Portfolio and program management in mining
A considerable number of large mining capital projects were placed on hold as commodity prices lowered beyond breakeven points in late 2015 and early 2016. Now that commodity prices are recovering from notable lows, mining organizations are beginning to re-energize much needed capital investments.

With the large number of capital projects expected to impact the market near the same time, owners are carefully considering the appropriate project delivery and pricing strategies to increase the likelihood of success for developing new mine assets.

The large-scale, multi-party involvement and compressed project timelines associated with these projects increase their complexity and need for a well-designed contract strategy and integrated risk management.

Is your organization ready?
Copper, the proxy for the entire base metals sector, has remained relatively subdued in the past year and a half. Slowing Chinese demand growth as reflationary policies took a pause prevented a sharp rally in copper prices.

However, now that the “stock glut” is largely behind us, most commodity prices are recovering from notable lows and continuing to rise in 2017. As a result, mining organizations are beginning to re-energize much needed capital investments. (See Figure 1).

One thing is clear though: Mining companies should employ capital efficiency if they are to continue to survive and thrive. Capital efficiency is the measure of a company’s ability to select, deploy, and manage capital investments that maximize shareholder value. During the 2015–2016 downturn, investors punished the top 40 miners for their poor investment and capital decisions. Many shareholders also exhibited a “spot mentality”, focusing on short-term returns—or the lack thereof—despite the fact that mining is clearly a long-term game. The top 40 miners survived by shedding assets, curtailing capacity, and mothballing marginal projects.

Companies responded to “growing disconnect” by cancelling or deferring major capital expenditures and reorganizing executive ranks.

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**Introduction**

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Figure 1

**Commodity price index**

Select commodity prices
Cum. Q-o-Q % change

![Commodity price index graph](image-url)

Their cost reduction efforts were effective, resulting in a 17% drop in operating costs against a backdrop of higher production volumes and lower input costs in 2015.

Given the need to maintain commodity volumes, miners are shifting focus back to large-scale capital projects even as other industries (LNG, oil and gas, etc.) increase their portfolios of smaller (<$100M), short-cycle projects. By necessity, mine owners are now developing, advancing, and restarting large-scale mining projects.

With the large number of capital projects expected to impact the market near the same time, owners are carefully considering the most effective project delivery and pricing strategies to ensure they stay competitive while successfully developing new mine assets. The fact that each project can be like a new “start-up”—with large-scale involvement of new team players and compressed project timelines—increases the complexity. To ensure success, miners need a well-designed contract strategy and integrated risk management. Is your organization ready?

Mining projects today often feel like like new “start-ups”: They involve quickly assembled teams of new players who work under compressed project timelines.
One of the earliest decisions owners make after deciding to invest in the development of a major capital project is determining the right contracting strategy for the project. Fit for purpose contract strategy decisions rely on an understanding of the relevant value drivers, the owner’s risk tolerance and associated plan to allocate risks, and the contract structure necessary to support that risk allocation. For a graphical depiction of this methodology, please refer to Figure 2.

Types of value drivers
Value drivers can be categorized as Project, Owner, and Market drivers. These drivers, taken together, define a project’s risk environment:

- Project drivers may include considerations related to site terrain, infrastructure requirements, operations in a new country, and the technical complexity of a project;
- Owner drivers may include considerations related to internal project delivery capabilities and risk tolerance; and
- Market drivers may include vendor or labor shortages, supply chain considerations, and regulatory requirements.

Risk allocation decisions
Owners make risk allocation decisions based on the risks created by these drivers. Risk allocation decisions should consider:

- Which party is appropriately suited for managing the risk?
- How will compensation terms be established based on the risk allocation?
- Is the owner willing and able to transfer authority to mitigate the risk along with accountability for occurrence of the risk?
- What controls are necessary to manage retained risks and monitor transferred risks?

Contract strategy options
Owners typically use specific contract terms and conditions to transfer risks to vendors. Once the scope of a project is defined and the owner has established the scope of work to be contracted, the contracting strategy decision is defined by multiple considerations including:

- Delivery models (e.g., EPC, EPCM, CM @ Risk, multi-prime, Design, Build Operate and Maintain [DBOM] or alliance);
- Pricing options (e.g., lump sum, cost reimbursable, incentives, or hybrid arrangements); and
- Award options (e.g., negotiated or competitive, with or without prequalification).

Each contract strategy decision supports a different allocation of project risks, and project-specific control environments are established to mitigate those risks. Risks retained by the owner are managed and controlled by the owner. Risks transferred to vendors are monitored by the owner in order to understand project status and to identify when owners must take management action to mitigate risks created by the vendor. Even if the vendor is responsible for a risk, the owner’s failure to manage that risk could jeopardize project completion or the meeting of owner goals and objectives.

Incidental impacts of risk transfer
Owners should be aware of the incidental impacts of their risk allocation decisions as they relate to establishing their control environment. When one risk is transferred to a vendor, another risk may present itself to the owner. For example, a vendor that holds cost and pricing risk through a lump sum arrangement may decide to mitigate that risk by providing cheaper (and lower quality) labor and material, resulting in an increased quality management risk for the owner. The owner then decides how to mitigate the quality risk and may decide to include operational performance incentives in the contract, as well as an oversight function to monitor compliance.
All risks cannot be transferred to the vendor community. There are legal, financial, and practical limitations on how much risk can be transferred. Contract strategy decisions should not be made with the expectation of eliminating risks, but rather must seek to properly allocate risks to best support project objectives.

Contracting strategies are project specific and, if multiple contracting strategies are anticipated, the project management process and control guidance should be developed in such a way as to support various contracting strategies, with project teams establishing their own project-specific control environment (subject to management approval.)

Figure 2

**Contract strategy selection**
Holistic risk and issue management

Risk management functions typically consist of a number of activities including risk planning, risk identification, risk analysis, risk monitoring and control, and issue management. Risk management is required to support the timely identification and management of material risks to a project so that they can be controlled and planned for to support project goals and objectives. The risk management process enables the organization to develop contingency plans and keep the capital project budget on track (see Figure 3).

The project structure should support the aggregation and holistic assessment of risks. This should include guidance related to risk management functions, including planning, identification, analysis, monitoring and control, and issue management. Consider specific resources (either project-specific or program-wide) responsible for supporting project-specific risk management activities and the integration of those activities with other project management areas such as cost, schedule, and change management.

Risk planning
Risk planning includes the development of risk management tools and enablers (e.g., risk matrices or registers, impact and likelihood categories, etc.) the identification of the frequency with which risk management activities should occur and the factors that would trigger the need for mitigation plan development; and the identification of resources available to project teams to assist with project risk management. Risk planning guidance should reflect the organization’s risk tolerance and identify reporting requirements associated with risk management. Owners should consider evaluating program level and project-specific risk management methodologies for alignment with enterprise-wide risk management practices, leveraging common terminology, risk identification, and risk assessment criteria.

Risk identification
Risk identification includes a holistic evaluation of the project to capture reasonably foreseeable risk. Risk identification activities should solicit input from process owners and may involve stakeholders outside of the project team, such as corporate finance, regulatory and legal personnel. Initial risk identification activities should occur early in the project lifecycle so that the budget and contingency plans can be established based on an understanding of the project’s specific risk profile. Early risk identification activities should then be repeated periodically throughout the life of the project to remove risks which are no longer relevant and to add emerging risks.

Risk analysis
Risk analysis includes the estimation of the likelihood and potential impact of risks, identifying the expected monetary value of identified risks, and linking the series of discrete risk analyses to the cost and schedule baselines to assess the cumulative impact of the risk environment on the project forecast. Risk analysis can be performed on a qualitative basis, but leading practice is to periodically perform quantitative probabilistic modeling of both the cost and schedule forecasts to confirm that the estimate to complete is reasonable based on the current status of the project.

Risk monitoring and control
Risk monitoring and control includes the identification of a risk owner, updating likelihood and impact estimates, defining events that may trigger an identified risk, establishing preventative and mitigating controls, assigning control owners, identifying improvement opportunities that could further reduce project risks, and planning the appropriate response if a risk were to occur.
Owners should consider implementing risk monitoring and control tools that identify risks, capture potential causes and impacts, estimate the likelihood and severity of impact, and identify preventative and mitigating controls associated with identified risks. Integrating this enhanced process with the change management workflow enables the capture of decisions and corresponding assumptions electronically as risks manifest and become issues.

**Issue management**

Issue management includes the process of analyzing and documenting the genesis of a specific issue, the current status of the issue, actions taken, and developing the decision to be made or resolution to be finalized. The information captured should identify the organizations or parties involved as well as sufficient technical, commercial, regulatory and legal detail to inform the reader of the context of the decision or resolution. The issue resolution information should typically follow a chronology of decision points and contemporaneous considerations, as each issue is likely to have a history and conditions or assumptions may change over time. It is valuable to store issue resolution information electronically for easy access in developing future projects, as well as to respond to any regulatory data requests.

**Figure 3**

**Capital project budget, contingency, and risk management continuum**
Looking ahead to the mining industry’s next upcycle

Large in scale and strategic in importance

When large capital projects are strategic to the company’s overall growth strategy, effective execution is essential to driving the shareholder value demanded by company executives and investors. Exploration, expansion, and new mine development are not a nice-to-have but a necessity.

To get the job done, mining companies will need to identify and select the optimal project delivery method and payment structure for each area, and ensure the oversight and management approach closely aligns with the selected strategy. Mining companies often find that key operations and business functional teams have their associated systems, and tools for procurement, financial management, and risk management are oftentimes not suitable for the size, scale, and volume of activities associated with the capital projects being contemplated.

Although mining companies typically have controls over routine capital projects, major construction projects and portfolio efforts require specific enhanced controls, with careful focus on and consideration of the contractors systems and tools deployed for the capital projects as well as how that information will interface with the owner’s requirements.

Establishing an appropriate contracting delivery and pricing model, along with the complementary controls and risk management environment, is the leading defense for mining companies to successfully execute capital investments.
What mining companies/executives can do

Mining executives strive to develop and deliver project portfolios with cost and schedule certainty while achieving excellence in safety and quality. To successfully and effectively achieve this vision, we believe mining companies should consider the following steps:

1. **Identify and execute the optimal contracting strategy** and delivery/pricing model based on a thorough review of all project, owner, and market risks and drivers.

2. **Implement a corresponding governance, oversight, and management structure** based on the select contracting strategy with defined roles and responsibilities.

3. **Leverage company resources or a centralized PMO** to facilitate consistent reporting of capital project status updates and tracking against defined benefits across the portfolio of capital projects.

4. **Design and implement a consistent and holistic risk and issue management approach** to allow risk identification to occur across the organization and provide a routine and actionable process to analyze, respond, manage, and monitor across the project and portfolio.

5. **Leverage the “right” project management tools and technology** to provide real-time project data to allow for timely and accurate reporting that facilitates active management and informed decision making throughout the lifecycle of the project.

6. **Establish capital efficiency by integrating strategy with planning and execution**, with real-time value measurement, KPI’s, and lessons learned to better inform capital allocation decisions.

These steps help forward-thinking mining companies successfully deliver major capital projects as necessary to implement their strategies, fulfillment of regulatory and environmental responsibilities, and protection and enhancement of shareholder value.
PwC can design a customized approach to help solve your organization’s capital allocation challenges. Our tools and approach help you improve your project portfolio and communicate its multi-criteria impact on the organization. PwC uses an established and effective methodology coupled with powerful software solutions that incorporate your organizational elements and priorities to create a customized valuation model. Portfolio dashboards provide senior management with critical measures to help achieve corporate strategy and keep a real-time pulse on value creation. The result is enhanced confidence in capital allocation and deployment while supporting growth and quantifying risk.

Contact us

To have a deeper conversation about how this subject may affect your business, please contact:

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