

# New Success Stories in Conservation

The 25 success stories presented here reflect the diversity of the activities and projects implemented by the Office of Conservation and Renewable Energy. Projects range from district cooling to biodegradable plastics. Although many of these projects have been under development for some time, they were judged to have become successes or have yielded new energy-saving products or processes during the past year. Through their diversity, these projects provide a comprehensive approach to saving energy in the United States.

## New Guide: Affordable Housing through Energy Conservation

Home builders have needed a simple, reliable way to determine the cost-effectiveness of different energy conservation options for designing and constructing energy-efficient homes. In response to this need, DOE developed a guide that will allow home builders to optimize combinations of design options, fuel choices, building materials, and labor costs for any region of the United States. The user can estimate easily and accurately the energy and dollar savings that will result from various improvements and compare those savings with any resultant increases in construction costs.

The *Affordable Housing through Energy Conservation* guide, consisting of microcomputer diskettes and technical support documents, comes in four parts: PEAR (Program for the Energy Analysis of Residences), a user-friendly software program that estimates the reductions in energy use for selected design and construction options; a handbook that explains how to specify, install, and operate the various combinations of design and construction options contained in the computer program; a second computer diskette, on which the analysis is to be stored, and a user's manual with full instructions for its use in combination with the software program; and a technical support document that describes the data base, operating assumptions, and algorithms used in the microcomputer program.

The data base developed for the PEAR program was also used to develop guidelines for the Federal Residential Standard for the design of Federally owned buildings and for proposed modifications to the residential portion of Standard 90A-1980 of the American National Standards Institute (ANSI); American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE); and the Illumination Engineering Society (IES).

## Design and Compliance Software To Support Building Energy Conservation Standards

DOE has promulgated energy conservation standards for designing new commercial and multifamily high-rise buildings. Compliance with these standards is mandatory only for the design of Federal buildings, but DOE recommends that all design professionals voluntarily adopt the guidelines.

Two microcomputer programs, ENVSTD™ and LTGSTD, were developed to facilitate the use of these standards. ENVSTD™ confirms that the building design meets the building envelope criteria contained in the standards. This program can also be used to assess the energy effects of a variety of window and wall design options. LTGSTD confirms that the building design meets the lighting standards and serves as a valuable design tool when assessing the lighting needs of a building.

Development of these computer programs was a team effort by ASHRAE, IES of North America, and DOE. The volunteer members of the ASHRAE Standard Project Committee 90R developed the computational algorithms used in the DOE standards, in ASHRAE/IES Standard 90.1-1989, and in this program. The Pacific Northwest Laboratory programmed these algorithms into user-friendly software. Both computer programs are helpful to architects, designers, and engineers who must analyze whether new building designs comply with DOE's new energy-conserving standards.