DEPARTMENT OF ENERGY

Key Challenges Remain for Developing and Deploying Advanced Energy Technologies to Meet Future Needs

What GAO Found

DOE’s total budget authority for energy R&D dropped by over 85 percent (in real terms) from 1978 to 2005, peaking in the late 1970s but falling sharply when oil prices returned to lower levels in the mid-1980s (see table). DOE’s R&D efforts have resulted in steady incremental progress in reducing costs for renewable energy technologies, reducing harmful emissions of coal-fired power plants, and improving safety and efficiency for nuclear power plants.

Further development and deployment of advanced renewable, fossil, and nuclear energy technologies face several key challenges. Challenges for renewable technologies include developing (1) cost-effective technologies to produce ethanol using agricultural residues and other biomass materials as well as the infrastructure for distributing ethanol, (2) new wind technologies to expand into low wind and offshore locations, and (3) improved solar technologies that can better compete with conventional technologies.

Challenges for fossil technologies are primarily associated with developing advanced coal gasification technologies to further reduce harmful emissions and reducing their high capital costs. Challenges for advanced nuclear technologies include uncertainty about the Nuclear Regulatory Commission’s revised licensing process, investor concerns about high capital costs, and the disposal of a legacy of spent nuclear fuel.

Many states have successfully stimulated the deployment of renewable energy technologies by using standards, mandates, and financial incentives that require, for example, power companies to provide small producers with access to the power transmission grid and purchase their excess energy. Each of the six countries GAO reviewed has used mandates and/or financial incentives to deploy advanced energy technologies that are providing, or are expected in the future to provide, significant amounts of energy.

What GAO Recommends

GAO suggests that the Congress consider further stimulating the development and deployment of a diversified energy portfolio by focusing R&D funding on advanced energy technologies. DOE had no comment on this recommendation.


To view the full product, including the scope and methodology, click on the link above. For more information, contact Jim Wells at 202-512-3841 or wellsj@gao.gov.