



The transformative potential of power supply to mines

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Mines have the potential to transform a country's power sector, but often do not connect to the national grid because of the risks this creates. To prevent this opportunity being lost, Governments need to intervene and directly target these risks.

In theory, large mining loads can be leveraged to develop a country's power sector

In resource-rich countries, mines hold significant potential for the **development of national power sectors**. This is particularly the case in many developing countries where electricity is expensive, power utilities are under-performing, and electrification rates are low.

Mines can provide a base load that would make **low-cost generation projects viable** and would provide utilities with large, **regularly paying customers**. The cost of electricity nationwide would be reduced, facilitating increased access to electricity. Mines can also **attract private capital** into the power sector alleviating **constraints on public-sector financing**.

Self-supplied electricity commonly makes up around 20% of a mine's operating costs, so there are potentially large savings to be made from connecting to the grid and accessing cheaper generation sources (in particular large-scale hydro) that are distant from the mine.

In practice, there are significant barriers to supplying mines with power

Rather than connecting to the national grid, many mines in developing countries rely on their own dedicated power supply. Despite high costs, this is due to one or more of the following barriers:

Poor grid-reliability. Utilities in developing countries often have poor network reliability due to historical under-investment and weak system operation. Network outages can be very expensive for mines.

Risk that the utility will not deliver a planned generation project. Many utilities struggle to deliver new projects on time, even ones which are privately procured, potentially leaving the mine without a cheap source of power for several years.

Risk of the utility being left with stranded assets. There are also risks for utilities - mining loads are uncertain and large relative to existing demand, and if projected mining output does not materialise, the utility could be left with assets that are underutilised and project-related debt that consequently cannot be serviced.

Inability of the utility to negotiate and deliver power supply agreements. Sometimes failure to supply a mine is not due to a commercial or technical barrier, but due to a breakdown in communication or a lack of expertise, particularly with respect to the negotiation of power supply agreements of the nature and size required to supply the mine.

There are delivery models that help overcome these barriers

Alternative delivery models to a direct mine-utility agreement include:

IPP supply via a dedicated line. An Independent Power Producer (IPP), rather than the utility, supplies power directly to the mine via a private transmission line. This improves network reliability and takes implementation out of the hands of the utility.

IPP supply via wheeling across the utility's grid. Under this model, an IPP generates the electricity, but supplies it to the mine via the national grid rather than a dedicated line. The fee for use of the grid is referred to as the wheeling charge. This theoretically enables a mine to source distant low-cost generation, but still exposes the mine to the reliability of the national grid.

IPP supply via private operation of the grid. In this case the utility contracts out the operation (and potentially also the required investments) of its grid to a private operator. This can help give the mine certainty that the grid will be well operated and maintained.

Clear Government policy direction is often what is missing

Mines need certainty of cheap power supply before they invest, and utilities/IPPs need a guaranteed purchaser of the power before they are willing to invest in long lead-time assets.

Economic Consulting Associates was established in 1997 to provide economic and regulatory consulting services to industry and government. Our senior staff have many years' experience of carrying out economic, market and policy analyses in the electricity, natural gas and water sectors.

The above delivery models thus require Government to put enabling policy, legislation, and regulations in place.

Mines and utilities have clear commercial interests. **Government can assess the situation from a broader perspective** and decide whether the reward justifies the risk.

For example, do the fiscal benefits of another mine being developed justify the risk of investing in large electricity assets that might end up stranded? Are there opportunities to **combine power supply to a mine with electrification projects** that are not financially profitable for the utility, but make the development of a larger/ cheaper generation more economically viable?

The **Government can explore contractual mechanisms, including guarantees**, that on the one hand improve the utility's creditworthiness and on the other hand address the utility's concerns that it will be left with stranded assets.

Governments tend to treat the power and mining sectors as being independent. Our advice is to directly **target the linkages between the sectors** by developing policy and regulatory frameworks that facilitate a range of innovative delivery models and contractual mechanisms.

ECA recently helped author a landmark World Bank report "Power of the Mine in Sub-Saharan Africa"
<https://openknowledge.worldbank.org/handle/10986/21402>.

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