

Shared-Use Mining Infrastructure: Why It Matters and How to Achieve It

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This viewpoint is a working draft and is open for comments, in the context of the Milken Institute initiative to develop principles for the shared use of mining infrastructure. These principles will consist in set of regulatory, financial and contractual norms which governments, private investors and development finance institutions can incorporate into mining concessions, project loan agreements and mineral rights tender documentation.

Please send any comments on this white paper by email to Glen Ireland of Infrashare Partners (glen.ireland@infra-share.org) or Carole Biau at the Milken Institute (cbiau@milkeninstitute.org). The Milken Institute will be holding a workshop to discuss principles for shared-use infrastructure at the Indaba mining conference, February 10, 2016 in Cape Town. Participation in this workshop is limited to a select number of investors, policymakers, regulators, DFIs and civil society organizations, so please indicate your interest to cbiau@milkeninstitute.org if you would like to attend.

Abstract

For many countries in sub-Saharan Africa, the effective exploitation of natural resource wealth is vital to their future economic development. With many bulk mineral deposits located in remote and poorly-explored regions, the infrastructure (particularly rail and port) necessary to exploit them is typically very costly. We argue that such infrastructure, once constructed, is critically important in enabling host governments to maximize resource rents and achieve broad-based economic development. In sub-Saharan Africa, large greenfield mines have historically been developed as “integrated” projects in which both mining and infrastructure operations remain under the exclusive and largely unrestricted control of a “first mover” mining firm. We consider the implications of this model, and examine the cases for and against imposing “open access” regulation on bulk mining infrastructure. We conclude that host governments in sub-Saharan Africa should, in almost all cases, impose regulation requiring open access to such infrastructure. We stress that care must be taken to ensure that such regulation is effective and workable, and that the need for greater expertise and capacity in this area should not be underestimated.

Keywords: mining infrastructure, open access regulation, sub-Saharan Africa

Introduction

The key to economic development and prosperity for many countries in sub-Saharan Africa lies, at least initially, in the effective exploitation of their natural resource wealth. Historically underexplored and underdeveloped¹, the region's sub-soil potential has in recent years been the subject of greater attention and more intense competition as China and other emerging industrial economies seek to secure direct access to bauxite, coal, iron ore, manganese, potash, and other "bulk" commodities. A lack of available rail, port and other critical infrastructure has long represented a major obstacle to developing many of Africa's world-class mineral deposits. Encouragingly, China has over the last decade demonstrated a strong willingness to fund and construct major infrastructure projects on the continent,² including by way of "resource-for-infrastructure" deals. While recent declines in commodity prices have reduced the near-term prospects for investment in major "greenfield" mining projects, there seems little doubt that sub-Saharan Africa will eventually take its place as the world's leading supplier of many bulk minerals. In the current subdued investment climate, African governments have an invaluable opportunity to plan for the future development of their natural resources and, in particular, to consider how anticipated investments in mining-related infrastructure can best serve their national interests.

Many of sub-Saharan Africa's large, undeveloped bulk mineral deposits are in remote, poorly-explored and highly-prospective regions. Mining of such deposits requires major investment in rail, port, power and other infrastructure, the cost of which is often multiples of that required to construct the mineral extraction and processing facilities. This infrastructure, when completed, could also be used to support other economic activity, including exploitation of yet-to-be-discovered mineral deposits as well as agribusiness, freight transportation and/or passenger services. Thus, the infrastructure will hold important potential in terms of enabling the host government to maximize resource rents and achieve broad based economic development. Whether or not such potential can be realized however depends, to a large extent, on the arrangements in place between the host government and a "first mover" mining firm regarding the financing, construction, ownership, operation and use of the infrastructure.

In sub-Saharan Africa, large greenfield mines have historically been developed as "integrated" projects in which both mining and infrastructure operations remain under the exclusive and largely unrestricted control of the first mover. We consider the implications of the integrated mining model for sub-Saharan Africa, and examine the case for imposing "open access" regulation on bulk mining infrastructure. We conclude that host governments should, in almost all cases, impose open access regulation, and that great care must be taken to ensure that it is both effective and workable.

The paper is structured as follows. In Part 2, we discuss some salient features of bulk mining, including the important role played by "pit-to-port" logistics infrastructure. In Part 3, we outline the benefits of open-access regulation in the bulk mining context, and evaluate arguments commonly advanced by mining firms, academics and others who oppose or seek to limit the use of such regulation. Drawing on experience in Australia and other countries, we outline in Part 4 some key

¹ Based on a global inventory of known sub-soil assets prepared by the World Bank in 2000, the average gross "value" of sub-soil assets per square kilometre of land area in the member countries of the OECD as at the millennium was \$114,000. The corresponding figure for countries in Africa was only \$23,000. (Collier 2010).

² ICA 2014, p. 14.

considerations for policy makers in sub-Saharan Africa, and summarize the main features of an effective and workable open-access regulatory framework.

Bulk Mining Operations: An Overview

Phases of a Bulk Mining Project

Major deposits of bulk commodities, which have a relatively low value-to-weight ratio, are typically exploited in large-scale operations involving the extraction and transfer of vast quantities of material. The realization of such projects generally involves the following discrete phases: exploration, development, construction, and operation.

In the exploration phase, a mining firm seeks to identify a large, high-grade, near-surface and well-situated mineral deposit. The main geological formations in which such deposits exist are, in general, widely understood within the global mining industry. Exploration activity seeks, however, to ascertain in detail the characteristics of individual deposits, and to rank or prioritize them in terms of economic potential. The cost of the exploration phase varies considerably, depending upon the amount of drilling undertaken, the remoteness of the location, and other factors. Most bulk mineral projects are abandoned at the end of this phase and, accordingly, exploration investment involves considerable commercial risks.

In the development phase, a mining firm seeks to determine whether exploitation of an individual deposit, or perhaps a group of related deposits, would be economically viable. The development phase includes additional site work and preparation of a detailed feasibility study, the cost of which can often exceed US\$100 million. The duration of the development phase can be 4 to 20-plus years, depending on factors such as commodity prices, global financial and construction markets, the host country's election cycle and the mining firm's financial strength—all of which need to align favorably. In most cases, the mining firm determines at the end of the development phase to terminate the project, sell it to a third party or hold it in "inventory" pending more favorable conditions. In a small number of cases, the firm decides to proceed with construction of a mining project.

The construction phase involves readying the mineral deposit for exploitation, constructing processing and other mine-site facilities, and building any required logistics infrastructure such as a railway and/or port. Costs of construction vary considerably depending upon on the size of the mine, its location relative to the sea, and other factors, but typically run to many billions of U.S. dollars. It is common for original cost estimates to be exceeded, due to unforeseen technical difficulties or other contingencies being encountered. The construction phase typically lasts for two to three years, although project delays are sometimes experienced.

The operation phase involves commercial exploitation of the mineral deposit(s), and typically runs for 50 years or more. Bulk mines involve the excavation of huge quantities of material, relatively limited on-site processing (e.g., crushing, screening and/or washing) of ore, and conveying saleable ore from the mine site to a port for shipping to international markets. In the initial operating period of a bulk mine, it might produce in the order of 20 million to 30 million tons per annum of saleable ore. Later in the operating phase, output of the mine and the capacity of its associated infrastructure

may be increased to meet additional market demand or improve the operation's competitiveness by lowering unit costs.

The Important Role of Logistics Infrastructure in Bulk Mining

A mine's position on the global "cost curve" determines its ability to withstand inevitable downturns in the price of the relevant commodity, which is outside the control of the mining firm. This is a key consideration for capital providers when evaluating the "bankability" of a proposed project and, accordingly, lowest cost bulk mining projects tend to be developed in priority to higher cost projects. The cost, efficiency, and reliability of a remote mine's pit-to-port logistics solution is critically important in determining its relative position on the cost curve. The logistics solution for a typical bulk mining operation will comprise a heavy freight railway connected to a seaport capable of handling deep draught, "Capesize" vessels. The cost of logistics facilities depends on a number of factors, including the distance from pit to port and the nature of the terrain covered, but is frequently greater than the cost of building the mine and its related processing facilities³.

Models for Owning, Financing and Operating Mining Infrastructure

Various models are employed globally for the ownership, financing and operation of logistics infrastructure required by bulk mining operations. In a vertically integrated mining operation, the mine and its associated infrastructure are under common ownership and/or control. This model is generally employed when the mining firm determines that suitable logistics infrastructure is not available, and the host government is unable or unwilling to provide and/or operate it on acceptable terms. These circumstances frequently arise when a mineral deposit is found in a remote, undeveloped region of a developing country that lacks the financial and/or technical capacity to deliver or operate a major infrastructure project.⁴

Bulk mining operations can also utilize public infrastructure, which is owned and operated by the state or a state-owned entity. This model can be attractive to mining firms when the host government has the capacity and credibility to fund and manage delivery of the infrastructure project, to pay compensation in the case of infrastructure project delays, to ensure reliable infrastructure operation, and to guarantee competitive and stable access tariffs.⁵

The independent private infrastructure model involves the operation and, in some cases, ownership of mining infrastructure by a private firm that is independent of the mine and/or other users, and is generally in the business of operating numerous infrastructure facilities. This model often arises from the privatization of public infrastructure facilities through an initial public offering or sale of an entity created to hold public infrastructure assets or a long-term right to operate and manage them.

³ The estimated cost of Rio Tinto's proposed Simandou iron ore project in the Republic of Guinea is, reportedly, US\$20 billion, of which US\$15 billion relates to construction of new railway and port facilities.

⁴ Examples of the vertically integrated mining model include: the iron ore operations of Rio Tinto and BHP Billiton in the Pilbara region of Western Australia; the Cerrajón coal mine operation owned jointly by Anglo American, Glencore and BHP Billiton in Colombia; the iron ore mines operated in the Labrador Trough region of Quebec, Canada by Rio Tinto and ArcelorMittal; and Compagnie des Bauxites de Guinée (CBG), a bauxite miner that operates and controls (under long-term concession arrangements) critical rail and port facilities held by the Guinean state-owned entity Agence Nationale d'Aménagement des Infrastructures Minières de Guinée (ANAIM).

⁵ Examples of the public infrastructure model include: coal mines in the Hunter Valley of Australia that utilize railways owned by the State of New South Wales (operated under concession by federally-owned Australian Rail Track Corporation); and coal and iron ore mines in South Africa that utilize rail and port facilities operated by Transnet, which is majority-owned by the South African government.

It also occasionally arises in the context of a greenfield mining project where the mining firm and/or host government decide that responsibility for the infrastructure facilities, including their funding, construction and/or operation, will be assigned to a third party.⁶

Railway and Port Capacity

Railway and port facilities constructed to support a bulk mining operation will generally have a throughput capacity that exceeds the initial planned output of the mine. This occurs either because the infrastructure cannot be designed with a lower capacity, or the mining firm elects to overbuild the infrastructure to accommodate increased throughput in the future. The capacity of a fully utilized railway or port can normally be increased through further capital investment. Due to the inherent physical characteristics of such facilities, the marginal cost (per unit of throughput) of adding capacity is, at least initially, quite low. Further capacity increases will eventually require a more substantial, or “step-change” investment. Invariably, the cost of expanding the capacity of existing infrastructure (even if a step-change is needed) is significantly lower than the cost of constructing new infrastructure having equivalent capacity.⁷

The Link Between Infrastructure Access and Exploration Investment

Mining firms carefully allocate capital for high-risk exploration/development of mineral “targets,” with each target competing with others within the firm’s project portfolio. In the case of bulk mineral targets, early consideration will be given to potential logistics solutions. Where infrastructure is unavailable, mining firms will favor targets that are located in close proximity to coastal sites suited to a seaport development. This is explained by the fact that only “world class” deposits (in terms of their size, grade and other characteristics) can possibly support the cost of constructing major new railway and port facilities, and the likelihood of identifying such deposits is very low.

If logistics infrastructure already exists, the mining firm will seek answers to basic, but important questions: Is the infrastructure of a sufficient standard to support efficient mining operations and, if not, what is the likely cost of upgrading it? Does the infrastructure have sufficient unutilized capacity to support a new mine and, if not, is it possible to expand the capacity, and what would this cost? Who is responsible for granting rights of access to, and approving, funding and constructing any required upgrade or expansion of, the infrastructure, and is there a material risk that any required grants or approvals may be refused or delayed? What commercial and other terms would apply to

⁶ Examples of the independent private infrastructure model, include: the large railway network servicing numerous coal mines in Queensland, Australia operated by Aurizon, a private, publicly-listed infrastructure operator created through a privatisation (by IPO) in 2010 (see Box 2); and networks owned by Canadian Pacific, Canadian National (privatized by the Canadian government in 1995), BNSF Railway and other private railway companies in North America that provide freight services relied upon by, among others, mines producing potash, “fracking” sand, coal and numerous other bulk commodities. The independent private infrastructure approach is more common in OECD-member countries, although it is currently being proposed for the Simandou iron ore project in the Republic of Guinea (see footnote 6).

⁷ The following two simplified examples illustrate this: (1) The capacity of a single-track railway can initially be increased significantly by the addition of sidings/passing loops. Eventually, further capacity increase will require a step-change investment to construct a second track. However, investment in the second track will benefit from the initial land acquisition and clearing for the shared railway corridor and, therefore, have a lower marginal cost per unit of capacity than if a new single-track railway were constructed. (2) The capacity of a port can initially be increased through more efficient use of the available berth(s). Once the existing berth(s) is/are fully utilized, a further capacity increase will require a step-change investment in an additional berth. However, such investment will benefit from earlier investment in the dredging of the shipping channel, which can be shared by all port users.

rights of access to the infrastructure? Unless satisfactory answers to these questions can be obtained, the mining firm, when making its investment decisions, will heavily discount the potential benefits of existing infrastructure.

There is, therefore, a strong link between a mining firm's decision to invest in mineral exploration and development, on the one hand, and what might be termed "infrastructure risk," on the other. All other things being equal, the higher the infrastructure risk associated with a particular target, the less willing a mining firm will be to make substantial investment in its exploration and development; and the converse also holds.⁸

Third Party Access to Mining Infrastructure

The mechanisms for third parties to gain access to mining logistics infrastructure vary by jurisdiction, but can be usefully grouped into the following categories: private negotiation, access undertaking and formal regulation. Under the private negotiation approach, a mining firm or other third party can gain access to existing mining infrastructure only if it is able to reach a negotiated access agreement with the infrastructure owner. The owner generally has no (or only a limited) obligation to negotiate,⁹ is unrestricted (or relatively free) in the negotiating positions it can take, and may withdraw from negotiations at any time. The access undertaking approach involves the infrastructure owner/operator making a contractual commitment to the host government concerning third-party access, which is often included within a mining concession agreement. Formal regulation involves a designated regulatory body or agency directly overseeing and resolving access-related issues and disputes. The approach can range from passive access regulation, where the regulator becomes involved only when needed to resolve disputes, to active access regulation, where the regulator is regularly involved in reviewing and approving access decisions, setting access tariffs and deciding other related matters.

Regulating for Open Access to Mining Infrastructure

The Case for Open Access Regulation

Newly constructed railway, port and other critical infrastructure facilities are generally non-rivalrous services: until their capacity approaches full utilization, the marginal cost of providing access to new users is extremely low. Such infrastructure also exhibits significant scale economies: it is more efficient to expand the capacity of existing facilities than to construct new, duplicate facilities. Furthermore, critical infrastructure often constitutes a natural monopoly: significant up-front fixed costs of construction, or "sunk" investments, combined with low marginal operating costs enable an owner/operator to deter potential market entrants from investing in competing services by, for example, engaging in short term predatory pricing behaviour. Moreover, even if competition between infrastructure facilities is achievable it may nevertheless be sub-optimal from a societal perspective insofar as it implies adverse environmental/social impacts or the inefficient allocation of

⁸ Glencore has described the infrastructure risk facing its coal business in Australia as follows: "Having the ability to predict infrastructure availability and costs is essential in making appropriate investment decisions. Uncertainty of infrastructure costs or availability over the expected payback period of the investment diminishes the expected returns and lessens the ability for these returns to be forecast. Uncertainty undermines, if not destroys, investment." (Glencore 2014).

⁹ In many countries, an infrastructure owner will at the very least be subject to general competition laws. In more sophisticated jurisdictions, these may impose civil remedies or penalties if the infrastructure owner/operator's refusal to deal with third parties or other actions amount to an "abuse of dominant position," particularly if the infrastructure in question is a so-called "essential facility."

capital to create excess/unneeded infrastructure capacity. Due to the foregoing characteristics, it is well understood that critical rail and port facilities require public ownership or, alternatively, public regulation to deter monopolistic pricing or other predatory behaviour and to ensure efficient levels of investment.

Critical rail and port infrastructure constructed to support a new bulk-mining project almost always creates potential opportunities for additional users. Until such infrastructure is actually in place, however, it can be difficult to identify these users because the normal process of trial and error by which opportunities are established cannot get fully underway. An important class of such opportunities is often the exploitation of other bulk mineral deposits by competing mining firms. The terms on which completed rail and port infrastructure can be used by third parties will largely determine whether and to what extent other mining firms elect to invest in the exploration activity necessary to discover and develop other deposits. If a mining firm holds unregulated private rights over its infrastructure, it retains the power of economic hold-up over competing mining firms. If a competing firm were to incur fixed exploration and development costs and successfully define a mineral deposit, the infrastructure owner could set terms of access that would extract from its competitor all rents associated with the deposit together with the entire value of any sunk costs. Since competing mining firms are aware of this power, a negotiation as to the terms of railway and port usage might be expected prior to any investment in exploration and development. However, even at this earlier stage, the unregulated infrastructure owner is in a position to extract from its competitor the entire expected rents from its proposed investment. As this, too, is known by all mining firms, they will simply avoid investing in exploration and development in the absence of regulation.

A mining firm holding unregulated private rights over critical rail and port infrastructure can also capture resource rents that would normally accrue to the state. In sub-Saharan Africa, for example, it is common for host governments to capture resource rents by auctioning mineral rights sequentially as a region gradually opens up to mining activity and the value of its mineral rights increases. If a first mover holds unregulated private rights over critical infrastructure in the region, potential bidders for these mineral rights cannot possibly know what to bid in the absence of a prior agreement with the first mover on access terms. However, in any such prior access negotiations the infrastructure owner can, through pricing of access rights, effectively pre-empt the state's share of the region's resource rents. And if the infrastructure owner wishes to secure for itself those regional mineral rights, it can simply refuse to negotiate with third parties and establish itself as the only credible bidder. In such a scenario, the infrastructure owner would have no incentive to pay more than a token amount for the explicit regional mineral rights, as it already owns the implicit rights over them.

Given the inherent uncertainty surrounding the existence of mineral deposits and the sequential nature of regional mineral discoveries, the value of rents associated with a region's mineral endowment is a classic instance of uncertainty as distinct to risk: no meaningful number can be placed on it. If a first-mover mining firm is allowed to hold unregulated private rights over critical rail and port infrastructure, it will (as explained above) acquire not only the explicit value of its initial mineral rights but also the implicit value of all yet-to-be-discovered mineral deposits in the same region. The value of such implicit rights is so uncertain that the first mover will be unwilling to bid up the price paid for its explicit rights. In this case, it is far better to leave the uncertain, but potentially

massive, value of the implicit rights with society than allow a first mover to acquire them for no consideration.

The public interest is overwhelmingly in favor of preserving future competition for mineral rights: only competition can ensure that the state, rather than an owner of critical infrastructure, captures the rents from future mineral exploitation. To maintain competition during the intrinsically sequential exploration and development process, a host government should impose appropriate open access regulations on the infrastructure owner.

Open access regulation also has an important role to play in enabling mining-related infrastructure to serve as a catalyst for broad-based economic growth, particularly in sub-Saharan Africa. In 2009, this was recognized by the heads of state of African nations when, acting through the African Union, they adopted the “African Mining Vision” (AMV), an initiative that seeks to put the continent’s long term, broad development objectives at the heart of policy-making concerned with mineral extraction. The AMV’s foundation report (African Mining Vision 2009) called for, among other things, “a knowledge-driven African mining sector that catalyzes [and] contributes to the broad-based growth & development of, and is fully integrated into, a single African market through [...] [s]ide-stream linkages into infrastructure (power, logistics, communications, water).” The AMV initiative has subsequently drawn attention to the potential benefits of “extending economic infrastructure,” particularly power and transport, which the African Union notes is critical in mineral development (African Mining Vision Bulletin 2). The African Union urges Africa’s policymakers “to maximize the beneficial spill over effects of infrastructure triggered by mining by planning around resource corridors” and by encouraging its “collateral or integral use by other economic sectors” including, for example, “to promote rural development.”¹⁰ To achieve this, the African Union reminds policymakers that “mineral transport infrastructure needs to allow third-party access at non-discriminatory tariffs.”

Evaluating the Arguments Against Open Access Regulation

Access to rail, port and other infrastructure has for many years provoked heated debate within the mining industry, with owners of integrated mining operations routinely defending their rights ownership and access-seekers insisting on the need for open access regulations. In Australia, the regulation of access to mining infrastructure has received considerable attention from policymakers at the national and state level during the past 20 years or so (see Box 1).

Box 1

Infrastructure Access in the Pilbara, Western Australia

Australia’s National Access Regime

In the 1960s, predecessors of Rio Tinto and BHP Billiton took the decision to construct large mines and associated rail and port infrastructure to exploit large ore deposits in the remote, and then undeveloped Pilbara region of Western Australia. Over the last four decades, these mines have—through expansion and further investment—evolved into large, efficient and highly profitable operations. In the process, Western Australia has enjoyed one of the fastest-growing mining sectors in the world. The Pilbara operations of Rio Tinto and BHP Billiton are among the lowest cost mines

¹⁰ The potential benefits from sharing mining infrastructure for the economies of host countries have also been highlighted by the International Finance Corporation (IFC 2013) and by the co-authors (e.g., Collier 2011).

in the global iron ore industry, enabling them to remain profitable despite recent declines in iron ore prices. Rio Tinto and BHP Billiton's integrated Pilbara mines are governed by so-called state agreements (i.e., mining concessions) entered into with the government of Western Australia. These contain, among other things, limited and highly conditional undertakings regarding the granting of third-party access to their infrastructure.

In 1995, the government of the Commonwealth of Australia introduced a National Access Regime (NAR) as part of wider national competition policy reforms. The stated purposes of the NAR were (1) to promote the economically efficient operation of, use of, and investment in the infrastructure by which services are provided, thereby promoting effective competition in upstream and downstream markets; and (2) to provide a framework and guiding principles to encourage a consistent approach to access regulation in each industry. The NAR operates as an umbrella framework and, accordingly, does not apply to situations where a state-level, industry-specific or other qualifying access undertaking is in place. (Since the NAR's introduction, many such qualifying undertakings have been introduced governing access to a range of infrastructure facilities across the country.)

Upon application by a person seeking access to qualifying "bottleneck" infrastructure in Australia, the NAR empowers government to "declare" the infrastructure, subject to certain conditions being met. A declaration enables access-seekers to require the infrastructure owner to negotiate access terms. The NAR provides for resolution of access disputes by way of arbitration conducted by the Australian Competition and Consumer Commission (ACCC).

In the early 2000s, unprecedented growth in Chinese steel production led to surging demand for iron ore. Holders of mineral rights in the Pilbara, including Fortescue Metals Group and Hancock Prospecting, sought to develop new iron ore mines. An affiliate of Fortescue, TPI, succeeded in having part of BHP Billiton's Pilbara rail and port infrastructure declared under the NAR. BHP Billiton, with supportive intervention from Rio Tinto, challenged the legal validity of the government's declaration. This led to the well-known "Pilbara railway case," which dragged on, at great cost, for many years. The Australian courts finally determined, in 2013, that the Australian government had not met the conditions for declaring the infrastructure for open access. The court's decision hinged on its narrow interpretation of the NAR, which placed an onus on Fortescue and other access-seekers to establish that they could not viably construct their own infrastructure facilities (known as the "private profitability test").

To date, the only Pilbara iron ore infrastructure to be successfully declared under the NAR is the "Goldsworthy" line (a minor section of BHP Billiton's railway), and no party has sought access to it.

State-Level Access Regulation in Australia

Despite its defeat in the Pilbara railway case, Fortescue, with support from the government of Western Australia, elected to construct its own rail and port infrastructure. It secured the funding required, and successfully constructed the fully integrated Cloudbreak mine. The Western Australian government required Fortescue to operate its infrastructure on an open-access basis according to a state agreement, existing state-level access regulations and a formal access undertaking entered into by TPI. Subsequently, Hancock Prospecting entered into similar access arrangements in Western Australia in connection with its Roy Hill integrated project, which is now nearing completion. The railway operations of BHP Billiton, Fortescue and Roy Hill all run parallel to one another and terminate at Port Hedland, where each company operates its own dedicated loading facilities.

In 2006, Fortescue entered into arrangements with junior miner BC Iron, under which Fortescue acquired a 25 percent joint venture interest in the junior's Nullagine project and granted rail and

port access for the project on purportedly arm's length terms. This was one of the first examples of meaningful rail/port infrastructure sharing between mining companies in the Pilbara. It seemed that the government of Western Australia was on track to achieve what the NAR had failed to do. However, in 2013, when another junior, Brockman Mining, sought access to Fortescue's infrastructure for its proposed Marillana project it faced strong resistance. Fortescue proposed "floor and ceiling" prices for access (as contemplated under its access regime) that many industry observers regarded as aggressive. In September 2013, Western Australia's access regulator, the Economic Regulatory Authority (ERA), rejected Fortescue's proposed access pricing range, and imposed a materially lower "ceiling" price. Fortescue then challenged the ERA's determination by way of judicial review, and succeeded in obtaining a court order requiring the ERA to reconsider its decision. Fortescue also commenced litigation to challenge the validity of Brockman's access application, arguing that Brockman had no clear intention or motive for seeking access and had neither the financial ability nor managerial expertise to develop its project. When announcing Fortescue's intention to appeal the Supreme Court of Western Australia's decision rejecting this challenge, Chief Executive Nev Power insisted that Fortescue is still "a strong proponent of third-party access to infrastructure" but that "it cannot be expected to subsidize third-party projects that are uneconomic."

In June 2013, a frustrated Colin Barnett, the premier of Western Australia, complained publicly that "the biggest obstacle to timeliness and keeping costs down [in natural resource projects in Western Australia] is disputes and lack of agreement and a lack of sharing infrastructure in the mining and petroleum sectors" and that "the companies need to look at themselves."¹¹

In early 2014, the Australian government asked an expert panel, led by Professor Ian Harper, to conduct a "root and branch" review of the country's national competition laws and policies. This included Australia's "National Access Regime," which regulates (at the national level) access to "bottleneck" infrastructure that is formally "declared" by the government. In their public submissions to the Harper Panel, several major mining firms and other commentators made public their views on access regulation in the context of bulk mining infrastructure. We set out below, and evaluate, the main arguments made by Rio Tinto, BHP Billiton and Ergas and Fels against open access regulation, drawing, where appropriate, also upon arguments made by Anglo American and Glencore in support of such regulation. We also address comments concerning access to mining infrastructure included in a report published in 2013 by the International Finance Corporation (which was not connected to the Australian process).

Opponents of open access regulation of mining infrastructure claim that it is unnecessary in light of market pressures. BHP Billiton and Rio Tinto, for example, argue that private infrastructure owners have a strong incentive to maximize its value and will, therefore, enter into access arrangements with third parties whenever the benefits of such arrangements outweigh the costs to them.¹² In the

¹¹ <http://www.miningaustralia.com.au/news/stop-fighting-and-share-infrastructure-barnett-tel#.U42n2bM8xRA>.

¹² Rio Tinto argues "[w]here duplication [of infrastructure] is privately feasible, the facility owner and access seeker have a commercial incentive to find the least cost arrangement", since for the former "if it would cost less to share the facility than it would to duplicate the facility, then the facility owner has a commercial incentive to provide access so long as it can charge an access fee that is greater than the cost of providing access", while for the latter an "access seeker has the incentive to share the facility rather than build its own facility provided the access fee is less than the cost of duplication." Rio Tinto therefore argues that the "parties' commercial incentives will result in the facility being shared at an access price struck somewhere between the cost of providing access and the cost of duplication." Rio Tinto also claims that "[t]he assessment of whether the true costs of access outweigh the costs of duplication is best made by market participants rather than by a regulator" and if and whenever "the true costs of access are less than the costs of constructing a new facility, the marketplace will ensure that access on commercially-negotiated terms is granted." (Rio Tinto 2014) BHP Billiton argues "the owner [of private export infrastructure] has no incentive to deny access in order to foreclose competition,

absence of a clear market failure preventing owners and access-seekers from reaching mutually acceptable outcomes, open access regulation is said to be an unnecessary and unjustified restriction on the free exercise of private property rights. According to BHP Billiton, situations such as that which has arisen in the Pilbara region of Western Australia, where access-seekers have for decades sought with only limited success to secure access to railway and port infrastructure (see Box 1), will only arise when the costs to infrastructure owners of granting third-party access vastly exceed the potential benefits to such owners.

Market-based arguments by opponents of open access regulation suffer from several flaws. First, they ignore the potential for the holder of unregulated private rights over infrastructure to extract a disproportionate share (or even all) of the value of the access-seeker's mineral rights in any access negotiations.¹³ In such a situation, the infrastructure owner has both the economic incentive and the power to extract maximum gains.¹⁴ Secondly, the likelihood of such one-sided access negotiations has a chilling effect on investment in mineral exploration and development.¹⁵ In effect, the imagined negotiation rarely occurs, because potential projects that might benefit from access to infrastructure never materialize due to lack of investment.¹⁶ While it is true that significant investment in exploration/development has historically occurred in the Pilbara, this was likely induced by the National Access Regime, which mining firms assumed (wrongly, as it turned out) would enable them to gain access to existing infrastructure on reasonable terms. Thirdly, such arguments ignore the wider public interest in ensuring open access to infrastructure. Whether or not the costs to an infrastructure owner of granting access to a third party exceed the benefits to the owner (as determined by it), open access regulation nevertheless promotes the wider public interest. The

since the end market is already competitive, and the owner would achieve no anti-competitive benefit by preventing the access seeker from participating in it. Accordingly: [1] the owner could be expected to share the infrastructure if it is efficient for the owner to do so on commercial terms that will be attractive to an access seeker; and [2] if the owner elects not to share that infrastructure, that decision will reflect the fact that there are no mutually beneficial terms on which access could be provided by the infrastructure owner and used by an access seeker, in light of the costs (both direct and indirect) and benefits which would arise from doing so." BHP Billiton appears to attribute the lack of access agreements in the Pilbara to "the costs associated with providing access [to infrastructure used in competitive international product markets which] are likely to be so substantial that there is no prospect of a mutually acceptable negotiated outcome." (BHP Billiton 2014 (Response)).

¹³ Glencore argues "... existing rail networks are in our view a classic example of a natural monopoly. It is very much more cost effective to increase rail track capacity through the expansion of an existing rail line rather than the building of a new rail line. For example, the addition of passing loops to an existing rail line will increase the tonnage throughput capacity of that existing rail line. However, a competing below rail operator cannot produce new capacity by building passing loops in isolation— an entire new rail line must be built, which is obviously many times more expensive. The price of rail access on the relevant route can be set by the owner of the existing infrastructure to be below the cost of duplicating the line, while still generating a substantial monopoly rent because of the much lower actual cost of adding the additional capacity to the existing network". (Glencore 2014).

¹⁴ Anglo claims "where the private owner [of infrastructure] is also vertically integrated throughout the supply chain, [...] the monopolist not only has the ability to demand uneconomic rent from access holders, it has an incentive to do so as well." (Anglo 2014).

¹⁵ Glencore has argued "[t]he value to the Australian economy of mining investment which is contingent on infrastructure is much larger than the value of the infrastructure. A reduction in mining investment triggered by the ability of private monopolist infrastructure owners to extract monopoly rent is an inefficient economic outcome and a huge lost opportunity for the nation." (Glencore Harper Submission) Anglo considers that the "workability of multi-user access regimes is clearly essential to the competitiveness of Australian mining." Anglo adds that "[w]ithout government regulation, access to critical export infrastructure could be restricted or prevented and drastically affect the ability of Australian miners to remain competitive in the dynamic global industry" and that this "could harm existing miners and also deter potential investment and investors from entering the Australian market." (Anglo 2014).

¹⁶ While it is true that investment in exploration/development has historically occurred in the Pilbara region, this was likely induced by the National Access Regime, which mining firms assumed (wrongly, as it turned out) would enable them to gain access to existing infrastructure on reasonable terms.

granting of access to a mining firm or other access-seeker may, for example, maximize the state's share of available resource rents, promote broad-based economic development, increase domestic participation in the mining sector, and/or diversify the country's foreign investor base.

Opponents of open access regulation argue that the costs imposed by such regulations create economic inefficiencies and market distortions. Ergas and Fels, for example, advised the Harper Panel that the declaration of vertically integrated commercial facilities (e.g., the integrated iron ore mines in the Pilbara) for open access under Australia's National Access Regime "would give rise to a range of economic costs that may be very large" (Ergas and Fels 2014). BHP Billiton endorsed this view. Rio Tinto, for its part, warned the Harper Panel that granting infrastructure access in the "wrong circumstances" could cause potentially "enormous" costs to be incurred by the firms involved, and Australia as a whole.¹⁷ The costs in question are said to relate to, among other things, third party access applications, access disputes, incremental capital investment, disruption of vertically integrated processes, and delays to infrastructure expansions and improvements.¹⁸ The adverse consequences of such costs are said to include misallocation of resources, pricing inefficiencies, infrastructure capacity losses, lower resource rents, reduced mining competitiveness, and dynamic investment inefficiencies.

Many of the unquantified costs and inefficiencies identified by Ergas and Fels, BHP Billiton and Rio Tinto can, in our view, be eliminated or reduced significantly through well-designed open access regulation. Whilst a detailed examination of Australia's National Access Regime is beyond the scope of this paper, the flawed design of that particular regime has given rise to a wide range of technical and legal issues and uncertainties. These have led, inevitably, to many costly and time-consuming disputes between infrastructure owners and access-seekers that, in our view, were largely avoidable. We do accept, however, that even well framed open access regulation will involve a degree of unavoidable costs. The relevant question is whether such costs are likely to be outweighed by the benefits of regulation. As we have shown, these benefits can potentially include greater investment in mineral exploration and development and higher resource rents for the state. It seems likely that, in almost all cases, such benefits will vastly outweigh the expected costs.¹⁹ Moreover, if the unavoidable costs of access regulation are being unfairly borne by infrastructure owners, it is possible to reimburse them for these through higher access tariffs, payments by the host government or other appropriate mechanisms.

¹⁷ Rio Tinto says there is "a very real risk that Australia's National Access Regime could significantly damage the Australian economy if it is not framed appropriately", and that "the costs of imposing access in the wrong circumstances, both for the companies concerned and for Australia, are enormous." (Rio Tinto 2014).

¹⁸ Billiton says its experience in the Pilbara demonstrates that access regulation "imposes very substantial costs, and delivers no practical benefits." BHP Billiton explains that such costs include, in addition to the cost of dealing with access applications, "operational costs [...] such as capacity losses and many operational inefficiencies caused by moving from single-user to multi-user operations," "costs associated with delays to expansions, technological innovation and operational improvements" and "costs associated with the prospect of declaration and access—most significantly, the incentives to defer, cancel or downsize an infrastructure investment in order to manage or reduce the risks associated with the potential future application of access regulation." (BHP Billiton 2014 (Response)).

¹⁹ Glencore says it is "very familiar with the costs associated with the administration of an access regime. [...] We are certainly supportive of access regulation being administered in a way which is less costly and less time consuming. However, as the customer of regulated access regimes, and hence the party which ultimately bears the cost of administering the regime, we consider that the costs of doing so are preferable to the impacts which would arise if no such regime was operated." (Glencore 2014).

Another line of argument against open access regulation holds that such regulation acts as a disincentive for investment. BHP Billiton, Rio Tinto and even the Australian Productivity Commission (Productivity Commission, 2013) have expressed concern that Australia's National Access Regime creates disincentives for mining firms to invest in "greenfield" mining projects and the expansion of existing operations.²⁰ Such disincentives arise, they say, due to uncertainties as to whether and when third parties might seek access, whether an infrastructure owner will be able to use available infrastructure capacity for its own mining operations, the commercial terms of access, and the priority arrangements (if any) that will apply in a shared-use environment.²¹ Moreover, where access regulations can oblige an infrastructure owner to incur risks associated with an infrastructure expansion undertaken for the benefit of an access-seeker, the possibility of this scenario is said to serve as a further disincentive.²²

Concerns that regulation of infrastructure access creates a disincentive for a first mover to invest can, once again, largely be addressed through appropriate regulatory design. If the open access regulation entitles third parties to gain access to infrastructure on terms that do not fully and fairly reflect an appropriate proportion of the owner's operating and capital costs, this would indeed create a disincentive for investment. A first mover would, in effect, be asked to assume the additional risk that it might be required, in the future, to subsidize one or more eventual access seekers. Open access regulation should, in our view, require access tariffs to be fully cost-reflective and, accordingly, create neither an incentive nor a disincentive for infrastructure investment.

In a related but separate argument, the International Finance Corporation has suggested that imposing open access obligations on a first mover mining company could adversely affect the "bankability" of an initial mining project (IFC 2013). The IFC points to the dearth of multi-user/multi-client mining-related infrastructure projects globally and, in particular, in sub-Saharan Africa, which suggests there are "limited options with respect to commercial structures that will result in successful project financing and execution." The IFC argues that commercial lenders' risk appetite and focus on cash flows mean that "the higher the complexity of the shared-use structure, the less bankable it will be." In the IFC's view, "[f]inancial viability is even more unlikely if other users or clients are not known" at the time of financing the initial mining project. The IFC suggests, therefore, that any access regime should "reflect the business and financial needs of the project's stakeholders at the time of project conception while acknowledging that changes in future business environment might require modifying the selected initial operating regime." This "pragmatic approach" could, in the IFC's view, be translated into the first mover's mining concession in a way that "leaves some

²⁰ The Productivity Commission concluded that that the National Access Regime had no useful role to play in relation to single-user export infrastructure used in competitive global markets, and that access regulation in this context is not only unnecessary, but "risks lowering efficiency and, in the long term, adversely affecting incentives to invest in markets for infrastructure services."

²¹ BHP Billiton claims that "the existence of the [Australian National Access Regime] increases uncertainty about whether and on what terms access must be provided to third parties [and that] this is a key disincentive to private investment in nationally significant infrastructure, and encourages investors to reduce the scale of their investments." Specifically, it claims that the "prospect that access obligations will be imposed on [...] infrastructure undermines an owner's ability to answer critical questions, such as: What do I get for my money? [...] Must I allow others to use the infrastructure? [...] How can I use my infrastructure? [...] Who, if anyone, will have priority to use the infrastructure?" (BHP Billiton 2014 (Submission)).

²² BHP Billiton has posed the following question: "[i]f the owner of single user infrastructure was required to fund a mandated expansion, and recover a return on that investment through regulated access charges, how would the risks of default by or insolvency of the access seeker be addressed?" (BHP Billiton 2014 (Submission)).

room for future renegotiations on a few key issues (i.e., tariff structure, transport capacity allocation, etc.) without diminishing project bankability.”

While the IFC is correct to focus on the considerable challenge of raising financing for large mining projects in sub-Saharan Africa, imposing appropriate open access regulation on mining infrastructure should not, in our view, render such projects “unbankable.” It will, of course, be important to ensure that any such regulation protects a first mover’s access to and use of critical infrastructure and the operational efficiency of its mining project, in order to maintain the cash flows needed to service the project’s debt. The first mover’s contractual commitment to use and/or pay for the infrastructure will sometimes be critical to securing project financing and, in such cases, project lenders will require assurance that third party access rights will not diminish this commitment. While such a requirement may raise an issue of fairness as between the first mover and other users of the infrastructure, there is no reason such an arrangement could not be put in place. Moreover, any unfairness can be addressed by requiring subsequent users to provide appropriate compensation to the first mover for its commitment. While open access regulation can be somewhat complex, project financing involves elaborate commercial and legal structures with which sophisticated commercial lenders routinely become comfortable. In any event, we consider that any disadvantages associated with the complexity open access regulation will generally be outweighed by the clear benefits for project lenders arising from the shared use of mining infrastructure. In particular, the introduction of third parties willing and able to pay tariffs that fully reflect the cost of access will reduce the project’s average unit costs, thereby increasing project cash flows available for debt service. Moreover, such third parties provide a degree of risk diversification to project lenders that would otherwise be entirely reliant on the cash flows from a single mining project. Finally, if the host government and local communities regard shared use of the project’s infrastructure as a way to promote greater resource rents and/or broad-based economic development, the lenders’ exposure to political risks should be mitigated.

We are also concerned with the suggestion that host governments should defer reaching agreement with a first mover on the detailed rules for access to mining infrastructure and address these in a later renegotiation. The experience in Australia suggests that, in the absence of a clear and enforceable process for reaching future agreement on definitive access rules, first mover mining firms will strongly resist any meaningful renegotiation. While a host government could seek to impose open access through legislation at a later stage, this might involve breaching contractual commitments to the first mover and/or its project lenders and, in any event, would likely be seen in a negative light by the global investment community (including other mining firms). All of this argues, in our view, for host governments grasping the nettle early and working with first movers to create comprehensive and workable open access regulation from the outset.

Opponents of open access regulation have also claimed that such regulation is contrary to the national interest of commodity-exporting nations, including Australia. Ergas and Fels say access regulation is inappropriate in the case of “vertically integrated infrastructure facilities used to export commodities whose prices are determined in competitive global markets.”²³ BHP Billiton makes a

²³ Ergas and Fels focus solely on the potential for competition benefits in downstream markets, arguing that “[d]eclaration [for open access] of vertically integrated facilities used to export commodities whose prices are determined in competitive global markets would not affect the prices of these commodities. Declaration would therefore not lead to competition benefits..” (Ergas and Fels 2014) They pay no attention to whether declaration of mining infrastructure for open access

similar argument in relation to “privately developed single-user export infrastructure used in competitive global export markets.”²⁴ It appears that, at the core of this argument, is the notion that a bulk mineral-exporting country can best maximize its resource rents by encouraging the formation of a small number of large, highly efficient integrated bulk mining operators. By enabling such operators to maximize total output (e.g., by eliminating inefficiencies that might arise in a shared infrastructure network) and, consequently, minimize unit costs of production (and, thus, higher operating margins), the state will (it is suggested) receive greater rents in the form of volume-related royalties and profit taxes than it would if ownership of bulk mining was fragmented. It is inferred that access regulation tends to encourage ownership fragmentation and is, therefore, contrary to the public interest.

We take issue with both aspects of this argument. First, it is not in the public interest for one or a few owners of infrastructure to control the pace of development in a mineral region. Today, the Pilbara boasts highly efficient, large-scale mining operations that have become important “profit engines” for Rio Tinto and BHP Billiton. It has, however, taken almost half a century to reach this point. Mining firms have varying levels of finite financial capacity, differing attitudes to risk, and distinct tolerances for exposure to “high-risk” countries. Accordingly, an individual mining firm will be unable or unwilling to pursue all regional mineral targets at any given time. Thus, the public interest requires active competition for mineral rights to maximize the present value of the state’s share of resource rents.

Secondly, conferring unregulated private rights over critical infrastructure is not necessary to achieve ownership consolidation (if this is, indeed, in the public interest). Open access regulation does not preclude an infrastructure owner and access seeker agreeing a transaction for the purchase of mineral rights by the infrastructure owner. Critically, it is the access-seeker’s option to seek access to infrastructure on fair and reasonable terms that enables it to negotiate a fair sale price for its mineral rights.²⁵ Providing mining firms with the ability to realize full and fair value for their mineral rights either through their exploitation or sale will, as we have shown, support greater investment in exploration and development activity. Such investment will, in most cases, result in the more rapid achievement of the high production volumes and operating margins necessary to maximize the state’s resource rents.

would lead to more entrants and greater competition in upstream markets (e.g., for the purchase/development of mineral rights) and/or midstream markets (e.g., the provision of logistics services).

²⁴ BHP Billiton seeks to distinguish “privately developed single-user export infrastructure used in competitive global export markets” from other types of infrastructure, perhaps so that it can adopt one position in relation to its Pilbara infrastructure (of which it is the single user) and another in relation to Aurizon Networks’ Central Queensland Coal Network (where it benefits from access under applicable open access regulations). BHP Billiton argues, that regulating access to its Pilbara infrastructure “is unnecessary [because] access regulation cannot promote competition in an end market that is already competitive, and the discipline of end market competition strongly incentivizes the infrastructure owner to use its resources, including its infrastructure, as efficiently as possible.” It claims that “requiring third party access [...] in this scenario will not promote competition in any significant market – instead, the downstream commodity market is already competitive.” BHP Billiton then argues that Queensland-type multi-user infrastructure “which is a non-integrated utility, price and service terms commonly do need to be regulate” and says it “is concerned to ensure that there is effective regulation of non-integrated and multi-user public infrastructure facilities in Australia” due to its “very significant commercial interests in the effective regulation of prices and access terms of infrastructure such as [Aurizon’s rail infrastructure].” (BHP Billiton 2014 (Submission)).

²⁵ This is precisely what happened in 2000, when Rio Tinto acquired North Limited for US\$2.8 billion following North’s partially successful efforts to “declare” Rio Tinto’s Pilbara railway network under the National Access Regime.

Finally, when governments seek to impose open access regulation on owners of vertically integrated mining operations after they have made their investments, arguments based on fairness and investor confidence are often advanced. Such *ex post facto* regulation, it is said, unfairly undermines key assumptions upon which major investments were made, including who will be entitled to use the infrastructure and what access tariffs will be paid by third parties. *Ex post facto* access regulation is also said to result in the effective transfer of value from infrastructure owners to access seekers and is therefore sometimes characterized as an act of partial expropriation without compensation. Imposing access regulation in this manner is said to undermine investor confidence, and to render infrastructure owners and other potential first movers less willing to invest.²⁶

The public interest in ensuring open access to critical infrastructure on fair and reasonable terms should, and generally does, take priority over private rights of ownership. In 1912, the U.S. Supreme Court, in *Terminal Railway*,²⁷ used the (then relatively new) Sherman Act to require owners of a critical railway terminal to grant access to third parties. This decision gave rise to the so-called “essential facilities doctrine,” which has over the last century evolved globally into a vast array of access-related regulations and court decisions that apply to railways, pipelines, communication networks, power transmission grids and similar facilities. After more than 100 years of regulatory and judicial intervention, owners of essential facilities including railways and ports used in bulk mining operations can, we would argue, generally be taken to have assumed the risk of regulatory intervention. Nevertheless, host governments can and, in our view, whenever possible should be proactive by developing and imposing comprehensive and workable open access regulation at or prior to the time that private sector investment in an essential facility is first made.

Regulation of Open Access to Mining Infrastructure: Practical Considerations

On the basis of the arguments set out in the previous section, we believe that host governments will, in almost all cases, be well advised to develop and implement (on a negotiated basis or otherwise) open-access regulation governing the use of mining infrastructure. This is, however, no light task and, in order to protect their national interests, governments should consider a range of important matters, including regulatory objectives, regulatory framework, and internal capacity.

Regulatory Objectives

When seeking to regulate access to mining infrastructure, a host government should endeavour clearly to identify its policy objectives. These will likely depend upon a range of factors, which will vary from country to country but often include: geography and location, the existence of any known mineral deposits, the country’s mineral development potential, the availability of existing infrastructure, the ownership and other arrangements in place for any existing infrastructure, the potential for development of non-mining industries (e.g., agribusiness), the state of the country’s public finances, and so on. Often, open access regulation will need to be tailored to specific opportunities and challenges. For example, such regulation may need to address concerns that

²⁶ BHP Billiton seeks to draw a distinction between its own Pilbara infrastructure assets and the Central Queensland Rail Network operated by Aurizon, which “was privatized in circumstances where the owner and operator of that infrastructure had full knowledge of, and the acquisition [by Aurizon of the infrastructure] through privatization was subject to, a pre-existing mandatory [infrastructure] expansion obligation.” (BHP Billiton 2014 (Submission)).

²⁷ *United States v. Terminal Railroad Association*, 224 U.S. 383 (1912).

owners of existing integrated mining operations are abusing their position by blocking access and/or charging excessively for access rights. Alternatively, regulation may need to address the need for expansion of mining infrastructure, so as to support the development of new mines. In other cases, regulation may need to encourage coordination among the sponsors of several small, economically-marginal mining projects, in order to secure private financing of a planned shared-use infrastructure solution.

Regulatory Framework

A workable open access framework should provide a clear description of the infrastructure that is available for shared use. It should also include clear and realistic timeframes for each step in the access application process, together with a practical and reliable procedure for resolving disputes (including those arising during the period of shared use). The framework should provide access seekers with ready access to information on technical, operational and other aspects of the infrastructure, including current capacity utilisation and options for future expansions. The framework must also specify the conditions that must be satisfied before an access-seeker can make an application, including any financial, technical and operational qualifications or project milestones. The basis for determining access tariffs should be clearly specified, along with other key access terms such as the duration of access rights, the conditions for renewal or extension of such rights, and the nature of an access-seekers' commitment (e.g., "take-or-pay" vs. "best efforts" commitment). Clear operating procedures for the shared infrastructure, or a credible mechanism for determining these, should also be provided. These may, for example, include provision for the first mover to have operational priority in certain circumstances. Finally, if an infrastructure owner can be required to undertake or permit the expansion of its facilities, the procedure to be followed and conditions to be satisfied should be detailed.

If the host government is in a position to require distinct ownership/operation of mining activities, on the one hand, and mining infrastructure, on the other, it is often well advised to do so. When a competent, independent operator is managing infrastructure that has been "unbundled" from its mining "client," this reduces the potential for conflicts of interest when access applications arise. Although regulation of an independent infrastructure operator is still necessary to prevent monopolistic pricing behavior,²⁸ a "light touch" approach can often be employed.

Globally, there are some good examples of effective, workable open access regulation being applied to bulk mining infrastructure (see Box 2, for a description of one such example).

Box 2

Aurizon: Open Access Regulation of the Central Queensland Coal Network²⁹

Aurizon is Australia's largest rail freight operator and a top 50 ASX company. Formed by privatization in 2010, it operates the Central Queensland Coal Network (CQCN), which is one of the world's largest coal rail networks linking more than 50 mines with three major ports at Bowen, Gladstone, and Mackay. An Aurizon subsidiary, Aurizon Network, holds a 99-year lease (which commenced in 2010) over the "below rail" assets comprising the CQCN. Aurizon Network controls,

²⁸ Source: Aurizon website. <http://www.aurizon.com.au>.

²⁹ As Anglo American notes, structural separation "does not mean that non-vertically integrated monopolists do not have incentives to engage in monopoly pricing." (Anglo 2014).

manages, operates and maintains the CQCN'S fixed rail network, and is regulated by the Queensland Competition Authority (QCA). Aurizon's above-rail business, which is structurally separated from Aurizon Network, comprises freight, container and passenger services using an extensive fleet of rolling stock and competes with other third party rail freight companies operating on the CQCN.

Aurizon Network is required to enter into an Access Undertaking with the QCA, which addresses a range of matters including the negotiating framework for access seekers (information, timing and processes), pricing (tariffs, limits and differentiation), connections and network expansion, capacity management (transfers, resumption and relinquishment), reporting, revenue management (caps, pass-through and variations), operational separation and Aurizon Networks' non-discrimination obligations.

Aurizon Network generates revenue in the form of access charges, which are regulated by the QCA. The regulatory model employed is a conventional "revenue cap." Aurizon earns a set return on its "regulatory asset base" (RAB) over the regulatory period up to the "maximum allowable revenue" (MAB). The RAB is determined on a "depreciated optimal replacement cost" (DORC) basis, and is adjusted annually with reference to inflation, asset depreciation, proposed capital expenditure and asset disposals. The MAB is determined by the QCA as the sum of (i) Aurizon Networks' permitted return on the RAB (using Aurizon's weighted average cost of capital) and (ii) the cost of operating the CQCN.

To facilitate third-party access, Aurizon publishes a "reference tariff" for certain specified routes, which serves as the basis for negotiation of actual access charges for new users. Aurizon Network must provide access to the CQCN to all accredited rail operations, which current comprise Aurizon itself, Pacific National and BMA. Mining firms typically contract with these accredited operators to move their coal. In the event of a breakdown in access negotiations, the matter is resolved using a dispute resolution framework set out in Aurizon Network's Access Undertaking.

Mining firms are generally obliged to enter into long-term, take-or-pay (TOP) contracts when securing rights of access to the CQCN for a new mine. With global coal prices now severely depressed and many coal mines in Queensland under financial pressure, these TOP commitments have come into greater focus. Some mining firms have complained that the fixed costs associated with their TOP contracts are unfairly forcing them to continue producing at a loss, which is contributing to downward pressure on global prices. Aurizon appears reluctant to consider renegotiation of the current arrangements.

In the case of significant expansions to the CQCN, including the so-called "GAPE" and "WIRP" projects, Aurizon Network has negotiated additional economic returns from users to compensate it for the significant construction, financial and other risks that it assumed.

The CQCN is generally regarded as a good example of how large-scale, multi-user, multi-purpose logistics infrastructure used by efficient bulk mining operations can be effectively structured and regulated. The model has, however, been the subject of periodic criticisms from mining firms (see, for example, Glencore 2014).

Internal Capacity

The Australian experience with regulating for open access to mining infrastructure illustrates the value of a robust, well-designed regulatory framework. Railway and port infrastructure clearly represents a key "competitive battleground" for mining firms, and both owners of integrated mines and access seekers will exploit any regulatory gaps or uncertainties for their own commercial advantage. Strategies and tactics employed by mining firms in Australia and other countries to

defeat the objectives of open access regulation have included: aggressive legal challenges,³⁰ engineering and design features,³¹ pre-emptive access arrangements,³² capacity management,³³ and mergers and acquisitions.³⁴ In view of this experience, governments in sub-Saharan Africa face a significant challenge in regulating effectively to protect their national interest. Given the significant financial and other resources available to major mining firms, this challenge can only be met by governments developing the necessary internal capacity and/or retaining expert external support covering the various fields required, including economic regulation, mineral economics, engineering and design, operations management, project finance and dispute resolution.³⁵

Conclusion

In sub-Saharan Africa, major bulk mining projects often require large investment in critical new railway, port, and other infrastructure. Such infrastructure often has the potential to support further mining investment as well as the development of other industries. Host governments should, in order to maximize resource rents and promote broad-based economic growth, impose regulation requiring open access to such infrastructure. Such regulation will enable effective competition for mineral resources and support economic growth by ensuring third parties can gain access to infrastructure on fair and non-discriminatory terms. Experience in Australia has shown that mining infrastructure is a key competitive battleground within the mining industry and, accordingly, care must be taken by host governments to develop access regulation that is both effective and workable.

³⁰ Infrastructure owners often employ aggressive legal tactics designed to slow down and, where possible, defeat access applications by smaller, poorly capitalized firms. Such measures often include challenging virtually every action or step taken by regulators, politicians and access seekers on substantive, procedural and technical grounds.

³¹ Rail and port infrastructure can be designed using proprietary technology and design elements that render sharing with third parties challenging or impossible. These elements are also used to support arguments that the rail and port facilities are not really infrastructure but essentially an extension of their mining operations (i.e., an elaborate “ore conveyor”).

³² Infrastructure owners will sometimes enter into early, but limited and highly conditional, third-party access arrangements with a view to fending off any potential criticisms that they are abusing their position. The goal of such access deals may be to allocate capacity to persons who could, in theory, require access—but who, in all likelihood, will not.

³³ Integrated miners will, where possible, design their rail and port infrastructure with the minimum capacity needed for their first-phase mining operations. This enables the owner to deny the existence of available infrastructure capacity, while preserving its ability to expand capacity rapidly when needed for its own purposes (e.g., a mine expansion). A variation of this strategy involves the inefficient design or use of rolling stock (e.g., using slow and/or short trains), which unnecessarily and inefficiently consumes railway capacity. Such capacity can later be recovered, when needed, through more efficient rolling stock deployment.

³⁴ Infrastructure owners sometimes act to acquire an access seeker before any rights of access are established, thus avoiding investments in systems that facilitate shared use of the infrastructure and might enable or encourage more access applications.

³⁵ A number of valuable resources are now available, which will be particularly useful to host governments in the early stages of considering issues relating to access to mining infrastructure. See, for example: CCSI 2014 and IFC 2013.

References

- African Mining Vision. 2009.
http://www.africaminingvision.org/amv_resources/AMV/Africa_Mining_Vision_English.pdf.
- African Mining Vision. Bulletin 2. http://www.africaminingvision.org/amv_resources/ISGbulletin2.pdf.
- Anglo American Metallurgical Coal (“Anglo”). 2014. Submission to the Competition Policy Review Panel.
<http://competitionpolicyreview.gov.au/issues-paper/submissions/>.
- BHP Billiton. 2014. Submission to the Competition Policy Review.
<http://competitionpolicyreview.gov.au/issues-paper/submissions/>.
- BHP Billiton. 2014. Response to the Draft Report of the Competition Policy Review.
<http://competitionpolicyreview.gov.au/draft-report/non-confidential-submissions/>.
- Collier, P. 2010. The plundered planet: How to reconcile prosperity with nature. London: Allen Lane.
- Collier P. 2011. Building an African Infrastructure, Finance and Development (International Monetary Fund).
<http://www.imf.org/external/pubs/ft/fandd/2011/12/collier.html>.
- Columbia Center on Sustainable Investment (“CCSI”). 2014. A Framework to Approach Shared Use of Mining-Related Infrastructure. http://ccsi.columbia.edu/files/2014/05/A-Framework-for-Shared-use_March-2014.pdf.
- Ergas H. and Fels A. 2014. Submission to the Competition Policy Review.
<http://competitionpolicyreview.gov.au/draft-report/non-confidential-submissions/>.
- Glencore Coal. 2014. Submission to Competition Policy Review. <http://competitionpolicyreview.gov.au/draft-report/non-confidential-submissions/>.
- Infrastructure Consortium for Africa (“ICA”). 2014. Infrastructure Financing Trends In Africa - 2013.
http://www.icafrica.org/fileadmin/documents/Annual_Reports/ICA-Infra-Fin-Trends-Africa-2013-Final-WEB.pdf.
- International Finance Corporation (“IFC”). 2013. Fostering the Development of Greenfield Mining- Related Transport Infrastructure Through Project Financing.
<http://www.ifc.org/wps/wcm/connect/c019bf004f4c6ebfbd99ff032730e94e/Mine+Infra+Report+Final+Copy.pdf?MOD=AJPERES>.
- Productivity Commission. 2013. Inquiry Report No 66 (National Access Regime).
<http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22publications%2Ftabledpapers%2F71836%22>.
- Rio Tinto Iron Ore (“Rio Tinto”). 2014. Submission on Part IIIA of the Competition and Consumer Act, 2014.
<http://competitionpolicyreview.gov.au/issues-paper/submissions/>.

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The Milken Institute is a nonprofit, nonpartisan think tank determined to increase global prosperity by advancing collaborative solutions that widen access to capital, create jobs and improve health. We do this through independent, data-driven research, action-oriented meetings and meaningful policy initiatives.

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