1	-15%	19.4	12.2	-37
Dividents US$b	11.5	11.4	-2%	1.2	0.9	-25%
Net debt/EBITDA	1.22	1.11	▼	2.7	3.1	▲
Cash from operations/capex	0.81	1.17	▲	0.5	0.9	▲
Cash from operations/dividends	4.29	5.39	▲	8.2	12.0	▲

Source: EY, S&P Capital IQ

In a further sign of improving financial health in the industry, the number of Standard & Poor's (S&P) credit rating downgrades in the sector has reversed its course, with two consecutive quarters of decline from a 4Q 2013 peak. While widespread upgrades are unlikely, S&P has assigned 70% of its rated mining and metals universe a stable outlook – implying limited likelihood of imminent ratings downgrades in the absence of major price shocks or unanticipated surges in capital spending. However, despite this, continued price weakness, such as we are seeing in iron ore in 2014, could threaten credit metrics and cause investor confidence to diminish in tandem with the scope for major capital returns. Not surprisingly, the most significant progress made in balance sheet repair has been achieved by the major diversifieds, which are now largely focusing their attention on stage two, capital optimization.

Stage two: Capital optimization

Capital optimization remains the core focus of the major diversifieds in 2014, via a disciplined, returns-focused approach to the portfolio of existing and future investments. Such an approach is essential to earning back the trust of shareholders, who have been vocal in their criticism of capital discipline through the most recent commodity cycle.

The majority of companies have undertaken portfolio reviews, identifying opportunities to release cash, reduce capex and raise average returns across the portfolio. Simplification – eliminating complexity – has become today's mantra: BHP Billiton points to its four pillars (plus one), while Anglo American has highlighted the scale of the challenge ahead, with 31 of its 69 assets delivering only 2% of EBIT.[1] More than US$6b of divestments were completed by the top-five miners in 2013 (in a difficult transactions environment), with more to come in 2014 and beyond. However, with balance sheets being stronger on the back of focused capital management, the burning platform for such divestments has gone away and management can afford to focus on achieving the optimal exit for assets deemed to be outside of the core portfolio. Despite the progress, we believe there is much left to do here, both in terms of achieving immediate desired outcomes (divestments of non-core assets, increased returns) and in truly embedding a best-in-class approach to portfolio review that:

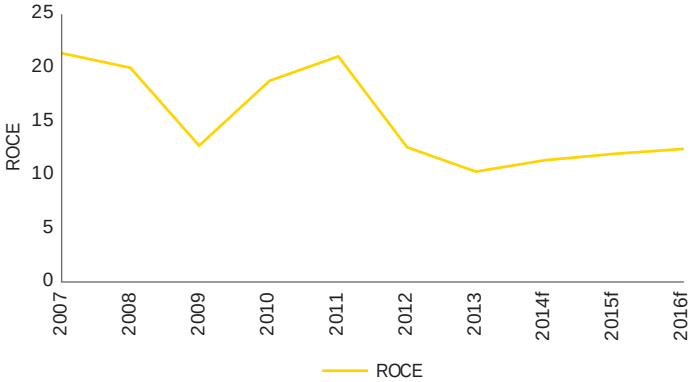
- Embeds consistency of reporting, forecasts and KPIs across business units and delivers outputs in a way that empowers quality decision making
- Is undertaken regularly, to ensure that portfolio performance and objectives are aligned with strategy and flexible to changes in market conditions
- Assesses investment options on an unbiased, like-for-like, holistic basis, recognizing interdependent risks, impact and opportunity costs across business units
- Recognizes and measures the value in optionality
- Achieves efficiency in portfolio composition

Stage three: Capital growth

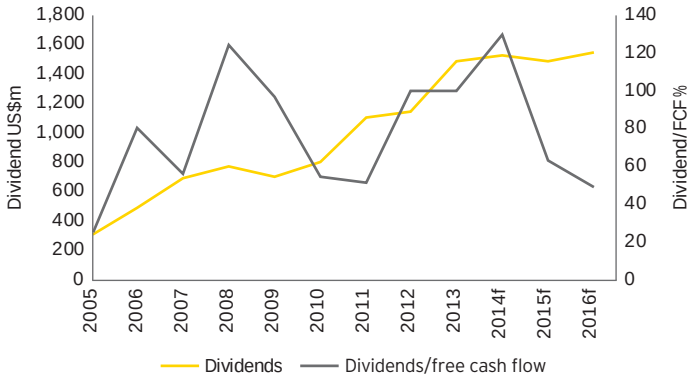
Few companies are publicly discussing major growth ambitions in 2014. However, responsible management must protect and preserve the incredible option value contained in the undeveloped projects of the sector. Growth is being pursued of course, but in a disciplined way, which does not threaten credit rating quality or emerging free cash flow yields. This includes low-risk acquisitions, incremental capex design, debottlenecking investments, volume growth through productivity gains and a tightening of investment appraisal to meet only the strictest investment criteria. Indeed, companies pursuing expansionary growth at full pace, with the full backing of financiers and shareholders, are relatively few and far between. They are typically privately funded, entrepreneurial pioneers

1. "BofAML 2014 Global Metals, Mining & Steel conference, 13 May 2014," Anglo American, 2014.

Historic and forecast return on capital employed



Dividends summary – historic and forecast



Source: S&P Capital IQ; based on a peer group of top-14 geographically diversified mining companies

of promising development-stage assets, pushing ahead to production and attracting the interest of strategic and yield-seeking investors with higher risk thresholds and longer-term investment horizons.

Consensus forecasts anticipate that returns on capital employed by the large producers will not significantly recover until after 2016, while dividend yields will recover more rapidly. But, for how long will short-term yield continue to be delivered at the expense of longer-term capital appreciation? The mining and metals sector will always be cyclical, and responsible companies will seek to invest in growth to meet the next cyclical upswing.

Earning back investor confidence will be crucial to moving ahead in the capital journey. Companies are publicly jostling to present a unique value proposition in an increasingly competitive market – from Glencore's diversification and integration, to BHP Billiton's productivity gains and portfolio simplification, to Rio Tinto's Mine of the Future™ innovation. The common thread is value-focused capital discipline.

Looking ahead: Preparing for growth and identifying the opportunity cost

Regardless of where we are in the cycle, capital allocation is critical to the success of the mining and metals industry, and especially those with multiple assets in varying stages of development.

Recent criticism of capital discipline will gradually be forgotten as higher returns are generated, prices rise to encourage new supply and balance sheets go from strength to strength. While management teams already have an eye on the next stage of growth, we expect external stakeholders to be pushing this agenda – perhaps as early as next year, but certainly as we move into 2016 and beyond.

The success, or otherwise, of private capital being deployed across the sector will influence how quickly the winds of change blow. These buyers arguably have a competitive head start on those constrained by the short-termism of public capital markets, able to bypass stages one and two in this capital journey.[2] A handful of bold acquisitions will certainly bring greater attention to the growth agenda, and a profitable exit by one of these funds will surely highlight that value can be found through the right acquisition. However, a profitable exit is more likely to be achieved if the strategy of the fund is adapted to investing in the mining and metals sector as distinct from the more typical private equity (PE) entry and exit. This adaptation will require an understanding of how to build a business in the sector, rather than simply opportunistically acquiring single assets and getting the timing right.

The major challenge for the funds that are forming around the sector is not necessarily the access and availability of capital, but the strategy around deploying this capital.

Most importantly, the capital discipline lessons learned over the last year or two need to stay front of mind and continue to be embedded in robust investment appraisal processes, surviving changes of CEO or senior management, regardless of where the industry sits in the cycle.

2. For more of our views on this topic, read our "Spotlight – the window of opportunity" in *Mergers, acquisitions and capital raising in mining and metals, 2014 outlook, 2013 in review* at www.ey.com/miningandmetals.

Key thought – Dilemma B

Access to capital remains a critical challenge for junior miners. Given the limited likelihood of near-term sustained price recovery, the return of risk capital to the sector remains out of sight, with severe implications for cash-starved explorers.

Dilemma B: Access to capital

While the major diversifieds continue to enjoy the benefit of strong demand in the corporate bond markets and a marginal re-rating in the equity markets, the juniors are still subject to widespread risk aversion which is impeding their ability to raise equity. Our two junior Mining Eye indices for London's AIM and Toronto remain down 76% and 60%, respectively, on their 2011 highs.[3]

Financial health still hangs in the balance for the single project/single commodity developers and small producers who have significant price risk exposure (for example, iron ore developers). These groups typically sit higher up the cost curve, and the uncertain near-term price outlook and undiminishing supply is providing little comfort to either investors or ratings agencies. Mitigating future price and credit risk requires an approach that improves their ability to respond to rapidly changing market conditions that spread financing risk. Such an approach should include:

- Understanding and mitigating exposure under a range of scenarios
- Reducing capex through incremental project design
- Exploring all financing options (including innovative structures such as streaming and Standby Equity Distribution Agreements (SEDAs))
- Considering strategic partnerships and joint ventures

It is a different picture again for the exploration sector, where limited cash balances are rapidly burned up.

3. As of 20 June 2014.

Miners lag the broader recovery

Global IPO markets got off to a strong start in Q1 2014, with the highest volume and proceeds raised since 2011. But this recovery has yet to extend to the mining and metals sector, with only three IPOs over the equivalent period, raising just US$715m. Moreover, the uncertain metals price outlook remains a drag on the speed of the sector's turnaround, particularly at the more speculative end of the market.

Perhaps, even more concerning is the continuing decline in secondary equity funding. Volume and proceeds raised by juniors in 1Q 2014 declined 14% and 10%, respectively, from an already subdued 4Q 2013. Average proceeds raised were just US$2.4m, with over half of the ca.500 issues raising less than US$1m. The inevitable response by explorers is to scale back exploration activity: The Metals Economic Group reports that the number of prospects reporting drilling results was at just 56% of last year's equivalent, on top of an even greater decline (62%) on 1Q 2012.[4] Combined with the widespread exits from exploration by the majors, the long-term future supply pipeline looks increasingly under threat.

Looking ahead: Back to basics

Despite the improving sentiment toward producers with the prospect of increasing free cash flow yields in sight, we see little likelihood of a broad-based recovery in junior mining share prices or capital availability as 2014 closes out. Price downside should be limited, with many commodities trading close to or below cost levels, but without the support of a sustained price improvement, investors will see little incentive to take on additional risk. Consequently, cost and capital management remain essential.

4. "State of the market: mining and finance report," *SNL Financial*, Edition 2, 2014.

Smaller companies also have an opportunity to exploit their innate flexibility by seeking innovative means of gaining competitive advantage and curbing high capital costs – for example, through partnerships with providers of emerging technologies that address the unique technical challenges faced when operating in geographically and logistically remote locations.

Consideration: Tactical partners and strategic buyers

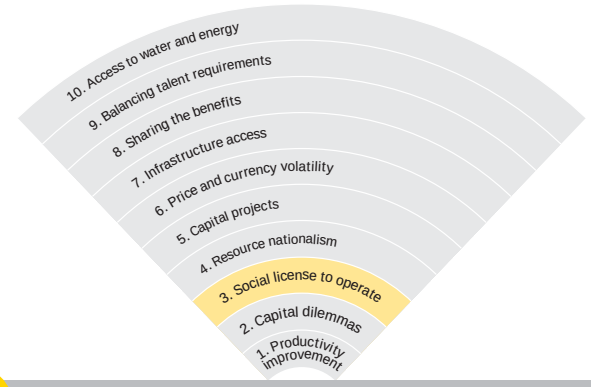
M&A will continue to play an important role in financing the junior sector, albeit on a selective basis. But with many of the majors turning their attention from exploration to production efficiencies, traditional partners may be harder to come by, and "non-traditional" state-backed partners potentially more complex to work with. Juniors will be reluctant to sell while share prices remain depressed, but acquisitions (minority or full takeover) or consolidation to pool resources may be the only realistic growth or exit option for many.

For many early-stage companies, the only available scenario is to halt exploration, lay off staff (who may never return to the sector), close premises and effectively go into care and maintenance mode to preserve the project option value. Just enough dilutive capital is being raised to provide life support (as little as US$50,000 is not uncommon). What they are hoping for is that prices will recover, encouraging risk capital back to the market. But this vital injection of capital is unlikely to occur during the remainder of 2014.

03

Social license to operate

(4 in 2013)



Key thought

There is a significant opportunity that exists for organizations to make a positive contribution to the broader society by integrating the activities required to obtain/maintain a social license into the strategic plan of a more sustainable business.

Walking the talk with your stakeholders

An organization cannot rest on its laurels, nor assume that acceptance provided by the community and its stakeholders will always be maintained. Even those that have a relatively high SLTO are not guaranteed that it will cross over to new operations or into other regions. Such is the recent experience of Barrick Gold at Pascua Lama and Newmont's Conga project, for example, where community protests have caused indefinite delays to multibillion dollar projects.

The risk of losing a license to operate must be constantly assessed, ensuring the right controls are in place. A failure of the controls can quickly put an organization into crisis, with significant financial and reputational impacts to the business. More importantly, it can also take a long time to restore the credibility required to regain acceptance by stakeholders, resulting in further delays and impacts.

As part of providing acceptance, local communities and broader stakeholders expect that an operator will act responsibly, deliver on their commitments and provide an equitable share of the benefits that the operation generates. Operators need to acknowledge concerns such as equitable land access, environmental damage and the ongoing impact of large multinational companies on local economies. Similarly, they must continually address employee concerns about health and safety, wages and benefit, job security, imported labor and mechanization.

Protests, negative media coverage, violence, sabotage and other direct attacks on the business and its employees are all signs that a company is not an accepted part of the community. We have seen in the aftermath of the tragic Turkish mining accident, where 282 lives were lost, how questions over mine safety and consequent community outrage quickly damaged the reputation of host governments, mine operators and more broadly the sector in Turkey.[1] Recently too, the community and environmental activists blocked trains accessing the Maules Creek coal project in New South Wales, Australia, attempting to stop development because of alleged threats to the local bushland and allegations of corruption in the approval process.[2]

Not having a SLTO is a very real and potentially very expensive risk to a business. Research shows that community conflicts over environmental and social concerns can incur costs up to US$20m a week in operating expense for large-scale operating mines.[3] The challenge for operators is balancing immediate stakeholder demands and the inherent value in being a socially and environmentally reliable operator.

Complication: Impacts of SLTO being adopted outside the extractive industry

Social license to operate or SLTO is a term coined by Jim Cooney with specific reference to the mining industry.[4] An emerging issue for mining and metals companies trying to obtain or maintain an SLTO is the evolution of the definition and the stakeholder base, as industries outside of extractives adopt the term. Companies are now obtaining and maintaining their "social license" in an increasingly broad variety of ways, creating differing levels of understanding of what stakeholders should expect to receive in order to gain their acceptance.[5] As the concept is now firmly

1. "Turkish tensions flare as mine rescue hopes ebb," *The Wall Street Journal*, 15 May 2014.
2. "Maules Creek protest at Kooragang Island," *Newcastle Herald*, 11 May 2014.
3. "Cost of Company-Community Conflict n the Extractives," Harvard Kennedy School, 2014.
4. "Corporate Social Responsibility – The Social Licence to Operate a Mine," *International Resource Journal*, November 2012.
5. "What gives you a social license? An exploration of the social licence to operate in the Australian mining industry," *Resources*, January 2014.

established in the general public and business psyche, a growing number of stakeholders beyond local communities and their unique interests are demanding attention.

Influential groups not considered to be traditionally part of the local community are mounting concerns over unsustainable mining practices, dwindling resources (particularly water) and climate change. This has resulted in vocal anti-mining sentiment, particularly toward large multinational miners. Ethical investing is on the rise, with socially conscious buyers considering a company's social and environmental impact while taking an investment decision. Disclosure of upstream business relationships (particularly relating to conflict minerals) is increasingly being demanded as buyers seek to distance themselves from any associated human rights abuses. Likewise, customers are increasingly demanding to know that products are ethically and sustainably sourced and refusing products without clear provenance.

The risks in not obtaining acceptance by anyone of these stakeholder groups include lost potential investment streams, supply chain and customer base challenges, and of course, reputational damage. This places an even greater obligation on company leaders to be proactive and concentrate on the big picture while developing their own policies and practices and managing the expectations of this wider set of interests.

Complication: Developing communication strategies for effective stakeholder engagement

The methods for engaging with stakeholders continue to expand at a rapid pace, thanks to technology. Communities in developed regions rely more than ever on electronic and social media content to form their opinions. Social investors and supply chain stakeholders are highly sensitive to press scrutiny and rely heavily on the strength of a company's non-financial corporate social responsibility reporting to determine buy-ins. Additionally, these stakeholders have access to a growing bank of global knowledge on economic and environmental impacts with the means to test company-produced information. Although this has increased the number of forums that need to be monitored and responded to, proactive companies now have the opportunity to consider these new channels as efficient and meaningful ways of engaging with the community.

There is also renewed attention on the challenges faced in trying to obtain free, prior and informed consent (FPIC) within traditional communities. There is greater awareness of culturally specific methods for what constitutes respectful engagement, class and gender structures that may not enable the breadth of consultation assumed in other regions. This creates a very complicated environment to achieve a social license, and it increasingly requires active engagement with human rights-based non-government organizations and other advocacy organizations to bridge the cultural gap. Early, ongoing and open dialog (i.e., on-site, in local language) with community groups is increasingly important to establish and maintain credibility, and avoid accusations of inadequate consultation with local stakeholders.

Complication: Maintaining good and equal governance across different environments

As mining and metals companies increasingly look into frontier and emerging economies for investment opportunities, there is a risk of not obtaining or losing their SLTO by their perceived association with poor governance in politically and socially unstable economies. While developed nations enjoy varying degrees of legislative and compliance requirements to offer basic assurances that community impacts are being considered, in many regions, communities are not well represented by governments, particularly those that have not established sophisticated human rights, environmental and economic frameworks. Miners can quickly get embroiled in accusations of corruption, bribery and human rights abuses when operating in countries with less stringent controls.

Increasingly too, illegal or unlicensed mining in some countries is impacting the social license of legitimate businesses. There are regular reports from Colombia of major accidents and loss of life in small-scale, artisanal mines. In Mexico, there are also

reports that drug cartels and organized crimes are affecting legal mining activities, through theft, threats, extortion and the intimidation of employee and local communities. This makes it even harder for legal companies to maintain a social license because locals often don't make a distinction between the activities of legitimate and illegitimate mining.[6]

This places pressure on global industry leaders to be self-driven in managing both positive and negative community impacts in gaining community acceptance. Lack of comparable local legislation does not negate the need to be vigilant, especially for large foreign companies whose reputation abroad is also a key factor in obtaining or maintaining their social license.

Outlook

As the SLTO concept continues to evolve, the dialog between companies and the widening range of stakeholders will need to become more robust. Expectations on mining and metal companies will continue to increase, and their responses will need to become more sophisticated, including improved monitoring of impacts and demonstration of shared value.

We expect to see increased activity from governments trying to bridge the gap between community expectations and company practices, potentially merging features of the informal license with more formal ones. Lease agreements, for example, will likely include expectations for local services and infrastructure, commitments to indigenous employment, utilization of local suppliers, resource self-sufficiency and labor regionalization. We are already seeing evidence of this in requirements for water access and waste management. Of course, there is also the risk that once these new needs are met, expectations may be raised even further.

Consideration: Wider economic benefit

While the financial value of a SLTO has been made abundantly clear, it is also important to consider the obvious wider economic benefit. Miners have the opportunity to help create opportunities for social and economic growth through their investment into infrastructure, power and utilities, support for local businesses and contributions to schools, hospitals and related social services. This is a very powerful win-win opportunity to help sustain the community long after the mine is closed, in addition to being a fair recompense for the value a company derives from being in the community.

Cost of community conflict

- Missed sales
- Damage to reputation as a reliable supplier
- Absorption of senior management's time
- Lost productivity
- Damages
- Increased security costs
- Costs of settlement
- Difficulties in recruiting talent

Consideration: Proactive and leadership

The more enthusiastic companies are in pursuing a positive social license going forward, the more credibility they will obtain with stakeholders. Proactive contribution to development in global guiding principles will also stand resource companies in the best stead to make incremental changes to their own policies and practice as well as strengthen their reputation among stakeholders. Similarly, companies that actively navigate through this issue on an ongoing basis will be seen as dynamic industry leaders. They will attract a higher caliber of socially innovative recruits and sophisticated investors, not to mention become an operator of choice within a community.

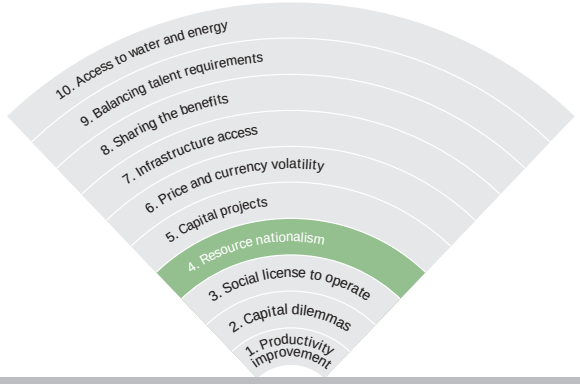
While there are no set guidelines on what steps a company need to take in order to obtain or maintain its SLTO, it is increasingly clear that very early engagement in employing a collaborative, trust-based model that includes effective engagement with stakeholders will achieve a greater level of credibility, a stronger sense of legitimacy and acceptance, and a healthier legacy than anything a formal license can offer. This early engagement can also include limited support activities directed at local needs, demonstrating commitment to the local community.

6. "Cartel culture – Mexico's war against illegal mining," *Mining Technology,* 27 May 2014.

04

Resource nationalism

(3 in 2013)



Key thought

The new world of resource nationalism is a balancing act between promoting investment and maximizing in-country benefits.

Advancing and retreating

Resource nationalism over the past year has brought with it a mixed bag of good and bad news for mining and metals companies. Despite declining commodity prices, we are still seeing waves of resource nationalism by countries keen to gain a greater return from the mining and metals sector. At the same time, with shrinking investment, some governments have begun to promote initiatives to attract mining investment into their jurisdictions. There is also a growing trend of increased transparency in the sector.

Retreating resource nationalism

Current low margins and high-supply environments mean many projects are being cut and/or operations have been put on care and maintenance. With fewer expansionary projects advancing, competition to attract those that will invest is intensifying. In the first half of 2014, many countries have changed their mining tax policies to attract mining investment. These changes to resource nationalism include privatizing state-owned assets (Kazakhstan), amending mining codes to be more investor friendly (Mongolia and Kyrgyzstan) and reducing export taxes (Vietnam).

Geology will always be foremost in the decision of where to invest, but the political environment in a country of investment is also important. Any government promoting tax policy stability will be favored as miners seek low-risk investments with minimal political uncertainty.

Dilemma: Boosting the economy or scaring away investment?

Resource nationalism is a balancing act for governments between attracting highly mobile investment into the sector and ensuring their countries get the maximum benefit in return. Countries may have a comparative advantage in the extent of their resources, but what else they offer will also make them competitive in attracting investment. Mining and metals companies will be assessing the cost of development and production through their whole supply chain. It may be that a country with similar resources can provide better infrastructure, access to energy or skilled labor, and therefore have the competitive advantage.

The most dramatic example of resource nationalism activity in 2013–14 has been the introduction of mandated beneficiation and state ownership. With depleted treasuries, the use-it-or-lose-it policy has reemerged, with governments threatening to revoke licenses of loss-making projects put into care and maintennace.

Mandated beneficiation

Governments are seeking to extract greater value from their resources by mandating that minerals are processed in-country prior to export. In theory, this will capture more of the value chain as finished products will achieve higher prices. In order to ensure in-country beneficiation, governments are imposing new steep export levies or complete export bans on unrefined ores. Indonesia, for example, has proposed a new export levy of 25% on mining exports in 1H 2014, increasing every year thereafter. The Indonesian Government believes that its proposal will help to develop its mining industry, create jobs, and make it a producer of higher-value finished goods from an exporter of raw materials. Similar measures are also being considered in other countries, including South Africa, Gabon (which is seeking 100% of minerals are processed locally by 2025[1]) and Zimbabwe (where an export ban on unprocessed platinum and chrome will take effect within two years).

It is questionable whether new jobs are indeed created, given technological advancements in downstream processing. In the US, for example, there are 395 downstream processing metals companies employing 19,000 people. Of this, 44% of the smelters employ less than 20 people, with most having an average of 50 employees. This is because the nature of

1. "SEM is organizing panels discussion during the NYFA," *Societe Equatoriale des Mines Media Release*, 28 May 2014.

the function is highly technical and mechanized, and requires fewer employees with higher skill levels.[2]

Mining and metals companies have to weigh up the risk versus reward when investing in countries where downstream processing of minerals becomes compulsory. The capital required in a project will increase, and it also concentrates investment risk in a country which by virtue of this policy could well become a poorer competitive environment. The return on investment decreases as it necessitates greater downstream investment, where there are potentially lower rates of return and greater risks of losses. Anecdotal evidence from a company mining in Indonesia indicates that while they are happy to commit US$500m to Indonesia for a mine, they could not justify a US$1.5b investment for a mine and smelter. The returns would not justify that much exposure to the country.

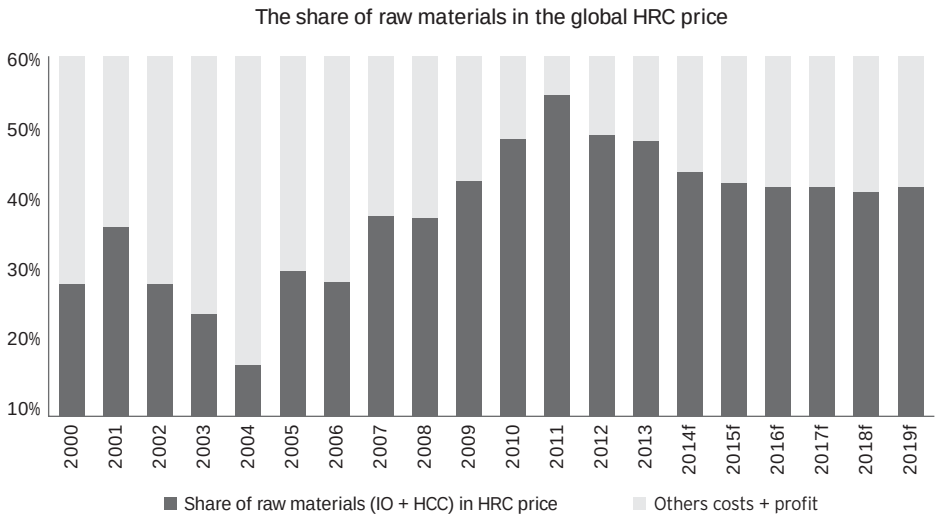
In addition to the high cost of smelters, companies also have to consider the following potential impacts on their risk profile:

- Investors rate mandated beneficiation as high risk and will discount preparedness to invest accordingly
- The need for both low-cost power and infrastructure for beneficiation plants – both of which are often in short supply in many countries
- The need for skilled labor for value-added processing
- Loss of flexibility in global supply chain
- Concentration of investment risk
- Relatively higher taxes on value add
- Threats to existing business models where miners are forced to move downstream
- Increased processing costs lead to increased cutoff grades and reduced life of mine

The concept of mandated beneficiation is very popular politically. It is of little surprise that a number of countries with active proposals also have current year elections. There is a misconception that massive value exists downstream. For example, Newmont claimed in their dispute with Indonesia that 95% of the entire value is captured in copper concentrate.[3] Additionally, most metals transformers are moving upstream because that is where the value is. The chart shows the raw materials value having the largest share of steel pricing.

The long-term fallout of Indonesia's action is therefore unclear, whether significant investment does occur in downstream investment or mining moves elsewhere. Freeport-McMoRan and Newmont Mining are both negotiating with the Indonesian Government to be able to resume exports. In June 2014, Newmont declared a force majeure on deliveries from its Batu Hijau copper mine in Indonesia, with 80% of workers put on leave with reduced salaries. The Energy and Mineral Resources Minister,Jero Wacik, has announced that Newmont can resume shipping its ore concentrates once it has completed a written declaration and put down a US$25m deposit to build a smelter.[4]

Mining is still a significant part of value chain



Source: Severstal presentation, Steel Success Strategies, June 2014.

State ownership

Mineral taxation around the world has increased in some countries to more than 45%, and therefore it is not much further until the majority of rents accrue to the state and hence majority government ownership. Even in the developed world, pressures on greater state participation (if not control) have produced plans such as the abandoned Resources Super Profits Tax in Australia, which essentially provided for 40% Government participation in every mine.

The desire to achieve security of domestic supply has been a major focus of the

2. "SIC 3341: SECONDARY SMELTING AND REFINING OF NONFERROUS METALS," References for Business: Encyclopedia of Business, 2 Ed, http://www.referenceforbusiness.com/industries/Primary-Metals/Secondary-Smelting-Refining-Nonferrous-Metals.html, accessed 7 July 2014.

3. "PTNNT supports government goals on in-country processing: PTNNT does not export unprocessed ore," PT Newmont Nusa Tengarra, 10 December 2013.

4. "Energy Ministry seeks commitment, smelter deposit before Newmont may resume ore exports," Jakarta Globe, 17 June 2014.

governments of many rapidly developing economies, including China, India and Indonesia, where they have sought to achieve this via state ownership of domestic resources and by acquisition of foreign resources (via state-owned mining and metals companies). Even developed economies concerned with security of supply, such as Japan and Korea, have used significant state participation in the acquisition of foreign production. The role of rare earths as scarce technology metals means we will continue to see state ownership in these assets, but it is also likely that we will see increased government ownership of strategic metals such as lithium and uranium.

Greater transparency in the sector driven by globalization

Transfer pricing and tax-efficient supply chains remain an area of opportunity for the mining and metals sector. The best-in-class companies can move from being run as multinationals to truly global, integrated organizations with an optimized taxation profile properly aligned with the business operations. Increasingly, there has been widespread sophistication of locating assets in low-tax hubs, e.g., marketing and trading operations to Singapore. This has led to the perception that countries lose substantial tax revenue because of structures that are eroding the taxable base or shifting profits to locations where they are subject to a more favorable tax treatment. This process, called base erosion and profit shifting (BEPS), has come under increased scrutiny in recent years. With support from the G8 and G20 governments, the Organisation for Economic Co-operation and Development (OECD) recently published a report on BEPS, presenting an integrated and holistic approach to addressing perceived risks to tax revenues, tax sovereignty and tax fairness for many countries. Major developing, non-OECD countries, including China and India, are also actively participating in the BEPS project. The OECD's efforts around BEPS reflect the new reality that even the appearance of failing to pay a fair amount of tax poses reputational risk to multinational enterprises across all industries and increases the threat of resource nationalism activity. As most in the sector know examples such as Singaporean trading hubs exaggerate the advantages over many other commercial reasons of operating there.

Country-by-country reporting is a cornerstone of the OECD's BEPS action plan and it represents an important global shift toward increased transparency for businesses operating in the mining and metals sector. The Dodd–Frank Wall Street Reform and Consumer Protection Act enacted by the US Government, the EU Amendments to Transparency and Accounting Directives, the Extractive Industries Transparency Initiative, and the OECD's recommendations regarding BEPS have significantly raised the bar for tax disclosure in the sector.

Outlook

Both the retreat of resource nationalism and the creation of a positive investment environment are vital for countries that wish to remain attractive for continuing and future investment. We are likely to see continued retreating resource nationalism, likely in the form of retraction or reduction of export taxes, increased privatization of state-owned assets and reduced red tape for licenses (exploration, environmental, etc.).

As we have already seen, mandated beneficiation (and the associated export bans) can have a significant impact on the sector. Indonesia's actions, for example, have altered the nickel market, with prices having already risen by about 40% since January 2014, when the export ban was introduced. Clearly, if a similar policy is adopted in other countries, we will see an unnatural inflation of some commodity prices, to the long-term detriment of the sector.

The impact of BEPS on the mining and metals companies is less clear. Many countries seem to be in favor of a BEPS action plan, as long as the actions do not harm global trade and investment through convergence of high tax rates or policies that distort competition. However, some countries may use BEPS to prove that multinationals cannot be trusted – the information provided could be misused under the banner of political populism, and the provision of information could lead to double taxation with governments laying conflicting claims. Companies should therefore evaluate the pros and cons of additional voluntary disclosure, and ensure that there is more proactive engagement with fiscal authorities on their tax position.

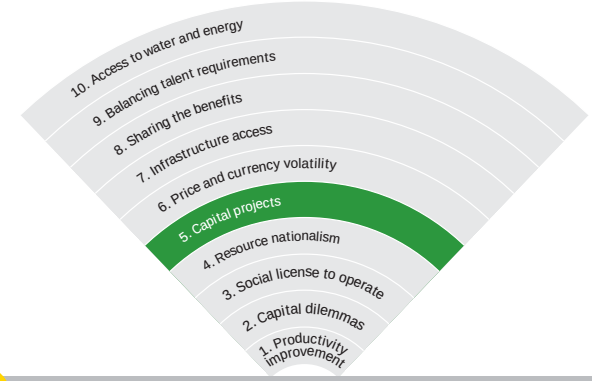
Considerations

- Become involved with trade and industry groups to influence future taxation schemes.
- Seek value-recovering trade-offs, such as improvements in time for project approvals.
- Put forward recommendations to demonstrate the impact of changes to both taxes and policies affecting mining and metal companies.
- Think proactively and really engage the government on local and country wide to demonstrate the benefits of mining to the community.
- With regard to BEPS, companies should use a framework that identifies and assesses areas in the organization that have limited transparency, consistency and substance. Undertaking a holistic review, with full value chain transparency and with focus on the BEPS actions, will identify key risks in relation to BEPS, enabling a company to prioritize the impact of these risks and define risk mitigating actions.

05

Capital projects: delivering value in the next wave

(7 in 2013)



Key thought

There is too much at stake with large projects, as failure to keep them on time and on budget can cost you your reputation and your social license to operate.

Learning from past project failures

Calls for greater capital discipline and greater return on capital deployed (ROCD) in the last two years ushered in an era of caution and restraint in capex by mining and metals companies. Numerous high-profile projects have been scrapped, shelved or sent back to the drawing board for re-planning. In fact, aggregate capex cuts since January 2012 have exceeded US$27b.[1]

Although total investment in the mining and metals sector may have peaked, it must still deliver a large number of projects worth a record US$791b of investment, as of December 2013.[2] Even as major mining and metals companies have avoided new projects, delivering value on the committed projects remains critical for business survival and success. Hence, timely delivery of these projects within budget continues to remain top of the agenda for miners. While the public capital markets still do not have an appetite for investment in new supply, mining and metals companies are beginning to quietly prepare for that inevitability as reserves need replacing and the cycle changes. However, those responsible for governance (often the board of directors) are demanding a much more interventionist role this time to avoid the failures of the past.

Given the size and scale, large capital projects have long payback periods and comprise a substantial percentage of a company's spend. Therefore, their success can provide a competitive edge as well as enhance an organization's enterprise value. Governments and local communities have a keen interest in such projects as they have the potential to drive a region's economic development. Consequently, high levels of transparency and assurance will be required to ensure that these projects can be delivered on time and on budget. Shareholders, capital providers and other stakeholders will all demand it.

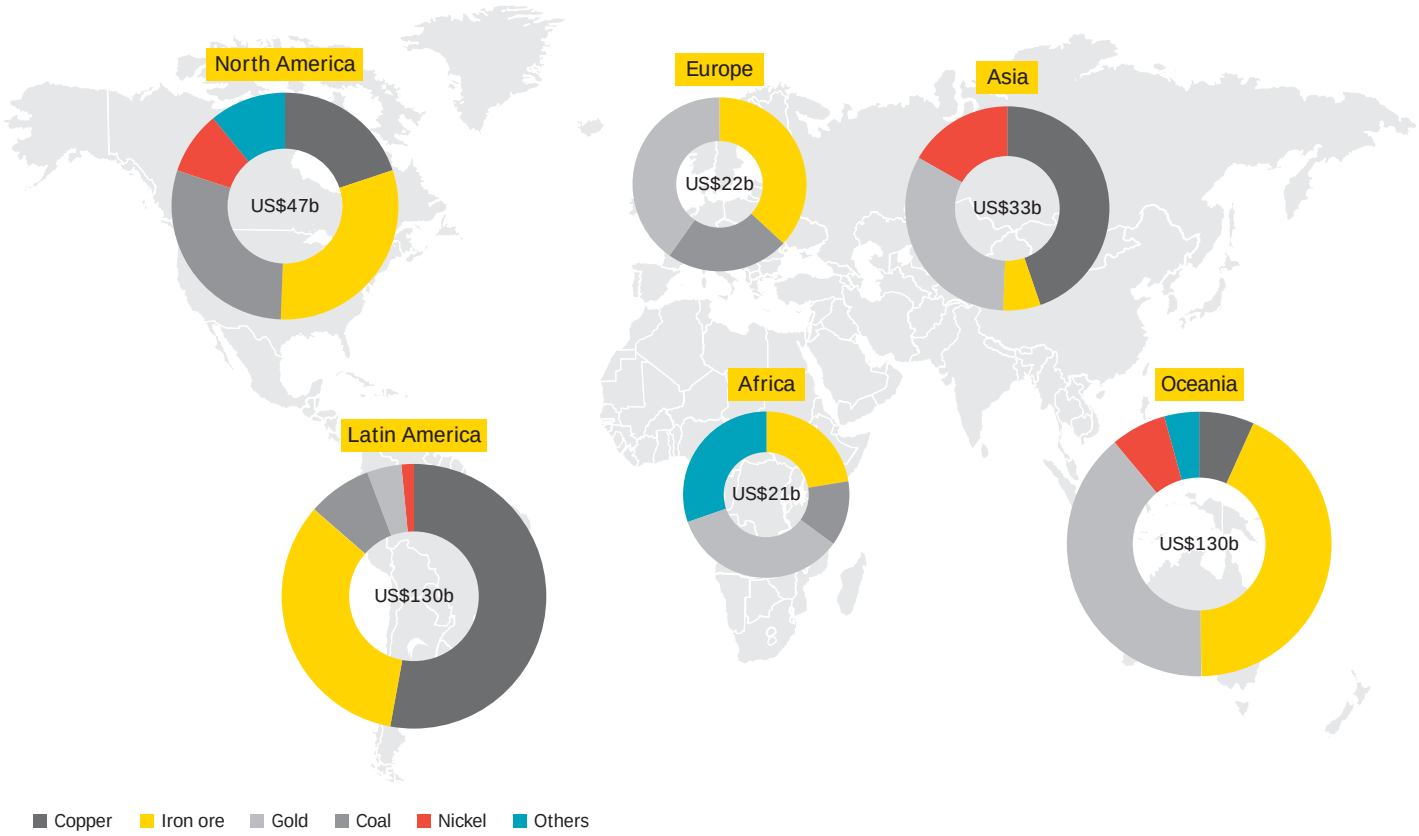
Dilemma: The majority of projects are facing delays and/or overruns

EY has conducted a study to gain a better understanding of the issues associated with the delivery of large capital projects in the mining and metals industry. As part of the study, EY identified 104 projects that were in the pipeline as at January 2014 with a proposed capital investment of more than US$1b in the following commodities: copper, iron ore, gold, coal, nickel and others (consisting of diamonds, molybdenum, platinum, uranium, vanadium and zinc). These 104 projects include those that have passed the final investment decision (FID) and are in the construction phase but still have to "go live," as well as others that are being proposed but have yet to reach FID. These projects involve a cumulative investment of approximately US$334.5b and are spread across the commodity groups and regions.

1. "Riding The Rising Tide of Global Growth," Deutsche Bank Research, 19 February 2014, via Thomson One.

2. "E&MJ's Annual Survey of Global Metal-mining Investment," *Engineering and Mining Journal*, 6 January 2014, http://www.e-mj.com/features/3674-e-mj-s-annual-survey-of-global-metal-mining-investment.html#.U6AlmPmSx1Y, accessed 5 April 2014.

Geographic distribution of projects costing more than US$1b



Source: EY research and analysis

As part of the EY study, we evaluated the performance of large capital projects based on two criteria – cost and time – to gauge the proportion of projects that have failed to deliver on budget and time. Two key findings emerged:

1. The majority of the projects were delayed and/or overspent when measured against estimates made during the initial stages of the project life cycle.
2. The cost and time overruns in these projects were not a function of whether the project has reached FID or not. Projects in all the stages were vulnerable to exceeding the initial estimates.

69% of the projects are facing cost overruns

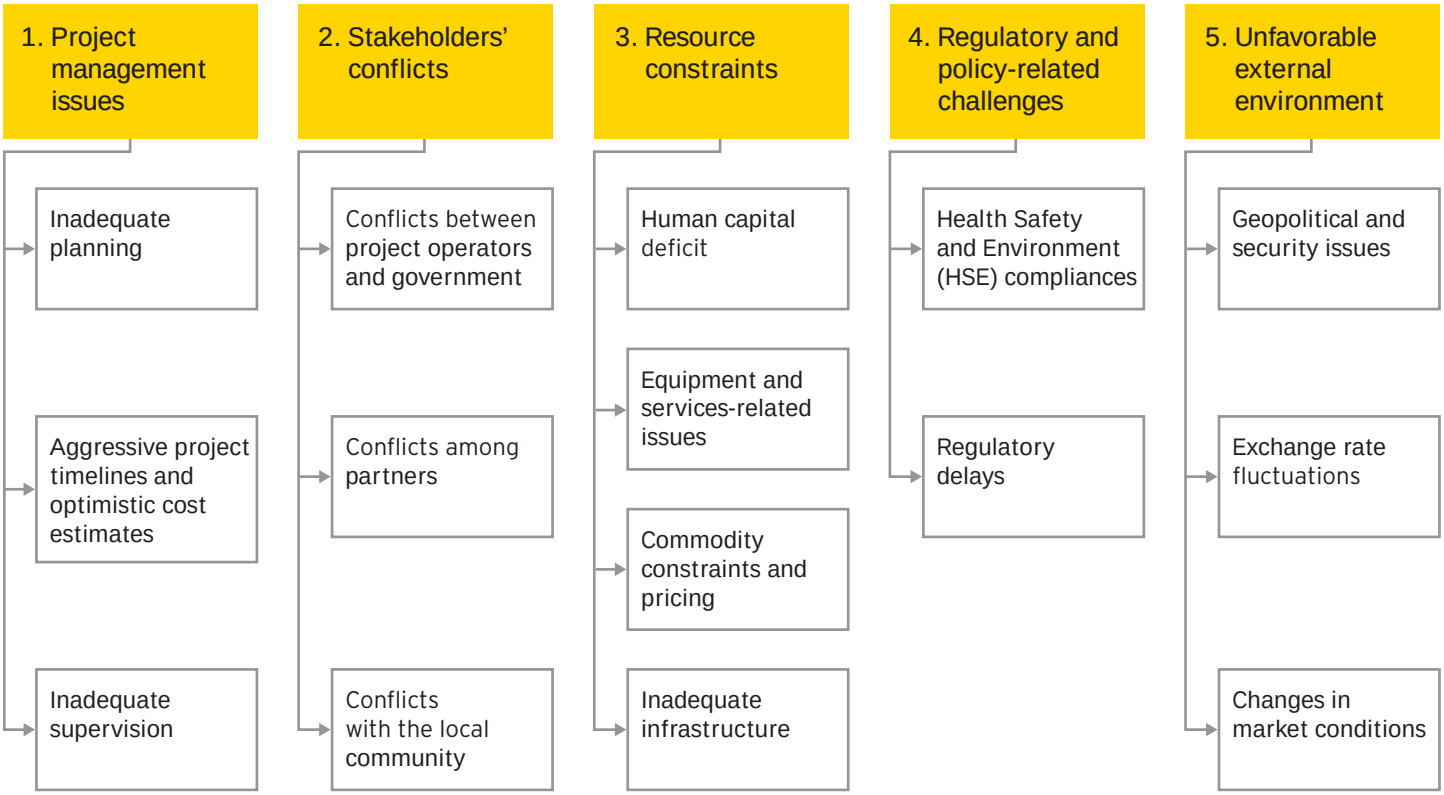
50% of the projects are reporting schedule delays

Source: EY research

Unsustainable time and cost overruns

The increases in commodity prices in the past few decades have masked many of the consequences of these overruns, but this trend seems unlikely to continue. Therefore, if the sector is to secure the investment and shareholder confidence it needs to supply future demand, it must deliver improved performance in this area.

Root causes of cost overruns and delays



Our study identified five fundamental causes of overruns and delays, most of which are common to many mining projects. However, their impact and consequences are more profound in large capital projects, given their scale, complexity and the budgets involved.

1. Project management issues

Development of large capital projects is a complex and complicated task that entails a combination of leading-edge technology, new geographies and multiparty governance. The sheer size and scale makes the development process equivalent to setting up a new multibillion dollar organization. Compounding this complexity, the lack of proper project planning, estimation and supervision creates challenges throughout the project life cycle.

2. Stakeholders' conflicts

Large capital projects carry high and unique expectations from all the stakeholders. Managing the needs of all the parties can prove to be a challenge, consequently increasing the risk of conflicts.

3. Resource constraints

Projects of this size require large-scale resources in terms of labor, equipment, services and infrastructure. Development of multiple large projects in a region can put a strain on these resources, causing companies to compete for access.

4. Regulatory and policy-related challenges

Many projects in the past have suffered on account of delays in regulatory approvals and policy uncertainty. Such challenges halt the progress of projects and delay their operations.

5. Unfavorable external environment

The progress of large capital projects is also influenced by external market and political forces. The impact of any major change in these forces can be severe on the overall project economics, given the multibillion dollar investment that is at stake. On certain occasions, when these external factors are so significant, when looked at either separately or cumulatively, companies may consider delaying or even canceling projects.

Outlook

As commodity prices improve and major capital projects start to come back online, we see an increased urgency to improve on the delivery of projects on time and on budget, especially given the increased scrutiny by boards and shareholders on costs. With a new understanding of better practices around these projects and knowledge of the consequences of bad management, it will be time for management to start putting these practices in place. For the new capital projects that will be kicked off as improved prices make them more attractive, management will need to put these practices in place upfront and tightly scope out and run these projects.

Consideration: Specific actions that could help mitigate risks and improve project performance

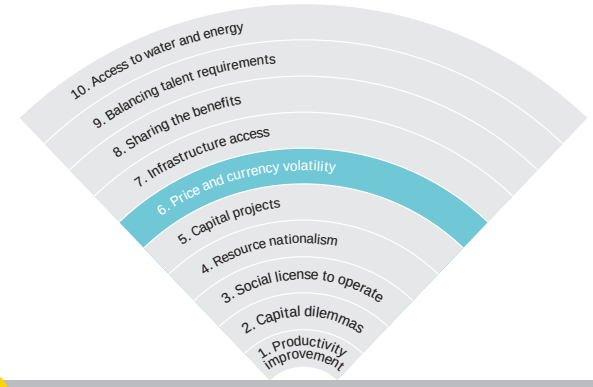
Determining to what extent the factors that result in cost and time overruns are controllable is critical. Clearly, the external environment and regulatory- and policy-related changes are less controllable and less predictable than project management issues, stakeholder conflicts and resource constraints. However, even issues that are less controllable and predictable can be built into the project scenarios and allowed for in the contingency plans.

This brings us to the next question to be considered: Is the root cause of the issue poor planning, poor project implementation or a combination of the two? Whatever the answer, it is clear that the scale and frequency of the time and cost overruns indicate that there is significant room for improvement in the internal processes of both mining companies and contractors. Better project planning, staffing, supervision, and robust contracting and procurement strategy are among the probable solutions. For instance, concerns around limited resources and extensive customization can be resolved through pooling resources and/or sharing infrastructure with other competing projects in a region and adopting a modular and standardized construction approach. Governance arrangements in partnerships, alliances or joint ventures need particular attention for the better management of stakeholders' interest.

06

Price and currency volatility

(6 in 2013)



Key thought

Riding out volatility without putting in place some form of hedging strategy is no longer an appropriate option.

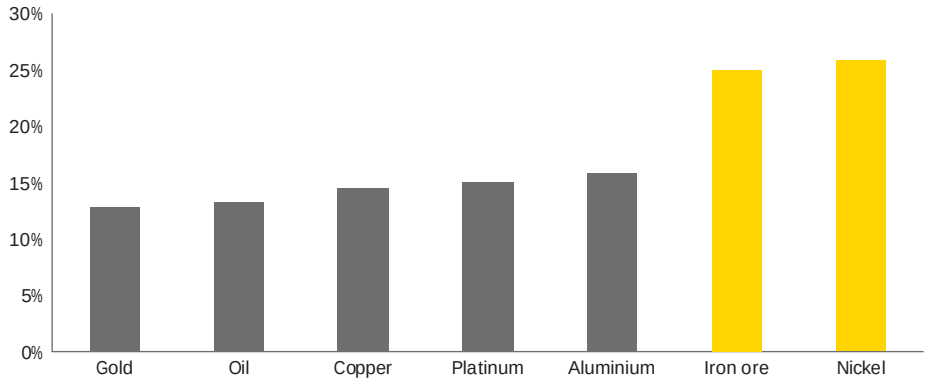
Diving for cover or riding the wave

Exiting the supercycle was never going to be easy. Years of price stimulus had the desired effect in encouraging new supply. However, given the lead time required to produce this supply, price signals are very ineffective at turning off supply quickly. As such, we are now experiencing the extreme volatility created as the market tries to return to equilibrium.

Those metals and minerals that received the largest amount of price stimulus to increase supply are generally expected to have greater volatility for longer until the supply–demand equilibrium returns. This impact outweighs even the market concentration as demonstrated in the commodity price chart.

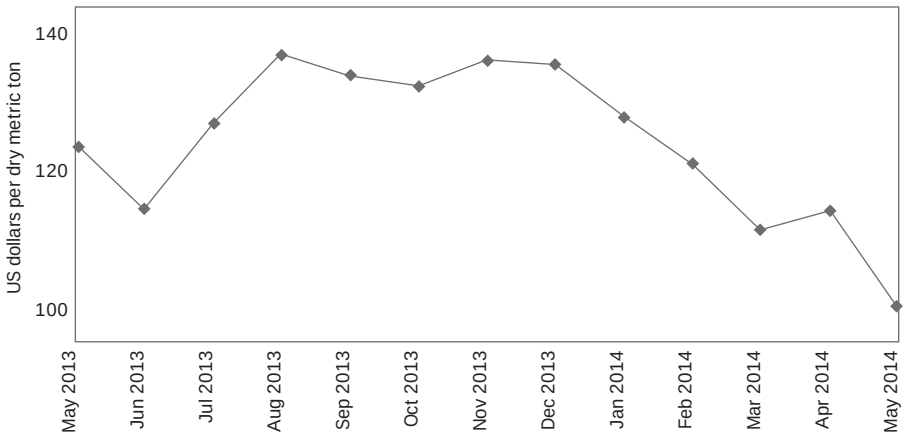
Iron ore, once an annually contracted metal, has proven to be one of the most volatile in pricing. The pricing has been impacted by the level of supply response and also by variations in funding provided to traders in China. During times of enforced reduction in credit availability, the lack of finance for stockpiling has meant destocking at lowered spot prices.

Annualized volatility in commodity prices (1H 2014)



Source: EY analysis, Thomson Datastream

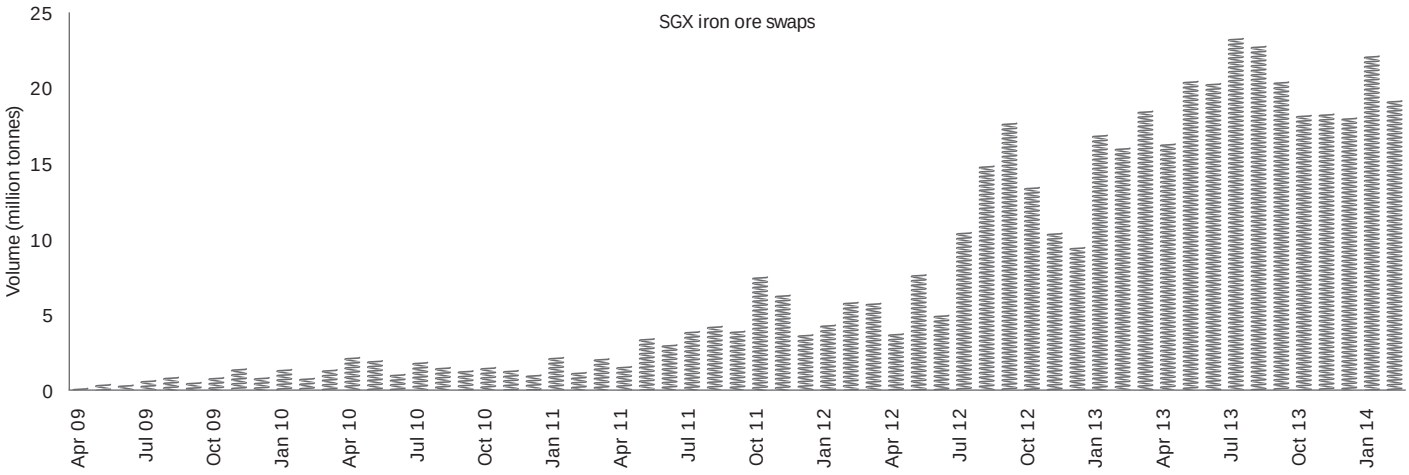
Iron ore price fluctuations



Source: Thomson Datastream

Changes in customer buying preferences have also impacted the way in which volatility has been accepted and managed. For example, steel end customers are seeking suppliers that can provide greater price certainty and in some instances are willing to pay for this certainty. As such, they are either directly or indirectly entering the steel derivatives markets to hedge those inputs. As steel producers have been increasingly hedging their sales, they need to hedge their inputs (iron ore, met coal). Industry discussions are also underway for a number of 'new' commodities regarding the development of indices to support price-setting mechanisms.

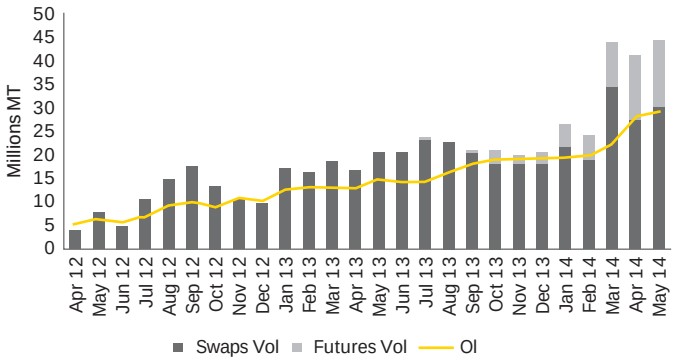
Iron ore and rebar derivative volumes on Shangai and Singapore exchanges



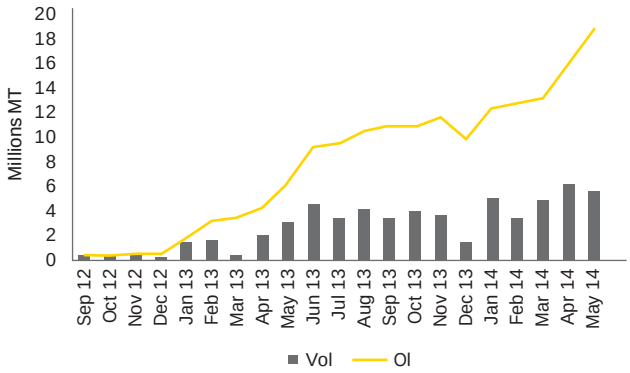
Source: SGX, ThomsonOne

This has increased the liquidity, depth and efficiency of the derivatives markets such that any steel mill in the world could hedge its purchases without overwhelming the market, as can be seen below.

Iron ore swaps/futures



Iron ore options



Source: "Managing Volatility in the Asian Ferrous Market," Singapore Stock Exchange presentation, June 2014.

As customers and producers seek to adjust to increased volatility, there is a growing acceptance that this structural change has provided greater depth to the derivatives markets, and for many they can appropriately incorporate physical and derivative trading into their core operations. Many of the larger producers are referring to this as a "revenue enhancement" strategy as they seek to extract some of the option value created by volatility and their naturally long position. This mirrors the convergence of traders that are increasing their exposure to commodity production.

While what has been described relates to iron ore and steel, similar effects though lesser in magnitude can be seen for metallurgical coal, nickel, aluminium and copper. In the prior year, the unwinding of exchange-traded fund (ETF) positions increased the volatility of precious metals, though this has abated somewhat in 2014.

Natural currency hedge offsets lower commodity prices in 2013–14

The effect of declining commodity prices on the underlying earnings of large diversified mining and metals majors in FY13 was offset by favorable currency fluctuations. Favorable movements in exchange rates cannot, however, permanently hedge the downside risk of commodity price declines on earnings. The gains are a one-off and may also have a negative impact in the long term as prolonged currency weakness in the respective country of operation will lead to growing domestic inflation, eventually amplifying costs as well as wages.[1]

Anglo American reported that currency price fluctuations offset 100% of the earnings impact of the commodity prices in FY13, compared with a 9% offset over the decade up until 2012.[2] The positive impact of currency movements was mainly due to depreciation in the operating currencies of major producers, especially across emerging markets, relative to the US dollar. This increased the monetary value of the export-oriented production.

Currency vs. commodity price fluctuations

	Time period	Average FX offset to commodity price moves	Latest reporting period (for which FX offset is calculated)	FX offset to commodity price moves in the latest reporting period
Anglo American	2002-2013	9%	FY13	100%
BHP Billiton	2001-2013	21%	1H13	214%
Rio Tinto	1998-2013	11%	FY13	78%

Source: Company data, Deutsche Bank estimates

1. "Rio Tinto Gets Boost From Flagging Aussie Dollar," *The Wall Street Journal*, 13 February 2014.
2. "Special FX for the miners' earnings," *Deutsche Bank*, 21 February 2014, via ThomsonOne.

However, other macroeconomic forces such as quantitative easing in much of the developed world have prevented the full "shock-absorber" effect of falling prices in other cycles. The Australian dollar, Canadian dollar and Chilean peso have not devalued as significantly as would be suggested by previous cyclical downturns, and this has created its own set of challenges for producers in these countries. They have needed to be innovative in their practices to provide greater productivity in order to offset the lack of full natural hedging protection. The absence of the anticipated devaluation of their currencies to restore global competitiveness has necessitated many providers to develop plans to not only restore productivity but to innovate to increase productivity as an offset.

Prolonged period of volatility

Due to the length of the supercycle, volatility will continue for a longer period than any we have experienced to date until we reach equilibrium. Many mining and metals companies, intimidated by the volatility of 2013, have chosen to sit on the side lines regarding investment and setting strategy. However, since this volatility is due to continue for the next few years, standing back and making no investments cannot remain an option.

Outlook

We expect the following factors to create volatility in the sector in the medium term:

- **Increased regulation:** The introduction of a new regulation that could affect supply can impact commodity prices. For example, the adoption of an export ban on unprocessed ores and export taxes on mineral concentrates in Indonesia created a supply–demand imbalance.[3] Nickel prices surged by 23.8% in April 2014 to US$17,422/MT over January 2014.
- **Divergent central bank policies:** The winding down by the US Federal Reserve of quantitative easing may lead to an increase in both commodity prices as well as currency volatility. The curtailment of quantitative easing will subsequently pave the way for increased interest rates. This may in turn depress market sentiment leading to increasing volatility in commodity prices.
- **Geopolitical risk:** Deteriorating relations between Russia and the EU and other NATO countries, compounded by sanctions on Russia by the EU and the US, may lead to economic volatility.
- **Provision of credit to traders:** Greater scrutiny of financing deals in China and elsewhere by regulators creates a risk that inventories used for this purpose may be liquidated.
- **Withdrawal of banks from commodity markets:** The possible withdrawal of JPMorgan, Goldman Sachs and Barclays from commodity markets may lead to an increase in volatility, particularly if large financing deals are unwound and inventory is released onto the market.[4]

Considerations

Living with volatility for long periods of time requires mining and metals companies to build in coping mechanisms that guard against the negatives of volatility while taking advantages of opportunity.

Opportunities

- Enhancing revenue by leveraging the option value of a natural long position
- Introducing greater flexibility in operations to vary production in response to volatility
- Extracting premiums by providing customers with greater price certainty

Challenges

- Developing long-term pricing protection to enable prudent investment
- Developing performance measures to properly evaluate management performance against a background of volatility

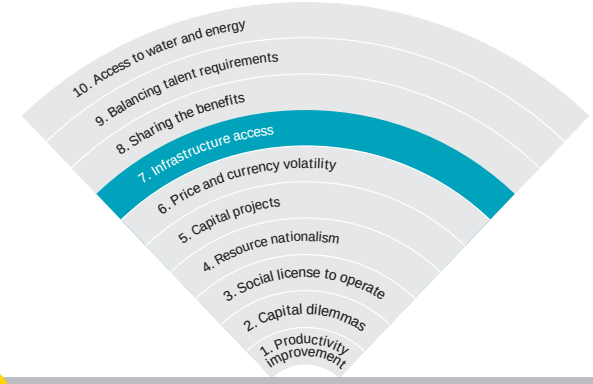
3. "Rusal CEO: Mineral Export Ban Will Benefit Indonesia," *The Wall Street Journal*, 26 February 2014.

4. "Banks fight back with warning over withdrawal from commodity markets," *Metal Bulletin*, 13 September 2013, via Factiva.

07

Infrastructure access

(9 in 2013)



Key thought

The issues around infrastructure financing, ownership and access make it a complex investment. However, the trend is toward shared access and shared value.

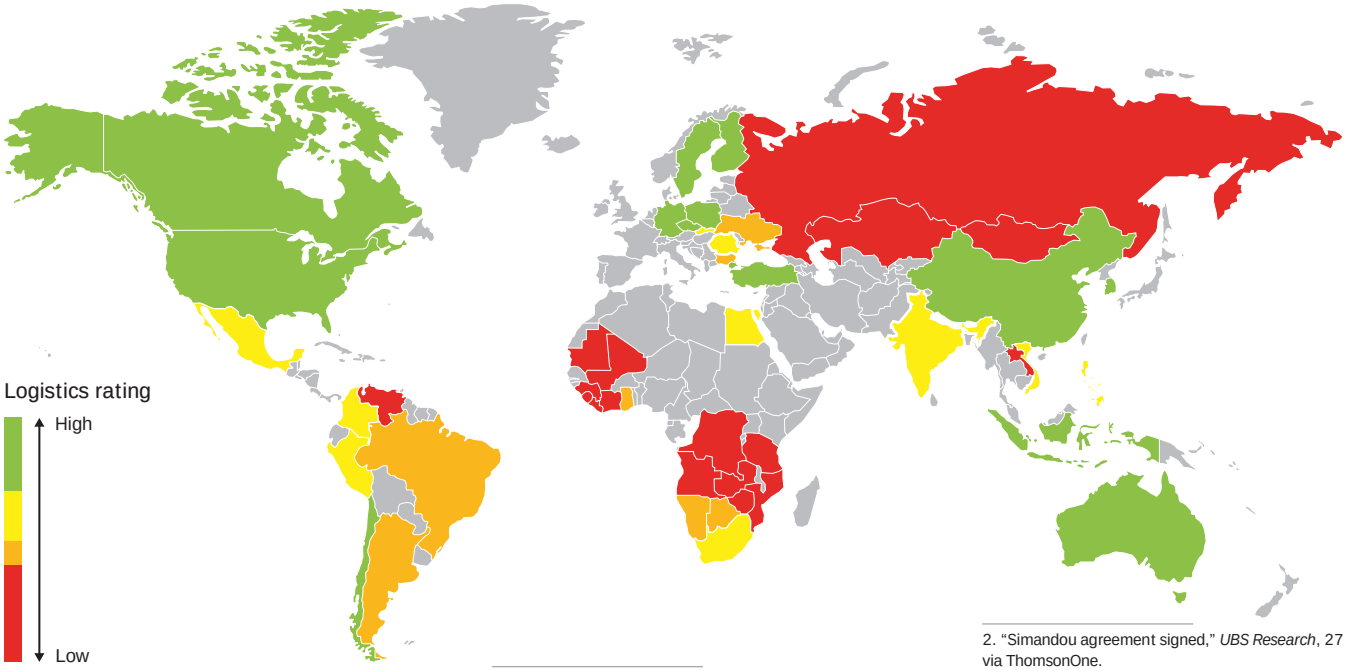
A new world of ownership and financing

Urbanization and a growing middle class will lead to continued growth in mineral demand, which will challenge mining and metals companies to look for new sources of supply. These new sources of supply are often located in remote locations that lack access to infrastructure.

Developing mines in remote locations is a complex exercise, especially when you factor in difficult terrain, the often less stable political or regulatory regime of these locations and the need to build the social infrastructure such as villages, schools and hospitals. These economic and social costs add to the total cost of mine development.

Infrastructure development is a significant part of any mine development and accounts for the majority of mine development costs. In some cases, the cost of developing the infrastructure has gone up to 75% of the total project cost.[1] For example, at Rio Tinto's Simandou iron ore project in Guinea (Africa), the cost to build infrastructure (multiuser 650km rail and deep water port) is expected to be about US$13.5b out of the total project cost of about US$20b, which also includes a 100mtpa iron ore mine.[2] The map below shows major mining countries and their logistics ratings. Logistics ratings aim to quantify the logistics outlook and supply chain challenges of operating in a specific country. It is clear from the map that developed countries such as Germany and US have the highest logistics rating, while African countries, most of which face severe infrastructure challenges, have the lowest logistics rating.[3]

BMI logistics ratings: Major mining countries



1. "Where have all the minerals gone?," *Mining Magazine*, 28 August 2012.

2. "Simandou agreement signed," *UBS Research*, 27 May 2014 via ThomsonOne.

3. "Data & Forecasts", Business Monitor International, accessed on 11 July 2014.

In the current environment, financing of such large infrastructure projects has become a challenge because of a weak commodity price outlook, shareholder activism and budgetary constraints. These factors have delayed the development of a number of large mineral deposits, despite the future growth options created through infrastructure development.

Developing large infrastructure projects requires coordination among a number of stakeholders, such as users (miners, communities), government(s) and capital providers (financial institutions, customers). The divergent priorities of these stakeholders make it difficult to decide the following:

- Who funds, builds/designs, owns and operates the infrastructure?
- Who will access the infrastructure and how?

Dilemma: Complexities due to divergent stakeholder priorities

Mining and metals company: Ideally, a mining and metals company would want integrated mining and infrastructure, which ensures complete control of infrastructure, even if it means higher initial development costs. This means that companies can optimize the design of various components, such as rail capacity, port capacity and mine output, as well as give them control over access rights and usage terms of the infrastructure. An integrated mining model requires large capital investments, and with current focus on ROCE, mining and metals companies find it hard to allocate capital to a lower ROCE investment such as infrastructure. Nevertheless, miners are willing to partially fund the infrastructure development costs in partnership with patient capital investors such as pension funds, or with governments or agencies such as the International Finance Corporation (IFC), the African Development Bank (AfDB) and the European Investment Bank (EIB).[4]

Governments: Governments are hesitant and often unable to fund large capital investments. This is especially true for governments in frontier regions, where large capital requirements for infrastructure development could be out of proportion with the country's GDP. However, this source of capacity building and derivation of competitive advantage is often supported by the development banks and multilateral agencies.

Increasingly, governments demand that infrastructure is developed on a shared-use basis so as to ensure maximum economic benefit from the infrastructure. These economic benefits can be in the form of development of other stranded assets and non-mining development along the infrastructure corridor. Shared use can be multiuser or multi-access, depending on whether the infrastructure is being used by multiple mining and metals companies or by other parties for agricultural transport or passenger use. Governments thus want a say in the build and design of the infrastructure. This includes routing of transport infrastructure and the option to offer extra capacity to other industries that lack the requisite scale. In some cases, transportation infrastructure is spread across many countries, for example, the proposed Niger development corridor covers Senegal, Gambia, Mali, Niger and Nigeria for iron, aluminium and other commodities. Shared usage and shared tariff revenue is especially preferred by host governments of transnational infrastructure.

Irrespective of who finances the project, governments favor the build-operate-transfer (BOT) ownership model, so that asset ownership is ultimately transferred back to the host government after the contractual period.[5]

Capital providers: Typical capital providers include development financial institutions (DFIs), such as IFC, AfDB, commercial banks, investment banks for loans, bonds and project finance structuring, and syndication and risk insurance providers.[6] Lenders are most interested in commensurate returns from risk taken in the project. They want the project to be built to schedule with minimal changes to design or capacity use/allocation at a later date. Any such change, if at all, should not increase the risk of the project.

Some of these projects, typically in regimes with high sovereign risk premium, have received financing through non-traditional routes such as resource for infrastructure (RFI). Under this scheme, a loan to finance an infrastructure project is repaid through natural resources (such as iron ore). In an RFI, the lender typically wants complete control from pit to port and offtake agreements. In many cases, they also want their contractors to build the project.

Divergent priorities of various stakeholders make the setting up of infrastructure projects a complex and time-consuming exercise. The importance of government incentives in terms of sovereign guarantees and policy assurances cannot be overemphasized. The last thing stakeholders in the project would want is lack of policy clarity leading to a suboptimal or failed project.

4. "Mining infrastructure – Are we on the right track," *Latham & Watkins*, 25 June 2013.

5. "Mining infrastructure – Are we on the right track," *Latham & Watkins,* 25 June 2013
6. Ibid.

Current multistakeholder infrastructure innovation involves many of the risks identified in the table. Different stakeholders have a major or minor tolerance to each of these risks. The innovative structures have these risks tolerated by stakeholders valued (priced) and transferred between the various other stakeholders. Having a common way of pricing these risks is critical.

Consideration: Financing models to fund infrastructure

Projects undertaken by the public sector: Governments can seek concessional funding from multilateral agencies such the World Bank, AfDB and IFC. While in the past, developed countries have raised capital from capital markets, frontier countries find it difficult to go to capital markets, given their low credit ratings and weak GDP compared to the extent of investments required.

Company as sole developer and user: A mining and metals company can raise capital on its balance sheet for its projects, giving them complete control and flexibility to use the infrastructure. However, in the current environment of rising infrastructure costs, poor profitability and increased shareholder vigilantism, companies have preferred not to take debt on their balance sheet and set up projects through off-balance-sheet financing.

Risks for stakeholders

Stakeholder	Tolerable risks – major	Tolerable risks – minor
Miner	Commodity price risk	• Construction risk • Expansion risk
Infrastructure operator	Operational risk	
Government	Uncommitted capacity risk	• Partial credit risk
Investor (fund)	Investment-grade credit risk	• Foreign exchange risk
Builder	Construction risk	
Third-party users	Access risk	
Customer	Commodity price risk	• Foreign exchange risk • Expansion risk

Special purpose vehicle (SPV): In off-balance-sheet financing, a mining and metals company contributes equity to the project, with the remaining capital provided by the lender. The infrastructure project thus works as a separate entity (or a SPV). The project lender relies on cash flows from the infrastructure project and has limited recourse to the mining company's assets. Since lenders have limited recourse, their required rate of return is higher than that in an integrated mining model, where the lender has full recourse to the balance sheet of the mining company.

In an independent SPV, investors or lenders would largely provide the financing and thus own and control the project. An SPV can also take the form of a public-private partnership (PPP) where the government is one of the parties in the framework.

For example, the Indian Government is reportedly considering floating an SPV to develop coal blocks in the country. The SPV would include government-owned miners and specialized mine developers and operators (MDOs).[7]

Third-party operator: A group of mining and metals companies come together in order to partly or fully fund the infrastructure, which is then operated by a third-party service provider.

Financing models for infrastructure development will continue to evolve as each new stakeholder in the project is essentially a new variable in the equation. Transaction participants need to continually adjust their models to accurately assess their exposure to the risks so that risk and rewards can be appropriately structured.

7. "India considers SPV for mining projects," *Miningweekly.com*, 30 April 2014, http://www.miningweekly.com/article/india-considers-special-purpose-vehicle-for-mining-projects-2014-04-30, accessed 4 June 2014.

Outlook

Increasingly and going forward, governments prefer the "shared access" model of infrastructure development, even though this model makes the design, capacity allocation and assessing the bankability of the project more complex. We see innovation in financing, and a change in the ownership model and the operation of infrastructure, as a large number of future projects will consist of a cluster of mines rather than just a single large-scale mine.

Mining and metals companies should also view infrastructure development from a sustainability perspective in that it provides social and economic benefit to local communities and businesses. These benefits are not just monetary (such as wages and community donations), but also socioeconomic contributions (such as providing employment, local purchases and the transfer of technology). Infrastructure development leads to monetization of otherwise stranded deposits and has a multiplier effect on the region. Mining and metals companies, through this process, also play a role in building institutional capacities. They provide support in funding of universities and improvement of mining policies and legislation.

It is vital that shared value from mining and metals projects is proactively communicated to all stakeholders. As communities and governments see benefits in infrastructure development, companies will see less community resistance leading to fast-tracking of projects and governments acting as enabler (through policy support) in project development. Together, it will provide the project developer with more certainty of project milestones, thereby reducing project's time to completion and cost overruns.

Dilemma: Project financing issues in shared use/open access

The shared-use model[8] is increasingly being preferred not only in frontier regions, but also in developed countries. For example, in the Pilbara (Western Australia), the Government has inserted clauses in agreements to facilitate third-party access.[9] To date though, these agreements have been unsuccessful. There are, however, a number of challenges in working with the shared-use model such as:

- Potentially higher capital costs as infrastructure design would need to accommodate varying requirements of both mining and non-mining users
- Reduced efficiency due to competing interests leading to suboptimal use of infrastructure
- Uncertainty in design as users may be identified or provided access on a later date after financing is closed
- Delay in development of infrastructure as negotiations would involve more parties

All of the above introduce additional variables and make assessing the bankability of the project more complex.

There are additional costs associated with the need to have a strong regulatory or policy regime, which is missing in most frontier markets. In the absence of a regulatory or policy regime, infrastructure users in a shared-use model will have:

- Monopoly concerns, if the infrastructure is owned by a large miner, which will have control over who accesses the infrastructure
- Pricing concerns, if the infrastructure is owned by a third party, for which infrastructure will be a profit center and may excessively charge users, who do not have an alternative

In both instances, cost plus charging for infrastructure access and services may be the appropriate mechanism.

For bankable project financing under the shared-use model, the IFC recommends that an investment-grade mining and metals company can act as an "anchor mining client" that provides the take-or-pay commitment to the SPV that owns the mining infrastructure. The anchor client is given "founding rights" such as prioritized use, tariffs and control of the infrastructure.[10] The anchor client needs to account for the probability that at a later stage, new users (miners or other industries) will be entitled to use the infrastructure, which will need to be expanded or modified.[11] The implementation of such a complex SPV would require an effective regulatory regime to enforce contracts.

8. "A Framework to approach shared use of mining related infrastructure," Vale Columbia Centre, March 2014.
9. "Mining infra - case for a new approach," Latham and Witkins, September 2013.
10. "Fostering the development of greenfield mining related transport infrastructure through project financing," IFC, April 2013.
11. "Mining infra- case for a new approach," Latham and Witkins, September 2013.

08

Sharing the benefits

(8 in 2013)

Key thought

Carving up benefits is the reality, ensuring all stakeholders see it that way is the challenge.

Managing expectations through the commodity price cycle

During the course of this year, some stakeholder demands, such as those of suppliers and governments, have largely rebalanced as it has become clear that mining and metals companies are grappling with reduced profits and soaring costs leading to the scaling back, suspension or closure of projects. The difference in the amount of economic value retained to fund growth or even reserve replacement between 2011, when commodity prices were high, and 2013, when commodity prices are closer to the marginal cost of production, is clear.

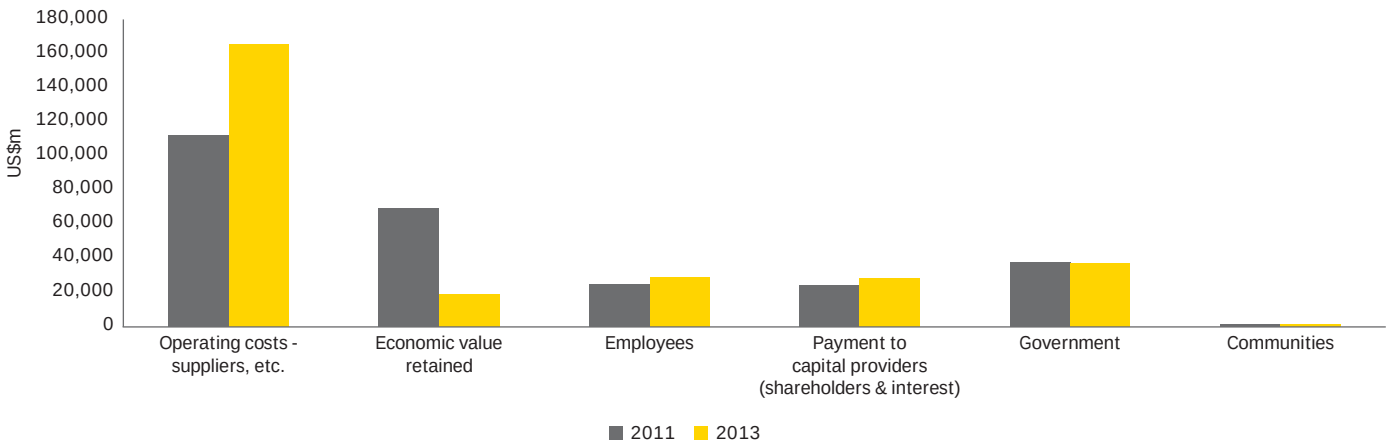
Risk: Competing demands from stakeholders

Sustainability in the broader sense is about "shared value" for all stakeholders in mining and metals projects. This is an important concept for mining and metals companies to promote in order to ensure, once the inevitable cyclical recovery in commodity prices occurs, that stakeholders have more balanced expectations in the longer term. Unless this 'culture' is established, improved profiltability or changes in shareholders or community/national leadership will reignite tensions.

However, embracing this concept of shared value fully would take significant changes to the ownership models of mining and metals companies. For example, in a recent report, the World Economic Forum[1] suggested that in a sustainable world, companies would shift from mineral rights owners to leasing of deposits or project developers. As the companies are balancing the needs of investors, governments and communities, such a radical change to ownership models is not the current option, particularly given the risk associated with mining projects. Getting the right risk-reward ratio is difficult, but important, to ensure that mining and metal companies and their investors are receiving adequate return for this risk. Given where the economic cycle is currently, long-term agreements with government, labor and suppliers could be considered for negotiation now.

If companies are not able to effectively manage the competing needs of stakeholders, they run the risk of damaging their corporate reputation, project approval delays and protests or violent opposition, and accelerating the move away from a mineral rights ownership model.

Declining economic value retained vs. rising costs (2011–13)



Source: EY consolidation of company sustainability reports

1. "Scoping paper: mining and metals in a sustainable world," World Economic Forum, February 2014.

Governments and the level of rents these investments can pay: Governments have, over the last few years of higher commodity prices, increased their expectations of the levels of investment that mining and metals companies can make in their countries. Now that profits are lower, expectations of governments have to be carefully managed, particularly in cases where some investment has been made but the project has been suspended until commodity prices improve. There is also a lot of pressure on governments to ensure that citizens receive their fair share of benefits from mining and metals projects. For example, in Tanzania, the Mining and Energy Minister announced that the Government was in talks with gold miners about higher taxes and royalties following growing public demand for more benefits from the country's natural resources.[2]

Changes in the investment climate have made most greenfield projects highly unlikely, and many higher-cost operations are beginning to close. As a reaction to this, most governments and policymakers have become more pragmatic in the expectation of economic rents to either attract or preserve investment. For example, the Ecuador Government plans to adjust a windfall tax, make changes to its mining law and offer tax incentives to attract foreign investors into its stalled mining sector.[3]

Communities: A lack of consultation prior to developing projects can lead to long-term protests, which may turn violent. The El Tambor project in Guatemala, where protestors have been blocking development of the mine since early 2012 is one such example. Protestors argue that there was no appropriate consultation process before the license was issued to Radius Gold and KCA. Their main concern is that the mine will threaten their already limited water supplies.[4] Communities take much longer to reset their expectations arising from the changing commercial reality. Often, they will be prepared to continue pursuing a larger proportion of a shrinking pie. For example, while the rents and benefits of the Simandou iron ore project in Guinea are likely to be delayed, the community is protesting and arguing about how US$700m of existing access payments are to be used or distributed.

The impact of these political and civil actions will most likely delay even more projects. In Peru, the Ombudsman office reported that in May 2014 alone there were 225 social conflicts, of which 66.2% related to mining activities and hydrocarbon projects.[5]

Employees: In some cases, it may be difficult to rebuild relationships with stakeholders. For example, in the aftermath of the Marikana massacre and large-scale strikes in South Africa, platinum miners were unable to come to a wage agreement with workers for five months, and therefore struggled to recommence production. The three largest platinum miners have lost more than US$2b in combined revenue as a result of the strike.[6] The settlement has had far-reaching implications, with the engineering sector striking over their wage negotiations having witnessed the success of the platinum sector.[7]

Mine closures have moderated wage demands in a number of high-cost regions of the world. The more flexible the labor market, the more responsive it has been to the cycle. However, in many emerging or recently emerging economies, wage demands across the economy are rising faster than inflation or increases in productivity.

Shareholders: In the boom time, miners adopted a growth-at-any-cost policy but are now suffering the sharp reversal of this policy. Not only have we seen a change in shareholder expectations, but also a change in the makeup of shareholders. This is evident in the rise of patient private capital into the sector. Similarly, institutional and retail investors with similar investment characteristics to private capital are becoming more prevalent investors via public capital markets. However, the continued recent focus on ROCE is constant and is expected to continue for the foreseeable future.

Consideration: Embracing a multistakeholder model

There needs to be a multistakeholder approach to sharing the benefits, and companies should tailor their approach depending on the group. Companies need to ensure that governments, communities, shareholders, employees and suppliers have a common understanding of the challenges their projects face. By forming strong partnerships with each of these groups, they are better able to communicate their long-term value to shareholders as well as integrate themselves into the local and regional communities.

Companies are seeing the importance of listening to communities via new methods such as social media, rather than communicating from the top down. There is

2. "Tanzania pressures miners for more cash," *Reuters*, 2 June 2014.
3. "Ecuador plans legal reform, tax incentives to spur mining," *Legal Monitor Worldwide*, 7 June 2014.
4. "UN urges talks following violent Guatemala mining protest," *Mining.com*, 2 June 2014.
5. "Peru's mining conflicts made country's total social issues climb to 225 in May," *Mining.com*, 13 June 2014.
6. "South Africa platinum miners consider new union offer to end strike," *Wall Street Journal*, 4 June 2014.
7. "SA engineering strike latest blow to sickly economy," *Engineering News*, 1 July 2014, http://www.engineeringnews.co.za/article/sa-engineering-strike-latest-blow-to-sickly-economy-2014-07-01, accessed 1 July 2014.

a need for improved metrics and case studies to enable companies to show that they are managing community outreach systematically and inclusively. It will also provide them with the evidence to prove they are delivering benefits to the community.[8]

There is a move to restore shareholder confidence in the sector by earmarking the majority of excess cash – after investments – in the near term for return to shareholders. In addition, there is a focus on delivering value to shareholders by improving margins. Higher productivity businesses are more robust businesses and are better placed to cope with lower commodity prices.

Consideration: Communicating a broad view of shared value and benefits

Proactive communication of shared value from mining and metals projects to all stakeholders is vital. Stakeholders do not always understand that shared value is not just monetary, i.e., wages and community donations, but it also encompasses the full range of benefits. This includes socioeconomic contributions, such as providing employment, local purchases and transfer of technology from global mining and metals companies. Project revenues also provide a substantial catalyst for development within countries via infrastructure and value-added processing.

In addition, corporate sustainability agendas include programs to improve health, education and skills of employees and communities. Companies play a role in building institutional capacities in developing countries through support for research and development and funding for universities. Support is also given to improve mining policies, legislation and guidelines. Public recognition of this corporate contribution is vital in demonstrating the sharing concept in action.

Consideration: Owning transparency and accountability

While there is no perfect ownership model that will appease all stakeholders, increased transparency by mining and metals companies helps generate trust with stakeholders. Lack of transparency in payments to governments and communities, equity arrangements with landowners, as well as equity returns to investors can lead to widespread community activism and loss of significant revenues to the country due to unreported payments.

The adoption of the Extractive Industries Transparency Initiative (EITI) standards is growing as countries seek to gain increased transparency in the extractive industry. Decisions to join the EITI have been largely underpinned by economic motivations. Transparency leads to better contracts and better deals and builds trust. So far, 42 countries[9] have joined the initiative, with the US recently joining and the UK planning to submit their candidacy this year.

Together with mining and metals companies, governments should work to increase transparency in mineral development contracts. This also helps ensure that communities have greater visibility of equity returns. Governments need a credible, concise and explicit program to detail payments to and from stakeholders. There is also a need for transparency in donations made by mining and metals companies, thereby ensuring local communities get a fair share.

There is an onus on governments to implement effective and transparent regulatory frameworks both at the national and regional level. An effective framework will not only prevent the wholesale departure of profits from the country, but also facilitate the sharing of tax revenues among central, regional and local governments. It will ensure that adequate return is received by communities around mining projects.

In addition, governments also have a role to play in managing resource rents effectively for future investment (e.g., investing in a future fund) and thereby mitigating some of the risks of commodity price fluctuations. This also takes into account the fact that mines will close and provide benefits to communities for a longer period than the life of mine.

Companies also need to provide shareholders with transparency in the rigor of decision-making processes on investments to provide shareholders with confidence in their long-term value.

Outlook

By 2017, deficits are forecast for a number of commodities. Dwindling reserves due to the effects of current mothballing/lack of capital will create a shortage in the market, implying a recovery in commodity prices. Mining and metals companies need to work to build credibility and trust with all stakeholders now to manage how these increased benefits are best shared.

Transparency initiatives have thus far been voluntary, but transparency rules are being enacted in the EU and the US. And unlike the EITI measures, new EU and US rules will eventually have strict legislative measures behind them.[10]

8. "Mining Indaba focuses on the new science of stakeholder outreach," *The World Bank*, 12 February 2014, via http://blogs.worldbank.org/energy/mining-indaba-focuses-new-science-stakeholder-outreach.

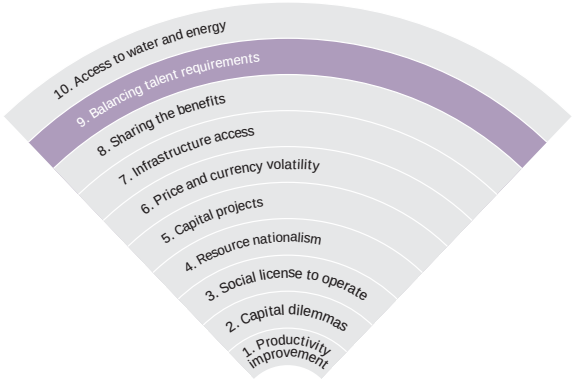
9. "Transparency: Voluntary disclosure group expands influence – slowly," *Energy Compass*, 4 April 2014.

10. "Transparency: Voluntary disclosure group expands influence – slowly," *Energy Compass*, 4 April 2014.

09

Balancing talent requirements

(5 in 2013)

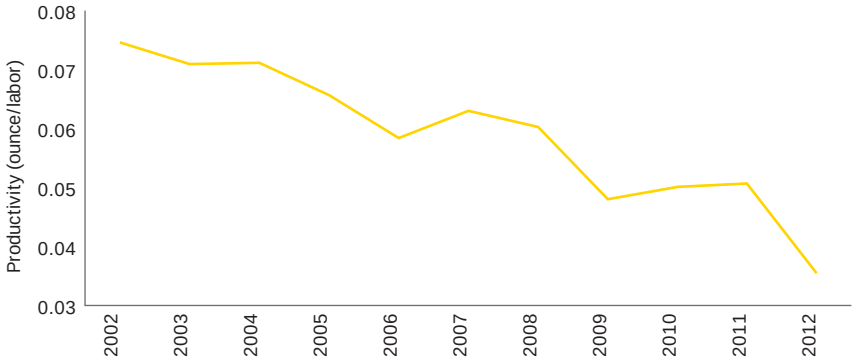


Key thought

The skills shortage risk has become more complex and is no longer a universal concept across the sector. It is now a matter of balancing the needs of an advancing industry against the skills that exist and investing in those of the future to avoid it becoming acute in the next cycle.

A two-needs economy

The structural skills shortage still exists, despite the temporary relief that it has been afforded through declining commodity prices and project closures. The sector is battling demographics on the back of an aging population (in countries such as Australia, Russia and Canada) and the remoteness of operations (on continents such as Africa and South America). In addition, the sector is currently viewed as an unattractive career option for young graduates or professionals as it is in cyclical decline, which further thins out the talent pipeline.



Source: AngloGold Ashanti, EY

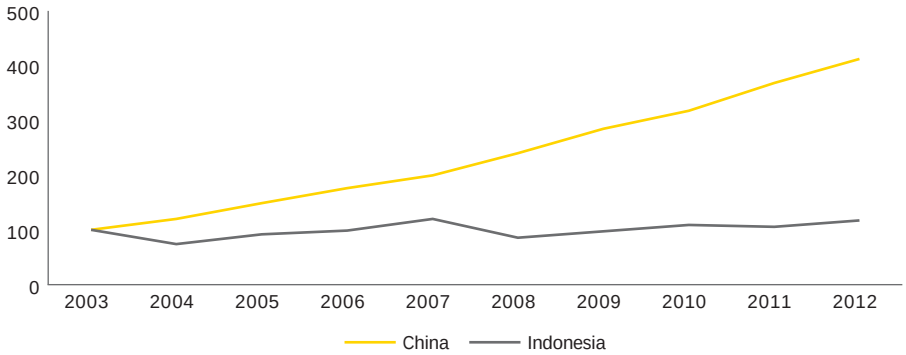
Challenges companies face in competing for skills

- Availability: The lack of sufficient, suitable candidates for middle and senior management is set to increase. Competition within the sector for talent will result in additional training needs of candidates who are not quite as skilled as the job requirements (a familiar situation over the past decade).
- Costs: Costs are both direct and indirect. Direct costs include sunk costs related to training and severance pay, and indirect costs include training costs for new hires or higher compensation to re-attract and induct talent when the market outlook improves.
- Productivity: Productivity may slump if semi-to-unskilled people are used for skilled positions. For instance, the mining labor productivity index in Australia has declined for the past 11 years[1] because of high cash costs employed to produce a tonne of material. These have nearly doubled since 2005.[2] The labor productivity (output per labor employed) for AngloGold Ashanti declined steadily during 2002 to 20.[3]

While much of the analysis of labor in mining and metals focuses on gross employment, which is undoubtedly shrinking, this perspective is too broad and simplistic. Rising real wages in previous low labor cost jurisdictions, such as China, South Africa and Indonesia, are fundamentally changing the mine planning in these regions. This is resulting in more capital being substituted for labor, and consequently the new labor is required to be more skilled. These skills are those experiencing the greatest shortage.

1. "Skills shortage blocks mining boom benefits," *ABC News*, 20 March 2013.
2. "2014 Mining Insight: Mining productivity [opinion]," *Mining Australia.com.au*, 1 April 2014.
3. Other reasons include the decline in ore grade and increase in the depth of the mines.

Real wage index in the mining sector (indexed, 2003 = 100)



Source: National Bureau of Statistics of China; Statistics Indonesia

Dilemma: Short term and unskilled

Lower commodity prices, weaker demand growth and the suspension of some high-cost operations mean that mining and metals companies are experiencing less pressure on labor requirements in the short term as they reset their work force to maintain profitably. In addition, there is also a softening of employment conditions due to the completion of some large development projects as mines transition from a construction phase to a less labor-intensive operational phase. In fact, growth in mining employment is in a steady decline after hitting a high of about 20% year-on-year (y-o-y) in 2011.

Cutting of muscle

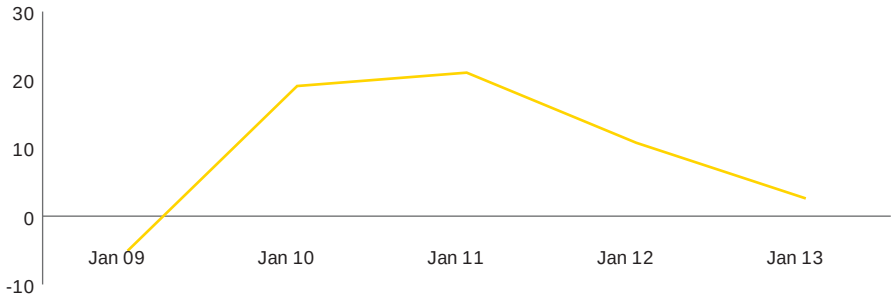
With lower mineral prices putting pressure on margins, the short-term focus of the global capital markets has rewarded indiscriminate cutting of costs. In a large number of instances, this has led management to lay off workers that will be difficult to rehire in the next cyclical upswing. To our knowledge, very little cost-benefit analysis has been done on skills retention.

Major reductions in work force 2013–14

Company	Country	No. of employees
Amplats	South Africa	3,300[4]
AngloGold Ashanti	Ghana	400[5]
Barrick Gold	Peru	155[6]
BHP Billiton Mitsubishi Alliance	Australia	230[7]

4. "Amplats is to give notice to 3,300 workers on Monday," *FSP Invest*, 30 August 2013.
5. "AngloGold to cut Ghana mine jobs in mechanising efforts," *Business Day*, 3 October 2013.
6. "UPDATE 6-Barrick to shelve Pascua-Lama, *issue shares to cut debt*," *Reuters*, 31 October 2013; "More layoffs at Barrick Gold," *Mining.com*, 25 June 2013.
7. "BHP Billiton Mitsubishi cuts 230 jobs at Qld mine," *The Wall Street Business*, 7 February 2014.

Annual growth in mining employment in Australia (y-o-y %)



Source: Australian Bureau of Statistics

This does not necessarily mean that the industry has an adequate supply of critical skills as this cycle is creating a structural change in mining employment. The critical skill shortages exist in another pool of talent altogether.

Dilemma: Long term and skilled

An increased focus on improving productivity and a move toward automation, mechanization, data analytics and contract negotiation means that there is an increasing level of sophistication in the operations of mining and metals projects. In addition, there has been a more proactive approach toward stakeholder management that has seen the introduction of roles, such as government relations and community engagement. With this comes the need for a more skilled subset of the work force within the sector.

Finding the right people to fill these roles is compounded by the high rates of employee turnover in the sector and the time it takes to fill jobs at middle and senior management (8 to 10 years of experience). The younger segment of the work force does not stay in the mining industry for more than two to three years.[8] According to the former South African Minerals Minister, Susan Shabangu, the industry loses more than half of technical graduates to other sectors of the economy in the first five years of employment. This figure increases to more than 70% in 10 years of employment.[9] This leaves this portion of the labor force in short supply.

Mining and metals companies are also battling demographics in keeping their skilled work force. The aging population means that many skilled employees are reaching the age of retirement. According to the Canadian Mining industry Human Resources Council (MiHR), roughly 20% of the Canadian mining work force is eligible to retire by 2016–18, whereas 6% are currently eligible to retire. The aging work force is highlighted by the expected rise in retirement age in Canada from 2.2% in 2013 to 2.8% in 2023, an increase of 27%.[10]

Future skills needs

Despite current conditions, forecasts show that a skills shortage is still likely to occur during the next upswing of commodity prices. The Minerals Council of Australia has predicted the need for an additional 86,000 mining professionals and skilled mine workers by 2020.[11] In Canada, about 145,000 workers are required by 2023, which would be approximately half of the current work force employed in the sector.[12]

8. "Annual report 2013," AngloGold Ashanti, 2013.

9. "Mining industry - The skills myth," *Financial Mail*, 6 December 2012.

10. "Canadian Mining Industry Employment, Hiring Requirements and Available Talent 10-year Outlook," *MiHR website*, http://www.mihr.ca/en/resources/Hiring_Requirements_Available_Talent_10_year.pdf, accessed 2 June 2014.

11. "Mining's graduating workforce: A plug for the skills shortage drain," *Mining Australia*, 21 March 2013.

12. "Canadian Mining Industry Employment, Hiring Requirements and Available Talent 10-year Outlook," *Mining Industry Human Resources Council website*, http://www.mihr.ca/en/resources/MiHR_10_Year_Outlook_2013.pdf, accessed 2 June 2014.

Outlook

The nature of the risk has changed and is focused more on skilled than unskilled workers. A solution to the issue is beyond the control of an individual company, and it requires the industry participants to change how they think about their business individually and as a sector as a whole. The key is to learn from the last upswing and plan ahead, using a more holistic framework that involves all stakeholders. Being more forward looking and considering skills retention for the next cyclical upswing will help manage volatility and lessen the permanent loss of skills from the sector. The solution lies in collaboration among the industry, various governments and academic institutions. While the current economic climate does ease some of the near-term pressure on the sector, the longer term risk of a shortage of critical skills and attrition still remains.

Mining leaders need to be forward looking and invest in a company's future capability needs. To manage skills through different phases of the commodity price cycle, mining and metals companies can invest in more effective and efficient ways of engaging their staff irrespective of where they are in the world.

Considerations

Productivity recapture: In the age of big data, industry can analyze and address specific challenges and bottlenecks to labor productivity. The mining and metals industry needs to identify operational productivity protocols that utilize labor more efficiently and utilize data analytics to generate actionable insights.

Critical role of human resources: The most cost-effective and logical role is to retain and develop your existing talent pool. This can be done through employee engagement, benefits and perks, including flexible benefits, variable pay, flexible work schedules, skills management and development, extended retirement, improving mid-career engagement, and providing a compelling value proposition. Organizations can also target the knowledge development of the workers and enhance retention through training, upskilling and redeployment.

Diversity and inclusiveness: The mining and metals industry can further plug its skills gaps by considering and attracting a more diverse group of talent such as women, indigenous and immigrants who are still under-utilized and under-represented in the sector.

A mobile immigrant work force can also be used to fill the skills gaps in knowledge occupations such as professional geoscience and engineering.

The retiring or sunset labor pool should be encouraged to either stay on for longer or mentor less-experienced colleagues in the sector.

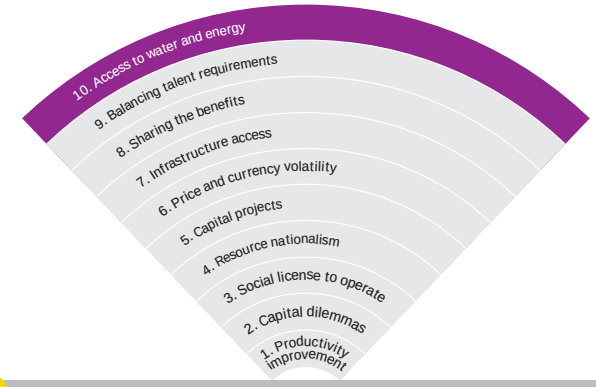
Willingness to invest in vocation and tertiary funding in the face of volatility: Organizations should not underinvest during the down cycle as this is a short-term strategy. Industry can coordinate and collaborate with educational institutions to develop technician training schemes or specific post-graduate qualifications that include practical industry internships. The idea is to be prepared for the demand of highly skilled and middle- to senior-level management professionals during the next upswing in the commodities market.

Accessing people from aligned sectors: Companies can continue to tap into skills from similar sectors such as oil and gas, engineering, construction and manufacturing that require complimentary skills. Targeting resources in these sectors can create a widening resource pool of technical (e.g., electrical trades, fitters and turners) and professional (e.g., civil and mechanical engineers) skills.

10

Access to water and energy

(12 in 2013)



Key thought

Burgeoning energy costs and competing water demands are beginning to hurt both opex and ability to operate. An end-to-end approach needs to be adopted, and renewables is a large part of the future.

Competing or depleting

Accessing water and energy is an essential part of operations for mining and metals operations, and is becoming increasingly difficult and expensive in many regions of the world. In 2013, mining companies spent US$11.9b on water infrastructure globally – an enormous 250% increase from US$3.4b in 2009.[1] Likewise, global energy prices have leapt by 260% since 2000.[2]

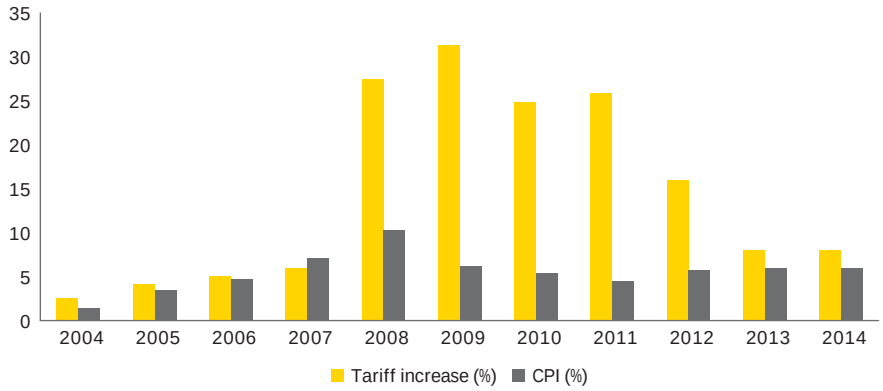
Dilemma: Increasing capex

The mining and metals sector faces increasing fuel prices while commodity prices tighten, resulting in ever-narrowing operating margins. These high energy costs are impacting the competitiveness of the industry as costs escalate. In Chile, electricity costs have increased by 11% a year since 2000, making it one of the most expensive mining regions in terms of securing energy. Rising residential energy demand, combined with underinvestment by utilities in South Africa, means a loss of competitive advantage as a low-cost energy location. South African mining companies are struggling to adapt their consumption patterns and mining methods, resulting in substantially higher electricity bills and notable margin erosion. In 2013, the National Energy Regulator of South Africa (NERSA) granted Eskom an 8% average increase per annum over the next five years. Despite these tariff increases being lower than those in the previous few years, they continue to be higher than inflation.

The large amounts of capital expenditure required in developing the necessary water and energy infrastructure is a limiting factor in developing some of the world's richest mineral deposits. For instance, several large projects have shelved development plans, including Barrick Gold's Casale project,[4] Goldcorp's El Morro project and Teck's Relincho project.[5]

Alternative water sources, such as desalination facilities, and pipelines to transport water over long distances are expensive; for example, the Escondida

South African electricity tariff increases versus inflation



Source: Eskom[3]

1. "Water: critical resource and costly risk for miners," *Mineweb.com*, 30 May 2013.

2. "Decoupling technologies, opportunities and policy options," United Nations Environment Programme, 2014, http://www.unep.org/resourcepanel/Publications/AreasofAssessment/Decoupling/Decoupling2/tabid/133371/Default.aspx, accessed 1 July 2014.

3. "Pricing documents," *Eskom website,* http://www.eskom.co.za/CustomerCare/TariffsAndCharges/Pages/Average_Price_Increases.aspx, accessed 18 June 2014.

4. "Water Shortage Confronting Global Mining Industry," *RWL Water Group*, 1 May 2013.

5. "Chile's Mining Sector Seeks Solutions to Water, Energy Problems in 2013," *OOSKAnews*, 2 January 2013.

seawater desalination plant will cost US$3b.[6] The large, globally diversified companies, such as Rio Tinto, Anglo American and BHP Billiton, have the requisite expertise and financial strength to build these complex water procurement systems for large-scale projects. They are likely to emerge as the partners of choice in water-scarce countries seeking to exploit their natural resources as a result. However, smaller companies, particularly those with single-mine operations in water-scarce regions, such as South America, are the most vulnerable. This is because they are likely to have the greatest exposure to event risks but have limited financial and technical resources at their disposal to deal with them.

Dilemma: Unreliable access to energy

In addition to the increasing cost of energy, there has been an unreliable power supply from the grid with uncertain power prices. In most instances, grid-connected electricity needs to be supplemented with on-site generation, typically large-scale diesel generation, resulting in a dependency on diesel fuel.

The more remote the mine, the more likely off-grid power solutions are required, e.g., the majority of Chile's mines are located in remote locations at altitude in the North of the country. Much of Chile's remaining hydro potential is located in the South of the country, far from the mines and the urban center of Santiago and not currently linked to the transmission network, and any proposals to date to link them to the network have been extremely politically unpopular. This is increasingly mirrored for operations around the world.

6. "Desalination plant," *Mining Weekly*, 26 July 2013.

Dilemma: Impact on social license to operate

In emerging and frontier countries, the risk is amplified as mining and metals companies have to compete with both governments and communities for these scarce resources. Failure to carefully manage a mine's use of water and energy may jeopardize the industry's SLTO.

Poor environmental risk management can lead to water contamination and resulting community backlash. This can lead to production stoppages, protests, fines and license withdrawals. For example, in Peru, the Tia Maria copper project and Minas Conga copper and gold project faced overwhelming community opposition over local residents' concerns about the impact of the projects on local water supply. It caused suspension of work at the mines and a large loss of tax revenue for the Government. Anti-mining former presidential candidate Marco Arana declared: "We all know that neither Conga nor Tia Maria have obtained social licenses nor the sufficient environmental basis with which to proceed."[7]

Consideration: Improve water management

An efficient water management framework is essential and needs to be considered across all development and operational processes, including preliminary approvals, production, de-commissioning and closure. Such a framework and its practices must aim to minimize contamination and optimize consumption. Companies need to find innovative methods to find a balance between regulatory compliance and cost savings.

7. "Billions of dollars worth of Peru mining projects to resume soon," *Mining.com*, 22 September 2013, http://www.mining.com/conga-and-tia-maria-to-resume-soon-peruvian-government-20420/, accessed 1 July 2014.

Consideration: Take a strategic approach to energy

It is not about choosing either renewables or conventional energy but using the complimentary characteristics of both energy types to optimize energy spend and energy risk profile. To better understand their energy profile, companies should understand:

- Their company-wide strategic approach to energy
- Whether it is more economical to generate energy on-site in some locations
- The available incentives being secured and the optimal financing structures being deployed

Consideration: Harness renewable energy

The sector is increasingly evaluating renewables as a possible source of cost-effective and reliable energy. Many of the world's largest mining companies are evaluating greater use of renewable energy plants – a trend set to intensify rapidly – as part of a broader strategy to lock in long-term fixed electricity prices and availability while minimizing exposure to regulatory changes, market pricing and external fuels. For example, Rio Tinto has enlisted First Solar 1.7 megawatt (MW) solar-diesel hybrid energy plant in Australia to offset its diesel consumption.[8] Codelco has replaced 85% of diesel demand with 51.8GWh solar thermal energy at one facility.[9]

8. "Rio Tinto to implement solar power at QLD mine site," *Australian Mining*, 22 May 2014, http://www.miningaustralia.com.au/news/rio-tinto-to-implement-solar-power-at-qld-mine-sit, accessed 1 July 2014.

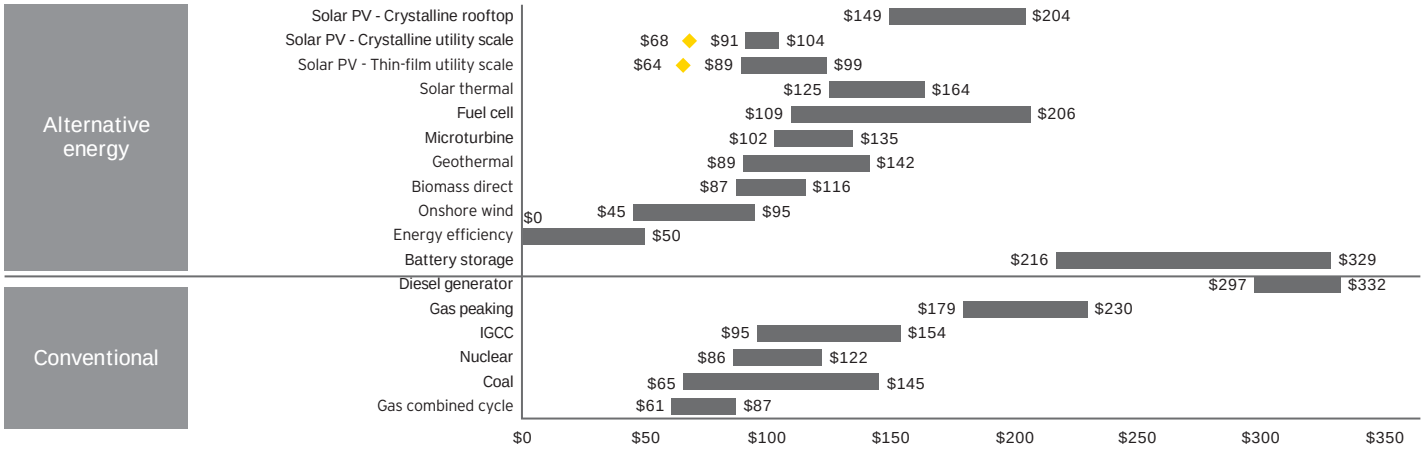
9. Elizabeth Judd, "Why solar is a good fit for mines: A Codelco case study," *Canadian Clean Energy Conferences, 2013*, via Renewables and Mining.

There is a growing understanding that renewable energy needs to become core to operations as it can potentially increase the acceptability of a project, both in terms of environment regulations and social acceptance.

Costs for renewable energy sources, such as solar and wind, have declined dramatically over the past decade, whereas the cost of accessing conventional energy sources has been increasing, especially in remote locations, thereby making renewable energy an increasingly compelling financial choice for large corporations. In a growing number of markets, renewable energy is cheaper than conventional sources.

In Chile, the mining industry is responsible for about 36% of the country's electricity consumption,[10] with electricity consumption in the country expected to grow by 6% to 7% per year until 2020. Consumers in Chile pay some of the most expensive electricity prices in Latin America[11] because of a reliance on fossil fuels and an import restriction from gas-rich Argentina. This has made harnessing renewable energy an essential strategy for the mining and metals sector as both wind and solar energy are cheaper than the long-term wholesale electricity projects in Chile. It also reduces transmission issues through on-site or near-site renewable production, including off-grid production in the remote Atacama region. This could also reduce water consumption for thermal generation, lower fuel transportation costs and ensure a regular and affordable power supply. An abundant wind resource along Chile's lengthy coastline and some of the highest insolation rates in the world seen in the Atacama Desert region mean there is plenty of potential for renewable investment.

Cost of energy comparison



Assuming: US$4.50/MMBtu gas; US$1.99/MMBtu coal; US$4/gallon diesel
Source: Lazard

10. "ClimateScope 2013 – New frontiers of low-carbon energy investment in Latin America and Carribean," *The Multilateral Energy Fund and Bloomberg New Energy Finance*, 2013.
11. Ibid.

Consideration: Be innovative

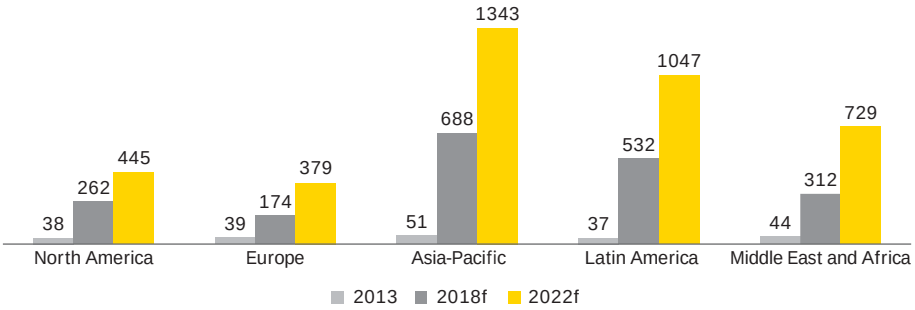
There is an increasingly urgent need for the industry to innovate and establish less water and energy intensive processes. This would include the use of hydrometallurgical systems that consume less water and energy, and produce tailings that are environmentally benign.

Outlook

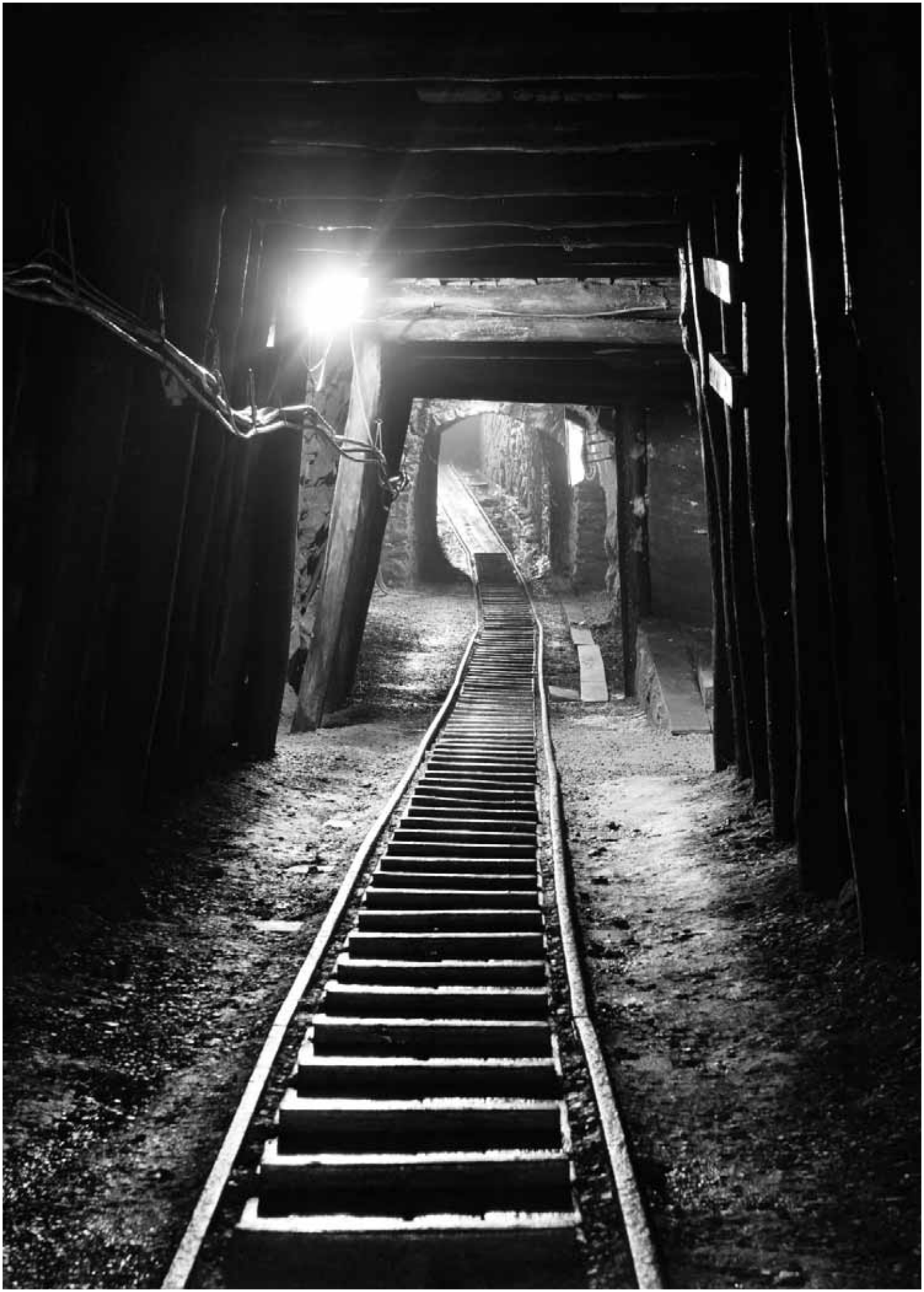
As global demand for energy is expected to increase 36% by 2035, this risk is compounding year by year, with the sector facing higher energy price increases and volatility. Managing costs sustainably is a priority. As the cost of renewable energy declines, the mining and metals industry will increase its reliance on renewables. The shift toward a resource-efficient and low-carbon operation can ensure community acceptance.

Water scarcity is an issue that demands a strategic and practical response from businesses to develop and implement solutions. Companies that treat water risks as a strategic challenge will be far better positioned in the future. This means assessing dependence on water and future supplies, and developing plans to cope with increased prices and possible shortages. Mapping water risks within the whole supply chain remains a key challenge. Going forward, a widely accepted water accounting framework may improve capability of the industry to report sustainable use of water resources, in a consistent and contextual manner, while enabling benchmarking of operations to identify potential efficiency measures.

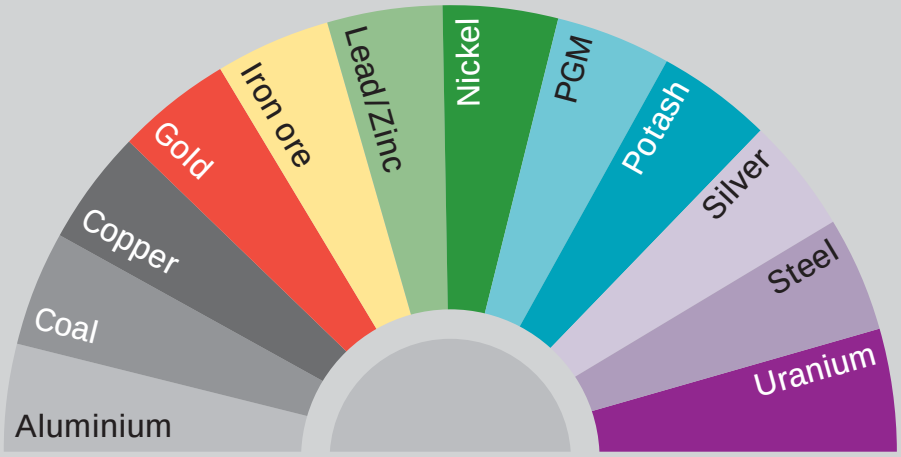
Renewable energy investment in the mining industry (base case, US$m), 2013–22



Source: "Mining: the growing role of renewable energy," Global Cleantech Center, EY, 2014.

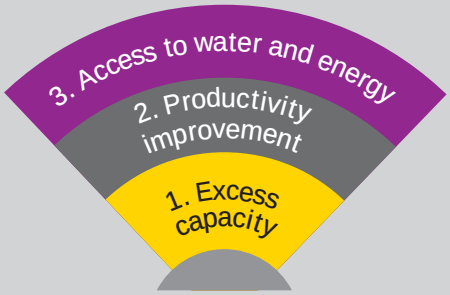


Top risks for commodities



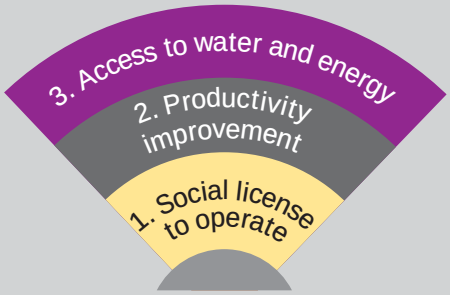
The top three risks for each commodity draw out the issues that are especially pertinent to that commodity. The number one risk, productivity improvement, features prominently as one of the top risks for many commodities as producers seek to address the significant decline in productivity across the industry. In base metals and bulk materials, in particular, oversupply is also fuelling the push for greater productivity as prices decline and producers are feeling increased pressure on margins as a result. Many producers have been, and will continue to, reassess their

Aluminium



Coal

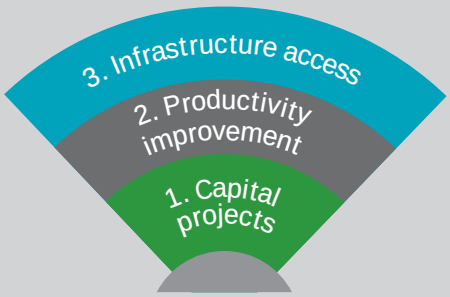
Copper



Nickel

PGM

Potash



portfolios and consider either deferring high cost projects or divesting non-core assets.

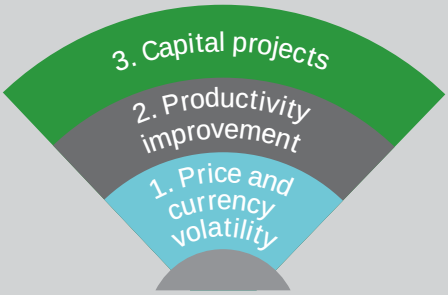
Access to energy and water, the new risk in our top 10 this year, is also impacting a number of commodities – including copper and aluminium. As energy and water costs increase, these producers will have to start looking to renewables to keep costs under control.

Resource nationalism features prominently, particularly in light of the Indonesian ban on ore and concentrate exports which has reverberated across a number of commodity markets. The ban has shifted the supply-demand balance in both nickel and copper.

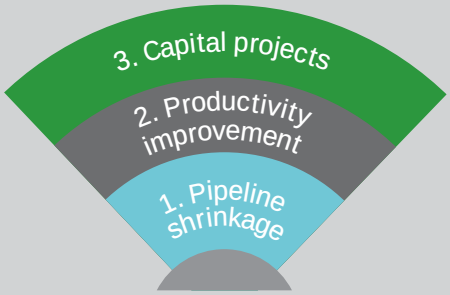
Excess capacity remains the number one risk for steel and aluminium. In view of continued low aluminium prices, producers have started a fresh round of production cuts, as well as shelving or delaying new capacity in an effort to reduce excess production. Steelmakers continue to closely manage their capacity utilization.

Gold

Iron ore

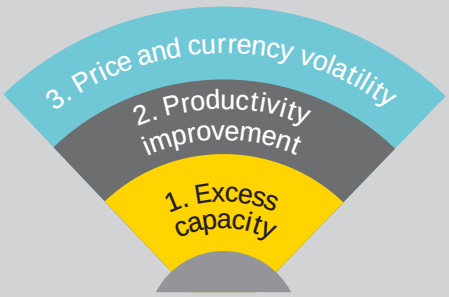


Lead/Zinc

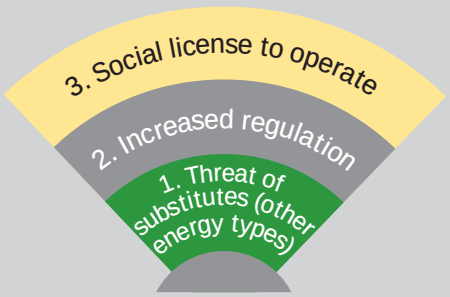


Silver

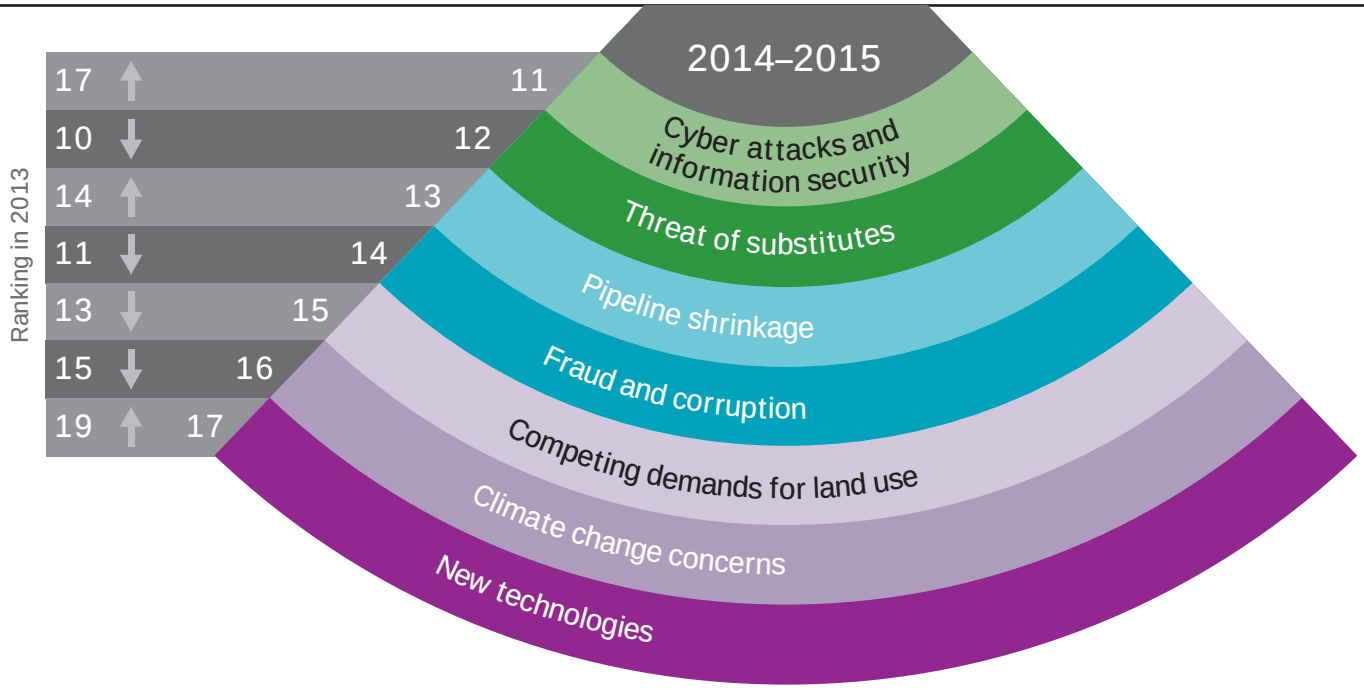
Steel



Uranium



Under the radar risks



↑ Up from 2013 ↓ Down from 2013 — Same as 2013

11 Cyber attacks and information security

(17 in 2013)

Key thought

The full potential of this threat has just started gaining momentum.

More than 75% of our clients in mining and metals cite cyber threats as their top security priority in 2013–14, with 41% of the mining and metals respondents experiencing an increase in external threats over the past 12 months[1] while the World Economic Forum names cyber attacks among the top-five likely global risks.[2] In response to this threat, the US Government has made cybersecurity a priority and has asked military services to contribute manpower toward a new force of "cyber warriors."[3] Cyber crimes come in many forms such as industrial espionage, intellectual property (IP) theft, cyber hacktivism, online scams, customer data theft, extortion, identity theft and money laundering.

To increase transparency around this threat, security exchanges have introduced regulations directing companies to disclose data breaches. For example, the US Securities and Exchange Commission (SEC) has guided companies to report breaches that are likely to affect investor decisions.[4] The European Union and Asia have started to introduce similar breach notice laws.

Businesses can no longer afford to take cybersecurity just as a compliance exercise and a cost burden. The mining and metals industry needs to approach the issue of cyber hacking and cybersecurity with the same seriousness as it took health, safety and environment issue in the last decade. There is a historical legacy in mining and metals companies that information technology (IT) came under the responsibility of the chief information officer (CIO) whereas operational technology (OT) production control systems were often the responsibility of the relevant technical function. Now, the better practice is that responsibility for the security, maintenance and integration of IT and OT should be managed by the CIO.

12 Threat of substitutes

(10 in 2013)

Key thought

Substitution is a risk for all commodities and all operators.

The progress in technological innovation across downstream industries and commodities has proved that no commodity is beyond substitution. The recent supercycle that led to high commodity prices had sowed the seeds of technical innovation to find or use low-cost substitutes. Other drivers that promote substitution, and potentially disrupt the existing business models, are regulatory change and environmental concerns. The following trends highlight the growing challenge some of the commodity manufacturers are facing.

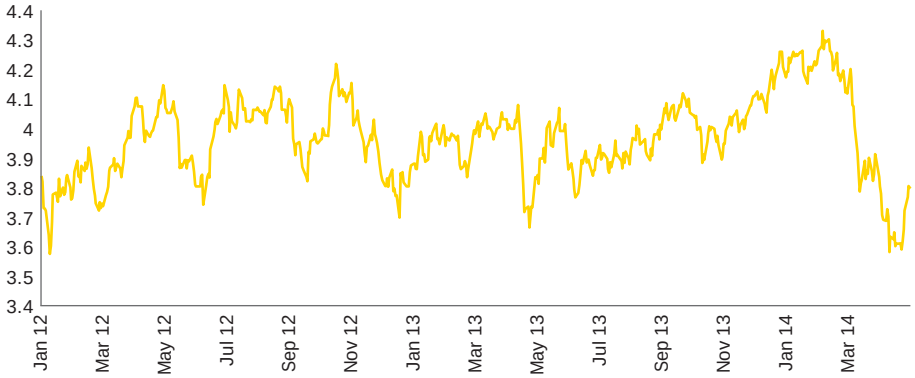
1. Gas and met coal: The steel business model is facing a challenge from within the industry. South Korean steelmaker POSCO could potentially alter the dynamics of the steel market through its ITmK3 technology, which does not use metallurgical coal for producing virgin steel. The companies that have heavily invested in coking coal assets could be required to alter their business model once this technology opens up for the wider market in 2015 upon expiration of the patent. Low-cost gas and DRI (direct reduction iron) are also met coal-free alternatives.
2. Coal-to-liquids (CTL) and petroleum: CTL is a process of coal liquification which allows coal to be utilized as an alternative to oil. In South Africa, CTL fuels are not only used in cars and other vehicles, but CTL fuels produced by South African energy company Sasol also have the approval to be utilized in commercial jets.[5] India-based steel manufacturer Jindal Steel and Power (JSPL) is investing INR550b to set up a CTL plant in Odisha, India. The investment will allow JSPL to produce methanol, petrol and diesel from coal.[6]
3. Aluminium and steel: Steel was thought to be irreplaceable in car manufacturing due to its strength and durability. However, with innovation in aluminium, cars are increasingly made from aluminium, including engines and drive shafts. This makes the cars lighter and more fuel efficient. According to Alcoa, aluminium usage in car manufacturing is expected to double by 2025. In recent examples, Ford is manufacturing its F-150 pickup truck and Toyota its 2018 Camry using aluminium instead of steel in a bid to lighten the weight and thus improve fuel economy.[7]

1. *Global Information Security Survey 2013*, EY, 2013.
2. "Global risks 2014 – ninth edition," *World Economic Forum*, http://www3.weforum.org/docs/WEF_GlobalRisks_Report_2014.pdf, accessed 30 May 2014.
3. "Obama Says Cyberterrorism Is Country's Biggest Threat," *International Business Times*, 18 February 2014.
4. "Disclosing Cyber Security Incidents: The SEC Weighs In," *Forbes*, 4 June 2012.
5. "Coal to Liquids," *World Coal Association*, http://www.worldcoal.org/coal/uses-of-coal/coal-to-liquids/, accessed 23 May 2014.
6. "JSPL to soon tie-up technology partner for Angul CTL plant," *Moneycontrol.com*, 14 March 2013.
7. "Ford's Aluminium F 150, What Took Them So Long?," *Forbes*, 27 December 2013; "Will aluminum Ford F-150 be a rolling beer can?," *USA Today*, 31 December 2013.

4. Coal and shale gas: The most pertinent risk of substitution was the increasing penetration of shale gas in the US for thermal coal. Coal's share of power production slipped from 50% in 2002 to 33% in 2012, whereas that of shale gas improved from 18% to 30% over the same period.

5. Aluminium and copper: Until recently, the premium in copper prices put the metal in significant risk of substitution in roofing, plumbing tubes, refrigeration, air conditioning and computer chip interconnects. Aluminium is increasingly used to replace copper in automotive precision tubing to reduce vehicle weight. Price differential is the main driver for copper substitution, with copper being nearly four times as expensive as aluminium. Other drivers include the development of the aluminium–zirconium alloy by companies such as Rusal and Alcoa,[8] which can withstand extreme cold and snowfall, to be used in power transmission line manufacturing instead of copper.

Copper to aluminium price ratio



Source: Thomson Datastream

Those most at risk are single-commodity organizations or organizations in which one commodity dominates the product mix or profit share. Mining companies have to consider a diversification strategy along with not aiming to invest for a very long term without taking equivalent risk mitigation measures. Is it so strange to think that steelmakers may also smelt aluminium as customer-focused metal producers? It is imperative that players strive to be in the low quartile of the costs so that even if the market changes, they would have business continuity to respond.

13 Pipeline shrinkage

(14 in 2013)

Key thought

A long-term supply risk due to the short-term investment environment.

There has been a notable drop in exploration spend, with global nonferrous metals exploration budgets falling from US$21.5b in 2012 to US$15.2b in 2013 – a 29% decline.[9] This is due to the capital discipline employed by several companies to arrest margin decline, as well as the general drought of affordable risk capital for the juniors who undertake most of the exploration. Projects have either been stalled and exploration deferred. For instance, Anglo American's Michiquillay copper project in Peru or Uranium One's Honeymoon mine in Australia.[10]

The change in investor sentiment and risk appetite has also contributed to this, and has especially impacted the junior explorers' ability to raise sufficient capital for projects. Many of these companies are in survival mode until conditions improve, operating on skeletal resources to stay afloat. In the current low-risk environment, it seems unlikely that companies will increase exploration spend in the near term. And the lack of exploration today will limit discoveries tomorrow and production in the years to come. This is going to have a large impact on the growth of the mining industry and supply in the long term.

8. "Aluminium spearheading substitution of costly copper," Business Standard, 9 October 2012

9. "Annual World Exploration Trends 2014 Report," *SNL Metals & Mining*, 2 March 2014.

10. "Uranium One Steps Away From Honeymoon," *Nuclear Intelligence Weekly*, 15 November 2013; "INTERVIEW-Anglo American may exit Peru copper project to save money," *Reuters*, 7 April 2014.

14 Fraud and corruption

(11 in 2013)

Key thought

An enduring threat that will never abate, it will just become better managed.

In a lower margin environment, executives are expected to deliver improved financial performance with less capex. This bolsters the growing risk that bribery or other unethical practices may be used to win business. According to the *EY Fraud Survey 2013*, respondents gave a concerning picture about the prevalence of unethical practices in their respective countries. In rapid growth markets, 67% thought bribery and corrupt practices were widespread, whereas only one-third believed the same in mature markets.[11] Most major mining and metals companies are now operating in emerging countries where laws regarding corrupt practices and their enforcement are comparatively weak. For instance, the Democratic Republic of the Congo (DRC), which is ranked 154 out of 177 in Corruption Perceptions Index 2013,[12] made it to the top-10 investment destinations in terms of total global budget for nonferrous metals exploration in 2013.[13]

Over the past few years, countries have developed measures to enforce actions related to unlawful activities. New laws, such as the UK Bribery Act, US Dodd–Frank Act and Canada's CFPOA, are impactful and have helped identify individuals involved in corrupt practices. In addition, companies are engaging in more robust anti-bribery and corruption due diligence as they evaluate new licenses or acquire other companies. As many bribery and corruption incidences relate to third parties, companies are also automating vendor due diligence and focusing on the business reason to employ a particular agent or consultant. However, risk exposure is still elevated in emerging countries, and far more effort is required by top management to create a framework that mitigates fraud and corruption without hindering the growth prospects of the company.

15 Competing demands for land use

(13 in 2013)

Key thought

Competing with traditional land users will never be popular.

Land access remains a significant risk to the sector that often faces community opposition over environmental concerns and land usage, with the resulting national and local governing laws becoming more stringent about land use. This opposition can increase start-up costs and cause significant delays to operationalizing a project. The issue is compounded in emerging markets where a larger number of people are dependent on the land.

Land management is critical for companies due to its impact on biodiversity and increased scrutiny by regulators, local communities, investors and non-government organizations (NGOs). For instance, POSCO has not been able to begin construction of its steel plant in Odisha, India because of local resistance to land acquisition, leading to a reduction in the steel plant's slated capacity from 12MTPA to 8MTPA.[14] In other cases, steel companies ArcelorMittal and Monnet Ispat have had to pull out of projects in Karnataka and Jharkhand, India because of deferrals in land acquisitions.[15] Accordingly, companies are focusing on measures to offset or minimize the impact of their operations on biodiversity. For example, BHP Billiton established a five-year alliance with Conservation International to preserve areas of high conservation value, in collaboration with local partners. The alliance aims to deliver lasting benefits to the environment, with Conservative International providing technical expertise to BHP Billiton.[16]

11. *Navigating today's complex business risks, Europe, Middle East, India and Africa Fraud Survey 2013*, EY, 2013.

12. Corruption Perceptions Index, http://countryeconomy.com/government/corruption-perceptions-index#, accessed 19 May 2014.

13. "Global exploration budgets down 29% in 2013," *Mining.com*, http://www.mining.com/global-exploration-budgets-down-29-in-2013-24176/, accessed 19 May 2014.

14. "Posco land acquisition over, not the problems," *The New Indian Express*, 5 July 2013.

15. "No country for foreign steel companies?," *The Hindu Business Line*, 24 July 2013.

16. BHP Billiton Sustainability Report, EY, 2012.

16 Climate change concerns

(15 in 2013)

Key thought

A sustainable operating model will become an essential part of the strategy.

Mining and metals companies are constantly under scrutiny by regulators, external stakeholders, local communities and activist NGOs to adopt a more sustainable approach to operations. Climate change concerns have increased the sensitivity of all the stakeholders, resulting in legal or punitive action on the companies. The impact is not only on the performance and brand image of the specific company, but also on the industry and employees. For example, activist NGOs such as Greenpeace are advocating an anti-coal stance due to the claimed negative impacts of coal mining and usage. Such opposition has resulted in stalling or delaying several coal-based projects across the world. For example, the Mahan coal block in Madhya Pradesh, India has faced resistance since 2013.[17] In another example, the US-based Environmental Protection Agency (EPA) plans to impose new regulations on carbon dioxide (CO2) emissions from power plants that use coal. The regulation proposes existing coal plants cut 30% of their CO2 emissions by 2030. Though intended to reduce the country's carbon footprint, it is expected that the necessary investments will cost roughly US$8b per year, which would push the cost of electricity up, resulting in job losses and slowdown in business growth due to lack of affordable, reliable electricity.[18]

In China, to address rising pollution levels, the State Council released a report – *Guidance for curbing excess capacity* – in which it outlined plans to reduce high-polluting steel capacity by 80 mt by 2017. This includes clean production audits and an upgrade to clean production technologies by 2017 in the Beijing–Tianjin–Hebei region. The Government has also decided not to allow new additions to overcapacity industries.[19]

With climate change posing a direct challenge to companies' reputation and SLTO, they are taking action to mitigate this risk by reducing their carbon footprint or improving product stewardship by investing in carbon capture and storage technology research. Companies are increasingly leveraging renewable energy and setting greenhouse emission targets by employing technology. For instance, Anglo American has invested US$201m in low carbon, and energy efficiency, research and technology development. The company aims to save US$75m through the sharing and adoption of best available technologies in underground ventilation, diesel use, pumping and conveyor optimization.[20]

17. "Greenpeace, other NGOs stance on development projects to hit economic growth: IB," *The Financial Express*, 11 June 2014.

18. "The War On Coal Is A War Against American Jobs," *Forbes*, 6 June 2014.

19. "China Steel Sector," *UBS*, 20 February 2014, via ThomsonOne.

20. "Climate change and energy," *Anglo American company website*, http://www.angloamerican.com/development/envs/climate-change-and-energy/approach.aspx, accessed 23 May 2014.

17 New technologies

(19 in 2013)

Key thought

Margin pressure to promote use of more disruptive technologies.

Amid the constant pressure on margins and declining prices, the mining and metals sector has been forced to look for innovative ways to cut costs and increase efficiencies. To achieve this, companies have been leveraging technology to advance exploration, increase productivity, improve safety, discover new ore bodies, improve recovery rates, remove waste and decrease energy use. There has been an investment in research into innovative processes and "disruptive" technologies. Such technologies can alter the dynamics of the market, from changing demand to threatening investments already made to develop existing technologies. For example, steel is under constant threat to be substituted by other "lighter" materials such as aluminium. ArcelorMittal has responded to the threat via its S-in-motion program, which includes a collection of more than 60 different advanced and ultra-high-strength steels that are 30% to 40% lighter than the standard steel. One of them is "Usibor technology," which is press hardened steel that provides light steel without reducing its strength. Honda had used the new steel for its new Acura MDX and achieved not only a 4 kg reduction in weight, but also the highest available collision safety rating from the Insurance Institute for Highway Safety.[21]

Such new "disruptive" technologies can also potentially disrupt *the status quo* in the market. For instance, if the new ITmK3 steel-making technology developed by POSCO, which does not use metallurgical coal, finds traction in the market, it can potentially change the investment dynamics in the steel and metallurgical coal industry.

21. "ArcelorMittal takes home "Best Innovation – Process" award at American Metal Market's fifth annual Awards for Steel Excellence,"*ArcelorMittal company website,* http://automotive.arcelormittal.com/News/newsapriljune/AMMAward2014HondaDoorRing, accessed 27 June 2014.

EY's Global Mining & Metals Center

With a volatile outlook for mining and metals, the global sector is focused on cost optimization and productivity improvement, while poised for value-based growth opportunities as they arise. The sector also faces the increased challenges of changing expectations in the maintenance of its social license to operate, skills shortages, effectively executing capital projects and meeting government revenue expectations.

EY's Global Mining & Metals Center brings together a worldwide team of professionals to help you succeed – a team with deep technical experience in providing assurance, tax, transactions and advisory services to the mining and metals sector. The Center is where people and ideas come together to help mining and metals companies meet the issues of today and anticipate those of tomorrow. Ultimately it enables us to help you meet your goals and compete more effectively.

Area contacts

Global Mining & Metals Leader
Mike Elliott
Tel: +61 2 9248 4588
michael.elliott@au.ey.com

Oceania
Scott Grimley
Tel: +61 3 9655 2509
scott.grimley@au.ey.com

China and Mongolia
Peter Markey
Tel: +86 21 2228 2616
peter.markey@cn.ey.com

Japan
Andrew Cowell
Tel: +81 3 3503 3435
cowell-ndrw@shinnihon.or.jp

Africa
Wickus Botha
Tel: +27 11 772 3386
wickus.botha@za.ey.com

Commonwealth of Independent States
Evgeni Khrustalev
Tel: +7 495 648 9624
evgeni.khrustalev@ru.ey.com

France and Luxemburg
Christian Mion
Tel: +33 1 46 93 65 47
christian.mion@fr.ey.com

India
Anjani Agrawal
Tel: +91 982 061 4141
anjani.agrawal@in.ey.com

United Kingdom & Ireland
Lee Downham
Tel: +44 20 7951 2178
ldownham@uk.ey.com

United States
Andy Miller
Tel: +1 314 290 1205
andy.miller@ey.com

Canada
Bruce Sprague
Tel: +1 604 891 8415
bruce.f.sprague@ca.ey.com

Brazil
Carlos Assis
Tel: +55 21 3263 7212
carlos.assis@br.ey.com

Service line contacts

Global Advisory Leader
Paul Mitchell
Tel: +612 9248 5110
paul.mitchell@au.ey.com

Global Assurance Leader
Alexei Ivanov
Tel: +495 228 3661
alexei.ivanov@ru.ey.com

Global IFRS Leader
Tracey Waring
Tel: +61 3 9288 8638
tracey.waring@au.ey.com

Global Tax Leader
Andy Miller
Tel: +1 314 290 1205
andy.miller@ey.com

Global Transactions Leader
Lee Downham
Tel: +44 20 7951 2178
ldownham@uk.ey.com

EY | Assurance | Tax | Transactions | Advisory

About EY

EY is a global leader in assurance, tax, transaction and advisory services. The insights and quality services we deliver help build trust and confidence in the capital markets and in economies the world over. We develop outstanding leaders who team to deliver on our promises to all of our stakeholders. In so doing, we play a critical role in building a better working world for our people, for our clients and for our communities.

EY refers to the global organization, and may refer to one or more, of the member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. For more information about our organization, please visit ey.com.

© 2014 EYGM Limited.
All Rights Reserved.

EYG no. ER0170
CSG/GSC2014/1393438
ED None

This material has been prepared for general informational purposes only and is not intended to be relied upon as accounting, tax, or other professional advice. Please refer to your advisors for specific advice.

ey.com/miningmetals