United States Energy Association

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Technology Development and Deployment

Technological advances have allowed us to find, produce, transport and use energy in ways unimaginable only a few decades ago. Technology has contributed dramatically to an energy supply system that is efficient, economical, safe, and environmentally secure. Future technological advances are expected to stimulate continued improvement in all of these areas as well as contribute to a diverse, robust, and economical energy future.

Paralleling the reductions in investment in capital improvements is a sharp decline in both public sector and private sector energy R&D expenditures during the 1990s. Analysis completed by the World Energy Council indicates that this phenomenon is not limited to the United States, but is true of all OECD countries. Total research appears to be less than half of 1990 levels. Increases in research and development budgets are needed to create a new technology base on which to build modern infrastructures for the production and delivery of oil, natural gas, coal and electricity.

A key element of technology advance is the achievement of consensus on the issue of the role of the federal government in research, development, and deployment. Particularly in the case of technologies for critical energy infrastructures, where system failures can have consequences that reach far beyond state boundaries, a role for the federal government should be defined. In addition, where technical and business risks of new technologies are high, risk sharing through collaborative leadership initiatives involving the public and private sectors seems appropriate.

Priority should be given to research efforts that can contribute to production and utilization of domestic energy resources. The federal government should focus on basic and applied research that can increase energy supply while improving both energy efficiency and environmental protection. Research and development priorities should be reviewed to insure that those energy sources most likely to contribute to a diverse and robust fuel supply system over the next twenty years are adequately funded. Increased federal funding for research and development in all arenas—oil, gas, coal, nuclear, and renewable energy—should be considered.

Initiatives to improve energy delivery—including natural gas pipelines, electricity transmission systems, and energy storage facilities—also require increased funding. Near-term programs are needed to ensure reliability of supply while system upgrades are needed to handle the new patterns of traffic on electricity transmission systems and pipelines caused by wholesale and retail competition. Finally, new technologies must be developed to begin the process of transforming the entire electricity power system—from generation to end use – into the equivalent of continental-scale integrated circuit, able to respond rapidly to changes in system loading while retaining power stability. The result will be a digital infrastructure that links an upgraded transmission system to a new distribution system, capable of supplying all customers with affordable, abundant energy, and differentiated energy products and services.

U. S. public spending for R&D should be better coordinated with other OECD countries. Doing so will improve the efficiency of research efforts and minimize duplication of efforts. U.S. research programs should reflect the potential for applications outside the U.S., particularly in developing economies. As energy issues increasingly become global concerns, federal government investments in R&D will have higher paybacks if the new technologies are deployed globally as well as domestically.

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