

15.933

Strategic Opportunities in Energy

Fall 2008, H1
M-W 4:00-6:00

Professors Donald Lessard and Henry Weil

Description

- Designed to provide participants with a deep understanding of the structure and dynamics of the energy sector and the emerging strategic opportunities available within it.
- Develops the necessary strategic frameworks and applies them to major of issues in the energy sector and to opportunities resulting from potential innovations in energy supply, conservation and use, and the relevant institutional and market contexts.
- Opportunities will be addressed from the perspectives of established energy companies, technology developers, equipment and service suppliers, financial players, and entrepreneurs in domains such as enhanced recovery from mature assets, combined generation/ sequestration, alternative energy sources, demand management, building technologies and markets for energy and carbon (risk).

Structure

- Strategic frameworks and perspectives will be presented in lecture/discussions by Lessard and Weil in the first 8 sessions of the term. These include: static positioning/resources/and customer-focused frameworks for strategic analysis, energy metrics, scenarios, dynamic modeling of technology change and customer adoption, scenarios, and global competitive dynamics
- Industry guest speakers will focus on specific opportunities arising in their businesses/sectors from the interaction of changing energy sector conditions (concerns about climate change, desire for energy security, prices) and new technologies, business models, and regulatory policies.
- Guest speakers will be industry leaders, entrepreneurs, policy architects, and energy experts on the MIT faculty.
- Readings will provide a fact base for the energy sector, highlight major issues, and permit exploration of the structure and dynamics of the sector and the strategic opportunities available within it. They will include current articles on important energy-related developments.
- Assignments/grading will be based on a two-part team project: 1) a “landscape briefing” on a specific opportunity and 2) and end-of term “strategic prospectus” on the same opportunity.

Eligibility

- Management students should have some background in Strategy, e.g. 15.900 (*Strategy*) or equivalent. Science or Engineering students should have some background in relevant energy-related science and/or engineering topics, e.g. 10.391J (*Sustainable Energy*).
- Both are encouraged to take 15.023J / 12.848J / ESD.128J (*Global Climate Change: Economics, Science, and Policy*). They also are encouraged to take a related field-project based subject, 15.396 (*Energy Ventures*) with which 15.933 is coordinated, and/or 15.992 (*Laboratory for Sustainable Business*).

Faculty

- Donald R. Lessard is the Epoch Foundation Professor of International Management at the MIT Sloan School of Management. His research interests are on project management and global strategic management, with an emphasis on managing in the face of uncertainty and risk. He currently teaches courses on global strategy and organization and global strategy in the energy sector and is co-char of the MITe Energy Education Taskforce. Lessard also is the faculty director for the BP-MIT Projects Academy, an executive education program for major project leaders that spans management and engineering. Lessard is a Senior Advisor to the Brattle Group, a consulting firm specializing in network and energy industries.
- Henry Birdseye Weil is Senior Lecturer in the Strategy Group at the MIT Sloan School. His research focuses on competition in technology-based industries such as energy, financial services, telecommunications, IT, media, and transportation. It illuminates the effects of management policies, technology developments, industry structure, and regulation on corporate competitiveness and the behavior of markets. Weil is part of the faculty of the Projects Academy. He is President of Weil & Company, an international management consulting firm specializing in corporate strategy.

Session Outline

I. Defining Opportunities

1) Wednesday, September 3 -- Overview, forces for change in energy sector

Lecture/discussion: Framing the issues; metrics – energy balance, carbon (environmental) footprint, financial and economic lifetime profitability. Lessard

Readings:

“The power and the glory – A special report on energy,” *The Economist*, June 21st 2008.

http://www.economist.com/specialreports/displayStory.cfm?story_id=11565685

Socolow et al, “Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies,” *Science* 2004, vol. 305, pp. 968.

Enkvist, Per-Anders, T. Naucler, and J. Rosander, “A Cost Curve for Greenhouse Gas Reduction,” *The McKinsey Quarterly*, 2007, No. 1, pp. 35-45.

2) Monday, September 8-- CleanTech: a Demand-Side Perspective

Guest Speaker: Dr. Craig Lawrence, Accel Partners

Craig joined Accel Partners in 2008 with a focus on emerging technologies in the energy industry. He advises companies and seeks investments for Accel in a number of areas related to energy, including energy efficiency, intelligent energy management and distribution, renewable energy, energy storage, and transportation. Prior to joining Accel, Craig spent 10 years at IDEO, one of the world’s leading product development and innovation companies.

Lecture/discussion: Dynamics of change and customer adoption of new technologies. Weil

Readings:

"The Case for Investing in Energy Productivity," *McKinsey & Co.*

Craig's blog – <http://www.energyhumanfactors.com>

<http://blog.tomevslin.com/2008/07/the-smart-grid.html>

Christensen, Clayton M. and M. Overdorf, "Meeting the Challenge of Disruptive Change," *Harvard Business Review*, March-April 2000, pp. 66-76; reprint no. R00202.

3) Wednesday, September 10– Upgrading Traditional Sources for Security and Sustainability

Guest Speaker: Tony Meggs, Co-Director, MITe Gas Study

Until recently Tony was Group Vice President, Research and Technology, at BP. He will give an overview of the potential improvements to traditional sources – oil and coal – in terms of environmental impact and supply security through sequestration. Tony will then discuss possible business models to develop this potential, closing with a discussion of why he has decided to do this on an empirical basis rather than through a large incumbent firm.

Lecture/discussion: Three strategic perspectives. Lessard

Readings:

Porter, Michael E., "Towards a Dynamic Theory of Strategy," *Strategic Management Journal*, Vol. 12, Winter 1991.

Sull, Donald N. "Why Good Companies Go Bad," *Harvard Business Review*, July-August 1999, pp. 42-52; reprint no. 99410.

4) Monday, September 15 – Industry Dynamics and Scenarios

Guest speaker: Richard Ward, Senior Director, Cambridge Energy Research Associates

Richard Ward, CERA Senior Director, is Director of Research for the IHS-CERA Cost Research Group in addition to serving as Chief Innovation Officer. CERA employs scenarios as a strategic tool to frame large issues within the global energy supply chain. Mr. Ward will review CERA's Global Energy Scenarios to 2030 and discuss how such materials can be used to drive strategic thinking within governments, companies and NGO's.

Lecture/discussion: Capacity cycles, commoditization, and innovation. Weil

Readings:

Wikipedia: "Scenario Planning" entry – http://en.wikipedia.org/wiki/Scenario_planning

Wack, Pierre, "Scenarios: uncharted waters ahead," *Harvard Business Review*, Sept-Oct 1985.

de Gues, Arie P., "Planning as Learning," *Harvard Business Review*, March-April 1988; reprint no. 88202.

Weil, Henry Birdseye, "Application of System Dynamics to Corporate Strategy: An Evolution of Issues and Frameworks," *System Dynamics Review*, vol. 23, no. 4, Winter 2007 (especially the sections on commoditization, technology substitution, and social factors).

Carr, Nicholas G., "IT Doesn't Matter," *Harvard Business Review*, May 2003, pp. 41-49; reprint no. R0305B and "Letters to the Editor," *Harvard Business Review*, July 2003, pp. 109-112.

5) Wednesday, September 17 – Regulation and the Value Chain

Guest Speakers: Peter Fox-Penner, The Analysis Group and Atul Arya, Head of Policy & Long-Term Strategy at BP plc

Readings:

6) Wednesday, September 24 – Landscape Presentations (student teams)

II. Exploiting Opportunities

7) Monday, September 29 – The Future of Biofuels

Guest Speaker: Prof. Charles Cooney, MIT Department of Chemical Engineering, Director of LS9

Prof. Cooney is Robert T. Haslam (1911) Professor of Chemical Engineering at MIT and the Faculty Director of the Deshpande Center for Technological Innovation. He sits on the Boards of Directors of Genzyme, BioProcessors, Biocon, Ltd (India), and LS9, and was a member of the BP Technical Advisory Council from 2001-2007. LS9, Inc is a privately-held industrial biotechnology company based in South San Francisco, California developing patent-pending biofuels made with synthetic biology.

Lecture/discussion: The market dynamics of biofuels, scenarios for success and failure. Weil

Readings:

Arthur J. Ragauskas et al, "The Path Forward for Biofuels and Biomaterials," *Science* 27 January 2006: Vol. 311. no. 5760, pp. 484 – 489.

Roberts, Edward B. and Wenyun Kathy Liu, "Ally or Acquire? How Technology Leaders Decide," *Sloan Management Review*, Fall 2001, vol. 43, no. 1, pp. 26-34; reprint no. 4312.

Munir, Kamal A. and N. Phillips, "The Concept of Industry and the Case of Radical Technological Change," *The Journal of High Technology Management Research*, (13) 2002, pp. 279-297.

8) Wednesday, October 1– Markets

Guest speaker: John Parsons, Executive Director of MIT Center for Energy and Environmental Policy Research (CEEPR)

Dr. Parsons is Executive Director, Center for Energy and Environmental Policy Research, and the Joint Program on the Science and Policy of Global Change. One of the key elements of the landscape is the shape and form of carbon taxes and/or cap and trade-based markets. Dr. Parsons will make a presentation regarding the likely development of markets/regimes for carbon going forward.

Readings:

9) Monday, October 6 – Building Technologies: Identifying Lead Clients and Markets

Guest Speaker: Don Young, President and Chief Executive Officer Aspen Aerogels, Inc.
www.aerogel.com

Don Young has been the President, Chief Executive Officer and member of the board of Aspen Aerogels since November 2001. For nearly 10 years, Mr. Young worked in the United States and abroad in a broad range of senior operating roles for Cabot Corporation, a leading global specialty chemical company. He will discuss key issues he faced in building his company: Did we choose initial markets or did initial markets choose us? Why prioritizing market segments and specific customers is obvious but hard? What is it like to work intimately with one of the largest companies in the world?

Lecture-discussion: Lead Clients and Markets. Lessard

Readings:

http://www.mckinsey.com/mgi/publications/Carbon_Productivity/slideshow/slideshow_1.asp

Michael Porter, "Competing Across Locations: Enhancing Competitive Advantage through Global Strategy" from Porter, *On Competition*, 1998.

Marian Biese, "Lead markets: country-specific drivers of the global diffusion of innovations," *Research Policy*, **33** (2004) 997–1018.

10) Wednesday, October 8– Demand Management

Guest Speaker: Carter Williams, President, GridLogix www.gridlogix.com

Carter is a Sloan graduate and successful entrepreneur. He will discuss linking information management with energy efficiency.

11) Wednesday, October 15 --Summary: Highlights of team projects (student teams)

Background References

OECD, *World Energy Outlook 2006*, Summary and Conclusions

BP Statistical Review of Energy 2008 (skim) www.bp.com/statisticalreview

International Energy Agency,