

*World Economic Forum Mining & Metals Industry Partnership
In collaboration with Accenture*

January 2014

Scoping Paper: New models for infrastructure investment in the mining and metals sector

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	3
OBJECTIVE	3
BACKGROUND	3
CURRENT SITUATION	3
FUTURE IMPLICATIONS	4
POTENTIAL ROLES FOR THE WORLD ECONOMIC FORUM	4
2. INTRODUCTION	5
3. THE CURRENT STATE OF INFRASTRUCTURE INVESTMENT IN MINING	5
INVESTMENT LANDSCAPE	5
OVERVIEW OF KEY ISSUES	6
4. INFRASTRUCTURE INVESTMENT MODELS	7
ACCESS TO CAPITAL	7
INVESTMENT MODELS	8
5. FACILITATING INVESTMENT IN MINING RELATED INFRASTRUCTURE	10
MINIMIZING THE RISK PROFILE OF INFRASTRUCTURE INVESTMENTS	11
MANAGING EXPECTATIONS	11
MOBILIZING A NEW CLASS OF MINING INFRASTRUCTURE INVESTORS	12
6. POTENTIAL ROLES FOR THE WORLD ECONOMIC FORUM	13
7. CONTRIBUTORS	14
8. APPENDIX	14
KEY ISSUES	14
NOTE FROM THE GLOBAL AGENDA COUNCIL	16

1. Executive summary

Objective

At the Annual Meeting 2013 in Davos the Mining & Metals Governors asked the World Economic Forum to prepare a scoping paper on **enhancing access to finance for mining and metals related infrastructure** to inform the Forum's future programme of work. This scoping paper is not intended to summarize a comprehensive research project; rather it highlights the key issues and trends on the topic to inform the Governors at the Annual Meeting 2014 in Davos, to decide which work activities the Forum's Mining & Metals team should pursue in 2014 and beyond to best support the Mining & Metals Industry Partners.

Background

Infrastructure development is a significant requirement for the success of a mining operation¹. In the wake of the global financial crisis however the mining sector is experiencing severe capital constraints and investors and creditors are looking for investments with lower risk profiles and stable investment returns. At the same time, new mining projects are in increasingly remote regions resulting in larger scale, higher cost and more complex infrastructure requirements (it is estimated that 60 - 80% of projects costs are due to infrastructure). Finally, there is increased pressure from local stakeholders to move beyond infrastructure development solely for mining (i.e. where companies own, operate and have exclusive access) to develop multi-use / multi-purpose infrastructure in order to maximize value from mineral resources. The combined effect of these trends makes it a particularly difficult time for mining companies to secure the capital needed to invest in projects with significant infrastructure requirements. Given that context this paper aims to understand how mining companies can improve access to finance for infrastructure development, with a specific focus on energy and transportation infrastructure.

Current situation

Based on interviews with experts across the mining sector, finance community and desk-based research, we have identified five overarching models for mining companies to access finance for projects with large infrastructure requirements. Findings also suggest that while there is capital available, investment is being blocked by unattractive risk return profiles and unclear roles and responsibilities for asset finance and development. This is particularly true for projects where the infrastructure is intended to be multi-use / multi-purpose as these projects are typically more complicated, generally have higher finance requirements, and are frequently in regions with high sovereign risk and weak fiscal, legislative and regulatory frameworks. All of these factors combine to exacerbate the financing challenge.

The five overarching models for mining companies to finance projects with large infrastructure components are:

1. **Solo:** Mining companies finance, build, operate and maintain infrastructure independently
2. **Project financing:** Mining companies drive the infrastructure investment opportunity and build, operate and maintain the assets but rely on financial and risk mitigation support from the investment community (including commercial banks, private equity, sovereign wealth funds, pension funds etc.)
3. **Contract:** Mining companies partly or fully invest through one of the models above and partner with third-party service provider(s) who accept(s) responsibility for building, operating, and maintaining the infrastructure component of the project
4. **Special Purpose Vehicle:** An investor, or group of investors, finance, construct, own and operate the infrastructure asset through an independent financing vehicle
5. **Public Private Partnerships:** Medium or long-term contracts between a public sector authority, a mining company, multilateral development banks and potentially other private companies (e.g. contractors) whereby infrastructure financing and responsibilities are bundled across the design, build, operation, and maintenance of the project

¹ The Forum's Mining and Metals Team anticipates that many of the findings in this document will be applicable to both the mining and metals sectors but the particular focus here is on the mining sector. Further research would be required to confirm the trends affecting infrastructure investment in the metals sector.

Any of these models can effectively finance a project with infrastructure requirements, and could be used in combination or individually, depending on the nature of the project and the risk profile and needs of the parties involved.

Future implications

To facilitate access to capital for investment in infrastructure, mining companies need to reduce the risk profile and clarify the roles and responsibilities across asset finance, build, operation and maintenance. It is unlikely that any new infrastructure investment models will resolve these issues. Instead, companies, host governments and investors need to consider how to improve existing models to overcome the challenges. There are three approaches for doing this:

1. Minimizing the risk profile of infrastructure investments
2. Managing expectations
3. Mobilizing a new class of investors

These approaches can be used independently or in conjunction to improve access to capital for infrastructure development.

Potential roles for the World Economic Forum

There are three key roles which draw on the World Economic Forum's unique ability to create communities of shared interest to catalyse necessary actions to unlock access to capital for mining related infrastructure:

1. **Minimize the risk profile:** Facilitate strategic dialogues between government, business, multilateral development banks, financiers, and civil society at country level to improve the understanding of technical and financial requirements for large-scale mining and metals-related infrastructure and associated roles and responsibilities across design, construction and operation
2. **Position infrastructure as an integrator:** Conduct further research, based on the principles detailed in the Responsible Mineral Development Initiative/Mineral Value Management programme and report, as to how the mining sector can utilize infrastructure as an integrator (especially considering multi-use, multi-purpose models) to attract investment and contribute to long term social and economic benefits for the region
3. **Mobilize new investors:** Work with the Forum's Investors community to facilitate strategic dialogue between the industry, new groups of investors and government to systematically address barriers to investment

2. Introduction

The energy and transport infrastructure requirements for the mining sector across project development, construction, and operation are vast. In addition, infrastructure is a key focus area for governments as it is not only critical to mining operations but can play a crucial role in regional and national development. Mining companies are facing increasing pressure to demonstrate the net positive impact of their operations and infrastructure development is one opportunity for companies to drive value both within and beyond the sector. This opportunity is tempered by the challenges in securing capital to cover the significant costs of designing, building, operating, and maintaining infrastructure.

Mining companies are finding it increasingly difficult to independently finance, operate and manage projects with large-scale infrastructure requirements. At the same time projects are increasingly in remote, frontier regions with geographical challenges that drastically increase the cost of infrastructure development. New sources of investment are emerging to support mining projects with large infrastructure components. For example, sovereign funds from China and South Korea are developing “resource for infrastructure” arrangements, and state-owned development and commercial banks are starting to release finance in exchange for a national mining company being awarded a mining license. These new sources of capital, however, only partially address infrastructure finance requirements.

At the Annual Meeting 2013 in Davos the Mining & Metals Governors asked the World Economic Forum to prepare a scoping paper on enhancing access to finance for mining and metals related infrastructure to inform how the Forum can best support the Mining & Metals Industry Partners. This paper sets out to provide an overview of the key challenges and opportunities associated with investing in infrastructure for mining projects. Recognizing that mining-related infrastructure requirements are diverse, this paper focuses exclusively on transport and energy infrastructure (e.g. road, rail, ports and power generation) given the high capital intensity of these requirements. In addition, this paper focuses on greenfield projects although many of the challenges and findings will be relevant to brownfield projects where infrastructure maintenance is a critical operational challenge.

The mining industry is facing trends of being increasingly capital constrained, with long-term investors looking for new investment vehicles and destinations, and governments pursuing open access regimes for multi-use / multi-purpose infrastructure. With that context the paper investigates whether there is an opportunity to develop new partnership and financing models for infrastructure development in the mining sector.

To conclude, the paper seeks to identify potential entry points for the World Economic Forum to develop guidance on the development of new partnership and/or financing models to accelerate investment in infrastructure development in the mining and metals sector.

3. The current state of infrastructure investment in mining

A review of current infrastructure investment in mining shows that there is significant global investment in infrastructure and this is likely to continue despite the financial crisis. Infrastructure is an integral part of strategic planning for mining projects and operations. In the current risk adverse investment climate, however, mining companies are finding it harder to secure capital. Despite the numerous investment models available on the market, mining companies are struggling to balance the need for infrastructure investment with sufficient project design and access rights. This section provides an overview of the investment landscape in infrastructure and describes some of the specific mining sector challenges.

Investment landscape

The value of global investment in infrastructure is astounding. Historically, the global investment in road, rail, ports, airports, power, water and telecommunications infrastructure amounts to approximately 3.8 % of global GDP². In the

² *Infrastructure productivity: How to save \$1 trillion a year*. January 2013. McKinsey & Company

mining sector, the proportion of investment allocated to infrastructure is significant. Infrastructure costs for megaprojects can be between 60 and 80 % of total project costs³.

Yet, substantial further investment in infrastructure is required to support the growth and development ambitions of regional economies and mining companies. Some estimates suggest that between 2013 and 2030, the world will need to invest an average of US\$ 3.4 trillion a year in transport and energy infrastructure⁴. While it is not clear how much of this investment is required for mining-related projects, particularly given the changing dynamics of integrated projects versus independent infrastructure investments, it is clear that there is a finance gap for infrastructure development in the mining sector. As an example, one bank estimates that US\$ 50 billion is needed to support iron ore projects in sub-Saharan Africa alone⁵.

Overview of key issues

Significant research is currently being undertaken by organizations including the World Bank Group, the Organization for Economic Cooperation and Development, and the World Economic Forum, on the global infrastructure financing gap and how new investment and partnership models can help mobilize capital from long-term investors for infrastructure development. Infrastructure projects for mining and metals operations are usually excluded from this research due to the nuances of mining projects. Our research suggests that the top three reasons why mining companies are separated as an asset class are:

- 1) **Scale and complexity:** Greenfield mining projects are increasingly in undeveloped regions. For example, in recent years about 40 % of mining exploration investment has focused on remote regions in South America and Africa⁶. In isolated regions there may be no existing infrastructure for companies to build upon, the physical geography may be challenging and the political and regulatory environments in these areas can sometimes be unstable. As such the scale of infrastructure requirements can be significant and can send costs soaring without offering a commensurate return on investment. This trend is expected to continue. For example, two-thirds of respondents in a recent Accenture survey suggested that mining projects will get bigger and 81 % say complexity will increase⁷. These factors combine to increase project costs and timelines creating less attractive investment opportunities.
- 2) **Project risk:** Mining projects with large infrastructure requirements have a high risk profile as the completion of the mine, and the associated revenues from mineral extraction, are dependent on the completion of supporting infrastructure. If the infrastructure project fails to complete, the mine will not generate revenue. Conversely, if the infrastructure is completed but the mine is not, there is no onward market for the infrastructure asset. Even if the mine is completed, once the infrastructure asset is linked to the mine it is exposed to the associated commodity price volatility as opposed to traditional infrastructure investments where revenue streams can be generated from the infrastructure asset itself. Investors gauge the attractiveness of a deal based on what is committed at financial close which suggests the investor may value the integrated mine and infrastructure project as lower than the mining company and thus offer less attractive financing options.
- 3) **Expectations for multi-use/multi-purpose projects:** There is increasing pressure for new infrastructure projects to be designed for multi-use/multi-purpose rather than to meet the sole needs of the mining project. There is an opportunity for the industry to position infrastructure as an integrator to attract investment and contribute to long term social and economic benefits for the region⁸. This opportunity creates a number of complications for investors. First, investors are precedent driven, and the limited history of such projects acts as an immediate

³ World Economic Forum Research

⁴ *Infrastructure productivity: How to save \$1 trillion a year. January 2013.* McKinsey & Company

⁵ Deutsche Bank

⁶ "Expenditure Summary". Metal Economics Group, <http://www.calvert.com/sri-SAGE-mining-sector-road-to-sustainability.html>. 2013

⁷ *Achieving Superior Delivery of Capital Projects. Accenture global survey of the metals and mining industries.* 2012. Accenture

⁸ For further details on the concept of infrastructure as integrator, please refer to the "Note from the Agenda Council" in the Appendix, which outlines a series of ideas and potential areas for further research.

deterrent. Second, the infrastructure requirements of mining projects and the region may not align, particularly with transport infrastructure where mining projects need the infrastructure to be designed to carry bulk goods, not passengers or light freight. Operational efficiency tends to decline in multi-use systems due to high coordination costs and uncertainty of access. Finally, multi-use/multi-purpose projects are more exposed to the political environment of the region and as many of the new projects are in developing frontier regions with limited experience and capacity the associated risk profile is elevated. This political risk is exacerbated as infrastructure projects are long-term investments and financiers are concerned about the reliability of government partners and deal structures over the life of the deal.

In the past, when investors have been disinclined to finance mining projects with infrastructure requirements, mining companies have been expected to take care of infrastructure finance requirements by themselves. This is becoming increasingly impractical. Despite the need for infrastructure investment, the US\$ 98 billion capital expenditure (capex) by the top 40 mining companies was actually almost 20 % below the 2011 forecast, indicating that access to capital is tightening⁹. The capex reduction is likely to continue as mining giants Rio Tinto and Vale have both announced smaller capex budgets. In December 2013, Rio Tinto announced that 2015 capital spend would be slashed to about US\$ 8 billion, less than half of its 2012 outlay, and Vale cut its capex budget for the third year in a row to US\$ 14.8 billion¹⁰. The recent spate of project write-downs and shareholder pressure for companies to demonstrate financial discipline are likely to have the combined effect of encouraging investors to focus on projects with more stable return projections.

This paper outlines models that are available for mining companies to finance infrastructure projects, including recognizing the barriers to investment, and identifying options to increase access to capital.

4. Infrastructure investment models

Access to capital and effective investment models are critical to the development of mining related infrastructure.

Access to capital

Following the financial crisis, access to capital has tightened for both equity and debt. Whatever source mining companies use to structure their investment they will be under greater pressure to present projects with stronger risk-return profiles in order to secure financing for infrastructure projects.

The equity market is turning away from mining investments. In 2013, there were no mining IPOs in the first quarter on the Toronto Stock Exchange for the first time in over a decade and financing through October 2013 was only CAD\$ 2 million compared with CAD\$ 362 million in 2012¹¹.

As for debt, between 1999 and 2009 commercial banks provided 88 % of infrastructure funding but have become capital and liquidity constrained following the financial crisis¹². There are three key reasons why funding has become limited since the financial crisis:

- 1) Less funding is available to banks
- 2) Banks are trying to bolster balance sheets and are therefore restricting new loans and focusing on the most profitable sectors
- 3) New regulations, Basel III and Solvency II, require banks to hold higher levels of capital against long-term loans, which deters long term project investments¹³

⁹ *Mine: The Growing Disconnect*. 2012 PricewaterhouseCoopers

¹⁰ Behrmann, E. "Rio to Cut Spending by Half to \$8 Billion on Price Decline". Bloomberg, <http://www.bloomberg.com/news/2013-12-02/rio-tinto-to-halve-capital-spending-by-2015-in-focus-on-cash.html>. 2013

¹¹ *Tracking the trends 2014: The top 10 issues mining companies will face in the coming year*. 2013. Deloitte

¹² *Paving the Way: Maximizing the Value of Private Finance in Infrastructure*. August 2010. New York. World Economic Forum

¹³ *Funding Options: Alternative financing for infrastructure development*. April 2013. Deloitte

While the capital available to mining companies to invest in mega-projects has declined, global capital earmarked for infrastructure investment is not being spent. Some estimates show that approximately US\$ 2.5 trillion (or ~3% of assets under management) is currently allocated from sovereign wealth and pension funds alone to the infrastructure asset class, however, the average target infrastructure allocation is closer to 6%¹⁴. In addition, the bond market has seen record issuance in recent years as issuers take advantage of historically low yields. This suggests that capital is available but not being effectively directed towards infrastructure development and allocated capital is probably not focused on mining related infrastructure.

Investment models

Table 1 describes the five overarching models for mining companies to finance infrastructure and gives an overview of the respected benefits and drawbacks of each.

Table 1: Overview of investment models

Model	Description	Pros	Cons	Example
Solo	<ul style="list-style-type: none"> Mining companies finance, build, operate and maintain infrastructure independently 	<ul style="list-style-type: none"> The mining company has complete control over the design, construction, operation, and maintenance of the infrastructure for the mine 	<ul style="list-style-type: none"> The company inherits 100 % of the project risk Only major mining companies are likely to have sufficient capital to pursue this model The mining company has to bear huge upfront costs which are hard to justify to shareholders in the current economic climate The company may not design the project to support local development objectives (i.e. risk of single use asset) 	<ul style="list-style-type: none"> Rio Tinto owns and operates the largest private rail system in Australia (1,500 km) to support 14 iron ore mines and 3 ports in the Pilbara Rio Tinto has been investing \$3.5 billion on building more berths at its Cape Lambert port, and expanding rail lines in the Pilbara. This infrastructure is due for completion in the first half of 2015.¹⁵
Project Financing	<ul style="list-style-type: none"> Mining companies drive the infrastructure investment opportunity and build, operate and maintain the assets but rely on financial and risk mitigation support from the investment community (including commercial banks, private equity, sovereign wealth funds, pension funds etc.) 	<ul style="list-style-type: none"> Mining companies bear a smaller capital burden Some support partners, particularly development banks, may exert pressure on mining companies to expand the scope of infrastructure projects to deliver wider development benefits 	<ul style="list-style-type: none"> The risk return profile of many mining infrastructure projects is unattractive to many potential support partners The company may not design the project to support local development objectives (i.e. risk of single use asset) 	<ul style="list-style-type: none"> The Boleo Copper Cobalt Mine in Mexico secured US\$ 823 million in financing from commercial banks and export credit agencies¹⁶ The project secured a project overrun agreement of US\$ 35 million to bolster investor confidence To further reduce risk the project agreed to hedge 50 % of its production over a three year period

¹⁴ World Economic Forum Blueprint for Institutional investors

¹⁵ Hoyle, R. "Rio Tinto to Boost Iron-Ore Output in Australia". The Wall Street Journal.

<http://online.wsj.com/news/articles/SB10001424052702304747004579225320461142860>. 2013

¹⁶ Baja Mining Corp Form 20-F. <http://www.otcmartets.com/edgar/GetFilingPdf?FilingID=9255571> . 2013

Model	Description	Pros	Cons	Example
Contract	<ul style="list-style-type: none"> Mining companies partly or fully invest through one of the models above and partners with third-party service provider(s) who accept(s) responsibility for building, operating, and maintaining the infrastructure component of the project 	<ul style="list-style-type: none"> The mining company has to bear a smaller capital burden 	<ul style="list-style-type: none"> The service provider may only accept contract terms that give them some access rights Development of the infrastructure may cost the mining company more than if they had financed it themselves There is a risk that infrastructure development will not align with mining operation timeline requirements 	<ul style="list-style-type: none"> Fortescue Metals Group awarded Leighton Contractors a US\$ 1.5 billion full-service, 5-year contract to manage their Firetail mine including infrastructure development such as the airport¹⁷ Fortescue provides a bulk of the capital for mining plant and equipment¹⁸
Special Purpose Vehicles (SPV)	<ul style="list-style-type: none"> An investor, or group of investors, finance, construct, own and operate the infrastructure asset through an independent financing vehicle (the SPV) The SPV makes all decisions regarding access Mining companies negotiate with the SPV for access 	<ul style="list-style-type: none"> Numerous investors can contribute to the SPV, even if they would be unable to finance the total capital requirements independently The mining company assumes no (or a very small) capital burden The SPV can act as a neutral party in determining access rights Does not require public sector finance 	<ul style="list-style-type: none"> Mining companies may need to be offered first mover advantage deals; prolonging open access rights May be reduced flexibility for mining company Strong legislative and regulatory frameworks are required to support the contractual arrangements surrounding design, access, tariffs, and compliance 	<ul style="list-style-type: none"> Aurizon operates and manages the Central Queensland Coal Network - Australia's largest export coal rail network All access applications must be approved by the competition regulator
Public-Private Partnerships (PPPs)	<ul style="list-style-type: none"> Medium or long-term contracts between a public sector authority, a mining company, and potentially other private companies (e.g. contractors) whereby infrastructure financing and responsibilities are bundled across the design, build, operation, and maintenance of the project 	<ul style="list-style-type: none"> Infrastructure assets are more likely to be designed, constructed, operated and managed in a manner that delivers positive social benefits to the region If the government contributes financially to the project it fosters confidence in the project and may open up alternative finance avenues 	<ul style="list-style-type: none"> Requires 'bankable' State financial support of guarantees, which can be difficult to achieve in frontier countries The roles and responsibilities for project financing, design, construction, and management may be poorly defined and understood Current mining mega-projects are frequently located in countries where host governments are unable to provide 	<ul style="list-style-type: none"> Richards Bay coal terminal is the largest in the world In 2010, private companies including Anglo American, BHP Billiton and Xstrata funded a US\$ 169 million expansion of the port¹⁹ Each company had export entitlements based on their shareholding The railways from the coal mines to port are controlled

¹⁷ "Leighton wins billion dollar Pilbara mining contract". Australian Mining, <http://www.miningaustralia.com.au/news/leighton-wins-billion-dollar-pilbara-mining-contra>. 2013

¹⁸ "Leighton wins billion dollar Pilbara mining contract". Australian Mining, <http://www.miningaustralia.com.au/news/leighton-wins-billion-dollar-pilbara-mining-contra>. 2013

¹⁹ Mundy, S. Ageing locomotives and dilapidated tracks. Financial Times, <http://www.ft.com/intl/cms/s/0/ead0b828-fc17-11df-b675-00144feab49a.html?siteedition=uk#axzz2qDuG3byn>. 2013

Model	Description	Pros	Cons	Example
			<p>project finance or the necessary skills and expertise to support infrastructure development</p> <ul style="list-style-type: none"> As a delivery mechanism, PPPs are most effective if the project has been fully planned and scoped in advance which can be challenging for complex mega-projects Dependent on strong legal frameworks and supporting governance structures 	<p>by Transnet, the state owned logistics company, who announced in 2010 they were willing to invest US\$ 2 billion to expand rail capacity provided the coal companies agreed long-term take or pay contracts²⁰</p>

Each of these models has their merits and the suitable model will depend on the nature of the project. It is clear that there is not a “one size fits all” model that is relevant, even within a commodity or region. Where possible, companies tend to prefer the “Solo” model from a control perspective. However, the extraordinary capital requirements to develop infrastructure for greenfield projects means this model is becoming increasingly challenging for mining companies to use. Therefore, the project financing model may become more attractive to companies as it preserves the mining company’s access rights but reduces their capital burden.

Projects that use solo and project financing models are more likely to be developed as single-use infrastructure assets. As governments and civil society increase the pressure on mining companies to develop multi-use / multi-purpose assets companies may start to consider financing infrastructure with other models including Contract, SPV and PPP. The underlying challenge for mining companies with all of these models is reaching an effective balance between financial contribution and access rights.

Further research is required to fully understand how to improve access to finance specifically for multi-use / multi-purpose projects and whether infrastructure can be positioned as an integrator. However, as detailed above, each of the available models is subject to a number of barriers that need to be addressed to facilitate investment in mining related infrastructure.

5. Facilitating investment in mining related infrastructure

In response to the challenges in securing infrastructure investment previously outlined, mining companies are looking towards new types of partnerships and investment models to improve access to capital for projects with significant infrastructure requirements. There are three approaches for doing this:

1. Minimizing the risk profile of infrastructure investments
2. Managing expectations
3. Mobilizing a new class of investors

These approaches can be used independently or in conjunction to improve access to capital for infrastructure development that supports mining projects and wider regional development.

²⁰ Eberhard, A. “The Future of South African Coal: Market, Investment, and Policy Challenges” January 2011. Stanford University

Minimizing the risk profile of infrastructure investments

In order to transform mining-related infrastructure into a more eligible asset category for investors including traditional and new players, mining companies, governments and supporting stakeholders need to reduce the risk profile of infrastructure investments. Table 2 introduces some approaches to resolve the issues that restrict access to capital for mining infrastructure investment.

Table 2: Issue resolution approaches

Issue	Resolution approach
Government capacity and capability	<ul style="list-style-type: none"> • Involve multilaterals in the issuance of partial risk guarantees • Improve sovereign risk insurance • Project completion guarantees • Take-or-pay/ Off-take agreements
Capital constraints	<ul style="list-style-type: none"> • De-couple infrastructure asset from mining asset by positioning the infrastructure asset as a utility (although there will need to be some guarantees about infrastructure access to reassure the investor of potential revenue streams)
Uncertain regulatory landscape	<ul style="list-style-type: none"> • Investigate the feasibility of a regulator for multi-use / multi-purpose infrastructure • Include provisions for periodic review in regulatory frameworks to accommodate changing needs across a project lifecycle
New stakeholders, new expectations	<ul style="list-style-type: none"> • Design and implement mining governance programmes with a focus on the complexities of infrastructure development • Facilitate broader understanding of technical issues and clarity on who should fund, regulate, operate and maintain, etc. • Establish better accessibility of project-related data and other relevant information • Improve understanding of challenges involved in financing mining-related infrastructure across community of potential investors

Addressing these risks will help mining companies secure greater access to finance for projects with large infrastructure requirements but the marginal gains will be especially large for multi-use / multi-purpose projects where the high-risk levels currently have a detrimental effect on project development.

Managing expectations

Mining infrastructure investment is often blocked by unreasonable expectations by the key players. New stakeholders often lack an understanding of what is required to develop, operate and manage major infrastructure projects and associated costs. The roles and responsibilities for project financing, design, construction and management across the different stakeholders are poorly defined and can also contribute to low levels of trust and the potential benefits from infrastructure projects (e.g. economic development, jobs, public services) are frequently overstated to local communities.

Poor communication and collaboration amongst stakeholders may lead to complicated and protracted negotiations, higher capital costs, and longer return on investment periods. Access to capital may be restricted due to mismatched expectations of appropriate risk and investment return profiles. To mitigate this, there is an opportunity to build knowledge and help manage expectations across the stakeholder groups:

- **Collect and communicate key data points:** Build a repository of infrastructure and investment requirements, track the impact of infrastructure development on local communities and associated investment returns to facilitate the appropriate allocation of capital and communicate with key stakeholders to build transparency, foster trust and develop an understanding of the benefits of infrastructure investments
- **Clarify and align timelines:** Articulate and compare the key timelines for project development and investment planning to encourage partners to proactively plan capital expenditure and align wherever possible
- **Define roles and responsibilities:** Define, discuss and agree with key stakeholders the key roles that are required for the effective design, construction, operation, and maintenance of infrastructure projects to help ensure responsibilities are allocated in accordance with stakeholder capacity, risk appetite and investment/returns

Improved coordination amongst key stakeholder groups can have numerous benefits. Not only will an improved understanding of key players help to reduce the risk profile and increase access to capital, but it will also help to maximize societal gains from the project by ensuring the design, operation and maintenance of the project is fit for purpose and effectively communicated to local communities. Reaching a compromise is an integral part of this process and governments in particular, may need to accept delayed multi-use functionality in order for mining companies to set up infrastructure assets at the lowest possible cost²¹. Managing expectations effectively will help to build trust and reach a consensus on how to achieve benefits for the long-term economic development of the region.

Mobilizing a new class of mining infrastructure investors

A further approach for improving access to capital for infrastructure investment is to increase the number of capital providers. The current gap between available capital for infrastructure investment and bankable projects in traditional investment destinations (North America, OECD countries, etc.), could now open a window of opportunity for long-term investors to look further afield for investment opportunities and investigate mining infrastructure as a new potential asset category. Asian state-owned development and commercial banks, predominantly Chinese but also South Korean, are increasingly looking to invest in mining infrastructure. These institutions often provide financing on the contingency that a corresponding mining license is provided to a national mining company. These “Infrastructure-for Resources” deals are especially common in sub-Saharan Africa, for example, in the Democratic Republic of Congo. Currently however, these deals do not usually provide specific financing for mining related infrastructure, instead funding tends to go towards infrastructure for broader community needs²². There is an opportunity to coordinate the available finance to fund infrastructure projects that can be mutually beneficial for mining projects and regional development.

Asian investors will not be able to finance the total funding gap. It is therefore necessary to look towards other groups of investors such as private equity and institutional investors as potential new sources of capital. Table 3 lists some of the new financiers for infrastructure development.

Table 3: New financiers for infrastructure development

Financier	Key principles	Pros	Cons	Examples
Sovereign Wealth Funds	<ul style="list-style-type: none"> State-owned investment fund Typically funds are created with a specific purpose and have long time horizons Funds have their origin in currency deposits, pension investments, central banks, fiscal surpluses etc. 	<ul style="list-style-type: none"> Significant source of capital - sovereign wealth fund assets surpassed US\$ 5 trillion in 2013, a 16% increase from 2012²³ Appetite to invest in infrastructure – 57% invest in infrastructure²⁴ 	<ul style="list-style-type: none"> Typically poor transparency of investment strategies Concerns that national resources could be held by overseas investors 	<ul style="list-style-type: none"> Singapore's sovereign wealth fund, GIC, has become an anchor investor in IFC Asset Management Company's US\$ 1.2 billion infrastructure equity fund²⁵
Private equity firms	<ul style="list-style-type: none"> Direct investment to private companies (not listed publically) Traditionally focus on investments where they 	<ul style="list-style-type: none"> New investment partners should stabilize the overall project and may provide 	<ul style="list-style-type: none"> Reduced control over business decisions Private equity 	<ul style="list-style-type: none"> In 2008, The Carlyle Group established 2 funds worth US\$ 1 billion for investment in South America and

²¹ *Fostering The Development of Greenfield Mining Related Transport Infrastructure Through Project Financing*. April 2013. International Finance Corporation

²² *Fostering The Development of Greenfield Mining Related Transport Infrastructure Through Project Financing*. April 2013. International Finance Corporation

²³ “Sovereign Wealth Fund Assets Surpass \$5tn”. Preqin. https://www.preqin.com/docs/press/Sovereign_Wealth_13.pdf. October 2013

²⁴ “Sovereign Wealth Fund Assets Surpass \$5tn”. Preqin. https://www.preqin.com/docs/press/Sovereign_Wealth_13.pdf. October 2013

²⁵ “Singapore's GIC invests in IFC's \$1.2 bln infrastructure fund”. Reuters. <http://www.reuters.com/article/2013/10/09/gic-ifc-idUSL4NOHZOQY20131009>. 2013

Financier	Key principles	Pros	Cons	Examples
	<ul style="list-style-type: none"> have particular expertise Mid-long term investment horizons 	<ul style="list-style-type: none"> expertise 	<ul style="list-style-type: none"> firms will want to have clear exit options 	<ul style="list-style-type: none"> Brazil and in 2013, raised an additional US\$ 308 million to be invested in Peru's mining, construction, and infrastructure industries²⁶
Export Credit Agencies	<ul style="list-style-type: none"> Provide loans, guarantees, insurance and similar financial support to domestic companies for international operations 	<ul style="list-style-type: none"> ECA assumes export risks Can be used to mitigate political risk, lots of experience in emerging markets 	<ul style="list-style-type: none"> Perceived by some as being export subsidies Concern that they support the importing country more than the exporting country 	<ul style="list-style-type: none"> The Export Finance and Insurance Corporation is providing a US\$ 100 million export finance guarantee to support senior secured loan facilities of close to US \$3.0 billion, to finance the construction and operation of the Wiggins Island Coal Export Terminal²⁷
Multilateral Development Banks	<ul style="list-style-type: none"> Institutions with representation from one or multiple countries that provide finance to national governments for development activities 	<ul style="list-style-type: none"> Can help to leverage private and public capital Often complement finance with advisory services Favorable interest rates and maturity periods 	<ul style="list-style-type: none"> Unlikely to finance total capital requirements for greenfield projects 	<ul style="list-style-type: none"> In 2011, the World Bank approved an investment credit of US\$ 25 million for Mongolia's mining infrastructure investment support project (MINIS)²⁸.

6. Potential roles for the World Economic Forum

The World Economic Forum's unique ability to create communities of shared interest to catalyse necessary actions makes them well placed to address some of the challenges that restrict access to finance for infrastructure development. Table 4 outlines the potential roles for the World Economic Forum to help address some of the challenges restricting access to finance for infrastructure development in the mining and metals sector.

Table 4: Overview of potential roles for the World Economic Forum

Objective	Potential roles for the Forum
Minimize the risk profile of infrastructure investments	<ul style="list-style-type: none"> Assist with the process of clarifying roles and responsibilities between users through design, construction and operation phase by facilitating strategic dialogues between government, business and civil society

²⁶ "The Carlyle Group Raises \$308 Million for Investments in Peru". The Carlyle Group. <http://carlyle.com/news-room/news-release-archive/carlyle-group-raises-308-million-investments-peru> . 2013

²⁷ "EFIC to finance Wiggins Island Coal Export Terminal". Dynamic Export. <http://dynamicexport.com.au/articles/freight/efic-to-finance-wiggins-island-coal-export-terminal-17102011/> . 2013

²⁸ "MN – Mining Infrastructure Investment Supp". The World Bank. <http://www.worldbank.org/projects/P118109/mn-mining-infrastructure-investment-supp?lang=en&tab=overview> . 2013

	<ul style="list-style-type: none"> Facilitate development of best practice guidance on negotiation, regulation and arbitration of open access regimes Conduct research to determine the impact of multi-use / multi-purpose infrastructure projects on the risk profile of the investment
Position infrastructure as an integrator	<ul style="list-style-type: none"> Review the principles of the Responsible Mineral Management Initiative and Mineral Value Management programme to develop guidelines about the broader role for the sector to contribute to infrastructure development Research how the mining sector can use infrastructure as an integrator (especially considering multi-use / multi-purpose models) to attract investment and contribute to long term social and economic benefits for the region Articulate how to improve contracts between parties to ensure they are comprehensive, clear and effective
Mobilize a new class of investors	<ul style="list-style-type: none"> Collaborate with Forum Investors community to expand current blueprint for policy-makers for infrastructure investment to include mining specific infrastructure Research development of multilateral Sovereign Wealth Funds and other global strategic infrastructure funding mechanisms Facilitate strategic dialogue between the industry, new groups of investors and government to systematically address barriers to investment Conduct research to understand if multi-use / multi-purpose infrastructure projects are more attractive to investors

7. Contributors

We are particularly thankful to our interviewees, including:

- Mark Aplin, Verus Partners
- Tony Hodge, President of International Council of Mining and Metals; Chair of the Global Agenda Council on Responsible Mineral Resource Management
- Alhassane Haidara, Chief Investment Officer, African Development Bank
- Glen Ireland, Partner, Latham and Watkins
- Kevin Lu, Regional Director, Asia-Pacific, MIGA, World Bank Group
- Zakhele Mayisa, Principal Infrastructure Finance Officer, African Development Bank
- Richard Morgan, Head of International Government Affairs, Anglo American
- Imrhan Paruk, Executive, Corporate Development, African Rainbow Minerals
- Paulo de Sa, Manager Oil, Gas and Mining, World Bank
- Nic du Toit, Group Head of Projects, Anglo American
- Perrine Toledano, Lead Economics and Policy Researcher, Vale Colombia Centre
- Members of the Global Agenda Council on Responsible Mineral Resource Management (see note in Appendix)

8. Appendix

Key issues

Table 5 below provides a high-level contextual overview of the key issues and potential implications for mining and metals companies.

Table 5: Key issues for mining and metals companies in securing investment for infrastructure development

	Issue	Details	Potential implications
Demand drivers	<i>Demand for more infrastructure</i>	<ul style="list-style-type: none"> • Exploration and development in new, and frequently remote, areas requires additional supporting infrastructure 	<ul style="list-style-type: none"> • Mining and metals companies may need to develop innovative investment and infrastructure models to effectively support projects and operations
	<i>Urbanization and local development</i>	<ul style="list-style-type: none"> • Population growth and urbanization requires additional energy and transport infrastructure 	<ul style="list-style-type: none"> • Mining and metals companies may be competing for investment with those developing urban infrastructure
	<i>Multi-use/multi-purpose infrastructure</i>	<ul style="list-style-type: none"> • Increasing demand from governments for mining and metals companies to provide shared use and open access regimes (e.g. Africa Mining Vision) to develop lateral industries and resource corridors • Increasing pressure to develop infrastructure that benefits local communities (i.e. passenger rail access) • Complex licensing structure • The commodity, or mining product, is not the priority 	<ul style="list-style-type: none"> • Access rights and tariffs will need to be negotiated • Funding, operational, and maintenance responsibilities will be shared between the various users
Supply drivers	<i>Capital constraints</i>	<ul style="list-style-type: none"> • Drops in profits in recent years put pressure on internal CAPEX budgets and CAPEX is prioritized for projects with higher ROI and lower operational risks • Some higher-risk countries fail to attract the required external investment • Equity players and lenders have become increasingly cautious in the wake of the financial crisis 	<ul style="list-style-type: none"> • Commodity price volatility may deter investors from mining and metals infrastructure projects • Mining companies increasingly offered less attractive capital structures e.g. higher interest rates and longer payback periods • There is often a mismatch between the lifecycle of infrastructure assets and the lifecycle of the vehicles in which they are packaged²⁹ • Projects may be deferred
	<i>Rising costs of infrastructure</i>	<ul style="list-style-type: none"> • Energy and transport investments are highly capital intensive, and costs are rising • 2012 was a record year for mining CAPEX investment for the top 40 mining companies³⁰ • Remote areas, often the location of greenfield projects, require greater operational costs for transport (including transport of fuel for energy production) • Specialist skills required to design and build projects in challenging geographic frontiers are in short supply and expensive 	<ul style="list-style-type: none"> • CAPEX requirements for infrastructure are increasingly becoming a strategic consideration for mining and metals companies • The cost of required infrastructure can be pivotal in the viability of proposed projects

²⁹ *Public and private financing of infrastructure Evolution and economics of private infrastructure finance*. EIB Papers. Volume 15. No1. 2010

³⁰ *Mine: A Confidence Crisis*. 2013. PricewaterhouseCoopers

Issue	Details	Potential implications
Changing rules of the game	<p><i>Uncertain regulatory landscape</i></p> <ul style="list-style-type: none"> Increasing regulations and incentives around renewable energy (i.e. hydropower) and multi-stakeholder design Difficulty in determining access and tariffs in haulage models/ absence of independent regulation Underdeveloped and/or insufficient regulation regarding the design, development and utilization of mining related infrastructure 	<ul style="list-style-type: none"> Mining and metals companies may be impacted by increased operational and compliance costs
<i>Government capacity and capability</i>	<ul style="list-style-type: none"> Current mining ‘mega projects’, requiring large-scale infrastructure development are frequently located in countries where host governments are often unable to close the financing gap through public sector investments Political instability, particularly related to the expropriation and nationalization of (non-recoverable) physical assets, increases sovereign risk Governments prefer multi-use, multi-purpose designs and ownership models but do not always have the requisite technical skills and expertise to manage and operate projects of this design 	<ul style="list-style-type: none"> Higher cost of capital Longer timelines, and consequently higher costs, for infrastructure planning and construction Operating standards are not well defined i.e. health and safety
<i>Changing license to operate</i>	<ul style="list-style-type: none"> Governments and Civil Society are placing increasing pressure on companies to deliver positive societal benefits (e.g. legacy of transportation and energy infrastructure) Local communities are well informed and able to mobilize quickly increasing reputational and operational risks for companies who are perceived to be delivering insufficient societal benefits 	<ul style="list-style-type: none"> Mining and metals companies need to develop multi-use/multi-purpose transport and energy infrastructure to secure and / or maintain their license to operate Required to show benefits across the entire country
<i>New stakeholders, new expectations</i>	<ul style="list-style-type: none"> Development agencies, international CSOs/NGOs are increasingly taking part in project negotiations with host governments and mining companies New stakeholders often lack an understanding of what is required to develop, operate, and manage major infrastructure projects and associated costs The roles and responsibilities for project financing, design, construction, and management are poorly defined and can also contribute to low levels of trust The potential benefits from infrastructure projects (e.g. economic development, jobs, public services) are frequently overstated to local communities 	<ul style="list-style-type: none"> Poor communication / collaboration among stakeholders may lead to higher capital costs and contribute to project delays Longer ROI periods Insufficient expertise and technical understanding of mining infrastructure projects across investors, governments and companies can complicate and protract negotiations

Note from the Global Agenda Council

Background and purpose:

Infrastructure development was identified by the Mining Governors in 2013 as a significant issue for the mining and metals industry. In response, the Mining Team initiated a research effort that resulted in a draft report on “New Models for Infrastructure Investment in the Mining and Metals Sector.” The draft report was reviewed by the Global Agenda Council on Responsible Mineral Resource Management on 18 – 20 November in Abu Dhabi at the annual Summit of Global Agenda Councils.

The Global Agenda Council felt that it was not within its expertise to comment on “investment models”. However, Council Members wished to report to the Mining Governors on a number of key issues related to infrastructure – particularly those that are leading to inefficiencies. The purpose of this note is to do so.

Infrastructure issues and challenges for the mining and metals industries:

For infrastructure planning, construction and operation, particularly when large volumes of commodities are involved and when operations will extend beyond a few years, it makes economic, social and environmental sense not only from a company perspective but in particular from the perspective of host community and countries, to build infrastructure that serves the public good. Such infrastructure development is critical everywhere but in particular in emerging frontier regions.

The Global Agenda Council focused on the following five issues:

- 1) **Lack of effective, long-term regional planning by governments** - Mining and metals activities do not occur in isolation but always take place in the vicinity of communities and other industries. Governments must serve to bring coordination amongst competing interests in a fair and efficient way – not only over the short term, but also the long. In some cases, government capacity and resources are limited, in others needed legislation is not in place, in still others systems that are in place are overly complicated to the extent of impeding effective planning and decision-making.
- 2) **Lack of consideration of cumulative implications – negative and positive – over the long term** - Without a regional and long-term overview, there is little chance that cumulative implications for people and the environment will be identified and effectively integrated into engineering design. As a result, negative impacts are not effectively addressed and opportunities not realized – social, environmental and economic. Inevitably, this contributes to both inefficiencies (for companies and governments) and negative reputational spin-offs for industry in particular.
- 3) **Lack of recognition of both natural and man-made infrastructure** - Man-made infrastructure is layered onto existing natural infrastructure. Not allowing for this connection weakens engineering design.
- 4) **Lack of effective coordination between companies and between companies and governments** - The competitive nature of companies and in some cases the incompatibility of corporate cultures impedes effective coordination between companies leading to significant inefficiencies. Similarly, lack of effective communication and coordination between industry and government can be a significant cause of inefficiencies.
- 5) **Lack of clearly defined responsibilities between parties and related accountabilities** - Faced with pressure to provide needed infrastructure and services, companies often step in to fill the void. However, the limits to discharging related responsibilities – particularly related to long term maintenance – can be vague and poorly spelled out. In time, the lack of clear definition of the boundary between company and government responsibilities – and clear systems of accountability – leads to difficulties.

While the above issues would not arise in a review of “new models of infrastructure investment,” they carry with them significant cost implications for the efficiency of infrastructure design, construction and operation.

Two additional insights were raised during our deliberations:

- 1) Infrastructure development is uniquely placed to be considered an “integrator” for application of sustainable development ideas. An under-recognized aspect of mining and metals’ contribution is the attraction of foreign direct investment, much of which is applied to infrastructure development. And it is here where significant gains can be made for contributing to human and ecosystem well-being over the long term.
- 2) There is a particular opportunity for innovation in the development of infrastructure in Africa. Sub-Saharan Africa is experiencing an exceptional period of evolution at this time. At the heart of this is the development of infrastructure as regional corridors emerge that can facilitate trade within regions of Africa, a departure from the singular focus on getting resources to seaports for exports which has been pursued since colonial days.

The above issues and insights give rise to a number of questions which merit further consideration. These questions include:

- 1) What specific steps could be taken by the industry to facilitate effective regional planning including consideration of cumulative impacts and natural infrastructure over the short and long terms; are there some specific case studies that should be examined to draw insight?
- 2) What specific steps could be taken by governments and companies to encourage collaboration between all parties on infrastructure development in any given region?
- 3) What specific steps could be taken to ensure a clear and concrete definition of responsibilities and accountabilities related to infrastructure and related support services over both the short and long terms in any given region?
- 4) How can the contribution of mining and metals to infrastructure development be more effectively captured, assessed and communicated in terms of the associated positive and negative implications?

The above questions are forwarded to the Mining Governors for consideration at their meeting to be held on Thursday 23 January 2014 in Davos.