



THE SURPRISINGLY SUSTAINABLE CASE FOR COAL

Coal as a sustainable energy source. It's at once a straightforward statement of fact — and a provocative, even controversial, assertion. Let's review three pillars of what we would call the Surprisingly Sustainable Case for Coal.

1 The first pillar is the market. Even amid headlines that question coal's future, trends reveal that global coal demand will be substantial for many decades to come.

2 The second pillar is technology. The ability of advanced coal technologies to continue to drive down emissions from coal is extraordinary — and essential.

3 The third pillar is financial. While multiple factors will still lead to winners and losers, some industry challenges may paradoxically enable greater financial strength for those that remain and invest.

1 PILLAR ONE: The Market

The world uses more than 7.5 billion tons of coal per year.¹ A bit more than one out of every four units of energy in the world comes from coal — and that share has actually edged up in the past four decades — off of a much larger base.²

For the first time ever in 2018, global coal-fueled generating capacity topped 2,000 gigawatts (GW). That's a massive 62 percent increase since the year 2000³... and each GW can use about 3 million tons of coal per year. More than 100 GW of new coal-fueled generation are under construction around the world and expected to come online between 2020 and 2022.⁴ Some 50 countries have added coal-fueled generation since 2010.⁵

Within the U.S., past years of regulatory burden, financial incentives to switch fuels, and a country-specific shale play have created a secular decline, but coal still fuels nearly a quarter of electricity generation.⁶ Also, during peak days of usage during weather extremes in recent years, coal has fueled more than any other source.⁷

Coal is also essential to original steel-making, which consumes a billion tonnes of coal each year globally. And coal provides about 70 percent of the energy to create cement.^{8,9} Electrification of the transportation sector is already having stunning results, with coal again returning as a major fuel of transportation in places such as China which uses coal-fueled electricity for high-speed trains and electric buses, cars and scooters.

Life expectancy, educational attainment and income all correlate with per capita electricity use and more of the world's electricity is fueled by coal than any other source.¹⁰ Notably, between 1990 and 2010, about 1.7 billion people gained access to electricity.¹¹ Over the period, for every 1 person who gained access owing to solar and wind energy, 13 gained access thanks to coal.¹²

The seaborne coal trade, in which Peabody is a significant participant, has grown substantially in the past decade. For the decade between 2009 and 2019, seaborne thermal coal demand soared by 59 percent and topped 1 billion tonnes for the first time in 2019, according to data from Wood Mackenzie.¹³ During that same decade, global seaborne metallurgical coal

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demand grew an impressive 47 percent, reaching 315 million tonnes in 2019. Combined, the seaborne coal trade increased by nearly half a billion tonnes during a 10-year period when many were predicting a decline in coal demand. Also in 2019, the Asia-Pacific region reached 83 percent of the total global seaborne coal trade. While many of the headlines about preferred energy sources come from the U.S. and Europe, those regions are increasingly irrelevant in the seaborne coal trade.

Simply put, the world plans, and needs, to use substantial amounts of coal for the foreseeable future.

2 PILLAR TWO: Technology

Peabody believes that technology has been the proven answer, and we have the opportunity to continue to use technology to drive down emissions.

Step one is to allow the world to access electricity, something lacked by nearly 1 billion people — nearly 15 percent of the world's population.¹⁴ In 2018, more than 2.6 billion people relied on primitive biomass, which would be some 1,000 times cleaner using coal by electrification.^{15,16}

Steps can also be taken to improve emissions from existing fossil fuel generation — and the track record there is excellent through low-emissions technologies. Since 1990, U.S. SO₂ and NO_x emissions per MWh from coal have been reduced 88 percent and 85 percent, respectively — and that is even while coal consumption has risen 146 percent.¹⁷ The first step of reducing carbon emissions begins with higher efficiency. Globally, the average efficiency of coal-fueled power plants today is 35 percent. Raising that average by 5 points, to 40 percent, would reduce global emissions by 2 gigatonnes — or the equivalent of India's annual total.¹⁸ Positive steps are already being taken. In China, high-efficiency low-emissions plants comprise 66 percent of the installed capacity.¹⁹

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It is notable that China, India and Japan, along with other countries accounting for 70 percent of global coal consumption, have included advanced coal technologies in their nationally determined contributions under the Paris Agreement.²⁰ Many of the largest coal-consuming countries in the world continue to see a role for coal in a carbon-constrained world.

The final “grand prize” for advanced coal technologies comes through widespread deployment of carbon capture, use and storage (CCUS). The Intergovernmental Panel on Climate Change has said not only would the cost of achieving the 2°C goal be 138 percent more expensive (median estimate), it may well not be possible without widespread deployment of carbon capture.²¹

The coal fleet in Asia is less than 15 years old and many of these plants can be retrofitted with CCUS. Over 300 GW of the existing coal-fueled power capacity in China alone already meets the basic criteria for being suitable for CCUS retrofit.²²

In the U.S., we are already seeing a reason for renewed optimism in this field with the passage in recent years of the FUTURE Act legislation advancing the 45Q tax credit — a widespread incentive for large-scale CCUS projects. Peabody was pleased to be part of a bipartisan effort supporting its passage.

In reality, the world needs greater regulatory clarity around CO₂ storage and greater deployment of plants. The technology exists today, though it is only through learning by doing that we optimize project costs to deploy at scale. In addition, there are transformational technologies in the innovation pipeline that promise to reduce costs even further with continued research and development.

3 PILLAR THREE: Financial

In a world where some are calling for divestment of coal companies and other fossil fuel producers, Peabody believes that investment and engagement are far preferable approaches, as opposed to symbolic but misguided divestment actions by a minority of those in the financial community.

So long as the world uses substantial amounts of coal, society also needs responsible coal producers. Divestment activities do nothing to halt coal demand, but push away responsible public coal producers, and drive production to less accountable operators. Divestment also shuts down the value of coal companies engaging in continuous improvement activities in ESG and transparency in disclosures. Divestment forces subjective value judgements and creates far greater administrative hurdles and ambiguous fiduciary practices.

On the other hand, Peabody believes that engagement with a company regarding its ESG practices and accomplishments:

- Allows for productive engagement and gives investors a seat at the table;
- Recognizes differentiation between responsible producers and others within the space;
- Offers an incentive for fossil fuel companies to manage ESG and transparency;
- Allows companies to incorporate stakeholder feedback into long-term strategies;
- Helps organizations fulfill their broad social purpose and what we might call a “Corporate License to Operate.”

Ultimately, to the extent that “keep it in the ground” is advocated by some as an actionable phrase, Peabody believes that the principle should apply to those who don’t use strong practices in disclosure and application of ESG principles.



In addition, while both market and company-specific factors will still lead to winners and losers, recent industry challenges may paradoxically enable greater financial strength for those that take a contrarian position and remain. Several major dynamics are at play:

The first is environmental activism. Permitting of a mine or a port is likely to bring substantial pushback and delays in production that limits sourcing.

The second dynamic is the turning away from coal by certain global diversified miners and some investors through fossil fuel divestment. This, too, limits sourcing opportunities. The world's largest mining company's divestment of much of its thermal coal while still retaining the largest export portfolio of met coal; the world's second largest mining company's complete exit from coal; the world's largest seaborne thermal coal supplier's rapid surge then announced capping of coal; and the Euro-American divestment movement of fossil fuels all point to an industry not receiving investments in new supply to the extent it would have as recently as the beginning of this decade.

Ironically, though, very little of this impacts the underlying demand of our product, particularly in the busy ports of dozens of Asia-Pacific nations. Again, demand has edged up and supply may remain tight.

A world that will use coal for many decades more into the future... also needs sustainable coal companies more than ever. If you drive first-tier, sustainable

companies from coal, then the resulting effects will be negative for multiple stakeholder groups and society as a whole.

The third dynamic is a capex-light world that so many major companies in extractive industries find themselves in... where capital investments run well below both historic levels and current depletion.

Shareholders in a cyclical industry were tired of cash often being wasted on marginal returns in the good times and losses in the bad times. They are calling for far greater discipline in capital allocation. A quick analysis of capital investments in the coal industry since the early part of this decade reveals that capex is running less than half its peak level. In addition, technical elements are also discouraging investments. The move to spot markets and short-term contracts create the potential for greater volatility and shorter-term decision making.

To complete the thought, the coal industry of course faces multiple challenges. The twist here is that within our challenges may be embedded opportunities.

Those opportunities present themselves for those of us with the wherewithal to remain financially sound, to manage well, to insist on responsible mining, and to encourage advanced technologies to continually reduce emissions.