Accelerating the Pace of Change in Energy Technologies through an Integrated Federal Energy Policy

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PCAST Energy Technology Innovation System Working Group

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New energy systems typically take a half century to move from initial development to thorough integration in the economy. Imperative to speed up the end-to-end innovation process for reasons of:

- Economic Competitiveness
- The Environment
- Security
Stages of Technological Change and Their Interactions

Invention: Discovery; creation of knowledge; generation of prototypes
Translation: Creation of a commercial product or process
Adoption: Deployment and initial use of the new technology
Diffusion: Increasing adoption and use of the technology

Source, E.S. Rubin
Government Budget Appropriations or Outlays for Energy Research and Development, Average from 2004-2008 as % GDP

Source: OECD Government Budget Appropriations or Outlays for R&D (BAORD), Data by Socio-Economic Objective, expenditures on "Production, distribution and rational utilization of energy"
GDP from World Bank World Development Indicators.
Chapter 2: Recommendations for the Federal Government

2.1 Establish a Quadrennial Energy Review (QER)
2.2 Increase the annual energy RDD&D funding to $16 billion
2.3 Generate $10 of the $16 billion through new revenue sources
2.4 Realign energy subsidies and incentives
2.5 Enhance the Federal Government’s ability to purchase new energy technologies
2.6 Reestablish the Committee on International Science, Engineering, and Technology (CISET)
Coal Bed Methane
Chapter 3: Recommendations for DOE

3.1 Develop and implement an energy technology QER at DOE.

3.2 $12 billion should be allocated for RD&D, with emphasis on DOE competitive programs.

3.3 Exercise authorities to align internal processes and organization with energy objectives.

3.4 Establish a DOE Training Grant Program.

3.5 Initiate a multidisciplinary social science research program.