

Building Energy Simulation

User News

For Users of the DOE-2, PowerDOE, SPARK and BLAST Programs



Vol. 16, No. 4

Winter 1995

Pub-439



- **DOE-2 and BLAST Unite** This is the first issue of a joint DOE-2/BLAST newsletter. It is part of the recently inaugurated DOE/DOD Best Of! effort to combine the best features of DOE-2 and BLAST into a single, more powerful program.
- **User News on the Web!** Look for this and future issues of the newsletter at <http://www.eande.lbl.gov/BTP/SRG>, then choose the link to the User News.
- **DOE-2 on the Menu!** Pacific Gas and Electric Company of San Francisco is offering lunchtime seminars on DOE-2. Please turn to p. 6 for a description of what's being offered.
- **New Resource Center in Hong Kong** See p. 32.
- **Fenestration R&D Newsletter** From the Windows and Daylighting Group at LBNL, it not only offers articles about windows and glazing but lists window-related software available from LBNL, a description of user facilities for collaborators, and reviews of recent research papers. To get on the free subscription list, please fax Pat Ross at (510) 486-4089. Or you can view and download *Fenestration R&D* from the Building Technology Program's web site <http://eande.lbl.gov/BTP/BTP.html>.
- **RESFEN Revised** On page 31 of Volume 16, No. 3 of the User News, we wrote that the RESFEN program for fenestration systems was available free of charge from the National Fenestration Rating Council. This was incorrect. The NFRC charges a fee for preparation, packaging, and mailing of RESFEN; cost is \$20 to NFRC members, and \$40 for non-members. If you have questions please contact Susan Douglas of the NFRC at 301-589-6372, or E-mail nfrcusa@aol.com.
- **International Weather Data** If you have international weather data that you're willing to share, please let us know. We're interested in compiling a list and making it available to other users.

■ **Free DOE-2 Help!!** Call or fax our resident DOE-2 expert, Bruce Birdsall, for questions about DOE-2 modeling. If you need to fax an example of your problem, please telephone him beforehand. This free service is supported by the Simulation Research Group. Contact Bruce at (510) 829-8459 between the hours of 10 a.m. and 3 p.m. PST.

■ **DOE-2 Training** Southern California Gas Company is sponsoring DOE-2 training, see p. 8. Also, on p. 27 there are three consultants who offer group or individual training

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The User News is written by members of the Simulation Research Group at LBNL with submissions from program users; BLAST news is supplied by the BLAST Support Office at the University of Illinois. Direct comments or submissions to Kathy Ellington, MS: 90-3147, Lawrence Berkeley National Laboratory, Berkeley, CA 94720. Fax (510) 486-4089 or email kathy@gundog.lbl.gov.

BLAST-related inquiries should be directed to the BLAST Support Office, phone (217) 333-3977, fax (217) 244-6534, or email support@blast.bso.uiuc.edu

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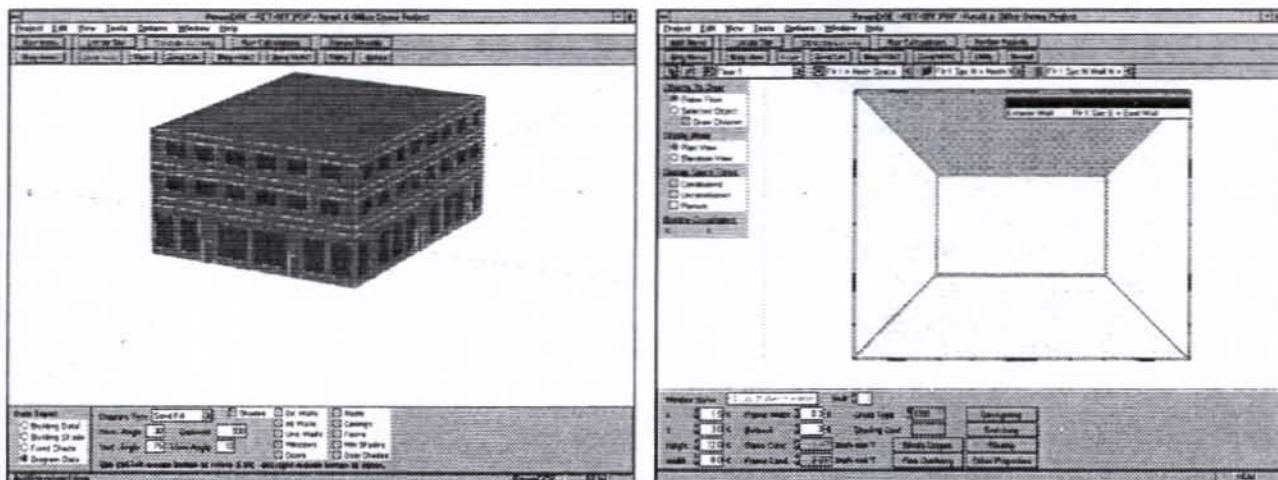
3/96 1900 (c) 1996 Regents of the University of California, Lawrence Berkeley National Laboratory. This work was supported by the Assistant Secretary for Energy Efficiency and Renewable Energy, Office of Building Technologies, Building Systems and Materials Division of the U.S. Dept. of Energy, under Contract No. DE-AC03-76SF00098.

A Sneak Peek At



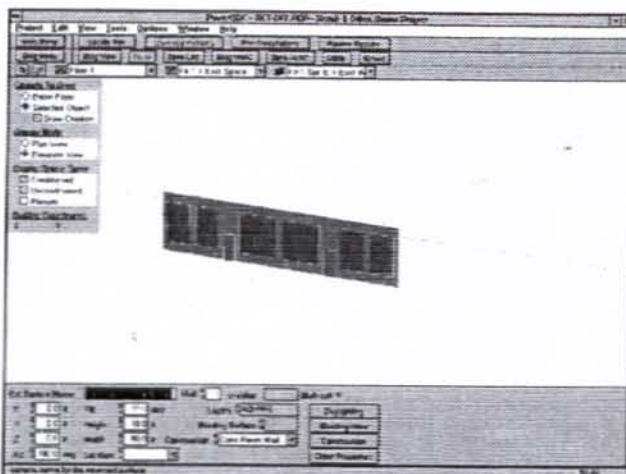
Beta testing will begin soon on PowerDOE, a new EPRI/DOE-sponsored version of DOE-2 that features a highly interactive, graphical user interface running under Microsoft Windows. PowerDOE is being developed by a team consisting of Hirsch & Associates, the LBNL Simulation Research Group, Regional Economic Research, the Southern Company, D.J. Borstein Associates and Energy Simulation Specialists. In addition to the user interface, which will make the program easier to use, PowerDOE (and its corresponding mainframe version, DOE-2.2) will include numerous calculation improvements, the most important of which is integrating the Systems and Plant programs into a single HVAC program built around circulation loops of hot water, chilled water and condenser water.

To give you a feel for what PowerDOE will look like we show here a variety of the program's input screens.

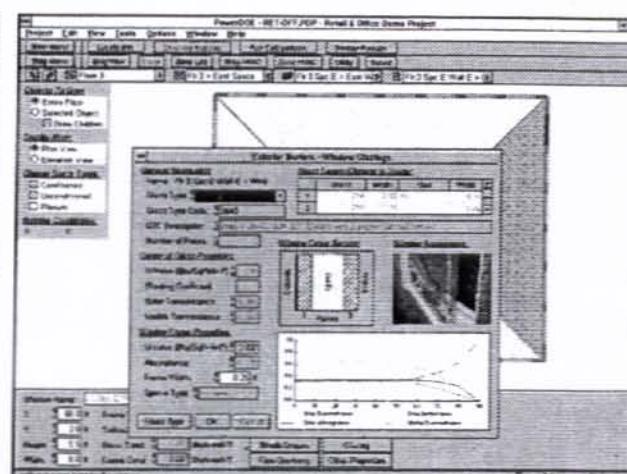


To help avoid misplacing building elements, 3-D view shows the walls, windows, doors and shading surfaces you have input. This view can be rotated, tilted and zoomed. Display of selected components, like roofs, can be turned on and off. Clicking on a particular element, like a window, takes you directly to its input screen. This view can also be shown in wire-frame or hidden wire form.

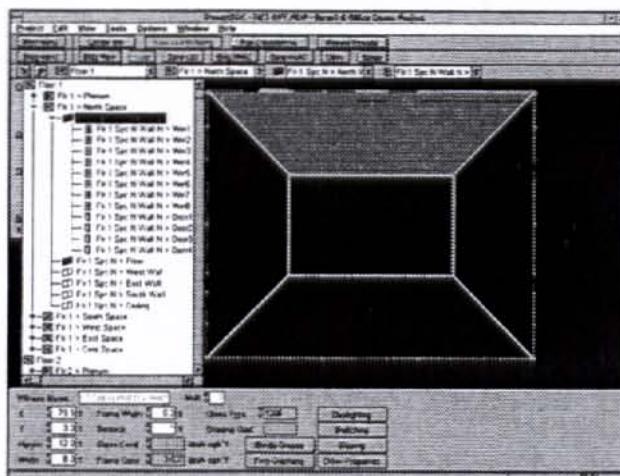
Spaces and their associated walls, windows and doors are entered in floorplan view. In PowerDOE walls, floors and ceilings can be triangles, trapezoids (like the perimeter floor sections shown here), or other polygons; in DOE-2.1E these were restricted to be rectangles. Clicking on an element allows geometry for that element to be entered at the bottom of the screen; clicking on buttons like "Daylighting" at the bottom allows additional data to be entered for that element. Choosing Elevation View on the left shows the elevation for the selected element (see next screen).



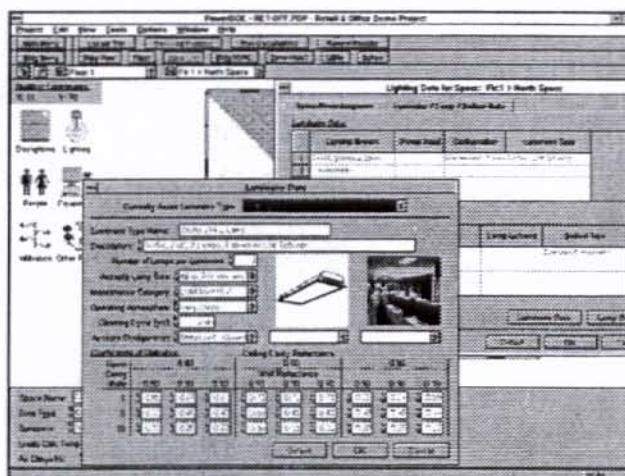
Elements selected in Floorplan View (previous screen) can also be shown in Elevation View. As with the Building View, this view can be rotated and zoomed.



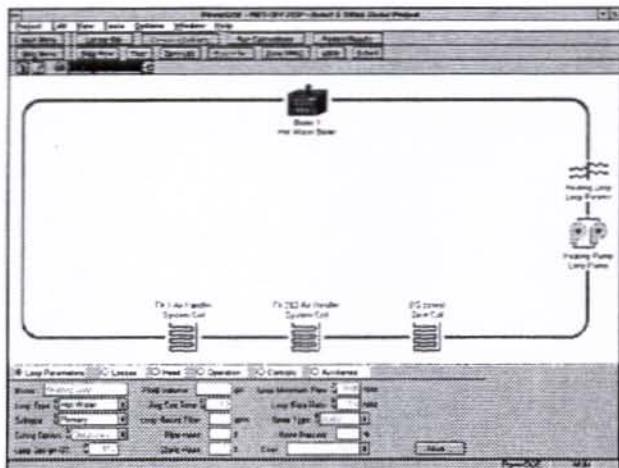
Detailed data for building elements is entered in dialogue boxes that pop up when you click on buttons at the bottom of the screen. Shown here is the Glazing dialogue. In this case a glazing has been selected from the library; the layer-by-layer construction of the window is shown, along with a graph of the transmittance, absorptance and reflectance vs. angle of incidence.



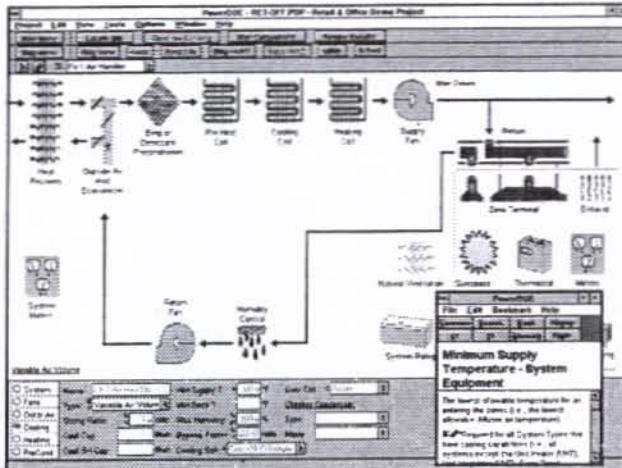
One way of navigating through the building is to use the Building Tree, shown at the left. The Tree shows all of the envelope elements arranged in a floor-space-wall-window hierarchy. The Tree can be expanded to show all of the elements or contracted to show only the floors. Clicking on an element in the Tree takes you to that element's input screen.



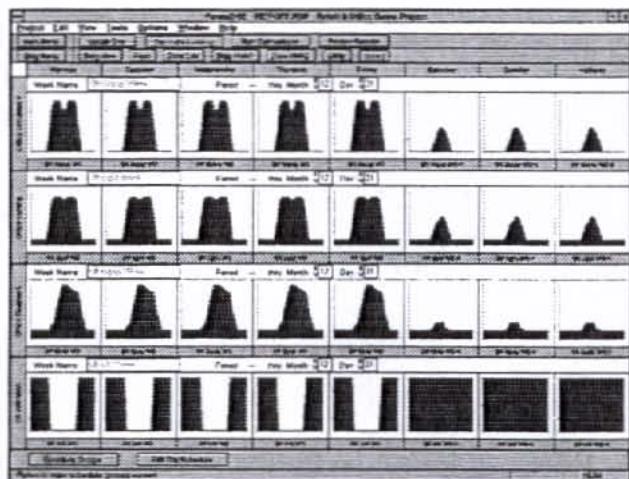
On the Zone Loads screen you enter information on internal gains, lighting and infiltration. In PowerDOE a lighting system can be specified by selecting luminaires and lamps from a library. The program then calculates connected power and workplane illuminance. Alternatively, the program will calculate the number of luminaires required to meet a specified illuminance setpoint.



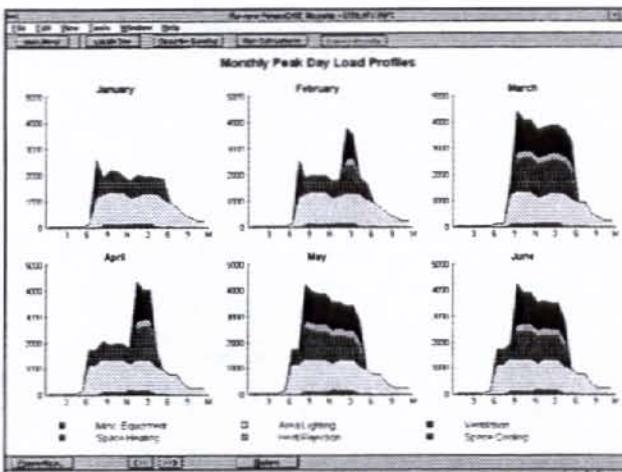
In PowerDOE the DOE-2 Systems and Plant programs have been combined into a single program, called "HVAC." In this program, primary and secondary system components are connected to circulation loops. This screen shows the hot water loop and its associated components. You can also specify circulation loops for chilled water, condenser water, DHW, and water loop heat pump.



When one of the 30 secondary system types is chosen in PowerDOE a schematic appears showing optional and required components. Clicking on a component allows data for that component to be entered. At the lower right, on-line help explains the meaning of a selected input item. This kind of on-line help is available for all PowerDOE screens.



Schedules for occupancy, lighting, infiltration, etc. can be selected by zone type from a library, displayed, and graphically edited. Modified schedules can be stored back in the library for reuse.



Any of the DOE-2 hourly or summary reports can be shown graphically. You can choose pre-formatted reports or assemble your own customized reports containing tables and graphs. The Windows Cut and Paste feature makes it easy to copy results graphics into other documents.

"Building Load Analysis and System Thermodynamics"



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Construction Engineering Research Laboratory
Telephone: (800)UI-BLAST/(217)333-3977
FAX: (217)244-6534
E-Mail: support@blast.bso.uiuc.edu

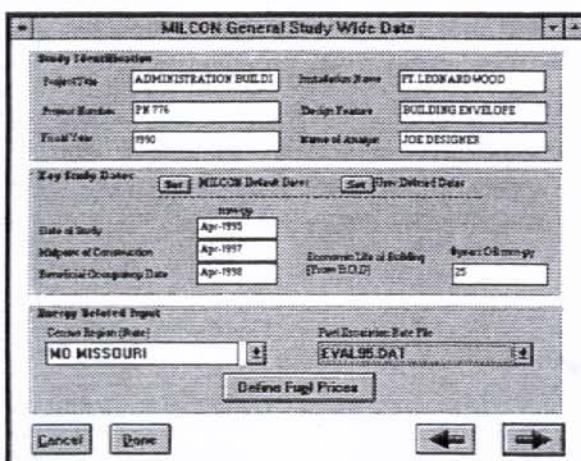
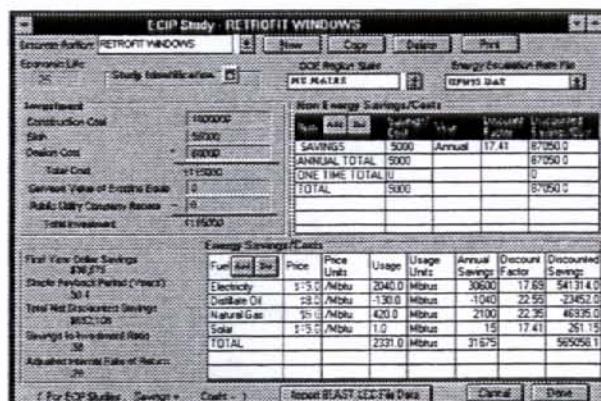
WINLCCID 96 is here!

LCCID (Life Cycle Cost in Design) has been a standard in the Department of Defense (DoD) community since its initial release in 1986. LCCID was developed to perform Life Cycle Cost Analyses (LCCA) for the DoD and their contractors, yet it goes far beyond being just a DoD study tool by providing many features of a general purpose life cycle costing tool. With LCCID, it's easy to carry out "what-if" analyses based on variables such as present and future costs and/or maintenance and repair costs. LCCID allows an analysis based on standard DoD procedures and annually updated escalation factors as well as Energy Conservation Investment Program (ECIP) LCCA.

Now LCCID has been upgraded to take advantage of the popular Windows environment for the PC!
 WINLCCID 96 uses a completely new navigation scheme (provided by a checklist) that helps new and infrequent users quickly input data and gives expert users the flexibility to jump between different menus with the click of the mouse. It even has a new on-line help feature which provides easy access to the latest program information. Check out the look of the new WINLCCID 96 interface:

WINLCCID 96 Features:

- Windows-based User Interface
- LCCID Calculation Algorithms
- Step-by-Step LCCA
- Advanced User Navigation
- Latest DoD Escalation Rates
- Tri-Service Specifications
- ECIP Compatible
- New Support Structure
- On-Line Helps
- Easy to Use



With its Windows interface, WINLCCID is the tool for the economic analysis of buildings. Following an intuitive step-by-step input structure, WINLCCID 96 can help you generate reports to the screen or printer in minutes. Editing existing study files is easy, too. **Order WINLCCID 96 today!** The purchase price for this release is \$295; the update for LCCID Level 92 users is \$195. To order your copy of WINLCCID 96 or to obtain more information on the program, please contact the BLAST Support Office or you may **download a free demo copy** of WINLCCID 96 from the BLAST home page (<http://www.bso.uiuc.edu>) on the world-wide web.

Pacific Gas & Electric Company's "Lunch Series"



...and DOE-2 is the Entree!



The DOE-2 Lunch Series is a user group forum co-sponsored by the Pacific Gas & Electric (PG&E) Energy Center and Lawrence Berkeley National Laboratory (LBNL). This series of lunchtime presentations provides participants with information to unlock the power of the DOE-2 building simulation program and introduces innovative applications and products. Each session will start with a one hour presentation followed by an hour of informal interactive problem-solving with participants.

Participants may bring their own lunch or order a boxed lunch for \$10.00 from the PG&E Energy Center. If you plan to order a lunch, you must do so at least one week prior to that session. DOE-2 Friday Lunch Series attendance is limited to 75 participants.

All programs are offered on site at the PG&E Energy Center at 851 Howard Street (between Fourth and Fifth) in San Francisco. For more information or to register, phone (415) 973-7268 or (415) 973-2277. For additional information or future program suggestions please contact Mark Hydeman at (415) 972-5498 (MMH0@pge.com) or George Loisos at (415) 972-5341 (GAL0@pge.com).

January 26	12:30-2:30	Visual DOE (2.0): a front end utility fully compatible with DOE-2.1E. Presenter: Charles Eley - Eley Associates
February 23	12:30-2:30	Chiller Plant Performance Curves: tools to develop chiller and tower curves from manufacturer's data. Presenter: Mark Hydeman - PG&E Energy Center
March 22	12:30-2:30	PowerDOE: an early look at the next generation from the project lead. Presenter: Jeff Hirsch - Hirsch & Associates
April 19	12:30-2:30	Applying Functions: how to get what you want from the program even if it's not available. Presenter: Joe Huang - LBNL
May 17	12:30-2:30	Applying Macros: how to automate simulations and use calculated values for building descriptions. Presenter: John Kennedy - Eley Associates
June 14	12:30-2:30	Micellaneous DOE-2 Tools and Add-Ons: including a residential tool for assessment of thermal performance during heat storms, a link to AutoCad and perhaps others. Presenter: Joe Huang - LBNL

Other PG&E Building Energy Efficiency Programs of Interest

Lighting Programs	March 20	Doing Commercial Lighting Surveys and Retrofits
	March 26	Data Collection Workshop: Commissioning Lighting Controls
	April 24	Warehouse and Industrial Lighting
	May 22	Calculations and Economics for Lighting Systems
	June 12	Evaluating Lighting Control Systems
HVAC Programs	April 23	CFC Management and Chiller Plant Optimization
	May 21	Data Collection Workshop: Commissioning HVAC Controls
	June 18	VAV Fume Exhaust Retrofits
Architectural Programs	March 15	An Architect's View of the Sun: Solar Geometry
	March 19	Passive Solar Design
	April 25	Building Loads and Systems, Part I
	April 26	Building Loads and Systems, Part II



E2BB: TRANSLATE INPUT OF DOE-2.1E TO BDL BUILDER



by
Gene Tsai, P.E.
Acrosoft International, Inc.

As promised, Acrosoft has created the E2BB program, which translates input of DOE-2.1E to BDL Builder - a reverse process of BDL Builder that generates DOE-2.1E input [BDL Builder, see User News, Vol. 16, No. 2]. This is great news to all existing DOE-2 users. With the E2BB program, you can switch your DOE-2 project to BDL Builder without re-entering your BDL input for current or existing projects. You can use the more powerful windows tool, BDL Builder, instead of the less-efficient editor/ word-processor approach. You can instantly enrich your BDL Builder library by disassembling existing DOE-2 input to BDL Builder database.

Design of E2BB

The E2BB program is composed of two sub-programs. The first is a DOS-based C program which reads DOE-2.1E input and translates it into table-like records. The second is a database program that reads the table-like records and transfers them to database tables.

There are basically two different kinds of databases for each DOE-2 module. First is the database of libraries, with a library for each command of BDL input, such as Schedule, Window, etc., or over 50 libraries in all. The E2BB program will transfer the command *unames* (if any) and values to the database tables. *Uname* will become the record name of a table and values saved under the proper field names (keywords) of a table. The second database is associated with the *unames* selected (such as input from the Builder menu option of BDL Builder) and other input data for use to compose a complete input for the module. An additional database is required for the SPACE commands of the LOADS module which contains all wall, window, and door data.

In the translation process, we had to consider two special cases. One consideration was if there was no *uname* associated with a command. Because each record represents an entry and needs a record name to distinguish it from other records, the program will now generate a unique name for each entry. The second case we considered was how to make allowances for those times when an input value for a keyword is longer than the size of the field allowed. We simply used the snippet feature of BDL Builder to take care of this. We saved the keyword/value pair to a snippet as it is, so that BDL Builder will be able to echo back the exact syntax when generating the BDL input.

Use of E2BB

The purpose of the E2BB program is to translate DOE-2.1E input to BDL Builder input. After conversion, you will be able to edit the project through BDL Builder and utilize all the library entries for other projects. Legal DOE-2.1E files accepted by the E2BB program do not need to be complete input of a module; but they do have to contain legal commands supported by each module. For example, BUILDING-RESOURCE is no longer in the LOADS module; therefore, you will get an error if your LOADS module includes this command. The only portion of input that does not transfer to BDL Builder is comment. This was in order to conserve development costs.

Run of E2BB

Running the E2BB program is very simple. First, starting from the DOS prompt, copy the DOE-2.1E input file to the E2BB sub-directory, which is created during installation. Second, in the E2BB sub-directory, type "CV_STEPI" to run the DOS program. After the DOS execution finishes, a text file is created called CHECK_IT.1ST. The

purpose of this text file is to verify any duplications of u-names. Second, go to Windows and click on the E2BB icon to activate the windows program to process table-like records and update BDL Builder database tables. The first sub-program runtime is very short; the second sub-program runtime of the database program takes longer, depending on the length of the input. If there are no errors, then you are ready to run or modify input from the BDL Builder. It's that simple!

You can purchase the E2BB program for \$45 per package, or you can send your input files to us and we will process them at \$75 per hour (minimum one hour), whichever you prefer.

Update of BDL Builder

Since the first release of BDL Builder, we have recompiled the program with the latest version of the FoxPro database program, Visual FoxPro 3.0, an object-oriented compiler. The new version allows longer field names, so now the input tables have long keyword field names instead of the previously abbreviated ones. We are sure you will like the improvement. With the new version, you can use the APPEND RECORDS feature, provided with the Table menu option, to append records of the same kind of library from a different project directory. To add more incentive to adapt BDL Builder as your DOE-2 preprocessor, we are making a special limited offer: if DOE-2.2 is released before June 30, 1996, you will receive BDL Builder for DOE-2.2 FREE and you pay only for shipping and handling - IF YOU PURCHASE BDL BUILDER BEFORE FEBRUARY 29, 1996.

For more information on E2BB or BDL Builder, please call or write to:

Acrosoft International, Inc.

Suite 220
3435 South Yosemite Street
Denver, Colorado 80231
Tel: (303) 696-6888
Fax: (303) 696-0388
Email: 102447.2611@compuserve.com



DOE-2 Training

DOE-2 training classes are being offered by Southern California Gas Company at their Energy Resource Center, 9240 East Firestone Blvd., Downey, California 90241. For additional information, please fax (310) 803-7551 or call (310) 803-7500.

May 8, 1996	<i>Building Energy Simulation: Selecting the Right Tool</i> (Event #1116) Speaker: Marlin Addison Time: 8:30 a.m. to 3:30 p.m. Fee: \$395 Limit: 90 people
June 19-20, 1996	<i>PowerDOE Training</i> (Event #1120) Speaker: Marlin Addison Time: 8:30 a.m. to 5:00 p.m. Fee: \$395 Limit: 20 people

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VisualDOE-2.0

Charles Eley, FAIA, PE
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94105



VisualDOE-2.0 is a second-generation Windows™ application that enables architects, engineers, energy analysts and utility personnel to quickly evaluate the energy savings of building design options. The program uses the DOE-2.1E hourly simulation tool as the calculation engine so that energy use and peak demand are evaluated on an hourly basis. In the past, the use of DOE-2 has been limited to energy experts. The program is designed so that future versions of DOE-2 or other programs can become the calculation engine.

The VisualDOE-2.0 Windows interface is truly graphic. Pictures of your building and HVAC system diagrams are produced as you create your model. You can verify that your model is accurate and immediately see the size and shape of thermal zones, windows and other building elements. Information is organized by objects that are familiar to designers. To modify the properties of an object, you simply click on the object and a form will appear showing you the current properties and enabling you to make necessary modifications.

Version 2.0 is much more powerful than the first version of VisualDOE [VisualDOE 1.0, see User News, Vol. 15, No. 2]. Complex building shapes can be created by dragging and dropping a library of shapes on up to ten plan levels. Each plan shape (or block) can have one of several standard zoning patterns, or a block can be divided into custom zones. DOE-2 input files are easier to understand since they do not use macros. And, diagnostic features are improved.

VisualDOE can be used effectively by the international community. You can eliminate time-consuming conversions and use either inch-pound or SI (metric) units. The VisualDOE library can be modified to include special holidays, schedules, equipment templates and other information unique to a particular country or region of the world. Specifying equipment is simplified through the use of templates, which can be created and edited with the Equipment Editor program module. In many cases an entire piece of equipment such as a chiller, boiler, or cooling tower can be specified by making a single choice in the templates list box.

Each project file contains information about the basecase design as well as information about up to 20 design alternatives. Design alternatives can be quickly created from the basecase or one of the other design alternatives. If you know the construction cost associated with each of the design alternatives, VisualDOE will calculate the life-cycle cost of each one. A single run, all runs, or a selected group of runs can be run in a single batch. Advanced users can edit the DOE-2 input files to include modeling features not supported by the graphic interface.

Scheduling building operation patterns is vastly simpler than using DOE-2 directly. You can choose an occupancy type from the library and all the schedules and other information associated with that occupancy type is applied. The Schedule Maker program module can be used to create new schedules and combine these into occupancies.

The program is supported by an on-line help system that explains how to use the program and gives details about information needed to perform a simulation. The help system is context-sensitive, providing immediate information about the form displayed on the screen. Error checking is provided after you enter information in each field. If the information is outside an acceptable range or is of the wrong data type

(date, numeric, alpha, etc.), a warning appears with information about how to correct the error. VisualDOE starts you with a set of reasonable defaults. These are generally consistent with the DOE-2 defaults, but sometimes depend on other data you have entered. The help system also contains explanatory information about the DOE-2 reports.

In addition to the reports generated by DOE-2, VisualDOE generates five additional reports that summarize information about your model(s) and present the results. Diagnostic information is provided to help assure that your results are reasonable. A RunDiagnostics form presents average temperatures of each space, the hours that the space is cooler than the heating setpoint or warmer than the cooling setpoint. It also summarizes total and outside air volumes to each space. If a simulation fails, diagnostic information is written to a LOG file. Finally, there is the BDL report which has diagnostic errors, warnings and cautions from DOE-2. In addition to the on-line help system, the program is supported by a User's Manual and technical assistance is provided to all users.

Overview of Program Modules

VisualDOE-2.0 includes seven program modules: Graphic Editor, Plant Only runs, Schedule Maker, Constructions Builder, Fenestrations Editor, Climate Editor, Utility Rates Editor, and Equipment Editor. Following is a brief description of each of the program modules.

- The **Graphic Editor** is the backbone of VisualDOE-2.0. It can be used to create a basemode and up to 20 design alternatives. The Graphic Editor uses the concept of blocks which you can vertically stack to create complex building shapes. You can choose from several standard zoning arrangements or create your own custom zoning for each block. As you create your model, plan and elevation views are drawn so what-you-see-is-what-you-get.
- The **Plant Only Runs** module allows you to choose from a library of predefined load profiles and only simulate the performance of central plant alternatives.
- The **Schedule Maker** is used to create patterns of building operation. With this tool you can use graphic metaphors to describe how people come and go, how lights and equipment will be operated, what temperatures will be maintained and how outside air will be brought into the building. Day schedules can be created for lights, equipment, people, etc. These can be combined into annual schedules. Annual schedules can then be associated with an occupancy. Schedule maker also allows you to create non-USA holiday schedules; international users will find this a delight.
- The **Constructions Builder** enables you to edit and create wall, roof, and floor constructions. Constructions may be built up as layers of materials and stored in the library. Once a construction is created and added to the library, it will be available in list boxes in the Graphic Editor and other program modules.
- The **Fenestrations Editor** is used to review and extend the list of fenestration constructions in the library. The Fenestrations Editor works with the VisualDOE library file, but also with the W4Lib.dat file which is used by DOE-2. Fenestrations Editor will read Window 4.1 files and display summary information on the screen. You can then add the file to the library and to W4Lib.dat.
- The **Climate Editor** is used to add, delete or modify the climates in the library. Each climate has a weather file associated with it as well as cooling and heating design day information that can be used for equipment sizing.
- The **Utility Rates Editor** is used to create utility rates. The editor supports time-of-use rates, demand charges, monthly charges, block structures, kWh/kW ratios, multiple seasons and many other utility rate features. Once data has been entered and stored in the library, the newly created utility rate will appear in the appropriate list boxes.

- The Equipment Editor is used to add new equipment templates to the library or to modify equipment templates already in the library. Choose an equipment type, chiller for example, and all the chiller templates in the library are displayed in a list box. Double click on one of the templates, and a form allows you to define the template properties. An especially powerful and advanced feature of the Equipment Editor is the ability to create part-load curves for specific pieces of equipment.

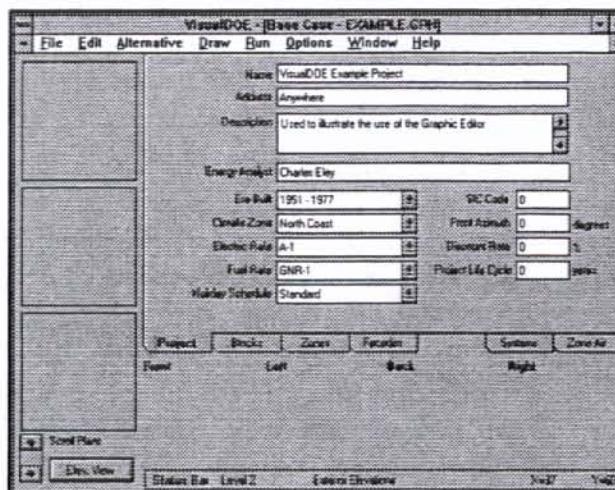
Cost and Availability

The program was released January 16, 1996 after two months of testing. The licensing fee is \$950. The upgrade cost for Version 1.0 users is \$450. A demonstration version of the program is available for \$30 (plus shipping). The demonstration version does everything but produce DOE-2 input files and make simulations. Contact Eley Associates, 142 Minna Street, San Francisco, CA 94105. Telephone (415) 957-1977. Fax (415) 957-1381.

Minimum System Requirements

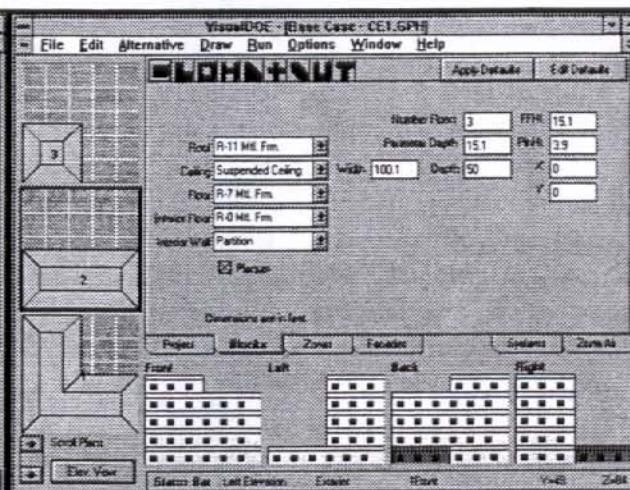
- 486 compatible computer with color monitor and mouse.
- Windows 3.1 or higher.
- 8 mb random access memory (RAM).
- 30 mb disk space.

Enter General Information



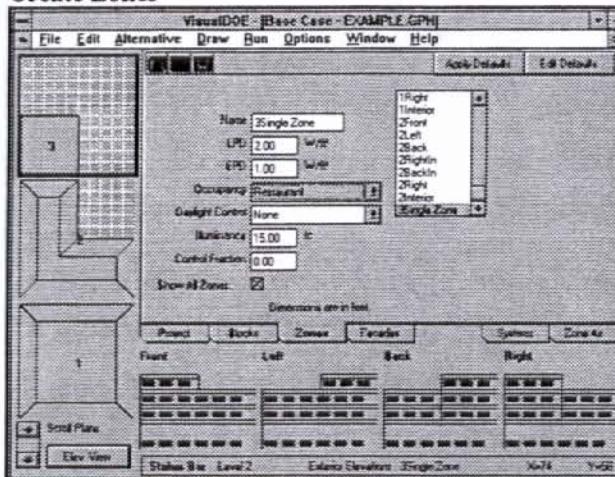
Enter general project information such as name, address, description and energy analyst. Select the era when the building was constructed and VisualDOE will set defaults based on this and other information. Choose a climate, electric rate, fuel rate and holiday schedule from the choices in the library. Enter the azimuth of the front of the building.

Construct the Block Model



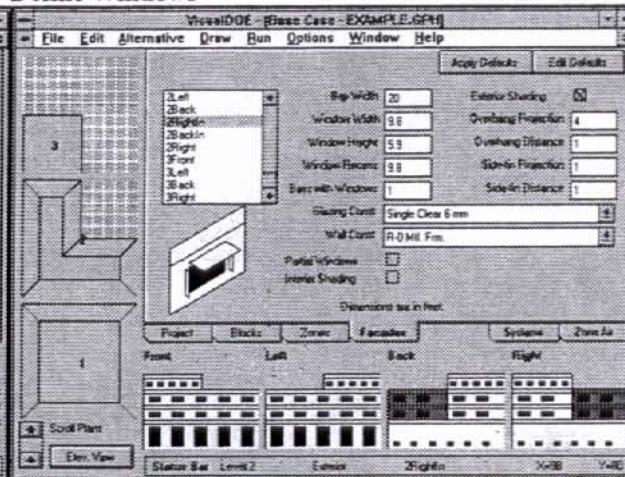
Drag and drop block shapes from the tool bar to up to ten levels or plan views. Dimension each block and enter the number of stories. Choose roof, ceiling, floor and interior floor construction from the library. Move blocks by assigning X and Y values. See your model take shape through elevation and plan views.

Create Zones



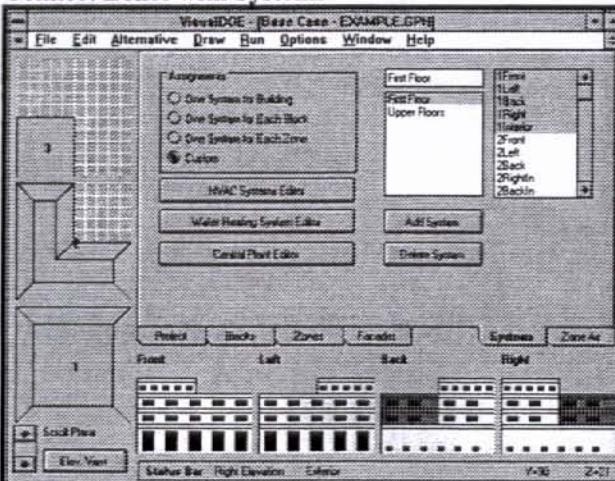
Drag and drop one of three zoning patterns on each block: (a) perimeter + interior zoning, (b) single zone, or (c) custom zoning. Select one or more zones from the list box and assign properties such as occupancy, lighting power, etc. Combine zone pieces to build up custom zones.

Define Windows



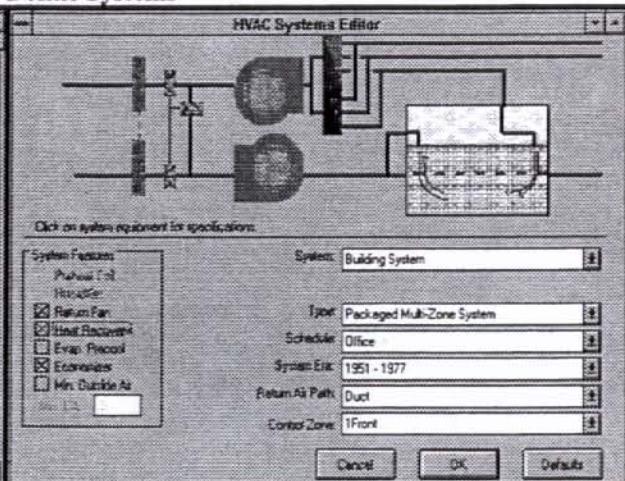
Select one or more facades from the automatically generated list box. Divide the selected facade(s) into bays (each bay can have a window). Dimension each typical window, select a glazing and wall construction from the library, specify exterior shading such as overhangs and/or sidefins, and indicate if the window has blinds or some other form of interior shading. See the elevations change as facade properties are modified.

Connect Zones with Systems



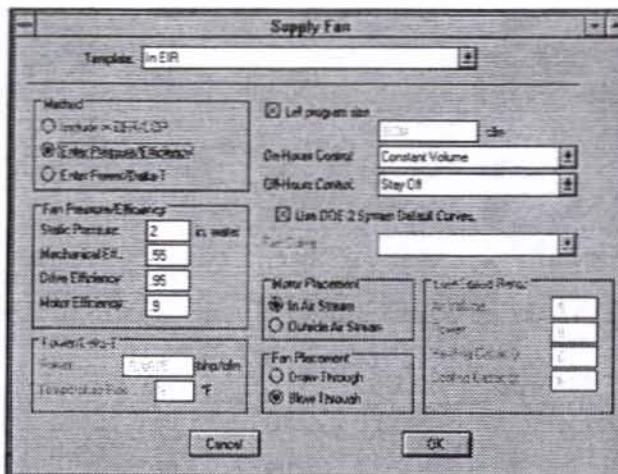
Select one of three standard system/zone assignments, or drag and drop zones to create custom zone assignments. Define the selected system by clicking the Define System command button. Define the central plant by clicking the Define Plant command button. Define the water heating system by clicking the X Water Heating System Editor command button.

Define Systems



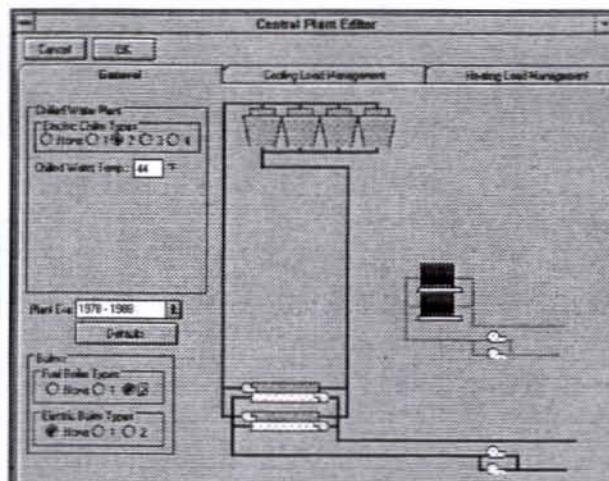
In the HVAC System Editor, choose the system Type from the drop-down box. Add features by clicking on the check boxes. Click the Defaults button to initialize system properties based on the area served by the system, the construction era, and other factors. Modify default properties by clicking on system components such as the supply fan, return fan, etc.

Define System Equipment



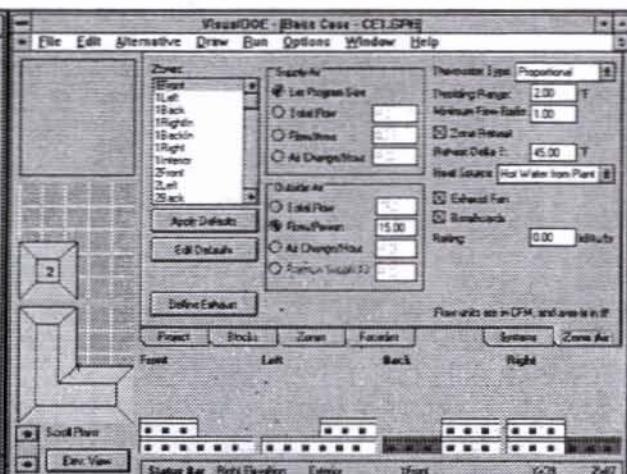
Click on a system component, the supply fan for instance, and a form will appear where you can review and edit its properties. You can set all properties at once by choosing a template. VisualDOE checks data as it is entered. Information that is not applicable is "greyed out" or made invisible so you know you can skip over it.

Define the Central Plant



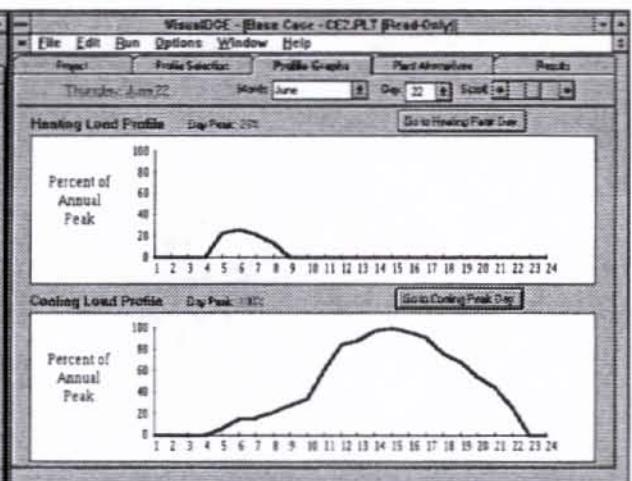
In the Central Plant Editor, a diagram of the plant appears showing each piece of equipment. Click on a plant component and a form will appear where you can review and edit its properties. Templates can be used to define all the equipment properties at once, including custom part load curves. Specify the sequencing of equipment with the Chiller Control and Boiler Control buttons.

Specify Air Quantities



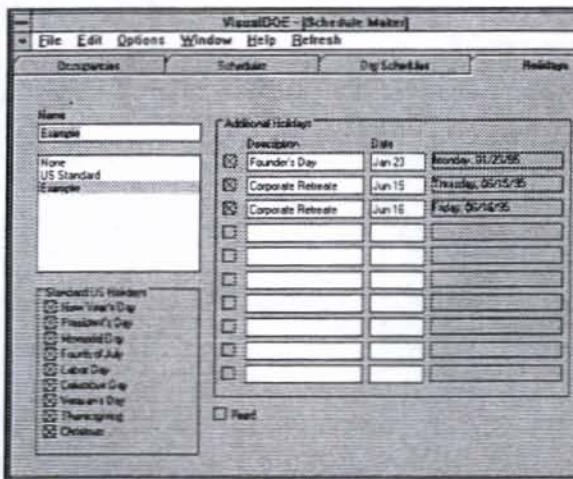
Let the program calculate the necessary supply air or enter fixed air quantities. Specify outside air in one of four ways. Define the thermostat type, type of zone reheat, supply air, outside air and other properties. Special equipment such as power induction units (PIU) and exhaust fans are defined by clicking command buttons.

Plant Only Runs



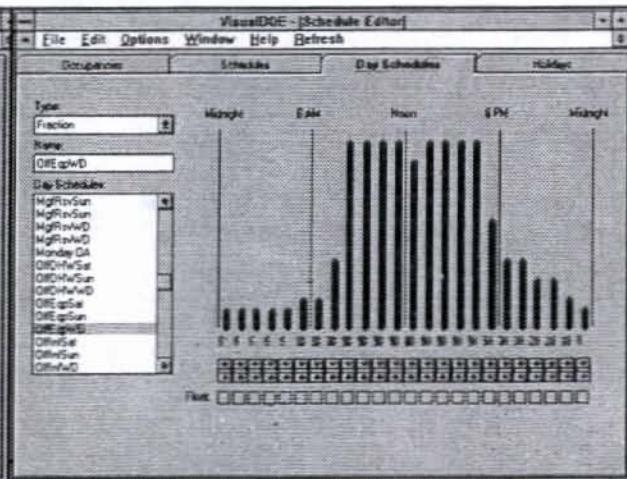
Skip building a loads and system model and choose a standard set of load profiles from the library. Create your own load profiles through the Graphic Editor. Create a basecase central plant and up to about 20 design alternatives. Evaluate these quickly (only plant and economics needs to be run).

Create Holiday Sets



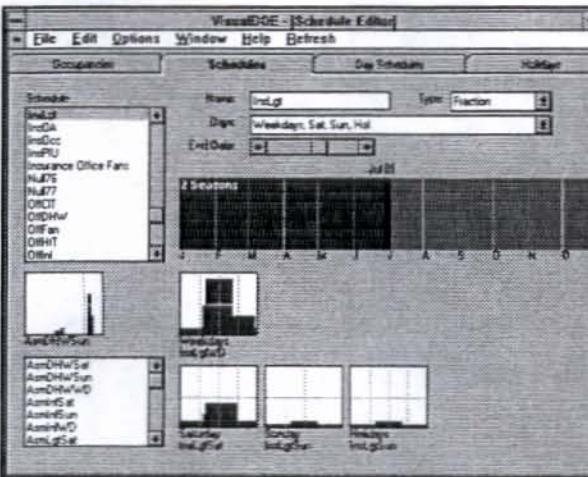
Give the new holiday set a name which will appear in list boxes in the Graphic Editor. Turn on/off the standard holidays that you want to observe. Add additional holidays by clicking the checkbox, adding a description, and entering a date. The day of the week is displayed for the date you enter.

Define Day Schedules



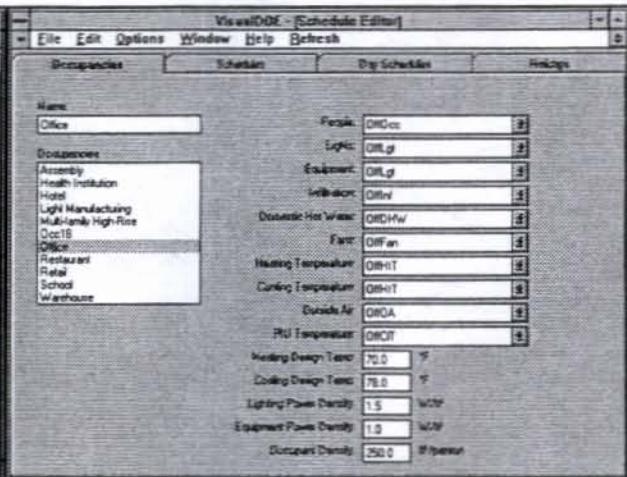
Create a day schedule by choosing Edit>Add New. Choose a schedule type. The choices are fractional, on/off and temperature. Give the new day schedule a name. Assign values for each hour of the day by clicking the scroll bars or checkboxes.

Build Schedules



Break the year into seasons by choosing Edit+Season!Add New. Set the end date for each season by using the scroll bar or by dragging with the mouse. Choose the pattern of days by selecting from the Days drop-down list box. Choose a schedule type. The choices are fractional, on/off and temperature. Drag and drop a day schedule for each day type.

Make Occupancies



Create an occupancy by choosing Edit+Add New. Give the new occupancy a name which will appear in list boxes in the Graphic Editor. Select a schedule for people, lights, equipment, etc. You choose only from the appropriate schedule types. Assign default information for design temperatures, power densities and occupant densities.

Construction Assembly

Description	R-value R-F-T400	Thickness in.	Conductivity Btu/h-Ft ²	Density lb/in. ³	Specific Heat Btu/lb-F
Sheathing	0.7	0.30	0.06	75	0.20
Soffit, Slat 3/4 in.	0.5	0.75	0.07	32	0.21
Asphalt Roofing, w/R-11	1.8	0.00	0.00	0	0.00
Gutter Board 5/8 in.	0.8	0.13	0.05	55	0.20
Total U-factor	0.7				

Give the construction a name and assign a category. Choose the number of layers. A text box will appear for each layer. Select a material for each layer. You can filter the materials that appear in the list by using the "Show Materials for Type" control.

Details

Construction	Calculation Details	Results

View the U-factor calculations and other details of the construction you have entered.

Materials

Add New materials by choosing Edit|Add New. Standard materials can only be edited after entering a password. Define the material by either entering an R-value or by specifying its material properties.

Fenestration Editor

Select a fenestration from the list box and all its properties will be displayed as they appear in the W4Lib.dat file. Information is enhanced with a sketch. Add a new fenestration to the library by choosing Window 4.1|Read File. Choose Window 4.1|Add to Library and the construction will be added to W4Lib.dat and appended to the VisualDOE library.

Climate Editor

The screenshot shows the "VisualDOE - [Climate Editor]" window. It has a menu bar with File, Edit, Options, Window, and Help. A "General" tab is selected. On the left, there's a "List of Climates in Library" dropdown containing options like Bay Area, Big Sur, Central Valley, Coastal Valley, Lower Central Valley, Mountains, North Coast, and Santa Barbara Coast. Below the dropdown are fields for "Climate Name" (set to Bay Area), "Elevation" (0 ft), and "Weather File Name" (set to "calwf"). A "Select Weather File" button is at the bottom.

Add new climate by choosing Edit/Add New. Give the new climate a name and enter the elevation (used in air flow calculations). Select a weather file. The file will be copied to the weather directory if it does not already exist there.

Create Time Charge Periods

The screenshot shows the "VisualDOE - [Utility Rates]" window. It has a menu bar with File, Edit, Options, Window, and Help. Under "Rate Schedules", there's a list of time period charges: GNR 2 Summer, GS45 Winter, GS46 Summer, Copy of GNR 1 Winter, Copy of GS45 Winter, and Copy of A-1 Winter. Under "Time Period Charges", there's a section for "Electricity" with "Energy, Demand, and kWh/kW" selected. Below these are three tables for "Each Day", "Demand Charges", and "KWh/kW Charges". Each table has columns for Number of Blocks, Size, Range, and Cost.

Create new time charge periods by choosing Edit/Add New. Choose the resource type, e.g. electricity, gas, etc. Select the type of charges. The choices are energy and demand, energy only, etc. Separately define the charges for energy, demand and if applicable kWh/kW.

Combine into Utility Rate

The screenshot shows the "VisualDOE - [Utility Rates]" window. It has a menu bar with File, Edit, Options, Window, and Help. Under "Rate Schedules", there's a list of rates: A-1, A-6, A-10, and E-195. Below that, there's a "Description" field set to "PG & E's Small General TOU" and a "Resource" field set to "Electricity". The main area shows a calendar grid for "3 SEASONS" (J F M A M J J A S O N D) with "Season End Date/Rev Adjustment" and "Days" dropdowns. At the bottom, there are "Time Periods" and "Weekend and Holidays" sections.

Create new rate schedules by choosing Edit/Add New. Break the year into seasons. For each season, break the week into day types. Divide days into time-of-use periods if applicable. Choose Time Period Charges for each time period.





Index to the User News



Volume 1, No. 1 (August 1980) through Volume 16, No. 4 (Winter 1995)

KEY: The Index lists User News volumes, issues, and page numbers as follows: Title of the article, program version that was current when article appeared, then Volume, Number (No. 1=Spring, No. 2=Summer, No. 3=Fall, No. 4=Winter), and page number. For example, the entry Advanced Simulation (2.1C)...7:4,4-8 means that the article was entitled Advanced Simulation and it was printed when DOE-2.1C was the current version of the program; the article can be found in Volume 7:Number 4, on pages 4 through 8.

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