Princeton University
Woodrow Wilson School of Public and International Affairs
Spring 2006

WWS-402d: Policy Task Force

Energy for Sustainable Development

Room 012 Robertson Hall
Wednesdays 7:30-10:00 PM

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Overview:

Energy issues are increasingly in the news. Following Hurricane Katrina domestic gasoline, natural gas and home heating fuel costs increased dramatically. Debate continues over opening the Alaskan National Wildlife Refuge for oil drilling. Questions of national security surround Middle Eastern oil supplying nations. Geoscientists are predicting that the world is reaching maximum annual oil extraction. With increasing demand for oil from China and India as well as other developing and developed nations, and limited future increases in oil production possible, a debate is beginning on whether we are reaching the end of cheap fossil energy and what the future alternatives will be. Climate warming is now clearly linked to the emission of carbon dioxide from the combustion of fossil fuels. The melting of the Arctic and the possibility that increasing sea surface temperatures may lead to increases in the intensity of tropical storms and hurricanes has caused the media coverage of climate warming to increase. The world needs alternatives to the unconstrained use of carbon based energy sources to address these problems.

The World Summit on Sustainable Development, held in Johannesburg South Africa in 2002, addressed energy in the context of sustainable development. The Johannesburg Plan of Implementation calls for action to: "develop and disseminate alternative energy technologies with the aim of giving a greater share of the energy mix to renewable energy and, with a sense of urgency, substantially increase the global share of renewable energy sources, to [develop] cleaner and more efficient... energy technologies and to take action... to phase out subsidies that inhibit sustainable development". A key challenge is to find ways to reconcile the worlds need for energy with its impact on the world environment in order to achieve the goal of sustainable development. This task force will address this critical challenge. Students will have the opportunity to examine different non-fossil fuel energy technologies (e.g. renewable energy including solar and wind, nuclear power, etc.) as well as energy efficiency and the cleaner use of fossil fuels. They will be asked to examine existing policies and to recommend future policies to encourage more widespread implementation and distribution of environmentally acceptable energy sources.

The United Nations Commission on Sustainable Development (CSD) has set "energy for sustainable development" as one of its themes on which to focus work in 2006-2007. At its annual meeting at the United Nations in May it will address means to implement this objective. The task force recommendations will be in the form of a report to the United Nations for use during this meeting.

Structure and Calendar

The goal of the task force is for each student to write a research paper that will contribute to the group report. Sessions in the early part of the semester will consist of lectures and relatively extensive reading. Later sessions will focus more on individual research topics, establishment of the objectives of the group report, and finally on the presentation of the group report at the United Nations in New York during the annual meeting of the Commission on Sustainable Development (assuming this can be arranged). In addition, the report will be provided to the United States delegation to the meeting which will be led by the U.S. Department of State. Although recommendations for projects do not need to have the State Department as the implementing entity, inclusion of how the United States government could contribute to the success of recommended projects would be advantageous. Initial readings for the task force are either contained in your course packet, are on reserve in the Woodrow Wilson School library, are available on world wide web sites described below and identified during the semester or will be distributed in class.

The calendar for the task force described below is subject to modification as the semester progresses. We will have several guest speakers who are still being scheduled. Our initial plan is that each student will spend the first eight weeks of the semester on a research paper that will form the basis of the group report. Paper outlines will be due on Wednesday March 8 in class, for discussion with the director and advice from the senior commissioner during week 6 (mid-term week). Week 7 will be used to discuss how to integrate the individual research topics into a group research project and report. Week 8

will be used for consultation with the director (no group meeting is scheduled). Semi-final individual papers will be due on Friday April 7 (the second week following spring break). Week 9 and 10 (April 12 and 19) are for oral presentations of individual reports, and for discussion of the content of the final report. A draft of the final report, prepared by the senior commissioner, will be presented at the session on April 26 with a final report available for approval on April 28. Final revised papers will be due by Friday May 5, 2000. We will plan to make a trip to the United Nations to present the final report during reading period the week of May 8, 2006.

Individual papers are expected to be approximately 20 double-spaced pages in length, with tables, graphs and references additional. **Each report should be preceded by an abstract which distills the essence of the findings of the report into one paragraph**. The end of each paper should be followed by a list of references that were consulted in writing the paper. Web sites, interviews, and paper documents should all be listed here. The final group report will be at most 25 pages and will synthesize the findings and recommendations of the individual papers.

Week 1. Wednesday February 8, 2006. Framing the issues.

Overview of sustainable development issues: Growth in global population and consumption, increasing disparity between wealthy and poor countries and individuals, increasing global energy consumption, climate change, air pollution, deforestation, urbanization, water contamination, fishery depletion, habitat loss and decreasing biodiversity. The focus of the Commission on Sustainable Development at the United Nations for 2006-2007 is energy, air pollution and climate change. We will focus on energy in this task force and will examine options for reducing the impact of energy consumption on climate change and air pollution.

Reading:

United Nations, Johannesburg Summit 2002, Global Challenge, Global Opportunity: Trends in Sustainable Development. This is a short document that gives an overview of the key issues of sustainable development including energy, air pollution and climate change. Be sure to read it at:
http://www.johannesburgsummit.org/html/documents/summit_docs/criticaltrends_1408.pdf

Examine the United Nations Division for Sustainable Development website:
http://www.un.org/esa/sustdev/ Familiarize yourself with the various sustainable development milestones (follow the links in the column labeled “Milestones”) which include the Millenium Development Goals (MDG), Johannesburg Summit, Plan of Implementation, Earth Summit, etc.

This is the U.S. Department of State web site on sustainable development:
http://www.state.gov/g/oes/sus/

Including the Clean Energy Initiative: http://www.state.gov/g/oes/rls/fs/2002/16387.htm

Check out Energy Indicators for Sustainable Development: Guidelines and Methodologies http://www-pub.iaea.org/MTCD/publications/PDF/Pub1222_web.pdf

McDevitt, TM., World Population Profile: 1998, U.S. Census Bureau, 1999, pp. 1-4, 9-18. The complete document is available at http://www.census.gov/ipc/prod/wp98/wp98.pdf

Week 2. Wednesday February 15, 2006. Energy policy and Climate Change mitigation options

Bush administration energy policy. Energy proposals for addressing climate change.

Guest Speaker: Prof. Robert Socolow, author of the "Stabilization Wedge" article below.

Reading:

Elisabeth Bumiller, Bush's Goals on Energy Quickly Find Obstacles. *The New York Times*, February 2, 2006.

The State of Energy. *The New York Times*, February 1, 2006.

Spencer Abraham, The Bush Administration's Approach to Climate Change. *Science* vol. 305 July 2004. pp. 616-617.

Eileen Claussen, An Effective Approach to Climate Change. *Science* vol. 306 October 2004.

S. Pacala and R. Socolow, Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies. *Science* vol. 305 August 2004.

Facts About Energy. Johannesburg Summit 2002. August/September 2002.

United Nations. Johannesburg Summit 2002: Fact Sheets.

Week 3 . Wednesday February 22, 2006. Linkages between energy, air pollution and climate change.

Reading:

Shaw, J. The Global Experiment, Harvard Magazine, 2002.

Examine the Climate Change 2001: Synthesis Report, Summary for Policymakers
http://www.ipcc.ch/pub/un/syreng/spm.pdf

Week 4. Wednesday March 1, 2006. The Future of Oil plus U.S. initiatives

Depending on how scheduling works out in addition to a discussion on the future of oil, we'll also have a guest speaker. Mr. John Margolis, Head of U.S. Delegation to the WSSD and the CSD, U.S. Department of State. What is the U.S. contributing?

Readings on Oil:

Bumpy Road Ahead for World's Oil. *Science* Vol. 310 November 2005. pp. 1106-1108.

Leonardo Maugeri, Oil: Never Cry Wolf – Why the Petroleum Age Is Far from over. *Science* vol. 304 May 2004. pp. 1114-1115.

Letters. *Science* vol. 309 July 2005.

Robert Hirsch, Robert Bezdek, Robert Wendling, Peaking Oil Production: Sooner Rather Than Later? *Issues in Science and Technology*, Spring 2005.

Readings on Sustainable Development and U.S. Dept. of State documents:

You can see the report of the world summit on sustainable development including all of the final documents such as the important plan of implementation and political declaration:
http://www.johannesburgsummit.org/html/documents/summit_docs/131302_wssd_report_reissued.pdf

Partnerships for sustainable development are listed here including those that focus on energy: http://www.un.org/esa/sustdev/partnerships/partnerships.htm

The following web site provides access to various U.S. State Department reference documents, briefings, partnership initiatives on sustainable development, and various other related links.
http://www.state.gov/g/oes/sus/

Week 5. Wednesday March 8, 2006. Energy and the Developing World; Renewable Energy

Readings:

Can the Developing World Skip Petroleum? *Science* vol. 305 August 2004. pp. 967.

Jeffrey Chow, Raymond Kopp, Paul Portney, Energy Resources and Global Development. *Science* vol. 302 November 2003. pp. 1528-1531.

Eric Martinot, Renewables 2005 Global Status Report. Prepared for REN21 Network by The Worldwatch Institute. pp. 1-35.

Is It Time to Shoot for the Sun? *Science* vol. 309 July 2005. pp. 548-551.

Mark Jacobson, Gilbert Masters, Exploiting Wind Versus Coal. *Science* vol. 293 August 2001.

*****Paper outlines due, Wednesday March 8, 2006 in class*****

Week 6. March 15, 2006 Advanced Energy Technologies – Hydrogen, nuclear, carbon sequestration, etc.

Advanced Technology Paths to Global Climate Stability: Energy for a Greenhouse Planet. *Science* vol. 298 November 2002. pp. 981-1179.

Donald Kennedy, The Hydrogen Solution. *Science* vol. 305 August 2004. pp. 917.

The Hydrogen Backlash. *Science* vol. 305 August 2004. pp. 958-961.

David Keith and Alexander Farrell. Rethinking Hydrogen Car. *Science* vol. 301 July 2003. pp. 315-316.

Is the Friendly Atom Poised for a Comeback? *Science* vol. 309 August 2005. pp. 1168-1179.

Daniel Kammen and Gregrory Nemet, Revising the Incredible Shrinking Energy R&D Budget. *Issues in Science and Technology*, Fall 2005.

Spring Break

Week 7. Wednesday March 29, 2006. . Discussion of integration of individual research into group research project and report. Overall objectives. Goals of presentation to U.S. State Department.

Week 8. Week of April 3, 2006. Individual Consultations. No class meeting.

Draft research papers due, Friday April 7, 2006.

Week 9. April 12, 2006. Oral presentations start. Discussion of final report.

Week 10. April 19, 2006. Oral presentations continue.

Week 11. April 26, 2006. Presentation of final report. Discussion of revisions.

Week 12. May 3, 2006. Discussion and approval of final report.

**** Final revised papers are due by Friday May 5, 2006. ****

Week of May 8, 2006. 1-day trip planned to United Nations in New York to the Commission on Sustainable Development meeting. Final papers will be provided to the U.S. delegation.

Books on Reserve in Stokes Library

Smil, Vaclav, *Energy at the Crossroads: Global Perspectives and Uncertainties*. MIT Press, 2003.

Smil's book is an excellent overview of "energy."

Tester, Jefferson W., Elisabeth M. Drake, Michael J. Driscoll, Michael W. Golay, and William A. Peters. *Sustainable Energy: Choosing Among Options*. MIT Press. 2005.

Just out, this tome is a comprehensive quantitative introduction to energy technologies, with extensive discussion of non-technical issues

International Energy Agency, *World Energy Outlook 2004*. Paris, France: OECD/IEA

The projections for the world energy system, typically twenty five years into the future, published by the International Energy Agency in its biannual World Energy Outlook, are cited by the energy industries and frame their worldview.

Deutch, John and Richard K. Lester, *Making Technology Work: Applications in Energy and the Environment.* Cambridge University Press, 2004

Deutch and Lester have written a set of case studies dealing with energy and environmental topics. The emphasis is on teaching the techniques of the policy analyst to the undergraduate engineer.

Speth, James Gustav, *Red Sky at Morning: America and the Crisis of the Global* Environment. Yale University Press, 2004

Speth has written a call to action. He identifies new routes to policy innovation, by providing a fresh perspective on the relationship between government and civil society.

Weart, Spencer. *The Discovery of Global Warming.* Harvard University Press, 2003. Weart, a historian of science, tells a story of many small steps and lots of wrong turns.

Useful Websites

United Nations Department of Economic and Social Affairs, Division for Sustainable Development, This page provides links to a large number of sustainable development programs, international meetings, and plans – well worth checking.
http://www.un.org/esa/sustdev/
This page is specific for energy: http://www.un.org/esa/sustdev/sdissues/energy/enr.htm

Energy Information Administration, U.S. Department of Energy, 2004. *International Energy Annual 2002*. http://www.eia.doe.gov/emeu/iea/contents.html

Collection of Energy research documents and reports from the European Union on a variety of topics ranging from zero emission coal power plants to various renewable energy technologies. http://europa.eu.int/comm/research/energy/index_en.htm

BP, 2003. *BP Statistical Review of World Energy*
http://www.bp.com/subsection.do?categoryId=95&contentId=2006480

Energy Information Agency, U.S. Department of Energy, 2004. *International Energy Outlook, 2003*. Report # DOE/EIA-0484.
http://www.eia.doe.gov/oiaf/ieo/index.html.

International Energy Agency, 2002. *World Energy Outlook 2002*. Paris, France: OECD/IEA. By subscription:
http://library.iea.org/dbtw-wpd/Textbase/nppdf/stud/02/weo2002_1.pdf.

International Energy Agency, 2003. *Key World Energy Statistics. 2003*.
http://www.iea.org/dbtw-wpd/bookshop/add.aspx?id=144

Intergovernmental Panel on Climate Change. Includes the *IPCC Third Assessment Report—Climate Change 2001: The Scientific Basis; Impacts, Adaptation and Vulnerability; and Mitigation.* In addition, special reports entitled Carbon Dioxide Capture and Storage, Emission Scenarios, and Safeguarding the Ozone Layer and the Global Climate System. http://www.ipcc.ch/index.html
These are reports coming from the flagship international assessment effort of climate change.

IPCC, 2004. *Seventh International Conference on Greenhouse Gas Control Technologies*, Vancouver, Canada (papers presented)

http://www.ghgt7.ca

Gale, J. and Y. Kaya, eds., 2003. *Proceedings of the 6th International Conference on Greenhouse Gas Control Technologies, 1-4 October, 2002, Kyoto, Japan.* Two volumes. Amsterdam: Pergamon.
http://www.ieagreen.org.uk/ghgt6.htm

National Research Council, 2004. *The Hydrogen Economy: Opportunities, Costs, Barriers, and R&D Needs*. Washington, D.C., National Academy Press.
http://www.nap.edu/books/0309091632/html/