

# How (and Why) to Value a Coal Mine



The world’s focus of late has been on the tumbling price of oil. However, coal, which gets far less media attention (except for talk of greenhouse gas emissions and climate change), still is critical to the world economy.

**G**lobal demand for commercial coal has risen from 2,343 million tonnes of oil equivalent (“toe”) in 2000 to 3,827 Mtoe in 2013 — an annual average growth rate of 3.9 percent (see Figure 1).

**Worldwide, coal accounts for almost 30 percent of all energy use**, generating 41 percent of the world’s electricity and fueling the production of 70 percent of the world’s steel.

As seen in Figure 1, this demand for coal especially is strong in Asia. In China alone, **the domestic coal market is more than three times the size of the coal market in the rest of the world** (see Figure 2). After China, **India is projected to become the world’s**

**second-largest consumer of coal** by 2035, according to a 2015 report by BP. While developed countries continue to diversify their energy sources, many emerging economies remain dependent on coal.

However, for investors, coal mining is a somewhat risky business. The main sources of risk are the difficulties inherent in valuing coal mines and the vagaries of government licensing and regulations. In India, for example, the Supreme Court in 2014 concluded that the government’s process for allocating coal licenses since 1993 had been arbitrary and illegal. It, accordingly, canceled 214 of the 218 licenses awarded over that period, including for mines that already were

producing coal. The court also instructed the illegally licensed mine owners to compensate the government. This mass cancellation and the financial distress caused to owners of the mines have spiraled investor sensitivity to the sector’s risks.

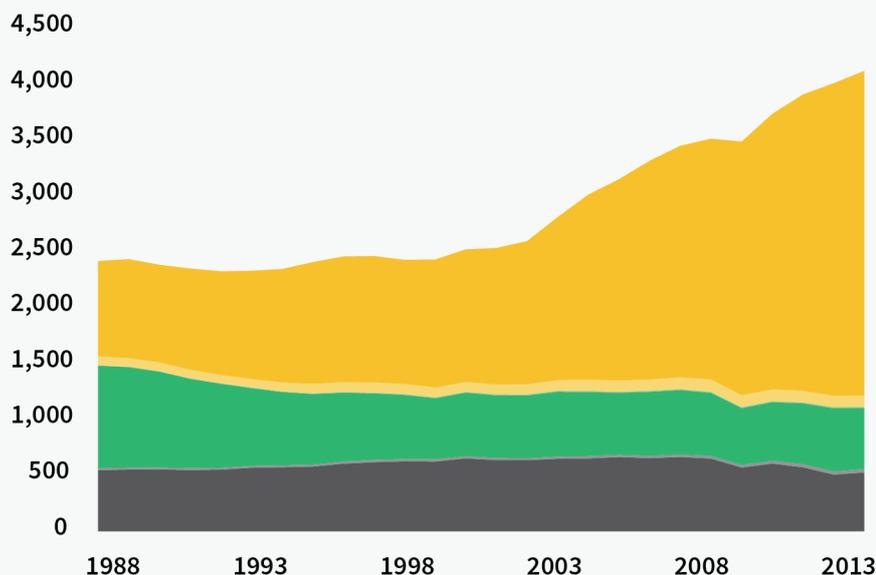
Being able to value coal and coal mines is critical to both investors and nations, whether for the purposes of analyzing damage (that may arise from claims being pursued by domestic or foreign investors or for estimating operational losses); ascribing a reserve price in an auction; ascertaining the value of a mine or mines in a transaction; or preparing capital budgets.

Mining projects are complex undertakings and require much time and effort to bring them into production. The process invariably begins with a substantial capital investment in exploration, mining equipment and infrastructure before commercial operations can commence. On top of that, projects may be prone to volatile commodity price cycles (such as those being seen in the oil market today) and uneven supply and demand. Given all that, the economic value of a mine is the key issue whenever it comes (and it always does) to licensing, mergers, acquisitions or disputes.

A valuation approach includes a detailed review of available market data, comparable transaction analysis and the construction of an income-based model whenever sufficiently reliable information exists to prepare one.

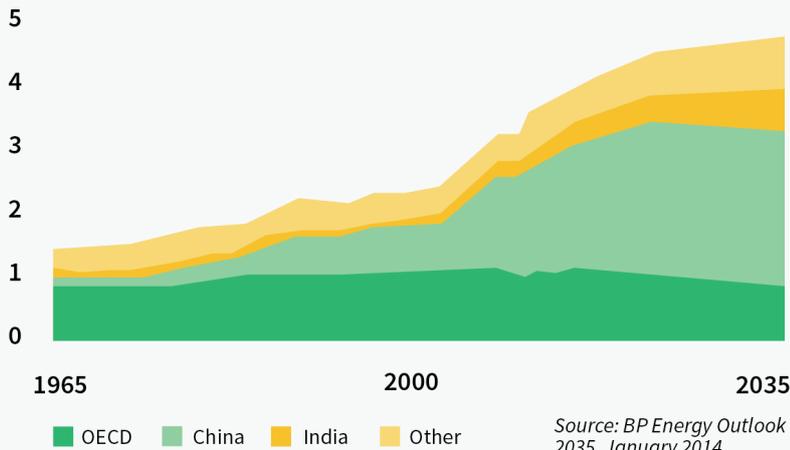
In this article, we look at three approaches that can be taken to value coal properties appropriately.

**Figure 1: Regional Consumption of Coal (in million toe)**



Source: BP Statistical Review of World Energy, 2014

**Figure 2: Forecast Global Coal Demand (in billion toe)**



A key characteristic of commodity companies is their dependence on the price of the commodity for their cash flow and value. Multinational commodity companies usually are price takers, regardless of their size, because the global market is so large. Therefore, commodity company revenues are vulnerable to price trends and to volatility that accounts for most of their variance in revenues.

However, other key value drivers of a mining property may include:

- The extent and quality of its reserves
- Sales arrangements
- Operating capital and extraction costs
- Applicable royalties, taxes and duties
- Project, market and country risks that may affect mine cash flow or the discount rate applied to convert future cash flows to present value

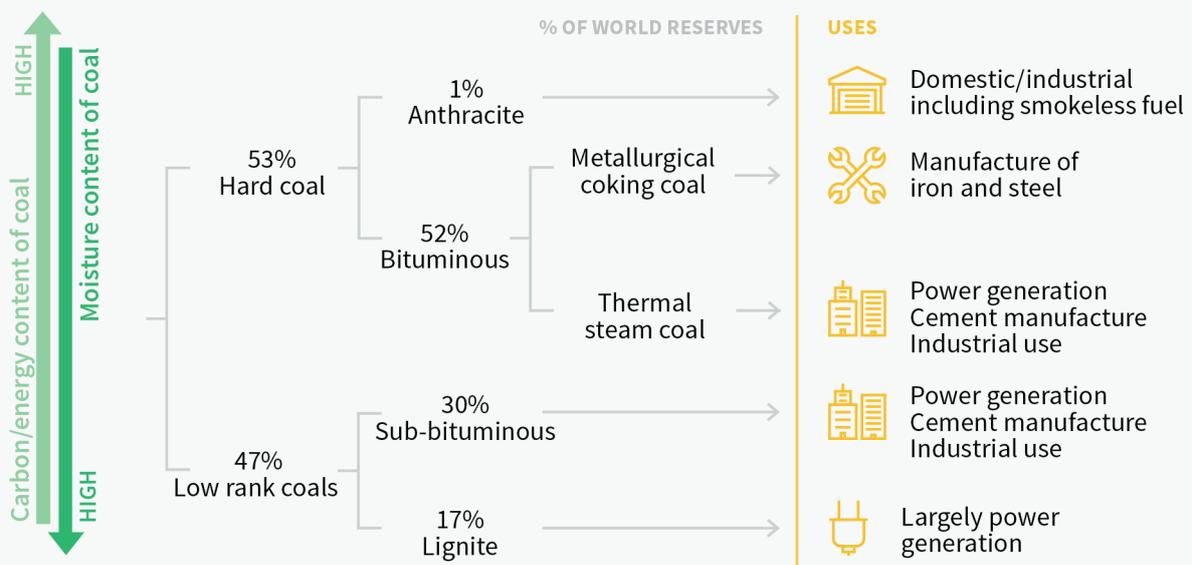
Just as coal is not a homogenous product, coal properties may vary in some respects, and those differences can be critical both in valuing a property and in distinguishing value between properties.

## What Drives Price and Value?

All coal is not equal; it is not a homogenous product. Coal is categorized according to its physical and chemical properties — such as hardness, energy content and moisture level. Harder, thermal coal (such as anthracite) or higher energy content coal mainly is used for steel manufacturing and industrial fuel; coal with a higher moisture content (such as lignite) largely is used for power generation (Figure 3).

Consequently, there are several different coal markets segmented by end use (steam, metallurgical), quality (calorific value (“CV”) and impurities such as ash and sulfur) and geographical location (which impacts costs). All these factors (and others) affect coal’s value. Thermal coal prices depend on the calorific value of the coal, as well as the level of impurities present. Everything being equal, the higher the CV and the lower the impurities, the higher the expected price per ton.

**Figure 3: Types of Coal**



## Valuing a Mine

The first step in valuing a property is to assess its development state at the date of valuation. The stage of development most often will indicate the appropriate valuation approach and will have a significant impact on the final value.

Mining projects follow a broadly predictable development path, from the identification of the mine’s potential, to exploration, to evaluation (through deposit samples), to mine planning and construction, production and, finally, to then decommissioning takes place followed by remediation at the end of the mine’s life.

There are three approaches normally used to value a mining asset: its replacement cost, the amount of invested capital and its market value (based on the future income the asset is expected to generate).

### Income-based approach

In valuation theory, discretionary after-tax cash flow is of primary importance. The most commonly applied income approach is discounted cash flow (“DCF”), which assesses the value of an asset by reference to the amount, timing and risk of future cash flows. When implementing a DCF method, it is customary to follow three main steps:

1. Estimate future cash flows for an explicit forecast period.
2. Calculate the value of the asset at the end of the forecast period.
3. Discount the cash flows and the terminal value using a rate that takes into account the riskiness of the cash flows and the time value of money. Then sum those values to arrive at the net present value of the asset.

Extractive industries are unique in some respects: Once a mining resource is sufficiently established from a technical perspective and its economic viability is verified with a feasibility study, the processes to extract the ore and produce the commodity are well-known. Costs, therefore, can be estimated

**Figure 4: CIMVAL Valuation Approach Guideline by Development Stage**

Valuation Approach	Exploration properties	Mineral resource properties	Development properties	Production properties
Income	✗	in some cases	✓	✓
Market	✓	✓	✓	✓
Cost	✓	in some cases	✗	✗

Source: CIMVAL Standards

with a reasonable degree of precision. Furthermore, the product usually has a ready end market (global or regional) so revenues can be forecast using publically available forward pricing curves.

### Market-based approach

With this approach, the value is inferred from publically available information about transactions and trading prices comparable with the target mine. While each mining project may have its own singular characteristics, value data from reasonably similar mines can be used to determine a range of fair market values or to reaffirm the reasonableness of value conclusions reached by other methods, including the income-based approach.

### Cost-based approach

In a cost-based approach, the value is based on the principle that a notional purchaser would not spend more on an asset than it would cost to actually construct the asset. Such costs would include the development costs of the property. The value calculated this way may be thought of as a “floor” value, as it would not include any expected future rate of return or cash flows from the investment.

The “Standards and Guidelines for Valuation of Mineral Properties,” produced by the Special Committee of the Canadian Institute of Mining, Metallurgy and Petroleum on Valuation of Mineral Properties (“CIMVAL”), sets out the valuation approaches that normally are considered appropriate to each type of mineral property, as seen in Figure 4.

It is important to take great care in choosing a primary valuation approach

for a target mine (or mines). When valuing a number of licenses or coal properties (for example, at an auction), the valuation analyses may need to be done on a block-by-block basis, as each block likely will be different in the characteristics of the resource and its stage of development. Where appropriate and feasible, it usually is best to apply more than one methodology so final conclusions can be cross checked. (The Central Mine Planning & Design Institute’s recent suggestion to ascertain total value of a block by assessing the block’s net present value based on an income approach (that is, DCF) appears to be consistent with the above standards and guidelines.)

## More to Mining than Markets and Money

The valuation approaches described above are important, but they do not contain the entirety of the valuation process. The intricacies specific to a property, as well as its geography, need to be taken into account. And there may be other unique issues that must be factored in.

For example, when assessing the value and attractiveness of a particular coal block, bidders likely will take into account market power, portfolio effect (a single buyer, for instance, might ascribe a higher value to a block than if it was sold to several buyers), ownership caps promulgated by the government, and specific end-use limitations that may reduce the number of potential bidders and, thereby, affect the value ascribed to the mine.

Mining, as we've noted, has long been perceived as a risky business — and with good reason. Risks that are difficult to calculate precisely include regulatory hurdles (such as the time and cost of procuring approvals and producing the necessary documentation to commence exploration, development and operations of a mine) and other market and project risks that may affect cash flows (such as the realizable coal price). Before inferring the value of a property, it behooves companies and investors to assess these risks as thoroughly as possible.

The valuation of a coal project is a vast undertaking. It requires knowledge of the overall mining process, a sound recognition of the property or properties under consideration from both a

technical and a financial perspective, and command of the appropriate valuation standards and guidelines. Proper valuation also demands a deep appreciation of the risks specific to the geography and project. Above all, it requires an understanding of the context of the valuation and experience with standard valuation and financial concepts and approaches.

Once all these areas have been addressed satisfactorily and due diligence applied as appropriate, then the risks of this inherently risky business may be mitigated. ■

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