

Dr. Lars Schernikau



# Economics of the International Coal Trade

The Renaissance of Steam Coal

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# Foreword 1

Coal, the catalyst of the industrial age, is now poised to shape how the world consumes energy in the twenty-first century. The ascendance of oil in the global economy to a looming peak is forcing countries, companies, and consumers to reconsider their relationship to something they cannot live without: energy. And while other sources of energy, such as nuclear, natural gas, and renewables, will all play an ever greater role in serving demand, intelligent observers would be wise not to miss what is perhaps the clearest trend of all: the second coal era is now upon us.

The developing world is rapidly electrifying in order to drive economic growth. And electrification means coal. This is particularly true in India and China, where coal offers the cheapest and most reliable route to electric power. These two countries alone will drive 80% of coal consumption growth to 2030. The International Energy Agency expects that global coal consumption will increase by 60% in the next two decades. Lars Schernikau's *The Renaissance of Steam Coal* could not come at a better time. Lars' skill in tracing the long arc of industrial evolution paired with his acute knowledge of the coal market make his arguments both insightful and highly credible. He begins by succinctly framing the problem and distilling our current predicament: we are caught between 'the Oil Age' and the 'the Solar Age' (by this he means the age of renewables). We are all optimists to some degree, but the realists among us know that renewable energy is not going to completely fill this gap for decades. Where, then, does this leave us? It leaves us with *The Renaissance of Steam Coal*.

Coal is now the world's fastest growing source of fossil fuel, a position it is expected to hold for the foreseeable future. Yet the coal market is far less well understood than the oil or gas markets. Academics, policymakers, and market participants are faced with the prospect of our collective knowledge about this market not keeping pace with its increasing relevance. Coal, only 30 years ago a localized fuel source, is now a volatile global commodity with banks and hedge funds piling into the once traditional business. Not only is the coal market now more relevant than ever, it's also much more complex.

As a shareholder of HMS Bergbau AG, a deeply experienced European coal trading firm, Lars is in a unique position to take us inside this world. As the global trade grows, growth is likely to be uneven. Major exporters such as Indonesia,

South Africa, Colombia, and Australia face a range of issues that will either enable or constrain their ability to serve the world's growing fleet of coal-fired power plants. His WorldCoal model provides us with the economic foundation of cost curves and competitive theory upon which we can layer a nuanced treatment of issues like increased local demand reducing exports or unstable governance threatening production. The result is a picture of growth patterns in the global trade that brings to bear the set of tools that are now essential for any coal market participant: knowledge of power markets, geopolitical astuteness, a detailed understanding of mining economics, and an acquaintance with global freight markets.

The market is becoming more sophisticated as trade becomes more complicated. Coal exchanges are expanding in an environment of high credit risk. Futures, swaps, and options – once the domain of oil markets – are taking hold in the coal markets. By many estimates, the financial trade is now six times the physical coal trade in Europe. The launch of several futures contracts for the Newcastle market is about to test whether the Pacific will follow Europe's lead in the commoditization of coal. For many observers, the appearance of derivatives in Asia (and the banks right behind them) will be enough to prove that coal is decidedly headed the direction of oil. But coal is not oil. The heterogeneous nature of this fuel and the prevalence of markets with complicated logistics ensure that not all of the coal trade can go on-screen; Renaissance puts the ceiling at 50% of the internationally traded market. If this is indeed the future of coal, the market will demand players that can place a physical cargo into Guangzhou one minute and short API2 swaps the next.

It would be a near requirement to be unabashedly bullish coal if not for one critical factor: carbon dioxide. Coal use is now the leading source of anthropogenic climate change. The European Emissions Trading Scheme (EU ETS) has put the brakes on coal burn by forcing power and coal traders alike to factor European Union Allowances (EUAs) into the power price. Watching 'clean spark' and 'clean dark' spreads that track coal's competitiveness against natural gas in the merit order is now required hobby for anyone trading in Europe. America is decidedly headed the same direction, and the world aspires to replace the Kyoto Protocol by the time it expires in 2012 with a binding cap on global emissions. Whether the coal business believes in global warming or not is irrelevant to the coal trade; the politics are clear, the policies are being strengthened, and the economics are unavoidable. Coal's relationship to climate policy will be one of the determining factors in deciding who uses coal and where. This book directly confronts this issue in a novel way, arguing that geographically limited application of CO<sub>2</sub> pricing may drive down coal use in Europe or the United States, but this would depress world coal prices and thus incentivize even greater coal use (and thus emissions) in the coal-hungry developing world. This nuanced global view of the coal trade and its relationship to climate policy need to be considered by policymakers, environmentalists, and coal producers alike.

Coal, like it or not, is about to witness a period of phenomenal growth. Unless the global community understands the coal market on a level consummate with

its importance, we cannot make good markets or good policy. *The Renaissance of Steam Coal* makes an important contribution to this end and should be read by anyone who has a stake in the future of global energy markets.

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## Foreword 2

Energy, the delivery of light and power, is one of the most important and potentially problematic of contemporary issues. As developing countries electrify their communities, already modernized societies seek to feed an ever-increasing technologically dependant way of life, and global populations continue to increase, the energy needs of the world are set to skyrocket. However nobly motivated the proponents of renewable energy may be, the world's energy demands are growing faster, and with greater force, than current renewable energy technology can adequately be made available or efficient enough to cope with. Environmental-political forces may have the power to sway the direction of future energy sourcing, but for coming decades, as billions of people turn on the lights for the first time, coal-fueled power stations will, and should, be the logical stopgap to the energy needs of the global community. The author of this book, Lars Schernikau, has identified this reemerging market and the general misinformation surrounding coal-fired power generation and put together a study seeking to inform, update, and educate people about today's coal industry. Up to now, the coal mining industry has been figuratively shrouded in industrial-era black dust. Few understand the modern processes or production barriers. Misinformation, propagated for a myriad of reasons – from fiction to political ideology – pollutes our understanding of the current industry. *The Renaissance of Steam Coal* is a timely, unbiased analysis of coal's ability to fuel the growing energy market, and of what a rebirth of coal-derived power will mean for industry, investors, and the quality of the world's energy supply.

Historically, the coal industry has been associated with images populated by Charles Dickens's downtrodden characters, struggling for survival in a soot-covered London; a time before child labor laws, when mine safety consisted of little more than a canary in a cage. The coal mining industry is over 200 years old and, along with many other long-in-the-tooth trades, both does and doesn't deserve its reputation. Underground mining, if not undertaken in a professional and safety-conscious manner, can result in significant fatalities. Almost every known form of premature death can occur in poorly managed underground mining operations. Burning coal in open fires or in boilers that do not have pollutant removal systems produces a variety of emissions with various environmentally damaging effects, ranging from carcinogens to acid-rain-forming sulfur compounds, as well as visual pollution in

the form of the notorious black smokestacks. Many great cities of the world, including London and New York, are still partially stained by the years when coal was burnt in open domestic fireplaces. And, of course, coal in its raw form is black, is dusty, and prone to spontaneous combustion if not stored properly.

Scientific advancements, along with human rights developments in our society over the past century, have led to a very different coal industry to that of the Industrial Revolution, though the industry seems to be able to do little to overcome the stigma of that era. In the developed world, occupational safety hazards and worker exploitation have been almost completely eliminated, while in the developing world great progress is being made in these regards. The replacement of unskilled labor with highly trained personnel, the use of advanced mechanics, and a greater understanding of chemistry and physics have been fundamental in improving operations.

Today, coal is burnt in state-of-the-art boilers that comprehensively remove ash dust, sulfur, nitrogen, and even rarely occurring heavy metals. Modern boilers are heavily filtered so all that remains from coal firing are water vapor and colorless, odorless, tasteless, carbon dioxide. (The extent to which CO<sub>2</sub> itself is a pollutant is amply covered elsewhere.) The ability to now build and operate boilers pollution free is not commonly appreciated. When my wife and I were on a tourist bus in China recently, a very vocal environmentalist proudly pointed out to his friends the wanton pollution of a Chinese coal-fired power station; he expressed his disgust at the Dickensian vision of clouds pluming from the flute. He was, in fact, pointing to the water vapor from the cooling towers.

The clean-up and rehabilitation of land surfaces following mining operations have been another factor in coal mining's historically foul reputation, with many past sites treating their surrounds with, at best, disregard. In many areas of the coal mining world (e.g., the United States, the United Kingdom, and Australia) where I spent parts of my youth, abandoned open pits and washery waste heaps still litter the landscape after more than half a century of neglect. In Indonesia, the modern regulated mines operating to high rehabilitation standards leave the mining area in as good a condition, and in some cases where trees have been planted, arguably better than prior to mining. This is certainly in stark contrast to the illegal operators who scar the landscape, destroy the jungle, and leave open pits that fill with water, which turns to acid poison. Every year Indonesian coal funnel millions of dollars into education, health, and animal welfare programs to aid in the responsible development of the communities they are a part of.

Indonesian mines are almost exclusively open-pit, truck-and-shovel operations. When factors are combined, draglines and highly mechanized bucket wheel and conveyors systems for overburden removal cannot be deployed. However, while the operating costs of truck and shovel operations are quite high (in the order of US \$2.50–3.00 per bank cubic meter of overburden removed, replaced, and rehabilitated), the capital cost is relatively low at about US\$2 million per 1 million bank cubic meters per annum of installed overburden removal capacity. We at Bumi Resources owe our livelihood to coal mining. As do more than 100,000 Indonesians who depend on the cash flows from our operations to directly and indirectly support

themselves and their dependants. Mine workers employed by listed mining companies typically earn double to treble the incomes of their compatriot peers working in comparative industries, regardless of the country or its general level of development. Huge royalties and taxes paid by Bumi and other mining companies to the Indonesian Government also provide vital stimulus to the economic well-being and stability of the nation. Countries like Indonesia are perfectly poised to be at the forefront of coal's resurrection.

In the absence of extreme levels of carbon tax, electricity producers on the coast of energy-poor countries (on the arc from North Asia through South East Asia to India) will choose coal as the most commercially attractive large-scale fuel source for the next one and probably two decades. Books such as *The Renaissance of Steam Coal* by Lars Schernikau are vitally important in presenting the public with unbiased quality information, assisting in rational debate, and hopefully avoiding counterproductive public policy. It is only through the availability of information and the de-cloaking of the coal industry that the resource coal, and the marketable energy it produces, can be judged fairly as a modern solution to our global consumption requirements. With his years of market experience and as a long-standing coal business owner, Lars is in a unique position to help us better understand this coal market.

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Kenneth P. Farrell



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