

contractors. Rights may also be obtained through licensing agreements with the national laboratories. When exclusive rights are licensed, private firms are often more willing to invest in the needed development work to put a product on the market or to apply a new process. This increases the likelihood that new, energy-saving products and processes will actually be put to use and save energy.

Cooperative R&D with Industry—When research focuses on technology development rather than on exploratory R&D, Federal funding is used as leverage to attract private-sector cost sharing. DOE participates in collaborative and cost-shared research with industry both to maximize research funds and facilitate technology transfer. Private companies will generally invest time and money in only those projects from which they plan to benefit. The continuous involvement of the private sector in cooperative R&D efforts greatly increases the likelihood that the technology will find application in industry.

Spin-off Companies—On occasion, researchers involved in a successful DOE research project will acquire the rights to the new technology or process and form a new company to develop and market it. Such companies, known as spin-off companies, cannot be planned or designed but nevertheless serve as one of the most direct mechanisms for getting new technologies on the market. Spin-off companies based on DOE laboratory research are rapidly increasing in number.

Technical Assistance—DOE offers technical assistance as another direct means of relaying energy-efficiency techniques and knowledge to the private sector. A variety of information and research services are offered at no charge. A good example is the Energy Analysis and Diagnostics Center program, which uses the services of 13 major engineering schools across the nation to provide energy efficiency audits to small and medium-sized manufacturing firms.

Experimental User Facilities—The Office of Conservation and Renewable Energy operates experimental facilities at DOE laboratories to facilitate research by industry, universities, and government agencies. The facilities provide the specialized equipment necessary to advance scientific understanding in governmental and industrial programs. Although the arrangements to carry out the R&D vary from one facility to the next, in all cases the interaction of scientists from

government, academia, and industry is valuable in strengthening the quality of research and the diversity of ideas.

R&D Working Groups—Technology transfer was made an integral part of many DOE research programs to promote the exchange of knowledge before, during, and after the research process. The involvement of experts and peers in the planning, review, and implementation of research projects ensures that efforts are directed toward useful, achievable goals and also provides one of the most efficient means of transferring research results to the private sector.

Educational Activities and Competitions—Recognizing the important roles that today's students must be prepared to fill in developing and applying tomorrow's energy-efficient technologies, the Office of Conservation and Renewable Energy directs a variety of educational training activities at the high school and university level. These activities, which include development of interdisciplinary curricula and energy-oriented competitions, are designed to encourage innovative thinking and problem solving.

Seminars, Publications, and Other Outreach Activities—The more conventional technology transfer activities are valuable when imparting research results to larger audiences. Although the groups targeted by these activities may be less strictly defined, the broad coverage they achieve is often successful in delivering crucial information to the right audience. As an example, someone in industry may enter into a licensing agreement after reading about the new technology in a document prepared for general dissemination.

Organization of This Document

This document is designed to help both new readers and those familiar with the earlier edition. All the new success stories are placed in the first section. These stories did not appear in the earlier edition and represent the most recent energy-efficiency achievements by the Office of Conservation and Renewable Energy. Following these, the reader will find updated versions of the previously published stories. These are organized by the energy-consuming sectors of the economy: buildings, transportation, and industry. A brief description of the program appears at the beginning of each section.