

ABARE International Seminar



National Climate Change Technology Initiative

28 May 2002

Dr. Robert K. Dixon

Deputy Assistant Secretary
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy

The Framework Convention



- A decade ago the United States and more than 160 other nations created the Framework Convention on Climate Change.
- The FCCC has as its ultimate objective ...

*The ultimate objective of this [The Framework] Convention ...is... the... **stabilization of greenhouse gas concentrations in the atmosphere** at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner. **Article 2 (UNFCCC, 1992)***

Global Challenges



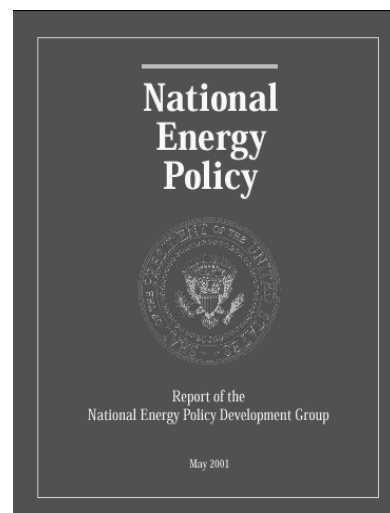
“The earth’s well-being is also an important issue to America... My Administration is committed to a leadership role on the issue of Climate Change...”

**President George W. Bush
June 11, 2001**

National Energy Policy



Of the 105 total recommendations, 54 address energy efficiency and renewable energy and contribute to lower greenhouse gas emissions.



President Bush



11 June 2001 speech outlined U.S. position on climate change

- Climate change is a long-term, global issue
- Needs a national and international response
- Two facets of U.S. response
 - National Climate Change Technology Initiative
 - National Climate Change Research Initiative

These initiatives recognizes the central role for technology in global climate issues.

www.whitehouse.gov/news/releases/2001/06/climatechange

National Climate Change Science Initiative



Basic Principle – “Advancing Science to reduce fundamental uncertainties.”

- Carbon Cycle
- Water and Energy Cycle
- Chemistry-Climate Connection
- Computational Modeling



- National Academy of Sciences
- National Aeronautics and Space Administration

National Climate Change Technology Initiative



Basic Principles

- Be Consistent with the long-term goal of stabilized greenhouse gas concentrations in the atmosphere;
- Measured, as we learn more from science and build on it;
- Flexible to adjust to new information and take advantage of new technology;
- Ensure continued economic growth and prosperity;
- Pursue market-based incentives and spur technological innovation; and
- Based on global participation, including developing countries.

Stabilizing Concentrations ... ?



... has non-trivial implications for energy.

...requires fundamental change in the energy system.

- Net Emissions must eventually decline to virtually ZERO.
- There is no “Silver Bullet”

Stabilizing the Concentration of GHG



Requires Technology and Policy in Three Different Time Frames

1. **Near Term**—5 to 50 Years
2. **Mid-Term**—30 to 100 Years
3. **Long-Term**—50 to 150 Years

Time Constants



- **Political** ~ 3-20+ years
- **Technical R&D** ~10+
- **Market penetration** ~10++
- **Capital stock turnover**
 - Cars 15 years
 - Power plants 40
 - Buildings 80
 - Urban form 100's
- **Lifetime of Greenhouse Gases** ~100's-1000's
- **Reversal of Extinctions** Never

Technology Solutions



Energy technologies that potentially play a major role in the mid- and long-terms are **NOT** significant components of the present energy system.

- Need to develop and test technology options.
- Need to combine technology options into energy systems and test performance and cost.

Components of a Climate Change Strategy



Technology Development

- Energy Efficiency
- Clean Energy
- Carbon Sequestration
- Basic Research
- Crosscutting Technologies

Strategy Development

- Sustained strategy implementation and technology deployment

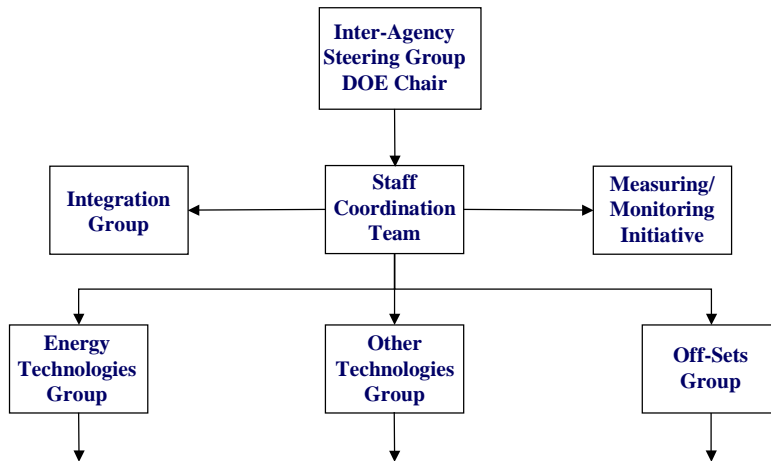
Policy Measures

- Targeted Incentives
- Fiscal Measures
- Voluntary Programs
- Emissions Trading
- Standards
- Federal Procurements
- Others

Reduced Emissions with Economic Growth

The role of NCCTI is to focus on the technology component.

Organization of Working Groups



Technology Initiative Process



- President Bush identified 5 Initiative tasks.
- Formed an interagency working group (chaired by DOE).
- Group includes Federal R&D Agencies, National Labs, universities.
- Group will prepare report to the President by January 2002, which addresses each task.



1

Evaluate Technology Research: Recommend Improvements

2

Develop Opportunities to Enhance Private/Public Partnerships

3

Recommend Demos for Cutting Edge Technologies

4

Improve Measuring and Monitoring of GHG Emissions

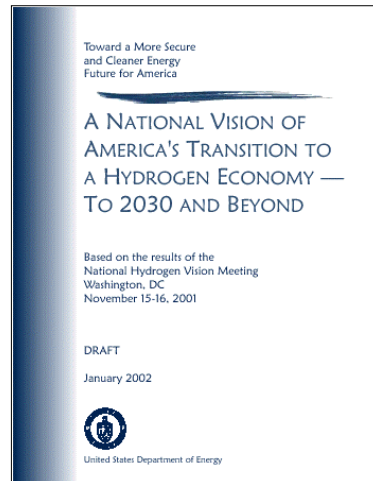
5

Provide Guidance to Strengthen Basic Research

National Vision for the Hydrogen Economy



“Hydrogen is America’s clean energy choice. Hydrogen is flexible, affordable, safe, domestically produced, used in all sectors of the economy, and in all regions of the country.”



Available at: www.eren.doe.gov/hydrogen/

Characteristics of the H₂ Economy



- Buildings use hydrogen for heat and power
- Vehicles are powered by hydrogen and are integrated with the heat and power system for homes, offices, and factories
- Hydrogen is produced economically from sources that release no carbon dioxide
- The distribution infrastructure is well developed
- Storage and use of hydrogen is safe

FreedomCAR



(Cooperative Automotive Research)

- New public/private research partnership replacing the PNGV program -- \$150.3 million (FY 2003 Request).
- Research shift to more fundamental, higher risk activities with an emphasis on fuel cells and a H₂ infrastructure.
- Focus: components/systems, not specific vehicles.
- Eventual goal: Petroleum and emission free cars/trucks.

Electric Power Systems



Superconductivity

Solar

BioPower

Hydro

Geothermal

Wind

Distributed Energy

“Convergence”



Transportation, Hydrogen, and Electric Power

