



## Energy Resources

- Moderator: **Richard H.K. Vietor**, *Senator John Heinz Professor of Environmental Management*
- Panelists: **John B. Hess**, *Chairman and CEO, Hess Corporation*  
**Martin P. McAdam**, *CEO, Aquamarine Power Ltd.*  
**Matthew R. Simmons**, *Chairman, Simmons & Company International (SCI)*

### Overview

While the world's demand for oil continues its unabated growth, driven by growing Asian demand, supplies of oil have likely peaked. The coming imbalance of supply and demand is so huge that the world needs to add six Saudi Arabias by 2030 to meet demand. Without enormous changes, the world faces an imminent oil crisis.

There are no silver bullets that can solve this problem—not more drilling, greater vehicle fuel efficiency, electric cars, or renewable energy. Political and business leaders must support these measures and more; whatever can help avert a major crisis. This includes actions to dramatically decrease demand, increase supply, and develop alternatives to oil. Doing so will require policy, innovation, and leadership. But first it requires that people wake up to the sobering ramifications of peak oil, which may be the defining issue of this century.

### Context

The panelists offered sobering perspectives on the world's dwindling oil resources, assessing the ramifications and offering potential solutions.

### Key Takeaways

- **The supply/demand imbalance makes the world's energy future uncertain.**

Over the past 20 years, cheap oil fueled global economic growth, fostering lifestyles, particularly in America, that led people to see affordable energy as a birthright. (Currently the United States represents 5% of the world's population but consumes 25% of the oil.)

The fundamental issue is a simple one of inexorably dwindling supplies in the face of inexorably mounting demand, with no silver bullets to reverse the situation.

- *Oil demand continues to rise.* Global demand for oil of 86 million barrels per day (bpd) is expected to rise by 1 million bpd each year over the next decade, growing to 96 million bpd in ten years. Today, 50% of oil is used for transportation and about 40% of worldwide demand comes from the developing world. Demand in the developing world is surging as living standards rise. In the United States, for every one thousand people there are one thousand cars, but in China, one thousand people have just ten cars. As China's economy develops, the number of cars and the demand for oil will grow significantly.
- *Oil supplies have peaked (or soon will).* On average, every year the capacity of an oil field decreases by 5%.

To maintain the same supply, reserves must grow by 5%. And that doesn't take into account the increased demand each year of 1 million bpd, which requires even more reserves. The Energy Information Administration has found that to keep current oil supplies flat in 2030, the world must add the equivalent capacity of six Saudi Arabias—an impossibility. Mr. Simmons believes oil supplies peaked in 2005; Mr. Hess believes the peak will be reached soon. (Natural gas supplies have probably peaked as well, said Mr. Simmons.)

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*"To keep current supply flat between now and 2030, we'd have to add six Saudi Arabias. We can't even add one."*

— Matthew R. Simmons

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- *There are no silver bullets.* The supply/demand chasm is widening too quickly for any solution the different factions advocate to reverse the tide. The major oil companies point to oil still in the ground, but bringing more supply online takes a minimum of ten years. In addition, the drilling rigs that exist are antiquated; replacing them will take enormous investments. (The useful life of a drilling rig is 25 years, yet the average age of the drillings rigs in use today is 28.)

Politicians put hope in renewable energy sources like wind, but huge impediments exist to realize T. Boone Pickens's goal of supplying 20% of U.S. electricity needs through wind. Today, wind supplies the power for 2% of the electricity that is produced; Mr. Hess said if this grows to 6% in ten years it will be a miracle. Solar energy today is inefficient. Use of corn and sugar cane to make ethanol solves just a small fraction of the problem (while increasing food prices). Nuclear is being reconsidered in several countries, but in the United States needs to overcome significant barriers among politicians and the public. Also, it would be great if the United States mandated more fuel-efficient vehicles, but there will need to be breakthrough engine innovation for meaningful effects on demand.

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*"It's a demand problem; it's a supply problem. It's not just one or the other—it's both."*

— John B. Hess

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- **"Peak oil" may be the 21<sup>st</sup> century's defining issue.**

Few Americans recognize the ramifications of the growing imbalance of oil supply and energy demand, an issue Mr. Simmons calls "peak oil." "The current leadership doesn't have a clue," said Mr. Simmons. Department of Energy Secretary Sam Bodman does "get it," Mr. Hess and Mr. Simmons concurred, but he lacks a seat at the table and no one in Washington is listening to his warnings.



Barack Obama is surrounded by smart people, but many of them are environmentalists and have not yet shown signs of recognizing the severity of the situation.

*"People don't really understand the comprehensive challenge we face."*

— John B. Hess

Mr. Simmons shared anecdotes of meeting with and speaking to many smart and powerful people (from Congressional staffers to the Pentagon) who aren't familiar with the concept of "peak oil." Until hearing from Mr. Simmons, they were unaware of this issue, its seriousness, and the potential consequences.

▪ **In addition to the economic arguments for renewable energy, there is also a strong sustainability story.**

Greater use of wind for electric power could have an enormous environmental impact. If 20% of electric power were generated from wind, it would save more than 7,500 million metric tons of CO<sub>2</sub> each year. And producing electricity in the United States uses more than 1.6 trillion tons of water each year, which could be reduced.

*"If we can't do it [increase the use of renewable energy] for hard economic reasons, let's do it for the [environment]."*

— Martin P. McAdam

▪ **The severity of the situation requires leadership, innovative thinking, and immediate action.**

While no silver bullet exists—as all panelists repeatedly stated—they concurred that every measure that may help forestall a crisis must be immediately and simultaneously pursued. Political and business leaders must wake up to the severity of the situation and promote innovative thinking and an all-out pursuit of solutions.

When asked what advice they would provide the incoming president, each panelist focused on different areas:

- *Mandate hybrid cars and make greater investment in supply creation (Hess).* Mr. Hess would like hybrid cars mandated, which would increase fuel efficiency by 10 miles per gallon and decrease demand by 1 million bpd. Also needed in his view are actions to increase supply, such as increased investments in exploration and production (from \$400 to \$500 billion).

*"The reason the three of us are agreeing is that the problem is severe. . . . We need to pursue many options to have a chance that economic prosperity can be sustained."*

— John B. Hess

- *Set oil prices to curtail demand, along with other radical reforms (Simmons).* Mr. Simmons admitted that his

recommendations are unlikely to win political or popular support, but they would help create the decreases in demand that are needed: set oil prices high enough to quell demand—at a floor of \$150 per barrel.

*"Oil prices must go high enough to self-destruct demand."*

— Matthew R. Simmons

Other reforms he'd like to see include: decreasing demand by paying people for productivity, not for commuting to work—let everyone work from home; change how goods are shipped, shipping via water where possible, and if not possible, then by light rail, then by two rails, and only via truck as a last alternative; grow food locally to end the massive amount of resources consumed in shipping food around the world; and end globalization by making things where we use them.

- *Spur the use of renewable energy in electricity (McAdam).* Generating electricity uses 35% of energy. Greater use of renewable sources for electricity generation could ease pressure on oil supplies and benefit the environment. U.S. public policy should:

- Provide far more public financing for research in renewable energy and encourage private sector investment in new renewable technologies.
- Invest to create a renewable industry in the United States by actively pursuing a goal of tripling the use of wind as the energy source for electricity generation; this could have enormous ramifications. For example, in Germany, renewable technologies have been good economically and environmentally, and have resulted in creation of a new 23 billion euro export-based industry that employs 250,000 people—presenting a great model for the United States.

## Other Important Points

- **Renewable learning curve.** An audience member noted that skeptics discount renewable energy as expensive and inefficient. But the entire area of renewable energy is still very young. In coming years, with additional investment, the efficiency and cost effectiveness of renewable energies should increase significantly.
- **Nuclear potential.** Another attendee suggested that the potential for nuclear energy is often overlooked and that many misconceptions exist about nuclear energy. He indicated that new nuclear facilities are being built around the world, with several countries strongly considering nuclear energy as an option. He argued that while nuclear energy still faces some challenges, it is a viable option that should be part of the discussion of future energy options.



## Speaker Biographies

### Richard H.K. Vietor (Moderator)

Senator John Heinz Professor of Environmental Management, Senior Associate Dean

Richard Vietor, the Senator John Heinz Professor of Environmental Management and senior associate dean at HBS, teaches courses on the regulation of business and the international political economy. He received a BA in economics from Union College (1967), an MA in history from Hofstra University (1971), and a Ph.D. in history from the University of Pittsburgh (1975). He was appointed professor in 1984.

Before coming to HBS in 1978, Vietor held faculty appointments at Virginia Polytechnic Institute and the University of Missouri. He is the recipient of a National Endowment for the Humanities Fellowship and Harvard's Newcomen Fellowship. In 1981 he received the Newcomen Award in business history. He serves on the editorial board of the *Business History Review*, the advisory board of IPADE in Mexico, and the Infrastructure Committee of the Competitiveness Policy Council. He was president of the Business History Conference for 1993–1994.

Vietor's research on business and government policy has been published in numerous journals and books. He has contributed chapters to *America versus Japan* (1986), *Wall Street and Regulation* (1981), *Future Competition in Telecommunications* (1989), and *Government, Industries, and Markets* (1990). His books include *Environmental Politics and the Coal Coalition* (1980), *Energy Policy in America Since 1945* (1984), *Telecommunications in Transition* (1986), *Strategic Management in the Regulatory Environment* (1989), *Contrived Competition* (1994), *Business Management and the Natural Environment* (1996), *Globalization and Growth: Case Studies in National Economic Strategies* (2004), and *How Countries Compete* (2006).

For his courses in business-government relations and environmental management, Vietor has published more than three dozen case studies on international energy issues; on the regulation of natural gas, nuclear power, air pollution, and hazardous wastes; and on strategy and deregulation in airlines, railroads, telecommunications, and financial services. He has been a consultant to the Hudson Institute and the Energy Research and Development Administration and is a consultant to IBM, General Electric, Anglo American, and the government of Malaysia.

Vietor is married and lives in Wellesley, Massachusetts.

### John B. Hess, MBA 1977

Chairman and CEO, Hess Corporation

John Hess has been chairman of the board and CEO of Hess Corporation since 1995. He joined the company in May 1977 and was elected a director in November 1978. Hess Corporation, with headquarters in New York City, is a global

integrated energy company that explores for and produces, purchases, transports, and sells crude oil and natural gas.

Hess is a member of the board of Dow Chemical Company and the national advisory board of J.P. Morgan Chase & Co. He is a director of the United Cerebral Palsy International Research Foundation and the Lincoln Center for the Performing Arts and a trustee of the Mount Sinai Medical Center, the Wildlife Conservation Society/New York Zoo, the Buckley School, Deerfield Academy, and the New York Public Library. He is a member of the Council on Foreign Relations, the National Petroleum Council, the HBS Board of Dean's Advisors, and the Business Council. He was a member of the Secretary of Energy Advisory Board from 1999 to 2002.

Hess, 54, is a graduate of Harvard College (a BA in 1975) and HBS (an MBA in 1977). He is married and has three sons.

### Martin P. McAdam, AMP 166 (2004)

CEO, Aquamarine Power Ltd.

Martin McAdam is CEO of Aquamarine Power Ltd., a marine energy company base in Edinburgh, Scotland. Aquamarine is helping shape an entirely new industry by developing multiple technologies that will deliver clean, renewable power and fresh water from ocean energy. Its goal is to be among the first to deliver large-scale, commercial, wave and tidal energy projects to help the EU, UK, and Scottish governments reach their targets for renewable energy generation and tackle climate change on a global scale.

McAdam joined Aquamarine in August 2008 after serving as COO of the windfarm developer and operator Airtricity. He founded Airtricity's North American operations, which E.ON purchased in 2007 for £0.75 billion. In February 2008 Airtricity was acquired by Scottish and Southern Energy for £1.08 billion.

McAdam holds a BE (with honors) in chemical engineering, awarded in 1982 from University College Dublin. He completed HBS's Advanced Management Program in 2004. McAdam is also a chartered engineer and a member of the Institute of Engineers of Ireland.

### Matthew R. Simmons, MBA 1967

Chairman, Simmons & Company International (SCI)

Matt Simmons is the chairman of Simmons & Company International (SCI), a specialized energy investment-banking firm. SCI has completed about 737 investment-banking projects for its worldwide energy clients at a combined dollar value of over \$125 billion, including 490 mergers and acquisitions totaling \$68.9 billion.

Raised in Kaysville, Utah, Simmons graduated cum laude from the University of Utah and received an MBA with distinction from HBS. He served on the faculty of HBS as a



research associate for two years and was a doctoral candidate.

Simmons began a small investment bank/advisory firm in Boston. Among his early clients were several subsea service companies. By 1973 almost all of his clients were oil-service companies. After the 1973 oil shock, Simmons decided to create a Houston-based firm to concentrate on providing highest-quality investment-banking advice to the worldwide oil-service industry. In time, the firm's specialization expanded into investment banking covering all aspects of the global energy industry. SCI's offices are located in Houston, London, Boston, Aberdeen, Scotland, Oslo, Norway, and Dubai, UAE.

Simmons serves as a director of Brown-Forman Corporation. He is a board member of the Initiative for a Competitive Inner City (Boston), the Houston Technology Center, and the Center for Houston's Future. He serves on the University of Texas M.D. Anderson Cancer Center Foundation board of visitors and is a trustee of the Bermuda Institute of Ocean Sciences. He is also past chairman of the National Ocean Industries Association. Simmons is a member of the Board of Dean's Advisors at HBS, where he has served as past president of the HBS Alumni Association and as a member of the Visiting Committee. Simmons is a trustee of the Farnsworth Art Museum in Rockland, Maine, and the National Trust for Historic Preservation. He is a member of the National Petroleum Council, the Council on Foreign Relations, and the Atlantic Council of the United States.

Simmons's recent book, *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy*, has been listed on the *Wall Street Journal's* best-seller list. He has also published numerous energy papers for industry journals and is a frequent speaker at government forums, at energy symposiums, and in the boardrooms of many leading energy companies around the world.