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The Economist debate series: Global energy crisis

Featured Guest's Comments

Aug 26th 2008 | MUJID S. KAZIMI

It is not possible to agree with the proposed premise without some qualification, that we are looking for *economic* and *long lasting* solutions to *large-scale* energy generation. The energy problems that we seek to solve involve deploying economic energy systems while reducing the environmental impact of energy generation, particularly the potential for global climate change. But there are two main domains of energy involved, electricity and transportation, and the need for innovation for each is different. We do have existing technologies to reduce emissions from electricity generation, but we do not have all the technologies to enable significant reduction in the transportation domain.

Today, nuclear energy is the largest source of CO_2-free electricity. The nuclear share of consumed electricity is about 16%, provided by nearly 440 plants in 31 countries. The electrical energy produced from nuclear plants is much larger than that provided by all renewables, including hydro. Developed over nearly 50 years, the nuclear fuel cycle of today uses mined uranium at a rate of 0.07m tons per year, and the proven reserves of uranium at today's price level is about 5.5m tons. Some geologists think the total economically-extractable resources could be ten times this amount, closer to 50m tons. Today's fuel cycle depends on fissioning U-235, an isotope present at a level less than 1% of natural uranium. Mined uranium resources are found in geographically spread countries like Australia, Canada, Kazakhstan, and Nigeria, and will support the doubling of world nuclear electricity generation in a few decades, but can last for centuries if fuel breeding in advanced reactors or uranium recovery from seawater is introduced as part of the nuclear fuel cycle. Furthermore, when uranium runs out, there is the three times more abundant thorium. The reliability of nuclear plants has grown with experience so that an American nuclear plant today operates on average 90% of the time as opposed to only 70% in 1990.

Providing affordable and clean energy for the transportation sector based on today's technologies is less assured, and innovations are needed to shift this sector away from its addiction to oil. Three avenues to reducing demand for oil and CO_2 emissions in this sector should be pursued: (1) obtaining higher mileage per gallon of gasoline and relying more on hybrid and electrical cars, (2) relying more on public transportation using clean electricity production, (3) and using cleaner heat and electricity in production of gasoline itself. About 15-20 % of the energy consumed in transportation is consumed at the refineries, depending on the quality of oil. If some of the energy and hydrogen needed are provided by nuclear or renewable energy, instead of natural gas or heavy oils, CO_2 emissions will be significantly reduced. Since more of future oil supplies will be heavy and sour, it is important to apply innovations to reduce the CO_2 footprint of refineries. Similarly, using cleaner sources of heat in extracting oil from tar sands or shale will be needed in the next few decades. In the longer run, relying on rechargeable batteries or synthetic gasoline will be needed. These technologies are present today, but not at economically competitive levels.

Debate Moderator

Vijay V. Vaitheeswaran
Correspondent, *The Economist*

Mr Vaitheeswaran's current portfolio at *The Economist* now encompasses global health, biotechnology, and innovation. His latest book, "ZOOM: The Global Race to Fuel the Car of the Future", co-authored with Economist colleague Iain Carson, has been named a Book of the Year by the Financial Times.

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Speakers

Pro
Joseph J. Romm
Senior Fellow, Centre for American Progress

Dr. Romm is also the executive director and founder of the non-profit Centre for Energy and Climate Solutions, which helps businesses and American state governments adopt high-leverage strategies for saving energy while cutting pollution and greenhouse-gas emissions.

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Con
Peter Meisen
President, Global Energy Network Institute

In 1989, Mr Meisen founded the Global Energy Network Institute to conduct research and to educate business leaders and policymakers to a strategy for linking renewable energy resources around the world.

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Featured guests

Michael Eckhart
Director General of Africa Rice Centre (WARDA)
Read Mr. Eckhart's comments

Katie Fehrenbacher more
Chairman, European Parliament's Agriculture and Rural Development Committee
Read Ms. Fehrenbacher's comments

Makito Takami more
Journalist specialising in the business and politics of natural resources
Read Mr. Takami's comments

Mujid S. Kazimi more
Director of Programme Design and Support for the United Nations World Food Programme (WFP)
Read Prof. Kazimi's comments

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