ENERGY TECHNOLOGY INNOVATION POLICY GROUP
AND
THE CONSORTIUM FOR ENERGY POLICY RESEARCH AT HARVARD

Acting in Time on Energy Policy

Policy Brief

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CITATION INFORMATION

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Please note that this policy brief is based on a full book published by Brookings Institution Press 2009, Gallagher, KS (editor), *Acting in Time on Energy Policy.*

Acting In Time on Energy Policy

OVERVIEW

This policy brief outlines urgent priorities for U.S. energy policy at the dawn of the Obama administration, and recommends specific steps that the U.S. government should take to address the numerous energy-related challenges facing the United States. It is based on the book, *Acting in Time on Energy Policy* (Brookings 2009), edited by Kelly Sims Gallagher, director of the Energy Technology Innovation Policy research group at the Harvard Kennedy School's Belfer Center.

We concentrate on six topics: climate change policy, carbon capture and storage policy, oil security policy, energy-technology innovation policy, electricity market structure, and infrastructure policy. The United States cannot afford to wait any longer to enact long-term policies on these topics. In fact, acting early is clearly in the longer-term interest of the United States.

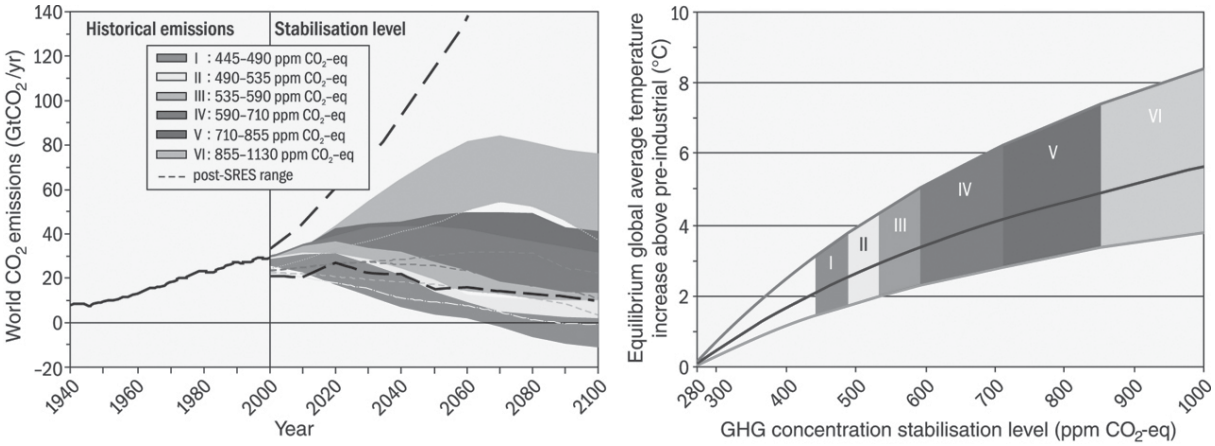
KEY FINDINGS AND RECOMMENDATIONS

Higher and stable energy prices would help achieve all the policy objectives in the longer term – improved oil security, lower greenhouse-gas emissions, more efficient operation of the electricity system, more incentives for private-sector innovation in energy technologies, and more incentives for consumers to purchase cleaner and more energy-efficient products. Although there is the legitimate concern that higher energy prices can unfairly burden low-income Americans, there may be creative ways around these problems – notably by using a portion of the revenues for social programs. Taking a carbon tax as an example, polling from 2006 shows that support for a carbon tax level tripled and opposition fell by two-thirds when a large carbon tax was paired with a similarly large income tax cut.

I. CLIMATE CHANGE POLICY — Kelly Sims Gallagher

- The world, and the United States specifically, must first establish a long-term goal for emissions concentrations in the atmosphere. Once there is agreement on this goal a long-term GHG "emissions budget" can be created. An emissions budget is no different from a financial budget in that it simply provides a quantitative limit on emissions (spending) for a given time period. Then, policies can be enacted that will enable the United States to stay within its budget.
- The U.S. government must place an initial price on U.S. greenhouse-gas emissions, either through a cap-and-trade mechanism or a tax. A tax has the advantages of predictability and being simple to implement quickly. (Importantly, such a step could raise revenue, which could be used for investments in clean energy technologies, income tax relief to the middle class, or deficit reduction, etc.).
- The Obama administration must re-engage internationally, especially with China – the world's largest and fastest-growing emitter – to devise an international solution to the climate change challenge.

Figure 2.1: GHG Emission Concentrations and Associated Temperature Changes



Source: Intergovernmental Panel on Climate Change, Fourth Assessment Report, 2007.

II. CARBON CAPTURE AND STORAGE POLICY — DANIEL P. SCHRAG

- Carbon capture and storage – an approach to mitigating climate change based on capturing the carbon dioxide emitted from power plants and storing it underground – will be important to both future climate change policy and future energy policy. The reason is that coal is abundant and relatively inexpensive, if one does not include all of the health and environmental costs associated with it.
- Costs for the first set of capture and storage facilities appear to be high (too expensive to be motivated by relatively low carbon prices), but these costs will come down through further research, development, and demonstration.
- The federal government should provide subsidies for 10 to 20 commercial-scale CCS projects. To maximize their impact these demonstration projects should employ different capture technologies, different strategies for geologic storage, and they should be spread across different regions of the United States. This program should be implemented immediately, so that knowledge can be acquired about the viability of this technology during the next 5-10 years, and so costs can be brought down to a reasonable level.
- New federal laws and regulatory policies should be created so that developers and operators of power plants and CO2 storage facilities understand their liability, and know which environmental regulations will apply to CCS projects.
- The federal government should encourage state and local governments to accelerate permitting processes for CCS projects.
- The long-term goal should be the adoption of CCS for all large stationary sources.

Table 4.2: Oil Consumption in U.S. Transportation Sector

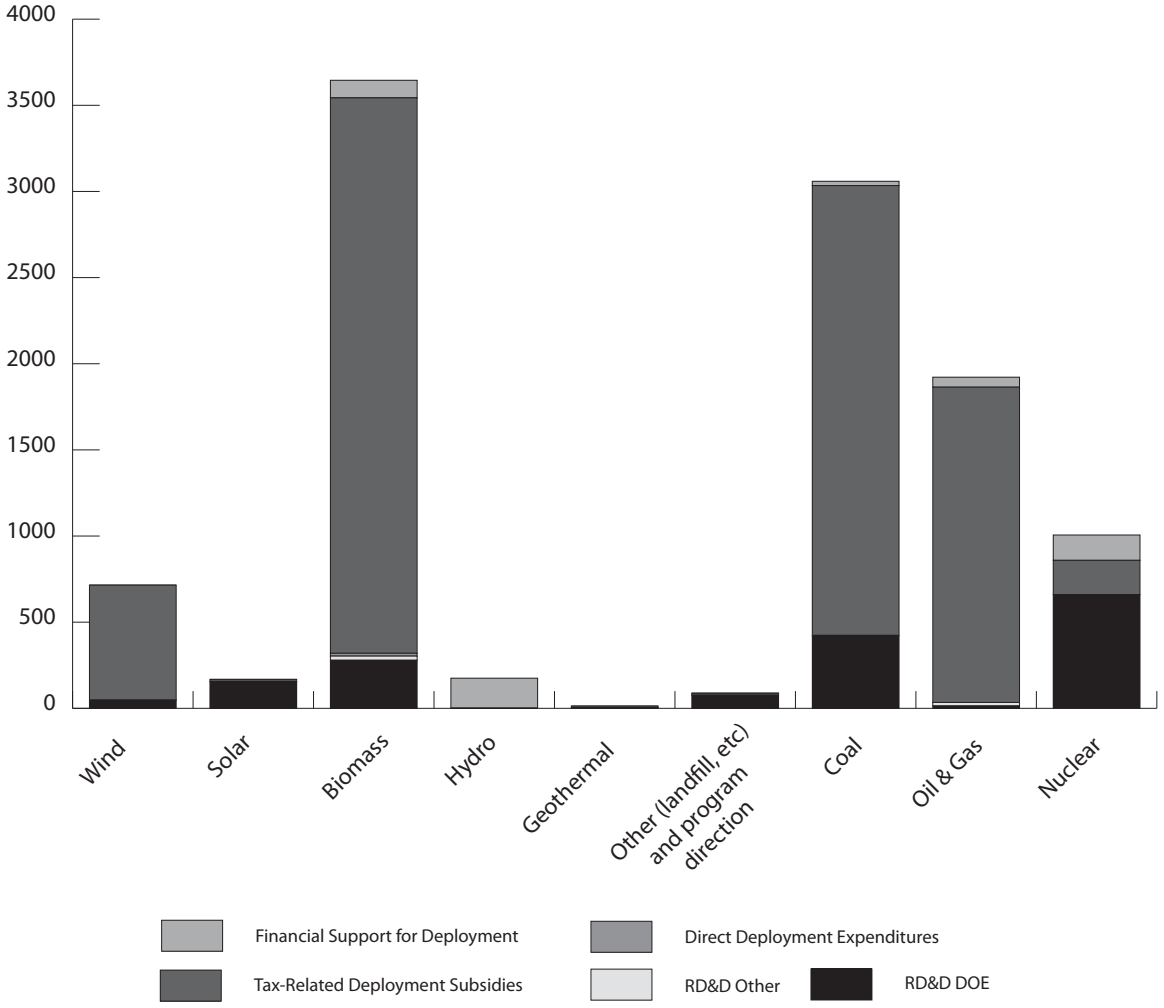
Mode of Transportation	000s barrels per day	% of total
Cars	4891.3	36
Light Trucks	3957.1	29.1
Motorcycles	14.4	0.1
Buses	93.2	0.7
Heavy Trucks	2473.5	18.2
Air	1208.3	8.9
Water	663.9	4.9
Pipeline	5.3	0
Rail	285.4	2.1
TOTAL	***13592.4***	***100%***

Source: Transportation Energy Data Book. DOE. 2007. Table 1.14.

III. OIL SECURITY POLICY — Henry Lee

- With oil prices set in a global market, the degree of U.S. economic vulnerability is proportional to its *total* oil dependence, not just *import* dependence.
- The oil security problem encompasses four concerns: short-term economic dislocations from sudden increases in oil prices, long-term supply inadequacies, a foreign policy overly constrained by oil considerations, and environmental threats, specifically global climate change.
- To address these concerns, the growth in world oil consumption and greenhouse gas emissions needs to be reduced. The United States needs to place a price on both imported oil and carbon either through taxes or a cap-and-trade program. By increasing prices, the government sends a strong signal to consumers to use less oil and emit fewer grams of carbon, and it also sends a powerful signal to entrepreneurs and investors who are striving to develop substitutes for imported oil.
- Congress should consider a variable tax that would be triggered when oil prices reach a certain threshold, for example $90 per barrel, so if oil prices slipped below $90 to $80 per barrel, a $10 tax would be imposed. If the price later rose above $90, the tax would disappear. Politically, this proposal seems unlikely during an era of low oil prices, but we should be prepared to take advantage of this opportunity when oil prices rise again.
- International cooperation is crucial because a coordinated effort that reduces oil consumption in all the major oil importing countries will be the most effective way to improve oil security.

Figure 5.6: Direct Funding for ERD&D from DOE and Other Agencies and Deployment Incentives for Different Energy Sources, 2007



Source: Gallagher 2008 and EIA 2008. Please note that other agencies are U.S. Department of Agriculture, U.S. Geological Survey, and Defense Advanced Research Projects Agency. Other category includes other renewable energy programs (such as the landfill gas and international renewable energy programs) and renewable energy program direction costs

IV. POLICY FOR ENERGY TECHNOLOGY INNOVATION — LAURA DIAZ ANADON AND JOHN P. HOLDREN

- Energy-technology innovation can both reduce the costs of energy technologies today, as well as improve the menu of options for the future. Current U.S. public and private energy research, development, and demonstration (RD&D) expenditures are small in relation to the economic, environmental, and security stakes, as well as in relation to the opportunities for U.S. businesses.
- In order to move cleaner and more efficient energy technologies from the laboratory into the marketplace, "market-pull" policies are necessary complements to "technology-push" policies. There should be a much greater coordination between the push and pull policies—and subsequently between the different federal and state actors that play a role

in making these policies—than has existed until now. In addition to improved coordination guided by an overall energy-technology innovation strategy, the link between government-funded basic science and applied R&D efforts, and the demonstration and early deployment innovation phases need careful attention.

- International cooperation in energy RD&D is an essential component of a successful energy innovation strategy because most of the problems and opportunities of energy systems, such as climate change, nuclear proliferation, effects of global energy resource and energy technology markets, and the economic and security benefits of providing modern energy for the poorest one third of humanity, are inherently global, and because international cooperation allows for the sharing of costs and risks of the innovation process. It is necessary to increase funding for international cooperation in energy RD&D as well as to develop a coherent international cooperation strategy.

V. ELECTRICITY MARKET STRUCTURE AND INFRASTRUCTURE POLICY — WILLIAM H. HOGAN

- A workable regulatory and market framework is essential if the United States is to have adequate electricity supply or to be able to increase the fraction of renewable electricity in the electricity mix.
- Without the necessary infrastructure investment, energy policy cannot take effect, and without sound policy, the right infrastructure will not appear – a classic chicken-and-egg problem. Acting in time thus requires that policies are put into place now to support efficient investment in infrastructure so that all the other desirable energy policies can be implemented.
- Improved scarcity pricing and a hybrid framework for transmission investment are two workable solutions that seem necessary to meet the needs for a long-term approach to infrastructure investment.

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Energy Technology Innovation Policy (ETIP) Research Group
The Energy Technology Innovation Policy (ETIP) research group is based at Harvard Kennedy School's Belfer Center for Science and International Affairs. ETIP's objective is to conduct research to determine and then promote adoption of effective strategies for developing and deploying cleaner and more efficient energy technologies, primarily in three of the biggest energy-consuming nations in the world: the United States, China, and India. These three countries have enormous influence on local, regional, and global environmental conditions through their energy production and consumption.
http://www.energytechnologypolicy.org

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http://www.hks.harvard.edu/m-rcbg/cepr/about.html

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