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Energy Co2 : Fossil Fuels

Peak Oil and the Energy Remix

A transition to cleaner, more secure energy is necessary, but it will not happen overnight. Improving the use of fossil fuels could pave the way.

Filipino protesters rally outside an oil company in Manila in August 2005. Since then oil prices have reached record highs and lows in just a few months time (Photo: Reuters)

Some dismiss it as apocalyptic pessimism, this talk of "peak oil;" others claim it is the bitter truth. But the question of when global oil production will reach its limit and how fast it will decline afterwards has polarized energy experts for decades. While record-high oil prices in the summer of 2008 rekindled the debate, prices have fallen again with the ongoing economic crisis. Does it mean the debate about peak oil is over?

For years, both sides have held their ground. Some say that, given our reliance on petroleum, dwindling oil reserves will sooner or later send shocking ripples through the global economy and even lead to widespread economic collapse.

On the other side of the debate, there is little cause for alarm. "This is the fifth time that the world is said to be running out of oil," says Daniel Yergin, chairman of Cambridge Energy Research Associates and one of the most outspoken critics of the peak oil theory. "Each time - whether it was the 'gasoline famine' at the end of WWI or the 'permanent shortage' of the 1970s - technology and the opening of new frontier areas has banished the specter of decline."

But mounting evidence about global warming is telling us that – with or without peak oil – we need to change our present consumption of fossil fuels sooner rather than later. With global energy consumption expected to double by 2030, economists like Nicholas Stern say that continuing business as usual for another two decades would be devastating to the global environment and business.

Finite resources, endless problems

It is not only oil that worries climate activists. According to the International Energy Agency, 80 percent of the current global energy mix comes from fossil fuels that are as finite and carbon-intensive as oil. Oil accounts for 35 percent of all primary energy, coal provides 25 percent, and natural gas another 20 percent. Only 10 percent comes from renewable biomass and waste; 6 percent from nuclear; and 2 percent from hydropower. Together, solar, wind, and geothermal power make up less than 1 percent of the global energy supply mix.

Even with massive growth, renewable energies will not be able to replace fossil fuels anytime soon. This is particularly true in rapidly developing countries like China, where a new, carbon-intensive coal power plant springs up nearly each week to meet rising energy demands. Governments simply have to go with the energy source that is available. In the case of China and India, this often means coal.

Picture Gallery (click on the image to start)

Coal is the most polluting of all fossil fuels, but provides a quarter of world energy needs (Photo: Reuters)

Similar economic pressures also exist in Europe, where political

support for renewable energy is stronger than in most parts of the world. Meeting ambitious targets – like the EU plan to supply 20 percent of its energy with renewables by 2020 – will require billions in investment and major changes to national economies and infrastructure.

Revolution in the air

Climate experts often use the term "revolution" to describe what is needed. Hans-Joachim Schellnhuber, head of the Potsdam Institute for Climate Impact Research, envisions a "third industrial revolution" to mainstream low-carbon technologies.

"The key is innovation in the energy sector," says Schellnhuber. "If we prove now that our society can remain prosperous, productive, and creative without carbon dioxide, then we can convince the newly industrializing countries that this is the way to go."

One of the most important challenges is to improve the use of fossil fuels, while advancing renewable energy. "Clean coal" power plants, for example, burn coal at higher temperatures and pressures to improve efficiency. Newer plants are also experimenting with ways to store carbon dioxide emissions under ground. With coal reserves expected to last for at least another 150 years, "clean coal" could be one of the most important technologies of the future.

Unfortunately, renewable energy sources have lost much of the attraction they had when crude oil prices were close to 150 dollars a barrel. Investments, however, still make sense.

Brazil faced a similar problem in the late 1970s, when falling oil prices seemed to render huge investments in sugar cane and hydroelectric resources useless. Today, after decades of government support, Brazil is virtually energy independent. Sugar cane-based ethanol fuels 40 percent of Brazilian automobile transportation, while 450 dams produce 83 percent of the country's electricity.

Next five years critical

As the case of Brazil suggests, changing course can take years. This is why the Worldwide Fund for Nature (WWF) says that the next five years will be crucial in determining how the energy mix will look by mid-century.

The technologies and methods to do this already exist. The biggest and most cost-effective way is to drastically reduce consumption by improving energy efficiency in industry, transport, buildings, and energy production. According to Conservation International, just upgrading the efficiency of industrial pumps and compressors in China could save 100 billion U.S. dollars per decade and eliminate the need for 378 Terawatt hours of energy per year – more than all the electricity used in Britain each year.

Renewables, despite their limitations, could conceivably play a much bigger role in the energy mix. The global solar photovoltaic market grew by around 19 percent in 2006, while the wind sector grew by 25 percent. While most of the growth initially came from Europe, India aims to meet 20 to 25 percent of its energy demand in 2030 with renewable sources. China has similar plans.

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The clean energy revolution will only happen when economic, political, and environmental interests converge. Higher prices for fossil fuels would help, but policymakers have to promote sustainable alternatives, more efficiency, and cleaner use of fossil fuels. If the world succeeds in this transition, it could be the most important revolution of our lifetime. If not, some may be wishing they took "peak oil" debate more seriously.

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