

Handicapping the Energy Shift by Eric Spiegel and Neil McArthur

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Energy prices are extraordinarily volatile. Politicians raise alarms about the security of foreign oil and gas supplies. Scientists warn of irreversible damage to the earth from the uncontrolled use of fossil fuels. Welcome to...the late 1970s.

For anyone who remembers that time, the crisis atmosphere surrounding energy today evokes more than a little *déjà vu*. But back then, there was a gradual return to normalcy as prices set by the Organization of the Petroleum Exporting Countries (OPEC) fell and the economy recovered.

Now, several factors make the energy outlook different from what it was then: global climate change, energy insecurity, and growing worldwide demand. A soft landing won't occur this time without an unprecedented energy shift — a shift away from the carbon-intense fuels and technologies of the past.

Life during an energy shift is tense, and for good reason: The forces that determine how quickly it can be accomplished are difficult to see clearly. One way to understand the options is to examine some of the persistent myths about energy, and the constituencies that benefit from their promulgation. These myths are relevant because they can drive public opinion, — and, hence, public policy — and because business practices may also be based on them, which in some cases can lead to severe competitive disadvantage.

1. The Peak Oil Myth: The world is running out of oil.

Reality: This myth has become popular among some environmentalists and others who hope to promote alternative energy and conservation. It has also been popularized by an ongoing argument, based on some supply estimates, that the world has passed the maximum global petroleum production rate.

Although a tempting notion, that scenario is not true. Despite the current imbalance between supply and demand in oil and other fossil fuels, long-term supplies will be available. Existing reserves still hold plenty of fossil fuels, and new reserves continue to be discovered in regions such as Central Asia and South America. There are also vast proven reserves of “nonconventional oil,” derived from tar sands, oil shale, and even coal. Using known technology, these could provide enough hydrocarbons to fuel a petroleum-based economy for many decades to come.

However, in one sense, the “peak oil” argument is right. Nonconventional oil sources are expensive, and also likely to prove unacceptable from an environmental perspective unless costly new technologies are deployed to limit greenhouse gas emissions. Therefore, although oil will remain abundant, it will not necessarily be easy to retrieve in the near future, and basing the drivers of industrial society on oil will not be sustainable beyond, probably, the next 35 years.

2. The China Myth: Rising prices are all Asia's fault.

Reality: This myth has gained currency because it makes it easier for people in the West to ignore their own role in boosting energy prices. Instead, it focuses all the blame on the newly industrializing nations of Asia. It is true to some extent that growth in energy demand in China, India, and other developing nations has been a major factor in rising prices. Mainstream forecasts project that energy demand in emerging Asian countries will more than double over the next 30 years. But the whole truth is more complicated. For one thing, price pressures can just as easily be blamed on growing energy demand in the developed world. In the past 10 years, energy usage in North America, for instance, has increased as much as it has in China.

Demand is only part of the price equation. Prices remained low during the 1980s and 1990s because oil production from nations outside OPEC — drilling in areas including Alaska, the North Sea, and Russia — grew steadily. Non-OPEC production, however, began to decline in 2002. Since then, the OPEC producers that control the most economical and easily recoverable oil and gas reserves in the Middle East have been straining to increase their capacity to produce more oil, but have not been able — or willing — to keep pace with demand. More broadly, the supply crunch has extended across the energy spectrum. The costs of providing other forms of energy have climbed in recent years owing to a dramatic rise in the cost of production equipment such as coal mining machinery, refinery vessels, and infrastructure of all kinds.

3. The Easy Ethanol Myth: Biofuels are the green solution for transportation.

Reality: This myth is promoted by those in the agriculture sector that stand to benefit from biofuels development, and it is also an attractive story for environmentalists. But the “first generation” biofuels available today are at best neutral, and in some cases harmful, from an environmental perspective, once

concerns about energy security). But today they supply only a tiny portion of electric power generation, and significant technological breakthroughs in storage and transmission, as well as supply, will need to be made before renewables can cost-effectively compete on a wide scale with traditional fuels. Even using optimistic assumptions about renewables, we calculate that the world's energy needs in 2030 will

The supply crunch extends beyond oil across the energy spectrum — due to a rise in the cost of production equipment.

the climate-change effects of land use are factored in. Biofuels are also implicated in food shortages, though the extent of their effect is uncertain. Even the next generation of biofuels under development in 2008 may not be a major improvement. With enough technological development, future biofuel approaches, such as algae-derived fuels that don't require large amounts of land, may prove to be a truly green solution, but many obstacles stand in the way, and development is going to take a long time.

4. The Carbon-free Power Myth: We can meet the world's electricity needs by making the switch to carbon-free renewable energy sources such as solar, wind, and geothermal energy.

Reality: It's true that renewable energy sources — especially wind and solar — have tremendous promise for the future, and ultimately may hold the answer to the problems caused by global climate change (and to many countries'

be filled, as they are today, by natural gas and coal. The next 20 years, however, likely will see renewables taking double-digit percentage shares in power generation, and the groundwork being laid for a more significant shift to lower-carbon and carbon-free sources in the future.

5. The No-nukes Myth: Nuclear energy is dead.

Reality: Much of the debate about meeting future energy needs tends to ignore the positive potential for more nuclear capacity. Today, nuclear energy supplies some 15 percent of power generation needs around the world from 439 reactors. In some nations, it commands very large market shares. France derives more than 80 percent of its electricity from nuclear energy; Japan's nuclear share is 35 percent; in the U.S., it's 20 percent. Moreover, despite persistent fears about safety, the nuclear industry has an excellent record, with the exception of the Chernobyl disaster in the Ukraine in 1986. Concerns

remain about the proliferation and storage of nuclear waste, about the availability of uranium for nuclear fuel, and about the potential link between nuclear energy production and nuclear weapons production; but these issues, although significant, should not slow down the advance of this technology.

Nuclear energy is a dependable, around-the-clock power supply that does not produce any greenhouse gases — making it the most scalable current power generation technology that does not contribute to global warming. Today, there are plans to build more than 200 new nuclear plants worldwide, although rising costs and supply chain problems are inhibiting the industry's growth.

6. The Private-sector Solution Myth: Industry alone can accomplish the energy shift.

Reality: This myth is the result of the mistrust that has grown in some developed countries, including the U.S., about the ability of government to play a positive role in resolving long-term economic problems. But although it is true that private entrepreneurs and corporations accomplish most of the world's innovation and R&D and operate many of its energy businesses, it is also correct that historically, major shifts in energy markets — France's embrace of nuclear power, Brazil's creation of a sugar-based ethanol industry, the rise of wind power in Denmark — were rooted in government policy choices. Given the magnitude of the challenge that the energy shift presents, it is clear that government decisions, public-private initiatives, and tax incentives will be necessary components in achieving major technological breakthroughs and

building new energy infrastructure.

In short, the realities of energy in the late 2000s are contradicting perceptions and expectations from all quarters. The world has discovered in the last few years what some energy experts have been warning of for decades: Civilization's reliance on fossil fuels is, in the long run, unsustainable. At the same time, scientific consensus on the dangers of global warming has been reached. It cannot be ignored or dismissed: Humans need to sharply slow the growth of greenhouse gases to avoid irreparable damage to the environment. This will limit the options that companies and nations have to meet future energy needs. And it will accelerate the shift away from fossil fuels to more sustainable forms of energy.

Amid all the uncertainty about the future of energy, however, two things are certain: The energy shift is already happening, and it will continue. As it proceeds, this shift will transform the commercial, industrial, and consumer landscapes of the world throughout the 21st century. For business leaders, the status quo is not an option. The corporate energy policies that have

been adequate in the past will be inadequate in the future.

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This article was adapted from Spiegel and McArthur's forthcoming book (with Rob Norton), *Energy Shift: Game-Changing Options for Fueling the Future* (McGraw-Hill, 2009).

Growing Pains in Vietnam

by Dennis J. Meseroll and Kendall K. Turner

Consider the double-edged sword hanging over Vietnam. For the past five years, the tiny emerging nation has been a favorite of foreign investors. Real foreign direct investment

(FDI) in productive assets rose an average of 45 percent in both 2006 and 2007, reaching approximately US\$20 billion. That's roughly one-fourth of comparable FDI in China, a country with a nominal GDP 46 times that of Vietnam's.

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