

# Effective capital project execution

Mining and metals



# contents

Achieving major capital project effectiveness	03
The drivers of project execution complexity	04
The consequences of risk	06
Focus on stage gated delivery and early intervention	07
Working with you to achieve project delivery effectiveness	08

# Achieving major capital project effectiveness and corporate performance



**Paul Mitchell**  
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**“The strategy to switch from organic projects is under threat as delays and cost increases impact comparative rates of return. Mining and metals companies that best manage project execution risk will derive great competitive advantage.”**

Managing the complexity of major capital projects in today’s mining and metals landscape has never been more challenging or critical. Global demand for commodities continues to drive substantial capital investment within the sector.

In 2011, the top five diversified mining companies are set to advance over US\$180b of projects<sup>1</sup>, with some individual projects exceeding US\$10b (“mega” projects). This increased demand has placed additional pressure on already constrained owners and contractors.

The near simultaneous commitment to new capital projects immediately after the global financial crisis in 2008/2009 meant that capital project decisions were not factoring in many of the capacity constraints on project execution.

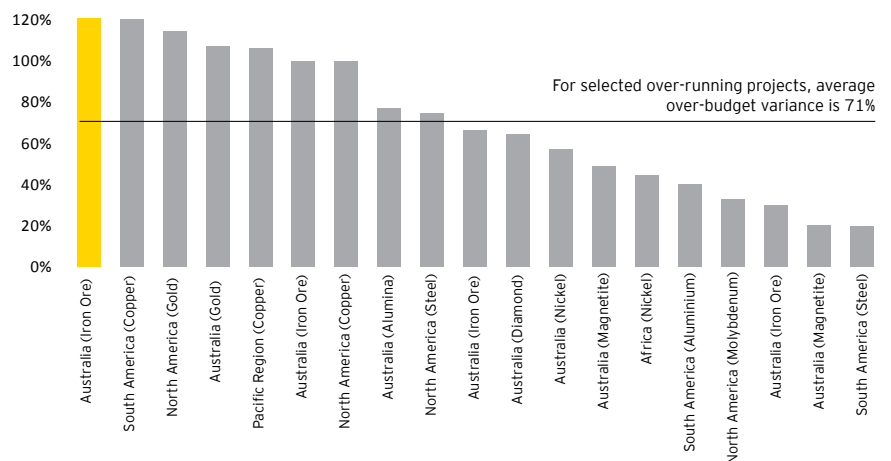
The Reserve Bank of Australia in its 7 June 2011 policy meeting noted that “capacity constraints would result in delays or cancellation of some of the projects in the earlier stages of planning”. The ratings agency, Fitch, expects funding to become more difficult as projects continue to face cost increases and timetable over-runs.

Project delivery track-record and expectations are impacting companies’ market value more than ever. Capital expenditure and associated project delivery is a key topic in many of today’s financial and resource publications, yet many owners and contractors alike continue to be challenged by the strategic and /or tactical issues of project execution.

Capital projects comprise a significant percentage of company spend and require particular focus on budgets, schedules and execution. These issues alone, if managed poorly, can be the cause of dramatic losses in project and hence enterprise value.

Capital project execution, which was not deemed a major risk a year ago, now features as the fifth of Ernst & Young’s top ten business risks facing mining and metals companies in 2011 and beyond (Ernst & Young, *Business risks facing mining and metals 2011-12*). Addressing risks surrounding the delivery of mining projects is critical with many companies having incurred cost escalations that have forced them to defer, cancel or revise project business cases and execution strategies.

**Figure 1. Projected cost variances for selected over-running capital infrastructure projects**



Note: Percentage variances between market-advised cost projections and original estimates for selected capital infrastructure projects

Source: Publicly available material and Ernst & Young analysis

Of the companies that reported project overruns publicly (between October 2010 and March 2011), the average overrun was about 71% of the original project cost estimate. These are not restricted to any one geography or commodity but seem to be fairly evenly distributed. This would be indicative of the overall and mutual challenges facing many of the large projects.

After accounting for outlying data points, analysis results clearly indicate the consequences of underperforming projects and the materiality of this risk to corporations.

In this context of cost and schedule pressure, mining and metals companies delivering a portfolio of capital projects face a growing level of execution complexity and risk.

High performing mining and metals companies are responding to these challenges with a focus on the integrity of stage-gated delivery and early intervention, in addition to deployment of robust project controls and maturity of project, program and portfolio delivery practices.

<sup>1</sup>Ernst & Young analysis from company reports and publicly available news releases



# The drivers of project execution complexity

**“With the huge expenditure on current projects, schedule delays or cost increases, coupled with fluctuating commodity prices, are now materially impacting the financial performance of organizations involved in their execution.”**



**Claus Jensen**  
Advisory  
Ernst & Young

Delivery of predictable project results undoubtedly bestows competitive advantage and market confidence to those companies who successfully instil this discipline. The following consistent global themes are impacting our clients:

- ▶ **Human capital constraints** – The current human capital deficit (between supply and demand) to deliver projects is between 10% and 15% and is sufficient enough to impact project delivery schedules. This is being experienced globally on all major capital projects. With an estimated additional 86,000 workers needed by 2020 in the Australian mining industry alone<sup>2</sup>, owners and contractors alike are considering innovative ways to attract and retain project staff, to often remote areas, through strategic workforce planning. Despite this, many are continuing to be challenged by the ability to identify ‘project resources’ that have the depth of experience to plan and deliver on these ‘mega’ projects. Consequently, many owners are placing increasing pressure and responsibilities on already constrained contractors, which in turn is creating increased execution challenges.
- ▶ **Accurate cost and schedule control** – At a time when transparent and timely project reporting to boards and shareholders is receiving increased scrutiny, the ability of companies to accurately forecast cost and schedule completion is quickly becoming a competitive differentiator. As a result of a resource deficiency in the area of Engineering and Project Controls, many projects have suffered from ill-defined project scopes and execution plans, driving poor cost and schedule estimates. This has a knock-on effect of cost escalations that have forced some miners to defer, cancel or suffer the costs of project delays and/or overruns. Examples include the Ambatovy nickel project in Madagascar<sup>3</sup> where costs were estimated to have risen from US\$3.3b to US\$5.5b, and the Karara iron ore project where costs increased by 20% due to cost escalations and scope<sup>4</sup>.
- ▶ **Contractor delivery reliance and performance** – Human capital constraints, compounded by the sheer scale and complexity of emerging projects, is placing increased reliance on contractors (EPC, EPCM and subcontractors) to deliver. However, the competencies, processes and systems of many contractors often fall short of those required to successfully deliver ‘mega’ projects.
- ▶ **Global program delivery consistency** – Increased project complexity and/or pressure on supply chains is forcing many organizations to review their project management methodologies. In doing so, many are identifying a significant lack of standardized processes, controls and systems required to decrease contractor reliance and achieve global synergies. Instead, organizations are continuing to rely on a few ‘key personnel’, many of whom are approaching retirement in the coming years.
- ▶ **Scope growth and claims management** – Many of the aforementioned factors are root causes for scope growth and resultant claims management. Notwithstanding this, many scope changes, and indeed claims, arise from poorly designed ‘work break down structures’ causing engineering and construction interface issues. This is often compounded by contracts with insufficient compensation and legal contingency funding to manage claims.
- ▶ **Access to strategic infrastructure** – A company’s ability to provide a product to market is not only influenced by project delivery, but also the ability of that project to ‘tie into’ existing infrastructure such as rail and ports. Logistical options available as a result of previous infrastructure investment by a company influences whether additional investment is required to support the development, with many organizations now realizing the benefits of prior investment into infrastructure in strategic transportation corridors.

<sup>2</sup>National Institute of Labour Studies', Minerals Council of Australia

<sup>3</sup>Costs jump again at delayed Ambatovy', Mining Journal, 17 June 2011

<sup>4</sup>Gindalbie Metals' Karara costs blow out 20pc', The Australian, 6 May 2010



- ▶ **Production ramp-up** – Many projects do not deliver the expected production rates as a result of failure to consider all aspects required to deliver the product to market due to latent production issues, technology failures, logistics bottlenecks or labor market constraints. Critical production ramp-up considerations should be included in the early design phases of any major capital project.
- ▶ **Project economic forecasting** – Failure to achieve economic forecasts as a result of misalignment between the expectations of technical and commercial functions plague many projects, often requiring issuance of revised market updates. Issues such as infrastructure access and existing facility bottlenecks are underestimated, leading to over optimistic project economic forecasts.
- ▶ **Financial and commercial management** – The impact on project costs and schedules brought about by currency volatility and hedging risks are often overlooked. This is particularly true for those global mining and metals companies whose revenues are earned in weaker currencies while their operational costs are in stronger currencies. Input costs are also a major factor, e.g., the cost of steel for manufacturing.

- ▶ **Legal and regulatory compliance** – Unclear delineation of contractual responsibilities between owner and contractor with respect to obtaining licenses and consents is often a cause of schedule delays. Additional legal and contractual focus is required to ensure full compliance with regulatory requirements (FCPA and SEC) and legislation relating to bribery and corruption, to avoid unwittingly exposing project and corporate executives.
- ▶ **Health, safety, environment (HSE) and stakeholder management** – The health and safety performance of a project and its supply chain is receiving increased scrutiny as a result of corporate responsibility requirements. Greater awareness of the environmental impact of mining and metals projects increases the need for proactive and sustained community and government engagement, driving increased staffing requirements in HSE and community affairs departments.

## The drivers

- ▶ Human capital constraints
- ▶ Accurate cost and schedule control
- ▶ Contractor delivery reliance and performance
- ▶ Global program delivery consistency
- ▶ Scope growth and claims management
- ▶ Access to strategic infrastructure
- ▶ Production ramp-up
- ▶ Project economic forecasting
- ▶ Financial and commercial management
- ▶ Legal and regulatory compliance
- ▶ Health, safety, environment (HSE) and stakeholder management

# The consequences of risk

“In mining and metals, the consequences of project execution risk are real, immediate and severe – there is a substantial corporate strategic benefit for investing in effective risk management and mitigation.”



Loretta Hudson  
Advisory  
Ernst & Young

The mining and metals industry wouldn't exist if not for risk-takers. What separates success from failure is having a clear definition of what constitutes 'acceptable risk' for a project, then avoiding or mitigating that risk. Failing to address risk can lead to consequences that span the spectrum from mere inconvenience to grave danger. The following examples illustrate some of the potential consequences of project execution risk:

- ▶ **Failure to deliver against agreed plans** – Realized delivery risks will typically impact one or more of a project's cost, schedule, scope and quality parameters. Where impacts represent a material variation from approved plans, a critical review of the project's alignment to Business Case assumptions and rationale may be required. Late-stage Business Case modifications have the potential to undermine the project's investment case and severely impair stakeholder buy-in and confidence.
  - Where policy, process or control break-downs do occur, and an incident results, mining and metals companies must respond immediately to prevent long-lasting reputational damage.
- ▶ **Claims and disputes** – The scale, complexity, risk and uncertainty of capital projects increases the potential for claims and disputes with delivery partners. The vendor selection and commercial negotiation process should ensure all parties have a common understanding of scope, dependencies, commercial terms and protocols for potential dispute scenarios. Where contractual agreements, performance targets, quality acceptance criteria and dispute resolution procedures remain ambiguous, project teams risk financial claims and disputes with embedded vendors.
- ▶ **Regulatory non-compliance** – Mining and metals companies must operate within a complex framework of regulatory and statutory obligations. Compliance teams should actively maintain visibility of the scope of these obligations and communicate corresponding requirements to functional and delivery personnel. When regulatory engagement is required, companies should maintain a single-point liaison team and coordinate engagement activities across their organization. Where compliance obligations and regulator expectations are not met, companies risk fines, forfeitures, business restrictions and reputational damage.
- ▶ **Loss of competitive advantage** – For many mining and metals companies, the ability to efficiently and predictably operationalize assets and infrastructure forms a key source of competitive advantage. As commodity prices, commercial terms and the competitive landscape constantly change, the window for timely project delivery is finite. When risks result in project delays, cost overruns or quality defects, many companies will feel a direct impact on corporate performance and competitive advantage.
- ▶ **Damage to reputation** – Leading mining and metals companies recognize the essential disjointed role of corporate reputation in securing and maintaining a social licence to operate. The risk of health, safety, environment and community incidents is ever present, demanding high levels of delivery discipline and management vigilance.

# Focus on stage gated delivery and early intervention



**Nathan Roost**  
Advisory  
Ernst & Young

**“The best opportunity to make a positive impact on the lifecycle of a major capital project is during early planning, even before the capital outlay occurs.”**

One of the most proven and effective ways to manage the complexity of capital projects in the mining and metals industry is to take the holistic approach of a stage gate model for evaluating progress and enabling informed decisions as the project moves through its lifecycle from concept to operations.

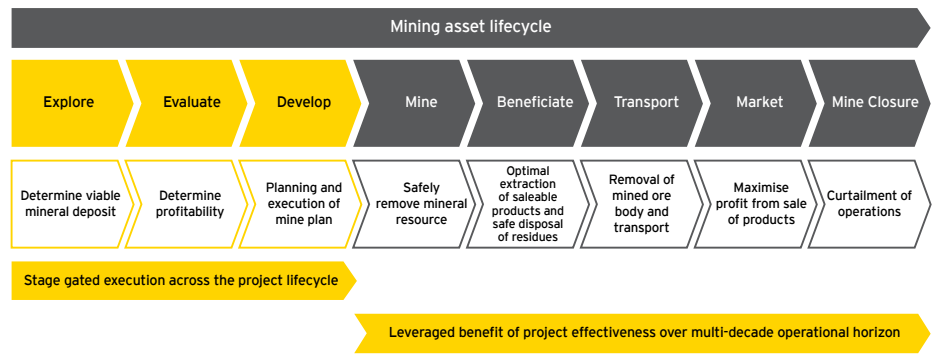
Incorporating stage gate review milestones across the project delivery lifecycle establishes clear intervals for the assessment of current-stage performance against approved business cases and execution strategies. Leading mining and metals companies are embedding stage gates within project delivery schedules, mandating minimum stage gate acceptance criteria for all projects and aligning funding releases to successful stage gate completion. Stage gates reinforce a discipline of reflection on progress to date and provide a timely opportunity to capture and leverage lessons learnt.

Implementing a comprehensive lifecycle framework allows decision-makers to understand the appropriate investment to underpin the next phase of the project, and in doing so ensure less rework and improved scheduling throughout the project. Effective stage gated execution across the project lifecycle establishes a sound foundation for success across the wider asset lifecycle, including the immediate need for projects to complete on time and release product to the market.

The best opportunity to make a positive impact on the lifecycle of a major capital project is during early planning, even before the capital outlays occur.

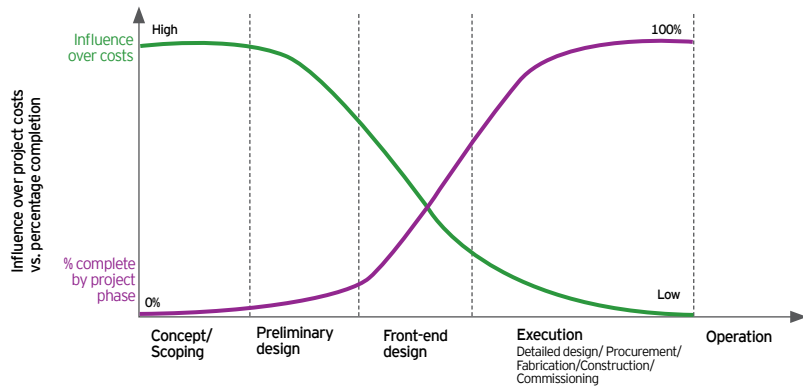
This is particularly true with mining and metals companies that are moving into frontier areas or undertaking projects that are more technically complex. The combination of new technology, new geographies, multibillion dollar capital expenditures and multi-party governance means that these projects require high levels of assurance for cost, schedule and risk management.

**Figure 2. Stage-gated execution within the project and asset lifecycles**



Two of the key elements of effective early planning are laying the right foundations for delivery success and ensuring early intervention as risks emerge. Key foundation activities include securing a clear executive mandate for the project investment, endorsing a comprehensive delivery methodology, undertaking detailed project planning, actively engaging key stakeholders and establishing a firm contractual footing for vendor engagement and performance management. To position a project for early risk intervention, project executives must embed an ongoing discipline of risk identification and review, maintain a sense of urgency in mitigation execution and tracking, and ensure timely escalations so that resources can be mobilised before risks mature.

**Figure 3. Ability to influence total cost over the project lifecycle**



Source: Ernst & Young

By proactively considering acceleration opportunities and anticipated challenges in the project planning process, mining and metals companies can substantially de-risk subsequent design, execution and operation phases. Effective planning and early intervention can allow project delivery executives to switch from reactive to proactive portfolio and strategic planning.

# Working with you to achieve project delivery effectiveness

Ernst & Young have successfully partnered with leading mining and metals clients to support the safe, predictable and competitive delivery of a wide range of global capital mega-projects. From this body of experience we have identified the following support areas as critical leverage points in achieving project delivery effectiveness.

For each focus area, our experienced program management professionals, who consist of engineers, lawyers, economists and accountants with major capital project industry experiences, can tailor project delivery enhancements to the unique opportunities and challenges facing your project portfolio.

- ▶ Business case assessment
- ▶ Portfolio management and benefits realization
- ▶ Contracting strategy and implementation
- ▶ Organizational design – roles, responsibilities and work breakdown allocation
- ▶ Assurance framework and auditing methodology
- ▶ Project controls, reporting and governance
- ▶ Qualitative and quantitative risk assessment
- ▶ Health, safety and environmental management and controls
- ▶ Commercial optimization – tax, marketing, foreign exchange management
- ▶ Business process improvement – owner teams and contractor performance
- ▶ Cost control, including contractor payment verification
- ▶ Community, public and indigenous affairs



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## Ernst & Young's Global Mining & Metals Center

With a strong outlook in the sector, the global mining and metals industry is focused on future growth through expanded production, without losing sight of operational efficiency and cost optimization. The sector is also faced with the increased challenge of changing expectations in the maintenance of its social license to operate and meeting government revenue expectations.

Ernst & Young's Global Mining & Metals Center brings together a worldwide team of professionals to help you achieve your potential - 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. It's how Ernst & Young makes a difference.

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