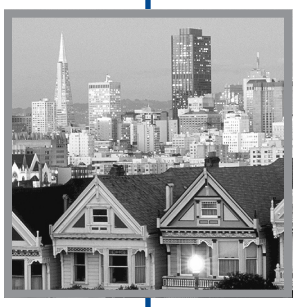
BUILDING ENERGY CODES

Strengthening the Foundation for Building Energy Efficiency

The U.S. Department of Energy (DOE) is working to improve the energy-efficiency of the Nation's buildings through incorporation of new technologies and better building practices. DOE's Building Energy Codes Program (BECP) helps achieve this goal by promoting stronger building energy codes and helping states adopt, implement, and enforce those codes.

Our accomplishments in fiscal year (FY) 2002, listed below, helped further that goal.

Compliance and Training Tool Development



Easy-to-use code compliance tools and training materials to help building professionals comply with code requirements were developed or updated and distributed.

Our products include **MEC*check*™**, **COM*check-EZ*™**, and **COM*check-Plus*™** energy code compliance software. These are based on the International Energy Conservation Code (IECC) or ANSI/ASHRAE/IESNA Standard 90.1 (Energy Standard for Buildings Except Low-Rise Residential Buildings) requirements—the national model codes that serve as the basis of most state codes. We supported the software with accompanying user's guides, videos, training materials, and compliance manuals.

Every dollar DOE has spent on the Program has yielded more than $105 in annual energy savings.

Used nationwide by designers, builders, product manufacturers, and code officials, these tools helped deliver energy savings by making energy code compliance and enforcement easier.

Key FY 2002 Activities

Release of MEC*check*™ 3.3
This release added customized versions to accommodate the residential energy codes in New York and New Jersey. We also updated the AreaCalc Take-Off Tool with a new user-interface and a shape calculator for determining the area of odd-shaped windows, skylights, and envelope components. The Java version of **MEC*check*™** was developed to make our products available to users of Apple Macintosh, Linux and Unix computers. In addition to multi-platform support, it includes several user-interface enhancements.

Development of Mac® version of MEC*check*™
This new Mac® version supports Mac® OS and OSX platforms. It is compatible with data files generated by the Windows® version, making it easy to exchange data files between Macintosh and Windows versions.

MEC*check*™ Prescriptive Package Field Guides
Nineteen Prescriptive Package Field Guides (one for each climate zone) provide a single page summary of each zone's 1998/2000 IECC requirements for insulation levels and glazing

(continued...)

U.S. Department of Energy
Energy Efficiency and Renewable Energy

Building Energy Codes
U.S. Department of Energy

From 1991 through 2001, the Building Energy Code Program

Key FY 2002 Activities

(continued from page 1)

U-factors. Local jurisdictions can distribute the guides to those who seek a simplified compliance approach or do not have computer access.

MEC*check*™ Web Package Generator
This tool, which launches from DOE's website at www.energycodes.gov, gives builders and designers the flexibility of generating their own code-compliant insulation and window packages rather than following pre-defined prescriptive packages. Builders can print and save a corresponding Compliance Report and Inspection Checklist. In the last quarter of FY 2002, the Web Package Generator received an average of 1,300 visits per month.

Release of COM*check-EZ*™ 2.4
An important new feature permits users to demonstrate compliance with the Standard 90.1-1999. We also added support for the IECC 2000 and customized versions to accommodate the commercial energy codes in New York, Vermont, Colorado, and Louisiana. It also supports the IECC 2001 with updates to the mechanical equipment efficiencies.

COM*check-EZ*™ Web Package Generator
We developed a web-based package generator to provide customized on-line COM*check-EZ*™ packages. Web-based compliance reports can be generated.

A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

Outreach

Our outreach activities helped inform and educate code officials, designers, builders, and others on developments in energy codes and standards. Outreach also increased awareness about our compliance products, tools, training, and technical assistance. In FY 2002, the project's outreach efforts were both noteworthy and recognized:

Satellite Training on Standard 90.1-1999
DOE in cooperation with ASHRAE and IESNA broadcast four hours of training on the building envelope, lighting, and mechanical requirements of the Standard which drew over 3,300 participants representing 40 states and three Canadian provinces.

DOE website gains recognition
With a new easier-to-remember URL *www.energycodes.gov* and a new design, the energy codes website attracted considerable attention in FY 2002. It earned a Crystal Award for Excellence in print media from The Communicator Awards, an international competition in communications. Use of the website as a national energy code resource surged with 7.9 million hits; website activity more than doubled that of FY 2001. User sessions topped 730,000. Perhaps most important, the website attracted an average of 13,000 unique users each month.

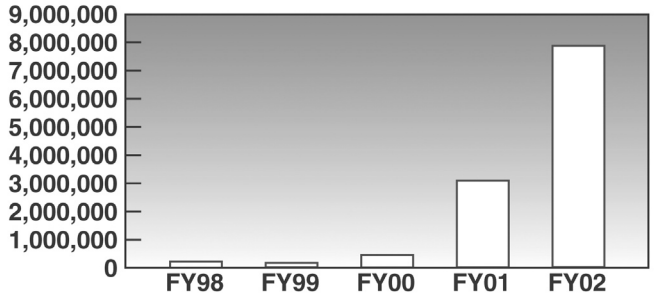
***Setting the Standard* newsletter earns award**
Setting the Standard was honored with an Apex Award for Publication Excellence. The newsletter encourages information exchange among building professionals and organizations, state and local code officials, researchers, and designers. In FY 2002, *Setting the Standard* reached more than 19,000 professionals by mail or email. An average of 1,144 new subscribers were added each month in FY 2002.

Energy Codes Hotline
Hotline staff provided product and technical support on building energy codes and compliance tools. Staff answered questions, provided information, and assisted customers with additional resources. Hotline staff fielded more than 2,200 inquires in FY 2002.

The Building Energy Codes Hotline has proven to be a valuable resource especially to states that adopted new energy codes or updated their energy codes. Hotline staff assisted with more than 280 inquires in less than 6 months for the State of Texas alone. Texas adopted its first International Energy Conservation Code in 2002.

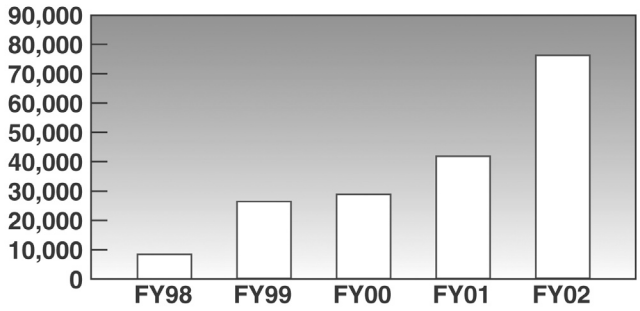
Distribution of compliance and training tools
Outreach efforts included the distribution of compliance software, compliance manuals, and training tools. Software downloads from the DOE website were particularly active in FY 2002, surpassing FY 2001 downloads by 90 percent. More than 32,600 copies of MEC*check*™ software were downloaded. COM*check-EZ*™ downloads totaled 16,236, and

▼ Website Hits



has resulted in $4.2 billion in cumulative energy savings.

▼ Total Distribution of Compliance and Training Tools



downloads of COM*check-Plus*™ totaled 5,982. We mailed or distributed another 25,267 products via conferences, training events, or the Hotline.

Training

There were 63,729 downloads of training materials from the website in FY 2002. In addition to distributing training materials, project staff sponsored the following workshops and training events:

- **National Workshop on State Building Energy Codes in Des Moines, Iowa.**
  BECP sponsored this three-day event, which attracted 175 participants from 38 states. Now in its ninth year, this is the only national workshop focused solely on the adoption, implementation, and enforcement of building energy codes. Many of the workshop participants also attended one or more of the four energy code training sessions offered—each session averaged over 60 attendees.

- **2002 AIA National Convention and Expo in Charlotte, North Carolina.**
  Our AIA conference booth attracted 536 attendees and presented an opportunity to demonstrate the new Mac® version of MEC*check*™, AreaCalc, the Web Package Generator, and COM*check-EZ*™ and COM*check-Plus*™.

- **2002 International Home Builders Show in Atlanta, Georgia.**
  We trained more than 200 attendees on MEC*check*™ software and the Web Package Generator. Nearly 900 people visited the DOE booth, prompting numerous requests for our products.

Technical assistance to states

On request, the Building Energy Codes Program provided direct technical assistance to states and local jurisdictions to help them adopt, implement, and enforce building energy codes. In FY 2002, we provided individual technical assistance to 13 states, including the following:

- **Illinois**
  We performed an economic analysis that assessed the impacts on the state of Illinois from adopting the 2000 IECC for residential and ASHRAE 90.1-1989 for commercial buildings. Our cost/benefit analysis of code adoption in Illinois was critical in getting the code passed.

- **Texas**
  DOE supported building energy code training by providing 3,000 CheckMate CDs, which contain MEC*check*™ and COM*check-EZ*™ software, compliance manuals, and training tools. We also conducted an analysis of the impacts of the adoption of the IRC and IECC on the energy use in residential construction in Texas.

- **West Virginia**
  Project staff conducted training on the IECC 2000.

- **New Mexico**
  We assessed the energy and cost benefits of upgrading the mandatory statewide energy codes to the IECC 2000. This included developing simple, paper-based trade-offs for evaporative cooling, as well as modeling the energy use of commercial building prototypes.

DOE Special Projects Grants

In FY 2002, DOE awarded $1,989,000 in grants on a competitive, cost-shared basis. These grants helped support the building energy code work of 22 states. Some examples include:

Multi-State—Washington, Oregon, Montana, Idaho, and the Northwest Energy Efficiency Alliance

Funds are supporting implementation of Washington State Energy Code upgrades that took effect in 2002, and establishing broader consistency in Northwest code enforcement and builder training programs.

Kentucky

Kentucky is analyzing single-family residential new construction practices to identify design and construction practices that fall short of the state's building energy code. This information will support development of instructional materials for builders and code officials. Kentucky also is developing an innovative training tool for advancing energy codes among the many organizations involved in the construction industry.

New Hampshire

The grant helps fund a statewide energy codes consultant to work in participating towns to increase energy efficiency in new construction. The consultant will conduct site inspections and continue the training of code officials, architects, engineers, and builders on the state's energy code.

Arizona

Grant money supports implementation of energy codes in the Tucson metropolitan area. The City of Tucson, Pima County, local utility companies, the community of Civano, builders' organizations, and others are collaborating to offer training and technical assistance on updating residential and commercial building methods.

"I look at DOE as a lifeline to building energy code efforts in North Carolina. They are an excellent resource for technical assistance on the codes and software to show compliance with those codes. I truly appreciate the DOE Building Energy Codes Program, it makes my job a lot easier"

– Billy Hinton, NC

Codes and Standards Development

The Building Energy Codes Program works closely with the International Code Council (ICC), American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE), the Illuminating Engineering Society of North America (IESNA), and other code user groups to develop more stringent and easy-to-understand building energy codes and assess code barriers to new energy-efficient technologies.

Significant research and development activities for FY 2002 included:

Code Enhancements
We continued to help develop and refine code enhancements for the ICC's International Energy Conservation Code (IECC) and International Residential Code (IRC), as well as for the ANSI/ASHRAE/IESNA Standard 90.1.

- **Residential IECC Code change proposal**
  Working collaboratively with numerous residential building industry stakeholders, project staff developed a comprehensive code change proposal to simplify the residential portion of the IECC and IRC.

- **Climate zones for IECC and ANSI/ASHRAE/IESNA standards**
  Using traditional climatology principles, project staff developed 15 new large-scale, cohesive zones that capture the significant climate variation in the U.S. Because the zones cover a larger geographic area, they offer the benefit of fewer zones per state and the potential for more simplified code compliance. The climate zones submitted were proposed to ASHRAE for consideration in their model codes and standards.

- **Commercial lighting power allowances**
  Staff participated in the development of a new lighting power allowance proposal that incorporates the latest Illuminating Engineering Society of North America (IESNA) standards for illumination levels in commercial spaces. The proposal was developed in conjunction with the Standard 90.1 lighting subcommittee. The proposal aims to deliver significant energy savings by lowering and standardizing the lighting power allowances of the IECC and Standard 90.1. The proposal was submitted for consideration at the ICC code hearings in the fall 2002.

Development of a commercial analysis modeling tool
Project staff created a new spreadsheet model to help states assess the costs and benefits of commercial energy code adoption. We used the model to prepare economic analyses for Illinois, Michigan, and Iowa, leading to proposed energy code legislation in each state.

Commercial building characteristics database
We compiled a database on the characteristics of new commercial buildings that includes information on 130 specific energy related construction characteristics for 162 buildings nationwide. From window-to-wall ratios, to insulation levels, to lighting power, to relative percentages of HVAC zoning types, the database offers a detailed view of current construction practices in a variety of building types across the country. The information can help answer questions that support our codes and standards work as well as technical assistance to states. The database has already been used to determine the typical range of wall-to-wall ratios for various building types, identify current design lighting power density by building type, and understand the prevalence of digital controls in new buildings. Before proposing the new commercial lighting power density values discussed above, project staff used the database to expand and refine the whole building power density models from a base of 95 buildings to the current 256.

U.S. Department of Energy
Energy Efficiency and Renewable Energy

CONTACT INFORMATION

Building Energy Codes Website:
www.energycodes.gov

Tech Support:
www.energycodes.gov/helpdesk.cfm

RES*check*™ and **COM*check-EZ*™** can be freely downloaded directly from the Energy Codes website.

Information on the DOE Building Energy Codes Program:

Jean Boulin
Phone: 202-586-9870
Fax: 202-586-1233
Email: Jean.Boulin@ee.doe.gov

Teresa Carroll
Phone: 202-586-6477
Fax: 202-586-1233
Email: Teresa.Carroll@ee.doe.gov

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

September 2003
PNNL-SA-38398