



Software Tools for Energy Efficient Buildings

THE BENEFITS

Software tools help designers by allowing designers to:

- Design the most energy efficient buildings possible
- Calculate the effect of the interaction of building components on each other and on total performance
- Check for compliance with building codes and the Model Energy Code
- Consider the building as a single, integrated system.

A building's heating, cooling, lighting, and equipment systems all interact with each other, the building envelope and the building site in a multitude of complex ways. Integrating all of the variables into an energy efficient design can be a daunting task without the assistance of design tools—tools such as those found on the U.S. Department of Energy (DOE) Office of Building Technology, State and Community Programs (BTS) Web site at www.eren.doe.gov/buildings/tools_directory. The BTS Building Energy Software Tools directory provides information on more than 150 energy-related software tools. The common thread for all of the tools is an emphasis on sustainable design, improving energy efficiency, and integrating renewable energy technologies into building systems.

DOE researchers developed some of the building energy tools in the

directory, and private companies developed others. The tools include databases, spreadsheets, component and systems analyses, and whole-building energy performance simulation programs. The directory provides a short description of each tool along with information such as expertise required to use the tool, likely users and audiences, input/output criteria, computer platforms, programming language, strengths, weaknesses, technical contacts, and availability. Some are available free of charge while others require a fee or license.

An Invitation

We welcome new additions to this directory. If you are a developer of energy software, we encourage you to submit your software tools for addition to the BTS Building Software Tools directory.

www.eren.doe.gov/buildings/tools_directory



NEW SOFTWARE

DOE sponsors development of software for designing and retrofitting energy efficient buildings. A few of the software tools currently available or under development include:

- **Energy Plus**, a next generation building energy simulation program from the creators of BLAST and DOE-2
- **Energy-10**, an easy-to-use tool to evaluate daylighting, passive solar heating, and low-energy cooling strategies in small commercial and residential buildings
- **DOE-2**, DOE's flagship energy analysis program that calculates hourly whole-building energy performance and life-cycle cost of operation
- **Building Design Advisor**, a tool that serves as an interface for other energy, lighting, and environmental tools. It supports energy-related decision-making during initial, schematic phases of building design
- **COMCheck**, a package that helps designers demonstrate compliance with commercial energy code requirements
- **Window 4.1**, calculates the total window thermal performance indices such as U-value, solar heat gain coefficient, shading coefficient, and visible transmittances
- **Therm**, performs two-dimensional heat-transfer analysis in building envelope components.

The tools are assembled under four major categories with subcategories:

- **Whole-Building Analysis**
 - Energy Simulation
 - Load Calculation
 - Renewable Energy
 - Retrofit Analysis
- **Codes and Standards**
- **Materials, Components, Equipment, and Systems**
 - Envelope Systems
 - HVAC Equipment and Systems
 - Lighting Systems
- **Other Applications**
 - Atmospheric Pollution
 - Energy Economics
 - Indoor Air Quality
 - Multibuilding Facilities
 - Solar/Climate Analysis
 - Utility Evaluation

- Ventilation/Airflow
- Water Conservation
- Miscellaneous Applications

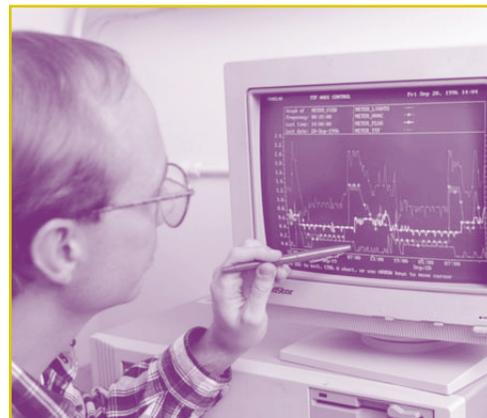


Photo Credit: Warren Gretz, National Renewable Energy Laboratory

This tools directory holds the software programs developed by DOE researchers in several BTS programs. The tools were developed to help researchers, designers, architects, engineers, builders, code officials, and others to evaluate and rank potential energy-efficiency and renewable energy technologies in new or existing buildings.

To learn more about buildings software tools, contact

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Visit the Building Energy Software Tools directory on the BTS Web site at:
www.eren.doe.gov/buildings/tools_directory

Or call the Energy Efficiency and Renewable Energy Clearinghouse at: 1-800-DOE-3732



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