

Surviving Big Oil's Collapse

*How to avoid global
economic Armageddon
as a result of fossil
fuel's demise.*

BY PHILIP K. VERLEGER, JR.

Scientists, economists, policymakers, and the public worry that global warming threatens human survival. Climate scientists fret that continued emissions of global-warming gases will push the globe past an unknown tipping point beyond which there is no return. Respected experts such as Nicholas Stern have warned that we need to reduce hydrocarbon consumption dramatically to avoid catastrophe. In that respect, the International Energy Agency postulates we will have to lower use almost 20 percent from current levels to move to achieving the 2040 targets established at the 2015 United Nations COP-21 climate conference in Paris.

Most who are familiar with energy-use patterns and their relationship to global economic growth believe the COP-21 goals are unreasonable. President Trump thinks meeting the targets would cause too much economic harm to the United States, and said so when he announced on June 1 the intended withdrawal of the United States from the climate accord.

Surprisingly, there is good news. Fossil fuel combustion will probably decline sharply over the next thirty years, and that decrease may slow global warming sufficiently to avoid the tipping point. This positive news is tempered, though, by the fact that declining fossil fuel use will coincide with big energy's economic collapse, which promises to make destitute many nations and millions of individuals. Venezuela's self-induced economic failure offers a preview of what is coming.

Like Venezuela, entire states will likely fail as the governments of fossil fuel-exporting nations become unable to continue to provide their citizens with the goods and services they enjoy today. Many of these nations will be in the Middle East, and some of their people may turn to terrorism,

Philip K. Verleger, Jr., is president of PKVerleger LLC.



possibly creating organizations ten to one hundred times the size of ISIS.

Those living in rich and poor fossil energy-consuming nations will not escape either, because the transition away from hydrocarbons will almost certainly be accompanied by a period of extraordinarily high energy prices. The resulting economic pain will depress incomes and economic activity around the world.

This global economic Armageddon will be the consequence of the fossil fuel industry's demise. To survive, the industry needs to make large investments to increase production to meet consumption projected by fossil fuel proponents or even just to sustain existing output. Only a small fraction of such investment is being made. The IEA forecasts that \$17 trillion must be put into projects to meet the fossil fuel demand expected by 2040. Today, it appears less than half that amount will be made available.

This underinvestment in fossil fuel development (the term used by the IEA and others such as the CEO of Aramco, Saudi Arabia's national oil company) is occurring because lenders and investors have concluded that fossil energy projects no longer offer good prospects for their money. They have turned away from the oil, natural gas, coal, and traditional utility businesses. At the same time, surviving firms such as the multinational oil companies must pay shareholders large dividends, which deprives them of the capital needed to invest and expand.

Historically, such firms would gamble, pouring \$10 billion to \$100 billion into new prospects that offered thirty- to one-hundred-year hydrocarbon flows. In most cases, the oil and gas extracted from these projects increased over the first few decades and then began to fall. Thus, these companies had to engage in a never-ending process of finding and developing new sources to offset the declining output of aging fields.

Ten years ago, the late investor Matthew Simmons warned that this massive exploration and production cycle

must inevitably end. Like many in the hydrocarbon business, he believed all easily accessed oil and gas had been found. New projects would not replace the old fields be-

*It is rapid technical change that will
doom traditional big energy companies.*

cause they were smaller and more expensive to develop. Simmons' book, *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy* (Wiley, 2006), became the bible for peak-oil proponents. Many others predicted that the downturn of global oil production would lead to higher prices, which in turn would destroy inefficient economies such as that of the United States.

Simmons and other peak-oil advocates were wrong for several reasons. First, they failed to foresee the spread of technology from Silicon Valley to the oil and gas sector. Technical advances expanded the global hydrocarbon base to a point where today much of the world's reserves can never be consumed if humankind is to survive.

The "peak-oilers" also failed to anticipate the Silicon Valley-type breakthroughs that have driven renewable energy costs well below those of hydrocarbon projects. Indeed, the renewable costs seem to be falling at exponential rates while the cost of supplying from traditional sources has been static.

In addition, the peak-energy apostles did not expect the world's eventual revulsion toward hydrocarbons. Today, fossil energy firms and their employees receive the same opprobrium as cigarette-firm executives: they are not quite criminals but one wants to see them fade away quickly.

It is rapid technological change that will doom traditional big energy companies. Consider nuclear power and the fate of Westinghouse. Eight years ago, pundits were celebrating the rebirth of nuclear energy. Matt Wald wrote on the nuclear renaissance for *MIT Technology Review*. As he explained, risks had changed from physical to financial. Proponents of nuclear power confronted the possibility that they could not control costs as well as alternative energy sources such as renewables. The U.S. government attempted to address this concern by offering loan guarantees through the Department of Energy. Construction on four new power plants was begun with those guarantees in place.

Continued on page 56

*The renewable costs seem to be falling at
exponential rates while the cost
of supplying from traditional sources
has been static.*

Big Energy's Ponzi Scheme

Charles Ponzi was an infamous swindler who paid returns to early investors with funds received from more recent investors. The term “Ponzi scheme” was named for him.

One can argue that some of the world's largest energy companies are engaged in a Ponzi scheme of their own. The scheme's nature was explained by Total CEO Patrick Pouyanné in a speech delivered at the 2017 Oil and Money Conference. Pouyanné asserted that a sharp fall in investment has led to a decline in new projects. This decrease could result in a crude oil shortage after 2020 with an implied oil price spike.

Pouyanné added that his firm “would play its part in replenishing the industry's project pipeline,” thereby boosting global supply. In his view, the industry would be better off with prices in the current range than with a return to \$100 oil: “‘\$100 per barrel would be bad news,’ he said, recalling how prices above that level before 2014 ‘opened the door to other technologies’ such as U.S. shale and renewable energy,” as the *Financial Times* reported.

Pouyanné's firm, as well as other large oil companies such as Shell, ENI, Statoil, and Rosneft, are all increasing expenditures on costly exploration efforts. These programs often cannot be financed from cash flow, especially with oil hovering around \$50 per barrel and natural gas in world trade moving for half the price of five years ago. Consequently, the companies must turn to debt markets to fund their exploration. One can argue that the debt offerings are a “hydrocarbon Ponzi scheme” because the monies received will be used to compensate investors through dividends and the projects financed with the debt are unlikely to ever generate the returns needed to pay the bondholders who financed the projects.



Charles Ponzi

Ten years ago, economist Nicholas Stern wrote on the investment practices of large firms, explaining that “businesses making investment decisions” often have far longer time horizons than governments. He added that businesses might not properly factor in the likelihood of rising carbon prices when making long-term investments in high-carbon assets. The failure to do so, Stern warned, threatened to leave companies with stranded assets that could not be used and capital costs unrecovered.

The “long-horizon” thinking seems to be prevalent in large energy companies today. Some are investing in very large capital projects—for example, the development of natural gas in Brazil or oil in Kazakhstan—that will pay a significant return only if oil consumption continues to expand and technological change stagnates. The probability of the projects producing enough cash to cover costs seems low. Nevertheless, investors and banks provide the money for these investments, and the companies use it to maintain their dividends. It could be called a Ponzi scheme.

—P. Verleger

Continued from page 29

Eight years on, there has been no renaissance. Technological change has made it possible to produce natural gas for almost nothing. For example, producers in the U.S. Marcellus field, which covers Ohio, Pennsylvania, West Virginia, and Virginia, can profitably produce gas for less than \$1 per million Btu, which is \$6 per barrel in oil equivalents. Meanwhile, the cost of building nuclear power plants has skyrocketed. In March, Westinghouse, the company that built the first commercial nuclear power plant in the United States in 1960 for \$35 million, filed for bankruptcy as costs for its new plants rose to more than \$10 billion each. The story is the same in Finland, where a French company is trying to build a new plant.

Coal, too, is losing out. In October, the U.S. Department of Energy proposed policies to encourage the continued operation of nuclear and coal-fired generating

plants. Three days later, a Texas generating company announced it would shut three coal-powered plants in early 2018. The plants account for 20 percent of the state's coal-generating capacity. Federal regulators cannot overcome economics. In Texas, an investment bank said that it costs \$60 to \$143 per megawatt hour to generate from coal compared to the unsubsidized cost for wind of \$31 to \$62 per megawatt hour. Meanwhile, the cost of producing power from renewable sources has declined exponentially, so much so that wind and solar power have become cost-competitive.

Firms engaged in producing and marketing natural gas and oil have not ignored these developments. Several of the large “legacy” international oil companies have invested billions in natural gas, viewing this fuel as a key to their future, a “transitional” hydrocarbon that will facilitate their adjustment to a low-carbon world. Shell,

Coal is losing out.

for example, acquired British Gas, a company with large investments in producing and transporting natural gas in many parts of the world. In similar fashion, Chevron has invested billions in a liquefaction facility in northern Australia. The consultancy Wood Mackenzie estimates the large companies spent \$725 billion on LNG facilities from 2006 to 2017. Planners for these companies likely expect years and years of good returns from these investments. The rub is that most of the investments anticipated (and required) high prices to earn good returns.

Technology, however, is frustrating this expectation. Fracking has opened new supplies in the United States that allow liquefied gas to be delivered at half the price or less than the price projected when the large projects were developed. The fall in the landed natural gas price in Japan illustrates the problem. There the price in 2016 was 60 percent below the 2012 price. The Japan Fair Trade Commission, seeing the proliferation of suppliers and the price drop, has banned some restrictive practices used by producers to sustain higher prices.

Confronted with increasing supplies, companies have also been forced to seek other buyers for their gas. The *Wall Street Journal* reports they may build power plants and infrastructure to supply electricity and gas to developing markets such as South Africa and Vietnam. Should they take these steps, though, they will find themselves in competition for buyers with far more flexible and aggressive renewable power sources that require much less capital.

In the petroleum world, major oil producers now confront a horde of Lilliputians bent on eliminating internal combustion engines from personal transportation. While oil industry executives continue to cast aspersions on the electric cars, politicians from Europe to China are moving at full speed to replace hydrocarbons in transport with electrons. The shift began with the mayors of European cities, who have sought to ban diesel vehicles in order to improve air quality. The disclosure of Volkswagen's environmental fraud accelerated this movement. The *coup de grâce* for hydrocarbons in personal transportation came this summer, though, when we learned that China plans to dominate the electric car industry. This means the question now is not if oil use in transportation will decline, but rather at what rate the decrease will occur.

Thus, the conventional vehicle's days are numbered as billions if not trillions are poured into research and development in battery technology and recharging stations.

Automobile manufacturers are scrambling, perhaps hopelessly, to forestall China's pursuit of domination. For example, plans by Volkswagen to offer electric versions of all models by 2030 are miserably inadequate. Volkswagen will vanish, as will many other manufacturers if the glove thrown down by China is not taken up.

As this transition occurs, the automobile industry will have to write off enormous sums invested in facilities that manufacture internal combustion vehicles. These sums will be matched by the write-offs made by firms invested in oil refineries, LNG plants, and energy distribution systems.

Westinghouse's story offers a view of the future. In recent years, the company has focused on building very large nuclear energy plants. The costs and complexity of these facilities eventually outgrew its ability to manage its business. Rapid technical change and the emergence of many smaller, skillful competitors able to satisfy the market's energy needs accelerated the transition away from nuclear power and hydrocarbons. Westinghouse, despite a long history of success, has become a dinosaur about to be exterminated by cost overruns, the progress of competing technologies, and changing consumer preferences.

Other big energy companies, as well as large energy-exporting countries, face the same fate. Bluntly, they lack the skills required to survive the next twenty years. Those

Venezuela's self-induced economic failure offers a preview of what is coming.

who have financed the activities of these firms will pay a large price as the companies reduce dividends and default on debt.

These problems will be acute for countries that have thrived on high-cost natural gas and oil. In many cases, their citizens are not prepared for the drop or elimination of income that must come as oil and gas prices fall along with sales volumes. Venezuela offers a glimpse of the social, economic, and political turmoil these countries may experience. Technological change and changing consumer predilections may turn many of the modern cities in the Persian Gulf created with high-priced oil and gas into ghost towns. ◆