

Part 1. Is DOE ready?

President Barack Obama has stated clearly that the United States must work to slow energy-related global warming, promote renewable energy sources, and reduce the country's dependence on fossil fuels. The necessary changes in energy policy will put major strategic and economic decisions before the Obama administration and the current Congress. An immediate task is to identify the role that the new administration will play in coordinating energy solutions, what role each federal agency will play, and how they might be rearranged to face the challenges ahead.

The Department of Energy is a logical agency to be in charge of developing technology and directing energy policy. It's the home of the Office of Energy Efficiency and Renewable Energy, for example. It employs about 30,000 scientists, some who work at the National Renewable Energy Laboratory and the Pacific Northwest National Laboratory.

In reality, those clean-energy activities have been a second priority for the department. DOE's primary role (and half its budget) is focused on nuclear weapons and nuclear energy. With so much of DOE related to nuclear projects, it may be difficult to redirect the agency to engage with the clean energy and climate change initiatives of the new administration.

Adapted from "President Obama's Cabinet for Energy and Climate"

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Questions for discussion and investigation:

1. How should the U.S. Department of Energy be organized in the new era of clean energy and carbon control?
2. Who are the new leaders and advisers advising the Obama administration on energy policy? What are their track records on renewable energy and climate change?

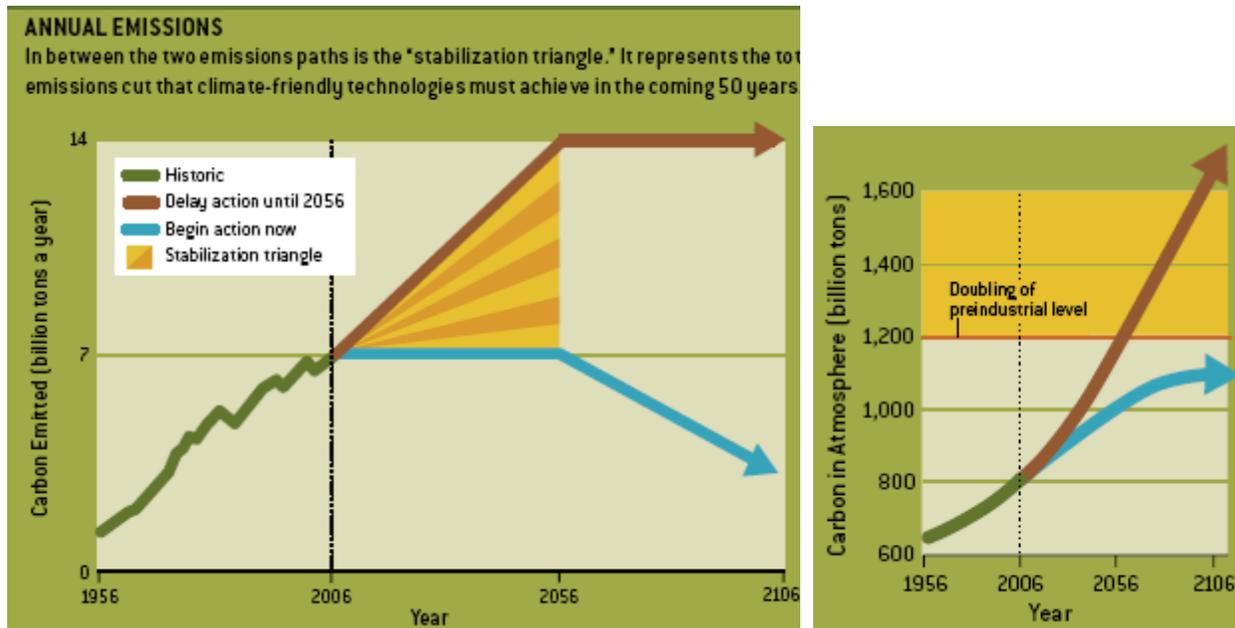
Additional questions:

3. What is the overall budget of DOE? How might \$100billion for an initiative on climate change be organized?
4. What would be the merits of creating a new National Energy Council? Disadvantages?

Part 2. Keeping carbon in check

Retreating glaciers, stronger hurricanes, hotter summers, thinner polar bears: the ominous harbingers of global warming are driving companies and governments to work toward an unprecedented change in the historical pattern of fossil-fuel use. Faster and faster, year after year for two centuries, human beings have been transferring carbon to the atmosphere from below the surface of the earth. Today the world's coal, oil and natural gas industries dig up and pump out about seven billion tons of carbon a year, and society burns nearly all of it, releasing carbon dioxide (CO₂). Ever more people are convinced that prudence dictates a reversal of the present course of rising CO₂ emissions.

Humanity can emit only so much carbon dioxide into the atmosphere before the climate enters a state unknown in recent geologic history and goes haywire. Climate scientists typically see the risks growing rapidly as CO₂ levels approach a doubling of their pre-18th-century value. At the present rate of growth, emissions of carbon dioxide will double by 2056 (*below left*). Even if the world then takes action to level them off, the atmospheric concentration of the gas will be headed above 560 parts per million, double the preindustrial value (*below right*)—a level widely regarded as capable of triggering severe climate changes.



To make the problem manageable, the required reduction in emissions can be broken down into “wedges”—an incremental reduction of a size that matches available technology. The stabilization triangle can be sliced into seven equal pieces, or “wedges,” each representing one billion tons a year of averted emissions 50 years from now (starting from zero today). For example, a car driven 10,000 miles a year with a fuel efficiency of 30 mpg emits close to one ton of carbon annually. Transport experts predict that two billion cars will be zipping along the world's roads in 2056, each driven an average of 10,000 miles a year. If their average fuel efficiency were 30 mpg, their tailpipes would spew two billion tons of carbon that year. At 60 mpg, they would give off a billion tons. The latter scenario would therefore yield one wedge.

For discussion::

An overall carbon strategy for the next half a century requires seven wedges' worth of emissions reductions. Identify as many technologies as you can from which those seven can be chosen.

Part 3. The first 100 days

Use the attached article to fulfill the request from President Obama.



The White House
Washington, DC

January 26, 2009

IGERT Energy Consultants
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Dear citizens,

As you may already be aware, Energy and the Environment is one of the critical elements on my agenda. I seek a strong leadership role for the U.S. in addressing climate change and my key goals are to slow energy-related global warming, promote renewable energy sources, and reduce the country's dependence on fossil fuels. My energy advisers have informed me that a group of energy experts work at the University of Delaware. I ask for your immediate assistance in formulating a plan to stabilize global emissions of carbon dioxide.

I seek vigorous approaches for reducing carbon dioxide emissions by seven billion tons per year, the increase anticipated over the next 50 years if emission rates continue unabated . Socolow and Pacala have advised me of their stabilization wedge concept and I find it to be compelling. Thus I ask you to review their ideas and rank order the seven most attractive wedge options for my consideration. Evaluate their feasibility for eliminating one billion tons each and prepare a brief synopsis of their merits and weaknesses for presentation to my advisers and several senators this afternoon.

Each presentation will last between five and seven minutes, with time reserved for questions from those assembled. At the conclusion of the presentations, my panel of experts will select the four most promising for detailed evaluation. Overnight, please develop a white paper for one assigned idea, providing appropriate scientific and budgetary detail to guide my advisers.

I have heard great things about the research and educational programs at the University of Delaware and look forward to receiving feedback from you on this urgent problem.

Sincerely,

A handwritten signature in black ink, appearing to read "Barack Obama", written in a cursive style.

President Barack Obama