



Third Party Research

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Winners & Losers in the Power Sector Revolution

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Winners & Losers in the Power Sector Revolution

By Robert Rapier
September 4, 2018

Since the turn of the century, a revolution has been underway in the power sector. The primary casualty has been the U.S. coal industry, while the winners have been natural gas, renewables, and the atmosphere. Energy sector investors should heed this virtually unstoppable trend.

According to data from the Energy Information Administration (EIA), in the year 2000, 71% of U.S. electricity generation was derived from fossil fuels. By 2017, the fossil fuel share had fallen to 63%.

But that decline is entirely because of a move away from coal for power generation.

Coal's share of U.S. electricity generation between 2000 and 2017 fell from 51% to 30%. Renewables get a lot of credit for this decline, but the truth is that natural gas took the lion's share of coal's market share. Over the past 17 years, the natural gas share of power production doubled from 16% to 32%. Natural gas is now the largest source of power in the U.S.A. (Nuclear power's share was 20% in 2000 and in 2017.)

Renewables have grown as well. The total renewable share rose from 9.5% to 17%, but hydro-power has always been responsible for the largest renewable contribution. In 2000, hydro-power accounted for 275 billion kilowatt-hours (kWh) of electricity. By 2017, that was just a bit higher at 300 billion kWh. But modern renewables like wind and solar power soared from nearly nothing in 2000 to 300 billion kWh in 2017.

Still, that is less than half the gains made by natural gas.

From 2000 to 2017, power generated by coal fell by 700 billion kWh. Meanwhile, at the same time natural gas generation increased by 700 billion kWh.

Dialing Down CO2 Emissions

The impact of the huge drop in coal can be clearly seen in the emissions data.

First, let me explain why coal has higher associated carbon dioxide emissions. Fossil fuels contain two different elements that produce energy: carbon and hydrogen.

When carbon burns, it forms carbon dioxide. When hydrogen burns, it forms water vapor. Coal has a much higher concentration of carbon, whereas natural gas has much more hydrogen. Thus, when natural gas is burned, it produces relatively fewer carbon dioxide emissions.

According to the [BP Statistical Review of World Energy](#), the U.S.A. has reduced carbon dioxide emissions by 639 million metric tons per year since 2000. This leads all countries by far in reducing carbon dioxide emissions. Far behind in second place was the U.K., where emissions dropped by 165 million metric tons per year.

China, by contrast, increased its carbon dioxide emissions by a whopping 6.8 billion metric tons per year, primarily a result of ~170% increases in both oil and coal consumption.

A Blueprint for the World

Those who wish to debate whether natural gas should be a bridge between a coal-fired past and a renewable future are missing the point. It is already serving as that bridge.

Further, the USA has set forth a potential path that the rest of the world could follow. Countries that rely on coal consumption for a large share of power production can phase that out in favor of a combination of natural gas and renewables, with an eye toward a future that is primarily renewable. In the interim, carbon dioxide emissions will drop as coal is replaced with cleaner-burning natural gas.

China has started down this path. China's natural gas consumption has doubled since 2010 as the country seeks to reduce its reliance on coal. This development, along with its investments in renewables, has helped China's coal consumption decline by 4% since a high in 2013.

The Winners

Who might benefit from such a global transition? Beyond the environmental benefits, the beneficiaries will include natural gas producers, liquefied natural gas (LNG) shippers, and renewable power suppliers.

Given the continued surge of U.S. shale gas production, the USA is in a good position to help supply LNG to the world. China is already the third largest export market for U.S. LNG, behind Mexico and South Korea. But that momentum could stall given China's recent announcement that it might impose a 25% tariff on U.S. LNG shipments.

There is tremendous opportunity for the world to adopt the U.S. blueprint for the evolution of the global power sector, given the right government policies. The opportunities for investors are vast as well.

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See ABOUT THE AUTHOR on the following page.

ABOUT THE AUTHOR



It is hard to imagine anyone better suited to covering the energy-investment waterfront than Robert Rapier. Robert is no armchair analyst—he has two decades of in-the-trenches experience in a wide range of fossil fuel and biofuel technologies, including refining, natural gas production, gas-to-liquids, ethanol production and butanol production. During a six-year stretch at ConocoPhillips, Robert ran a team of engineers in Scotland working on oil and gas projects in the North Sea.

For two years, Robert was an efficiency expert in a Texas petrochemical plant. The process changes he implemented saved the facility \$9 million a year. He later worked as the Engineering Director for a Dutch environmental-technology company and provided engineering support for a Chinese facility the company was constructing.

Robert was also a butanol engineer in Germany for the Celanese Corporation, where he designed a novel butanol unit that cut production costs by \$5 million per year.

In all, Robert has spent more than a dozen years working on liquid fuels technologies. Along the way he has picked up five patents, including one for a breakthrough way to convert ethane into ethylene (U.S. Patent 7,074,977).

Now, in addition to guiding readers to timely energy plays in his twice-monthly *Energy Strategist*, Robert travels the world evaluating start-up energy companies for deep-pocketed investors. After grilling management and assessing the technology on-site, he makes a go/no-go investment decision. His wealthy private investors and hedge fund backers trust him to make the right choice for the same reason we do: his vast real-world experience in just about every facet of the energy industry. If Robert votes thumbs-up, millions of dollars flow into these cutting-edge outfits.

Robert earned his master of science in chemical engineering and a bachelor of science in chemistry and mathematics (double major) at Texas A&M University. He tells us he was “this close” to finishing his Ph.D. before he decided he was having a lot more fun making money in energy stocks.

A prolific writer, Robert’s articles have appeared in *Forbes*, *The Wall Street Journal*, *The Washington Post* and the *Christian Science Monitor* — and he has been a featured expert on *60 Minutes* and *The History Channel*. His new book, [*Power Plays: Energy Options in the Age of Peak Oil*](#) (Apress, 2012), helps investors sort through doom and gloom, hype and misinformation to understand the true costs, benefits and trade-offs for each of our major energy options.

In what little spare time he has left, Robert consults for a number of energy projects, including biodiesel, ethanol, butanol, and biomass gasification facilities.