Building Energy Simulation

User News

For Users of DOE-2, SPARK, BLAST and their Derivatives
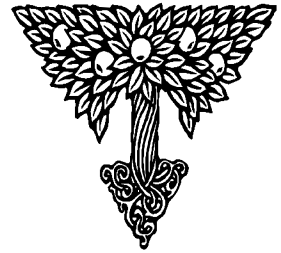
What's New?

❀ **DOE-2 Directory on the World-Wide Web**
Dru Crawley, program manager for simulation tools at DOE headquarters, is the author of an extensive building tools web page (see p. 30). Included therein is the DOE-2 Direc-tory of Program-Related Software and Services. Go to www.eren.doe.gov/buildings/tools_directory/doe-2_vendors.htm

❀ **TMY2 Weather Data** Both TMY2 weather data and the TMY2 User Manual are on the World-Wide Web at a (new) url. Go to http://rredc.nrel.gov/solar/. This web site is an important resource for solar data and we have repro- duced the site map on p. 17.

❀ **New DOE-2 Resource Center** A South African resource center has been established at the University of Potchefstroom. It is headed by Prof. L. J. Grobler of the School of Mechanical and Materials Testing. See p. 33.

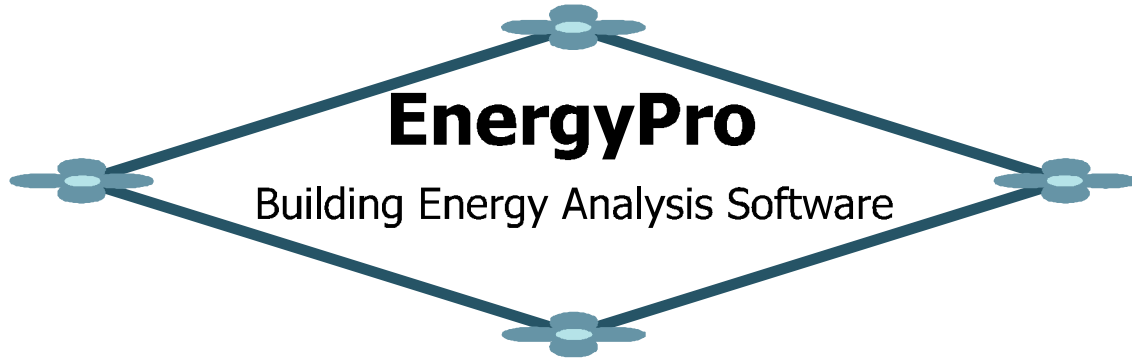❀ *EnergyBase* **is now** *EnergyPlus*
The combined BLAST/DOE-2 program, formerly known as EnergyBase, has been renamed as "EnergyPlus." EnergyPlus is being developed by the University of Illinois, Lawrence Berkeley National Laboratory, and the Construc-tion Engineering Research Laboratory.

What's Inside?

EnergyPro
Building Energy Analysis Software

Gabel-Dodd/EnergySoft announces the release of a new Windows-based building energy analysis software package called EnergyPro. Designed to run on the Windows NT™ and Windows 95™ operating systems, EnergyPro provides a next-generation interface that makes inputting and analyzing a building fast and easy. With features like cut/copy/paste, drag and drop, and full graphic printout, EnergyPro gives professional results quickly but is simple enough for even a novice to use.

EnergyPro was designed to appeal to a wide range of professionals in the building industry. The program's modular structure makes it versatile enough to meet nearly all your building analysis needs. You may purchase a single module, all residential and nonresidential modules, or any combination thereof. Modules specifically designed for the analysis of residential buildings include: residential load calculations, and state certified California Title 24 compliance calculations (Points System and Residential Simulation). Non-residential modules include Win/DOE, nonresidential heating and cooling loads, California Title 24 Prescriptive Method compliance calculations, and tailored lighting calculations. The DOE-2 calculation module (Win/DOE), produced by Gabel-Dodd/EnergySoft, is the only performance based compliance software currently available which has met the California Energy Commission's (CEC) strict certification standards.

EnergyPro can calculate the energy use for a particular building in any location for which you have a formatted weather file. Simply create a new location in the EnergyPro location library by entering the appropriate geographical and seasonal data and the name of the weather file. Select that location in your file and run Win/DOE.

EnergyPro also includes external links to the Common Energy Standard (CES) file technology, that allow you to plug in new energy standards, such as Standard 90, as they become available. Governmental agencies can use the standards software to create and distribute CES files which contain specific implementations of energy standards for code compliance purposes. You can quickly and easily change the standard assumptions to document compliance with regional standards. The CES standards technology was pioneered in 1994 by Gabel-Dodd/EnergySoft in the popular Comply 24 software; it is currently used by the CEC in their Perform 95 public domain software.

 For more details about EnergyPro, visit The Gabel-Dodd/EnergySoft website at www.energysoft.com or call 800-4NRGSFT (800-467-4738).

Win/DOE Module

The Win/DOE module is designed for versatility, depending on the skill level and analysis requirements of the user. It functions either from within EnergyPro or independently. More experienced DOE-2 users may wish to analyze features not supported by the interface, such as daylighting designs. As creating DOE-2 input files with the EnergyPro interface is much easier than directly in DOE-2, build the file in EnergyPro as far as you can, select the Win/DOE option to build a DOE input file, then finish your modifications directly in the DOE file.

You can use Win/DOE in compliance mode to calculate compliance with California Title 24 Standards or in non-compliance mode. In compliance mode, Win/DOE allows one-step calculations of both the building's proposed energy use and the standard energy budget (against which the proposed energy use is compared to determine compliance with the minimum requirements). In non-compliance mode, you can generate a more accurate assessment of the actual energy use of the building, using actual operation schedules instead of Title 24 default assumptions. Compare the energy use of your proposed design to a standard efficiency building with the click of your mouse.

EnergyPro Building Tree

The Building Tree is the backbone of EnergyPro. It is a graphical representation of the various elements of the building you are modeling. Each building element is displayed on the screen with an icon that represents that portion of the modeled building. The Building Tree is presented in a hierarchical manner. Each parent element contains information pertinent to all its sub-elements, while each subordinate element in the tree is a more detailed part of its parent element. The tree construction makes it easy to display any or all of the building components you wish. With a single right mouse click, you can display all the elements in the pro-
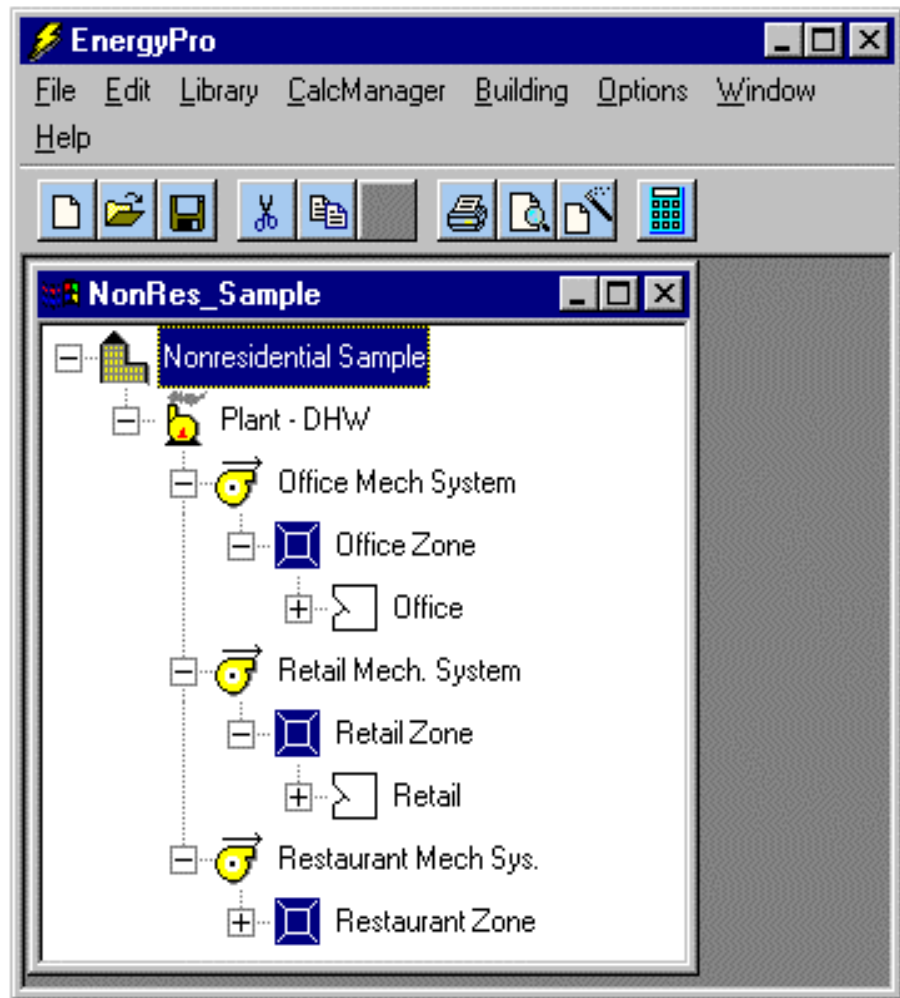

Figure 1: EnergyPro Building Tree

ject, or, if you prefer, display only specific elements of interest. You can customize the level of detail your analysis contains, from one HVAC zone serving an entire building or floor to an extremely detailed room-by-room analyses. Only the DOE-2 engine limits the number of components, (and consequently the level of detail on extremely large projects).

It's easy to arrange building tree components using the drag-and-drop and copy/paste features in EnergyPro. Also, the find and replace wizard means you can test various building elements quickly and easily. You may use the wizard to replace components in a single zone, within a specific portion of the tree, or throughout the project.

EnergyPro contains a complete on-line help system, including context-sensitive (*What's This?*) help. Click on the question mark in the corner of any dialog box, and then on a specific input to display a brief description of that entry. Access more detailed information about program functions, inputs, and modeling techniques from the on-line documentation. EnergyPro also contains a complete electronic version of the California Building Energy Efficiency Standards. You can now research topics related to Title 24 compliance quickly and easily, thanks to a Hyper-Text linked version of the Standards, which includes complete indexing and searching capabilities.

Libraries

EnergyPro comes with an extensive set of libraries populated with thousands of common building components. In each library, you may create, modify and store additional, frequently used items for easy access on every project, as well as specific entries needed for a particular project.

• The Material and Assembly Libraries are used to define and calculate the R-values, U-values and heat capacities of walls, ceilings, floors and doors based upon specified materials, framing percentage and framing material. Choose construction materials from the list of 150 pre-defined ASHRAE materials or create new materials as needed. The Assembly Library comes pre-populated with all of the most commonly used construction assemblies.

• The Fenestration section of the libraries contains separate Glazing, Interior Shade, Exterior Shade, Overhang, and Sidefin Libraries. These libraries are used to define glazing types, interior and exterior shading, overhangs and sidefins. The Glazing Library entries included with EnergyPro (e.g., Standard Double Clear) contain default U-values for 13 window types (e.g., Vertical Slider, Casement, Skylight). These correspond to the National Fenestration Rating Council (NFRC) values required by the CEC.

• The System Libraries (Central and VAV) are used to define the central and zonal system components of the HVAC system. You may define 21 different central system types in the Central System library, including packaged and split systems, heat pumps, evaporative coolers, and built-up systems. EnergyPro contains a complete online database listing of over 12,000 pieces of HVAC equipment, comprising the complete list of equipment certified by the CEC for use in California. As with all the EnergyPro libraries, you may also create new or modify existing entries.

• The Plant Libraries are used to define Chillers, Cooling Towers, and DHW/Boiler systems for both space conditioning and domestic hot water. You may also load information on CEC-certified water heaters and boilers into this library using the CEC equipment directories provided with the program.

- The Light Fixture Library is used to define light fixtures, including lamp and ballast types and other information for each fixture. This library comes pre-populated with several hundred of the most commonly used lighting fixtures available in the marketplace today.

- The Location Library contains design data and climate zones associated with 641 California ASHRAE locations and allows you to define additional locations. EnergyPro automatically creates a temperature profile and load-based solar gain profile (Figure 2) for each location. You can customize the graph format to display in several styles, colors and fonts. View and print the hourly direct and diffuse solar incidence (in Btuh/sqft) on your project at each of eight orientations during each month. The temperature profile shows dry bulb and wet bulb temperatures at specific design conditions for each month. You can also create new locations from pre-formatted weather files for analysis of buildings located outside California. A CD containing over 300 pre-formatted and source files is available from Gabel-Dodd/EnergySoft for $99.00. The CD contains weather data from the US and Canada.
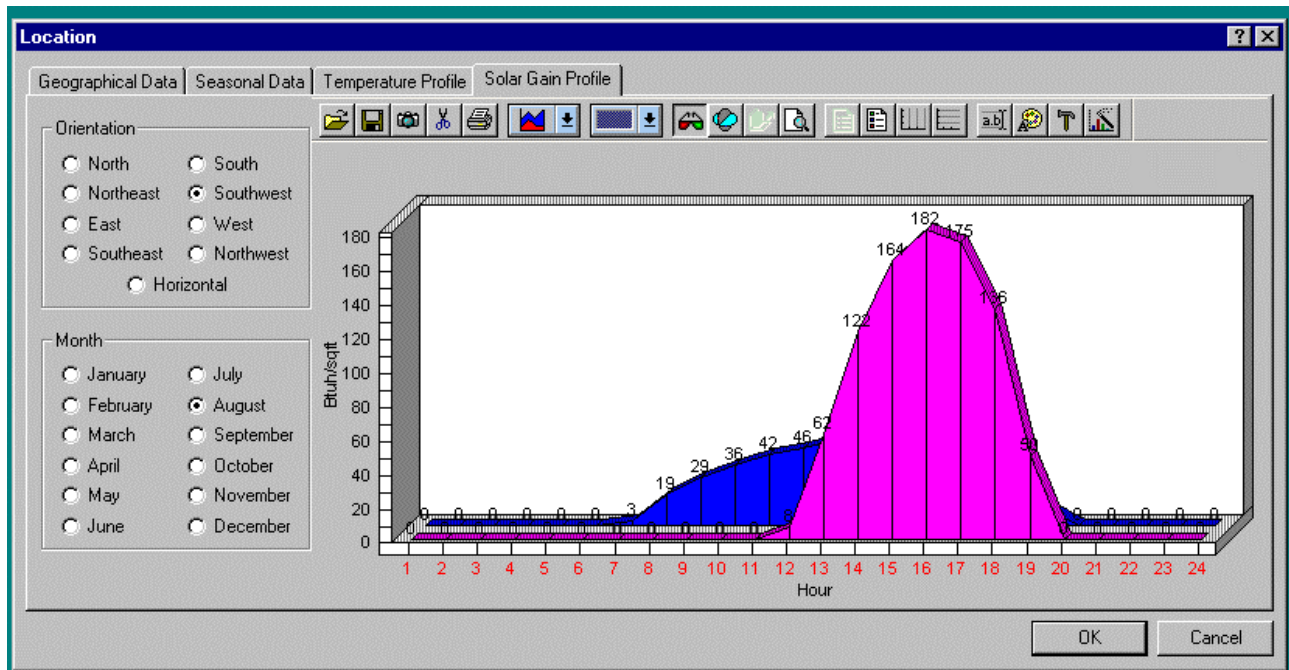
Figure 2:   Load-based solar gain profile

- The Schedule Libraries are used to set the weekly and yearly schedules associated with occupants, lights, equipment, infiltration, DHW, processes, heating, cooling, and fans. Schedules are used by the NR Loads and Win/DOE noncompliance calculations. (For Title 24 compliance, Win/DOE uses internally fixed schedules. These schedules are set by the California Energy Commission and cannot be changed by the user.) With the Schedule Editor you can display and modify schedules graphically (Figures 3 and 4).
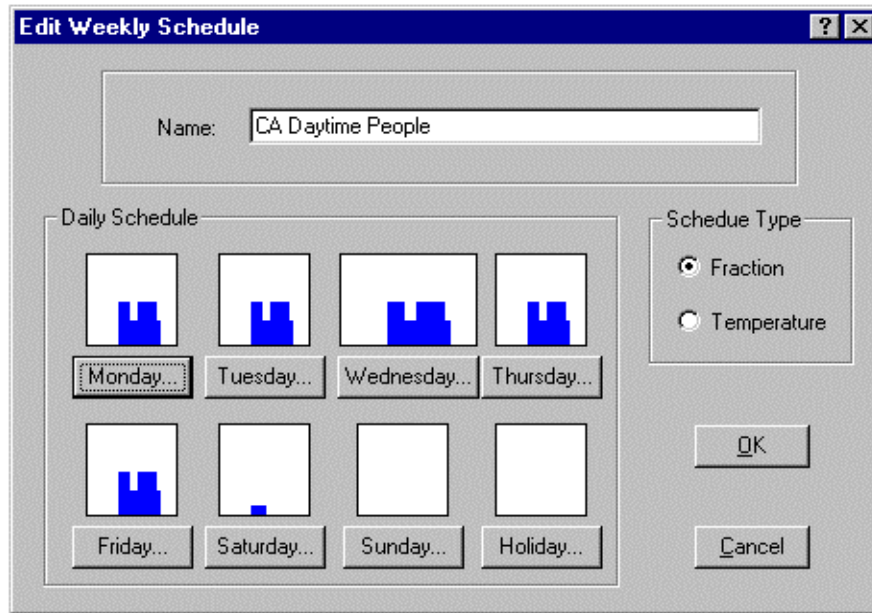
Figure 3:   Graph showing a weekly schedule
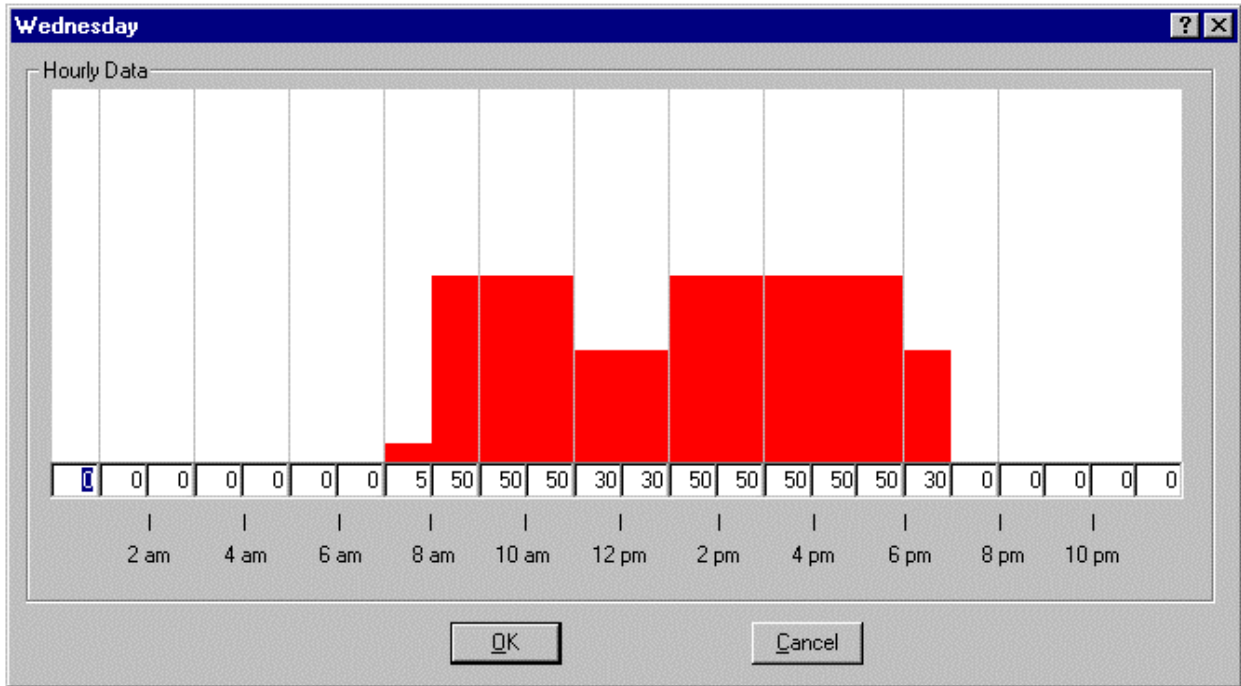
Figure 4:   Hourly schedule data

Report Wizard

EnergyPro's final product, the analysis report, is a fully graphical printout. The Report Wizard quickly and easily guides you through the process of organizing your report. Simply click on the Report Wizard on the toolbar, choose the report type and the forms you wish to include, and your report is ready for presentation. EnergyPro reports for documenting compliance with CA Title 24 Standards are duplicates of those distributed by state agencies. In addition, the program includes options to print the HVAC System heating and cooling loads summary. The summary contains many standard engineering checks, as well as the heating and cooling system psychrometrics, which show airstream temperatures at various HVAC system components. The HVAC summary also contains detailed descriptions of room heating and cooling loads calculations.

Exporting Forms

EnergyPro allows you to export specific forms or an entire report for use in other applications. During installation, EnergyPro automatically creates a subdirectory (titled Export) within your program installation directory to store exported files. You may change target directories whenever you choose. The export feature is commonly used to add the specific forms required on plans to an AutoCAD™ file. From the EnergyPro menu, select File/Print… to export forms. Select the pages you wish to export from the Print dialog box. Choose All to export the entire report, or specify a page range, and then click Export. You may want to edit the exported forms for final presentation. The exported forms can be edited in any application that reads metafiles (Word™, Corel™, or AutoCAD™).
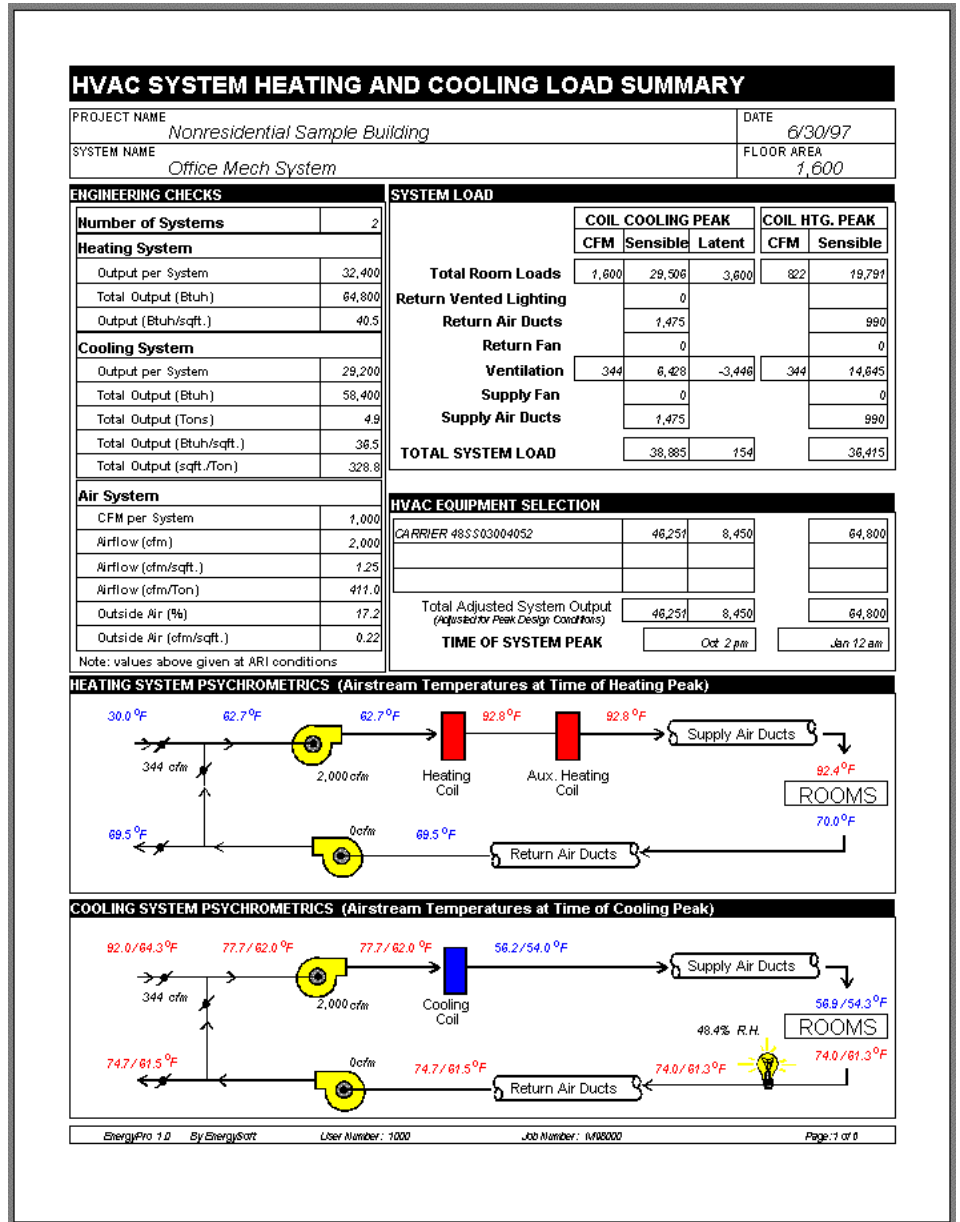
Figure 5: Example of a form ready to export

In Word™, Insert the file as a picture, then double-click on the picture to edit the contents.   Follow the appropriate procedure to edit the forms from within other applications.

EnergyPro Minimum System Requirements

Operating System	Windows NT™ or Windows 95™
Computer	IBM 486™ or Pentium 75™ with at least 16 MB RAM. The optimum computer system contains a Pentium 100™ processor with 32 MB RAM.
Disk Drives	One 1.44 MB (3.5") floppy disk drive, or a CD-ROM drive. Your hard drive must have 5 to 20 MB of free space available for the program files. Win/DOE program files require an additional 20MB of free space.
Video Display	An SVGA monitor with minimum 800 x 600 resolution. Optimum resolution is 1024 x 768.
Laser Printer	A printer equivalent to the Laserjet 4™. EnergyPro features graphical forms which are reproductions of those used by state agencies. The graphics processing power available in recent printer designs considerably reduces report printing time.

New Publication Available

"Selecting Windows for Energy Efficiency"

This guide contains an explanation of energy-related window characteristics, a discussion of window energy performance ratings, and a convenient checklist for window selection.

Order this new publication from the Energy Efficiency and Renewable Energy Clearinghouse, P.O. Box 3048, Merrifield, VA 22116 -- Fax (703) 893-0400.

You may also either or request the report via fax to Kathy Ellington at (510) 486-4089 or download it in PDF format from http://eande.lbl.gov/BTP/pub/selectingwindows/
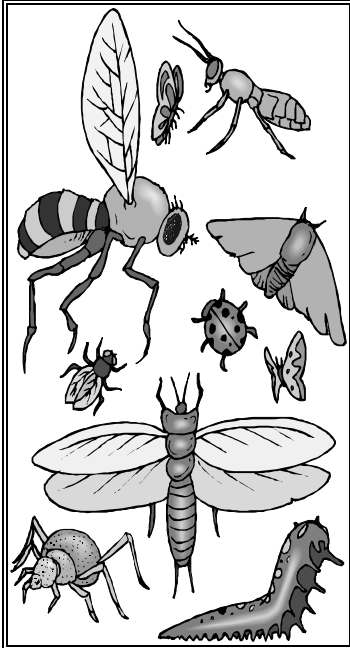
DOE-2.1E Bug Fixes 89 through 91

Following are bug fixes 89 through 91. Shown at the left is the version number of DOE-2.1E, which is incremented for each new set of fixes. This is followed on the same line by the subprograms to the which the fixes were made (bdl = Building Description Language Processor, lds = LOADS program, sys = SYSTEMS program, etc.). Then comes a short description of the set of fixes corresponding to that version number. The author's initials and date of each fix are also shown. Note that a particular version will include all fixes made up to and including that version number. So Version 005, for example, includes the fixes listed under "-005" as well as those listed under "-003" and "-004". You can easily determine what version number of DOE-2.1E you are currently using by checking any of the DOE-2 output reports, where version *NNN* is indicated as "DOE-2.1E-*NNN*".

All bug fixes are available via FTP on the World Wide Web. Go to ftp://gundog.lbl.gov/pub/VERSIONS.txt or see p. 25 for alternate instructions.

-089   wth
Add code to process the new TMY2 weather files. The input needed is quite short. For example

```
PACK
Denver CO TMY2
TMY2   94018
STAT
END
```

is all that is needed to process the Denver TMY2. The TMY2 files may be downloaded from NREL at http://rredc.nrel.gov/solar/old_data/nsrdb/tmy2 [note: this URL was under construction in late May].

-090   bdl lds sim
Use correct shade block length (MSHLEN) in DHITSH for fins/overhangs (was 15, should be MSHLEN = 13). This caused a pointer overflow in the daylighting calculation for windows in walls where the total number of fins and overhangs on all windows in the wall is greater than one. [FCW 1-24-97]

-091   lds
Restores shade block length for fins/overhangs to 15 in DHITSH. Undoes –090 fix, which incorrectly set this length to MSHLEN (=13). Also, fix bug that caused some schedule values to be overwritten in DAYCLC when report LS-G is not requested and there are one or more daylit spaces that have no lighting schedule. [FCW 2-20-97]
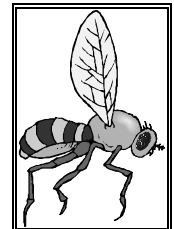
B.C. Hydro's BEST Interface to DOE-2

Hourly End-Use Energy Analysis as a Value-Added Customer Service[1]

by

Curt Hepting	**Gifford Jung and Lori Herman**
EnerSys Analytics Inc.	**British Columbia Hydro**
2989 Delhaye Drive	**6911 Southpoint Drive, 14th Floor**
Coquitlam, B.C. V3B 6Y9	**Burnaby, BC V3N 4X8**
CANADA	**CANADA**

ABSTRACT

In an effort to expand customer services and reposition its demand-side management (DSM) programs, B.C. Hydro, a public electric utility serving approximately 1.5 million customers in British Columbia, initiated a program to provide a package of DSM services for commercial and institutional customers. These services, tailored to each customer's specific situation, ranged from basic billing information to detailed end-use energy analysis.

Historically, providing detailed end-use energy analysis meant using simulation programs like DOE-2. This was relatively expensive because of the time and expertise requirements associated with energy auditing, simulation, and bill calibration techniques. To provide an easy-to-use simulation service for their customers, B.C. Hydro and its contractor developed the Building Energy Simulation Tool (BEST). BEST is a spreadsheet application that directs the energy analysis and provides customers with calibrated end-use energy information in exchange for, roughly, a day's effort. Customers are provided with a walk-through energy audit, DOE-2 energy analysis, bill calibration, energy efficiency screening, and reporting.

Described herein is the approach used for this new value-added customer service as applied to approximately 100 commercial customers during the pilot program phase. We present the preliminary results from the energy analysis and calibration performed for monthly end-use bill disaggregation. We also provide a preliminary assessment of the program's value to participating customers and the utility. Finally, we elaborate on future applications and directions for this new program.

INTRODUCTION

As the utility industry moves toward deregulation, DSM programs are being forced to undergo significant changes or be eliminated altogether. Competition is causing North American electric utilities to rethink how they can best serve the public and customer service programs are coming under increased pressure to be self-supporting -- or at least to act as an effective marketing agent for retaining customers. Moreover, such value-added customer services are positioning utilities to pursue new customers.

As a new service for commercial customers, B.C. Hydro created the Building Check-Up (BCU) program. Although still in development, much of the program is proceeding through pilot phases across British Columbia.

Bill Enhancement product
The BCU program has several levels of services from which customers can select. The Bill Enhancement product shows customers how electric bills are calculated (demand, energy, taxes, etc.). This allows customers to review their billing history, habits, trends, etc., and realize the importance of end-use disaggregation.

---

[1] This article is an abridged version of a paper originally published in "Commercial Buildings: Program Design, Implementation, and Marketplace Issues," _1996 ACEEE Summer Study on Energy Efficient Buildings_, American Council for an Energy-Efficient Economy, 1996. Turn to p. 31 to order ACEEE Conference Proceedings.

End-Use Disaggregation product

The next level of service, the End-Use Disaggregation product, provides the customer with more detailed and customized information: end-use bill disaggregation and energy efficiency screening. The rest of this paper focuses on this particular service within the BCU program.

OBJECTIVES FOR ENERGY ANALYSIS SERVICE

Providing the customer with end-use bill disaggregation and energy efficiency information is the most effective method for encouraging participation in energy efficiency programs. It also benefits the utility by providing indirect marketing and load research information. Through direct contact, information is collected on customer preferences, behavior, and characteristics for future databases.

In defining the BCU program market coverage, an appropriate level of detail and accuracy had to be balanced against cost. Hence, this particular program was structured to effectively handle approximately 80 percent of the targeted building types. In order to provide quick and reliable information, a simplified energy analysis approach was devised. Using this approach, most buildings (of the targeted building types) can be approximated using the customized system developed for generating calibrated end-use thermal models.

METHODOLOGY

Before providing any services, B.C. Hydro first identified target candidates and contacted them to find out if they wanted to participate in the BCU program. B.C. Hydro reviewed with the customers the graphical trends and disaggregation of their electricity bill in energy, demand, tax and power factor categories. This information increased the customers' awareness of energy costs and began a dialogue about what could be done to manage those costs. The customers were then asked if they were interested in the next level of service, the End-Use Disaggregation product, which would provide more detailed information for energy management purposes. During the pilot phase, customers who owned and/or managed one of the selected building types were eligible for the BCU package. Building types included high- and low-rise office buildings, large retail stores, large grocery stores, and both elementary and secondary schools.

The End-Use Disaggregation product went through two specific stages during the pilot phase. The first phase, a test stage for the pilot program, was offered to a focus group of eight customers; it was designed to examine customer response to, and evaluation of, the BCU program. After receiving feedback from the focus group, B.C. Hydro modified the original product and launched the second, or pilot, stage. The goal of the pilot program was to provide the End-Use Disaggregation product to 200 customers at a cost of $500 CDN each. This cost was estimated to be B.C. Hydro's cost for providing this level of service in the BCU program.

The process for generating the calibrated end-use energy analysis results for customer involved three general steps: (1) data collection, (2) analysis, and (3) deliverables and products. Figure 1 shows the basic tasks involved in each of these steps.

DATA COLLECTION

The first step in the data collection stage was to gather monthly billing data for the applicable fuel types. BEST allows for the calibration of electric energy (kWh), electric demand (kW), natural gas, central steam, fuel oil, propane, and diesel.

Next, the appropriate hourly weather data was identified for the nearest weather station to the site. The billing data, which is used for calibration purposes, should overlap with the period that the weather data covers. Having local weather data that correlates with billing data makes the calibration more accurate without the need to perform weather normalization. As of the first quarter of 1996, B.C. Hydro had over 36 typical reference year (TRY) and typical meteorological year (TMY) weather files for various sites within British Columbia. TRY weather files are updated quarterly so that the analysis will be relatively current for the customer. The TMY files can be used to estimate end-use energy requirements for an average year.

After scheduling a site visit and reviewing the billing data, a B.C. Hydro representative performs a walk-through audit, during which forms are filled out that directly correspond to data input screens in the BEST program. During the audit information is collected about the building site, building envelope characteristics, mechanical systems, space conditions, and operation schedules.

ANALYSIS

Once the audit data are entered, BEST runs DOE-2.1E iteratively, each time making adjustments to the most sensitive building characteristics. This is done to determine the relationships between certain building characteristics and end-use energy requirements using transformed multivariate linear regression. The results from the regression analysis are then imported into BEST for calculating end-use energy requirements. The DOE-2 simulation is simplified for inexperienced users through "flexible DOE-2 prototyping", which involves the creation of relatively complex building description files similar to the input files required by DOE-2. The simulation process is controlled by in-house processors, which insert approximately 60 building characteristics ranging from the estimated heating efficiency to the entire HVAC system.

The building characteristics, or building description language (BDL) objects, are divided into two categories: fixed and variable. Fixed building characteristics, like the number of floors, the floor height, and the HVAC system type, do not change during the multiple simulation process; they represent building characteristics which are typically well known. In some cases, however, fixed building characteristics, like schedules, are estimated.
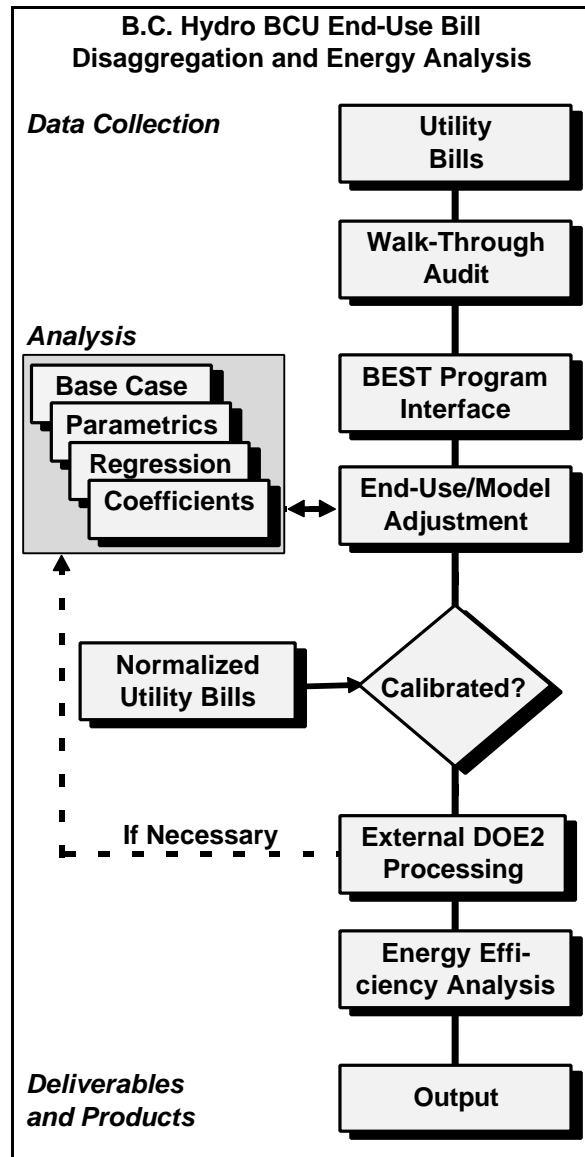
Figure 1. Level II BCU Energy Analysis Process

Developing regression coefficients based on key building characteristics allows for quick and effective energy analysis, including calibration to billing data, sensitivity analysis, energy-efficiency measures, transferability between similar buildings, and estimation of energy requirements of new buildings during pre-design and schematic design phases. In addition, the regressed energy use requirements have proven to be accurate in comparison to actual DOE-2 runs.

Calibration to utility bills is quick and easy using the approach outlined above. However, because calibration requires a knowledge of building systems and their interrelationships, this step should be performed by an analyst with a building science background. The BEST application provides immediate statistics and graphical feedback (see Figure 2) to assist the analyst. With practice, the user can satisfactorily calibrate most buildings in matter of minutes. Occasionally, though, the simulation must be rerun if the calibration is unsatisfactory. This typically occurs when any of the schedules vary significantly from what was estimated.

In some cases, the building either has unusual systems or control strategies which cannot be directly handled by BEST or it is not being operated as described to the auditor. In other cases, the building energy characteristics cannot be approximated using BEST. These situations were recognized early during the program planning stages and were accounted for by limiting participation to appropriate building types. In the relatively few cases which BEST could not directly handle, the DOE-2 templates were modified by simulation specialists to allow BEST to access and calibrate the DOE-2 results. Once the simulated energy requirements are calibrated, energy efficiency packages can be analyzed. BEST is presently preprogrammed with a set of energy efficiency options (EEOs):

- Interior and exterior lighting efficiency
- Lighting occupancy controls
- Daylighting controls
- Window treatments
- Window upgrades
- Efficient air conditioning
- Cooling setup
- Heating setback
- HVAC O&M
- Air-side and water-side economizer
- Refrigeration, fan, and domestic hot water efficiency
- Air destratification
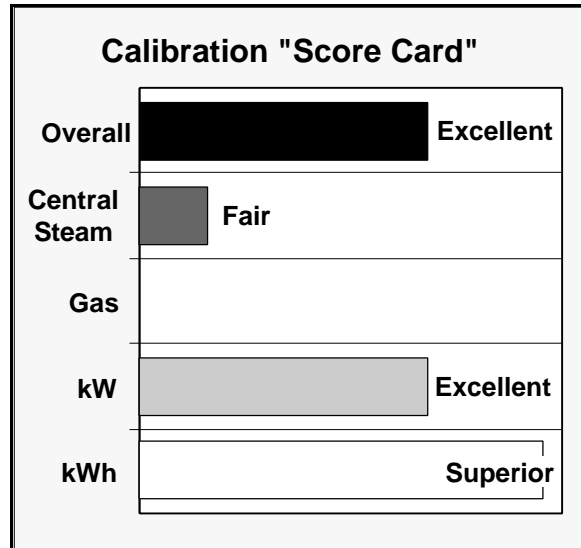
Figure 2. Example of Calibration Graphics

Each of these EEOs includes the appropriate variable building characteristics which can be customized to each customer's situation. Beyond these predefined EEOs, building characteristics may be changed to represent other efficiency strategies, either separately or in combination with other EEOs. Experienced users can perform individual DOE-2 simulations from BEST, or from DOS since the DOE-2 input files are fully accessible. The capability to perform special simulations is useful for analyzing the detailed impacts of various EEOs. The analyst, however, must extract the desired results manually from standard text-based DOE-2 output.

PRODUCTS AND DELIVERABLES
Numerous reports are available from the BEST application, including automated customer and calibration reports which act as key deliverables to participants in the BCU program. Figures 3 and 4 provide examples from the automated report. Other reports include more detailed monthly end-use analyses and show detailed energy requirements and associated utility costs by fuel type. All reports are available for the calibrated base case and any selected energy efficiency case. Further, reports can be customized since BEST uses Excel™ for reporting purposes. Additionally, BEST generates end-use load profiles for use in BC Hydro's load research efforts and applications. The building characteristic information is also output for linking with existing load research and customer survey systems.

1995 ESTIMATED ENERGY BILL: $426,490

Energy 49%

Demand 17%

Gas 34%

Refrig. 3%

Ext. LtsElev. 3% 4%

Fans 11%

DHW 19%

Equip. 5%

Cook 6%

Lights 27%

Cooling 14%

Heating 8%
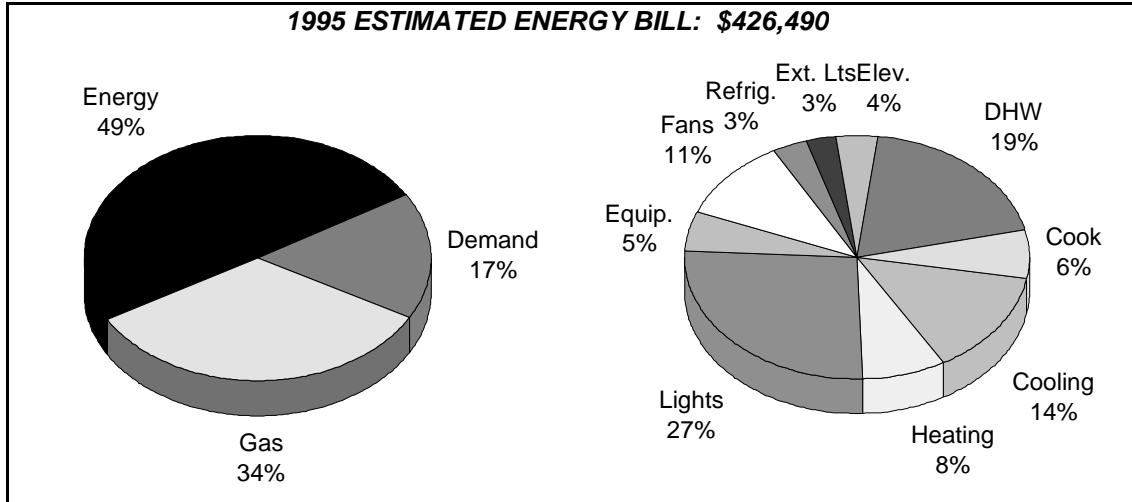
Figure 3. Example from Customer Report Showing Bill Disaggregation

Energy Efficiency Measure	Savings on 1995 "Base Case" Utility Costs		
	Electricity	**Other Fuel**	**TOTAL**
Interior lighting efficiency	$51,980 (18.4%)	-$5,540 (-3.9%)	$46,450 (10.9%)
Window treatments	$13,910 (4.9%)	$3,100 (2.2%)	$17,010 (4.0%)
Efficient air conditioning	$12,660 (4.5%)	$ 0 (0.0%)	$12,660 (3.0%)
Lighting occupancy sensors	$14,280 (5.0%)	-$1,780 (-1.2%)	$12,500 (2.9%)
HVAC O&M	$ 6,850 (2.4%)	$2,040 (1.4%)	$ 8,900 (2.1%)
Water-side economizer	$ 7,540 (2.7%)	$ 0 (0.0%)	$ 7,540 (1.8%)
Refrigeration efficiency	$ 1,570 (0.6%)	$ 0 (0.0%)	$ 1,570 (0.4%)
Combination of all EEMs	**$99,400 (35.1%)**	**-$2,220 (-1.5%)**	**$97,190 (22.8%)**

Figure 4. Example from Customer Report Showing ECM Summary Analysis

SUMMARY RESULTS

At the time of this writing, the pilot program for the BCU program had over 300 customers who were targeted to participate in the program beyond the initial testing stage. Roughly half of these customers are in the initial coordination phase, while the remainder have been contacted. Of the contacted customers, over half have been provided with the Bill Enhancement product or the End-Use Disaggregation product. About 40 percent of the customers agreed to participate in the Level II services.

Because the BCU program is in its early stages, only preliminary results are available. Figure 5 shows the breakout of the building types which have participated in the program so far. Including the first eight "test cases," nearly 100 customers have participated. Bill Enhancements were provided in approximately 70 percent of these cases, while the End-Use Disaggregation products were provided in nearly 50 percent of the cases.
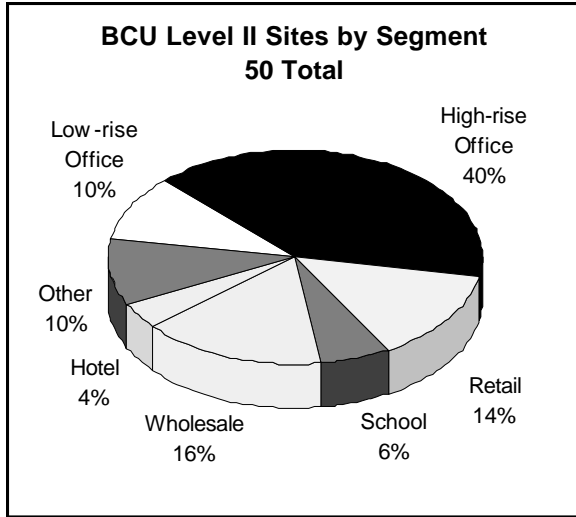
Figure 5. Preliminary BCU Customers by Building Segment
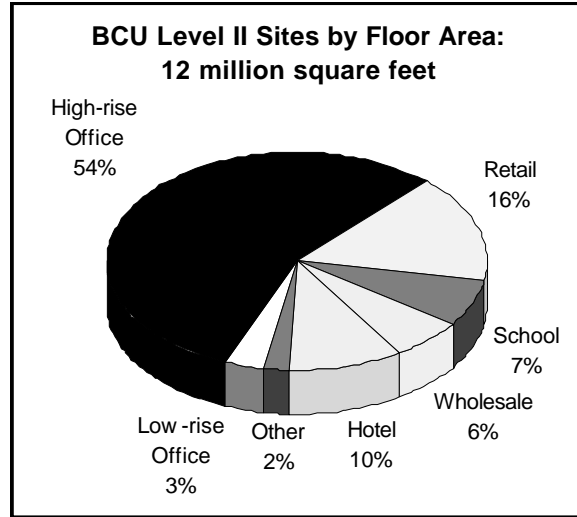
Figure 6. Preliminary BCU Customers by Floor Area

In Figure 6, the audited and analyzed floor area of all participants in the BCU program amounts to approximately 12 million square feet. The annual electrical requirements for these Level II participants totals approximately 254 GWh of energy and 56 MW of non-coincident peak demand. The total energy use for these customers, including gas and steam consumption, amounts to nearly 1,290 trillion Btu.

As shown by the "Other" category in Figures 5 and 6, many customers with building types other than those targeted for the pilot program expressed interest in the program. B.C. Hydro is responding to this interest by updating BEST to better handle the analysis of different building types. The hotel and warehouse/wholesale building segments have recently added. For other situations, special analyses have been performed to provide nearly all non-targeted customers with bill disaggregation and energy-efficiency impact information.
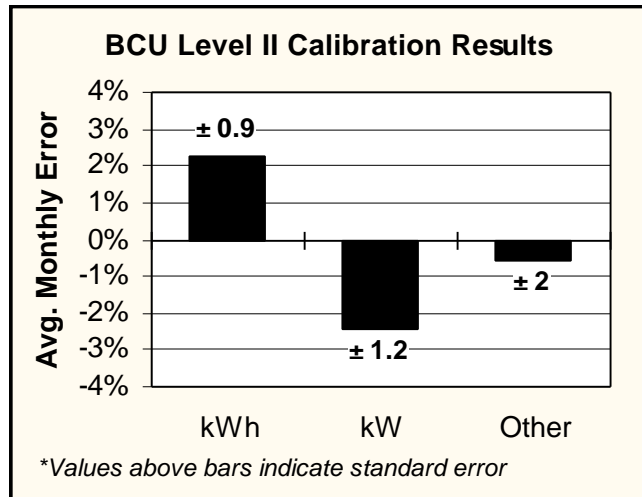
Figure 7. Average Monthly Calibration Results

Calibration to utility bills plays a key role in defining the baseline end-use requirements. As shown in Figure 7, the average monthly simulated electric energy (kWh) has generally over-predicted billed kWh by only 2.2 ± 0.9%. Simulated monthly peak demand (kW) compared surprisingly well to actual bills in under predicting billed kW by 2.4 ± 1.2%. This is particularly encouraging when considering human factors and the difference between how metered demand is figured (on a half-hour sliding window) versus DOE-2's hourly estimate. Finally, natural gas and steam combined to predict bills to within -1%. The standard error, however, was much wider (2%) which confirmed the general observation that gas and steam were relatively more difficult to calibrate against monthly utility bills.

Overall, the calibration provided an excellent baseline for screening EEOs. The analysis of EEO impacts was provided to approximately 30 of the participants and is now a standard service provided through the Level II BCU program. Of these projects, nearly 30 trillion Btu in annual energy savings were identified. This would result in an annual saving of approximately $350,000 by B.C. Hydro customers.

One application for which BEST (Level II service) has been expanded is load and market research. BEST can create end-use load profiles and save building audit data which is then used by B.C. Hydro in its database of recorded load data and building information. BEST can also be applied in other areas like new building design and area-specific load planning.

CONCLUSION

B.C. Hydro's Building Check-Up program is a promising customer service tool which serves several purposes while standing on its own as a revenue neutral program. This is especially true when the indirect marketing effects of the program are considered. Participants have received the program favorably, which helps further B.C. Hydro's customer service and marketing goals. In addition, the end-use energy analysis service acts as a mechanism to supplement other activities like load research and new building design assistance.

BEST will be expanded to include other building types and capabilities as the program progresses into full implementation. Future evaluation plans will focus on more formalized participant feedback and determining both direct and indirect cost-effectiveness of the BCU program. Since the service involves direct customer contact and is customized for each participant, focus also will be on the marketing value of the service. In an increasingly competitive utility environment, favorable customer perceptions are as important as the direct cost-effectiveness of the program. B.C. Hydro's BCU program aims to hit both of these targets.

REFERENCES

Chamberlin, J., and P. Herman. 1996. "The Energy Efficiency Challenge: Save the Baby, Throw Out the Bathwater." *The Electricity Journal*: 38–47.

Hepting, C., and J. Peterson. 1994. "Commercial Buildings End-Use Cross-Effects Analysis." *ACEEE 1994 Summer Study on Energy Efficiency in Buildings.* Washington, D.C.: American Council for an Energy-Efficient Economy (ACEEE).

Mast, B., and P. Ignelzi. 1994. The Roles of Incentives and Information in DSM Programs. *ACEEE 1994 Summer Study on Energy Efficiency in Buildings,* 10.145–10.153. Washington, D.C.: American Council for an Energy-Efficient Economy (ACEEE).

Vadon, M., P. Oatman, and C. Robbins. 1990. *Commercial Market Sector Energy End-Use Disaggregation Project: Regression Methodology.* Golden, Colorado: ERG International Consultants, Inc.

TMY2 and More!

The TMY2 World-Wide Web site is once again accessible after being under construction. As you can see from this copy of the URL (http://rredc.nrel.gov/solar/) a lot of useful information besides TMY2 data has been incorporated. All of this Solar Radiation Resource Information is presented by the Resource Assessment Program at the National Renewable Energy Laboratory. All of the underlined headings are data links; headings marked with an asterisk are available *only* on-line.

Renewable Resource Data Center

Archived Data
- •Data Products
    - •Data Files
        - •Broadband Solar Radiation Data
            - •The National Solar Radiation Data Base
                - •Daily Statistics Files (DSFs)
                - •Hourly Data Files (HDFs)
                - •The Solar Radiation Data Manual For Buildings
                    - •30-year (1961-1990) average of solar radiation and illuminance for each month
                - •The Solar Radiation Data Manual For Flat-Plate and Concentrating Collectors
                    - •Averages of solar radiation for each of the 360 months during 1961-1990
                    - •30-year (1961-1990) average of monthly solar radiation for each month
                - •Typical Meteorological Year 2 (TMY2)
            - •NOAA's Network (1977 - 1980): 39 Sites
            - •The Solar Energy Meteorological Research and Training Sites Network
            - •The WEST Associates' Network (1976 - 1980)
        - •NREL's Circumsolar Data Base
        - •NREL's Spectral Solar Radiation Data Base
    - •U.S. Solar Radiation Resource Maps

NREL Data Collection Activities
- •The Solar Radiation Research Laboratory

Publications
- •Circumsolar Radiation Data Manual
- •National Solar Radiation Data Base User's Manual (1961-1990)
- •Shining On Manual
- •The Solar Radiation Data Manual for Buildings
- •The Solar Radiation Data Manual For Flat-Plate and Concentrating Collectors
- •Spectral Solar Radiation Data Base Documentation, Vol. I
- •The Standard Broadband Format Manual
- •TMY2 User's Manual
- •WEST Associates On-line Data Manual*
- •Glossary of Solar Radiation Resource Terms*

Newsletters are a great way to keep up to date on news within the building energy efficiency community. Here is our "short list" of the best.

Advanced Buildings **http://greenbuilding.ca/GBIC.html/** Newsletter of the Royal Architectural Institute of Canada. Building simulation activities in Canada. Good sections on book reviews and upcoming events. There is a charge for this newsletter; call for a sample copy.	**Contact:** Nils Larsson, editor RAIC 55 Murray Street, Suite 330 Ottawa, Ontario K1N 5M3 Canada	Ph: 613-232-2330 Fx: 613-232-7018
Blueprint **http://www.energy.ca.gov/efficiency/blueprint** Newsletter devoted to the California residential and commercial building energy codes. Always an interesting Question/Answer section.	**Contact:** Dee Anne Ross California Energy Commission Energy Standards Office 1516-9th Street, MS: 25 Sacramento, CA 95814-5512	Ph: 916-654-4064
Building Systems Update **http://www.ased.pnl.gov:2080/** The Building Systems Program at Pacific Northwest National Laboratory's periodically publishes a newsletter of their activities.	**Contact:** Mark Hattrup mp_hattrup@pnl.gov Pacific Northwest Nat'l Laboratory P.O. Box 999-MSIN K5-16 Richland, WA 99352	Ph: 509-372-4348 Fx: 509-372-4983
CADDET **http://www.caddet.co.uk/** IEA's international newsletter on energy efficiency. Practical and innovative articles by international energy researchers and practitioners.	**Contact:** Marilyn Brown Oak Ridge National Lab P.O. Box 2008 Oak Ridge, TN 37831-6186	Ph: 423-576-8152
Center for Building Science News **http://eande.lbl.gov/CBS/** Capsule summaries of the advanced building energy research being done at LBNL	**Contact:** Joanne M. Lambert JMLambert@lbl.gov MS: 90-3058 Center for Building Science Lawrence Berkeley Nat'l Lab Berkeley, CA 94720	Ph: 510-486-4835 Fx: 510-486-5394
Conservation Update State-by-state news of energy-related activities.	**Contact:** Karen Landry, editor Kentucky Department of Energy 663 Teton Trail Frankfurt, KY 40601	Ph:502-564-7192 Fx: 502-564-7484
Fenestration R&D **http://eande.lbl.gov/BTP/pub/FenRD/FenRD.html** Everything you ever wanted to know about DOE-sponsored windows and glazing research at LBNL. Also building simulation news, websites, names, and addresses related to building energy efficiency.	**Contact:** Pat Ross, MS: 90-3111 PLRoss@lbl.gov Windows & Lighting Group Lawrence Berkeley Nat'l Lab Berkeley, CA 94720	Ph: 510-486-6845 Fx: 510-486-4089

Energy Systems Update **http://www-esl.tamu.edu/** Simulation and research news from the Energy Systems Laboratory at TAMU	**Contact:** Jeff Haberl jhaberl@esl.tamu.edu Energy Systems Laboratory Texas A&M University College Station, TX 77843	

IAEEL Newsletter **http://eff.nutek.se/IAEEL/IAEEL.html** International Association for Energy-Efficient Lighting. Lighting research and discussions of lighting energy efficiency and safety issues.	**Contact:** Nils Borg, editor nils.borg@nutek.se IAEEL c/o NUTEK S-11786 Stockholm, Sweden	Ph: +46-701-103700 Fx: +46-701-103800

IBPSA News **http://next1.mae.okstate.edu/ibpsa/** Newsletter of the International Building Performance Simulation Association (IBPSA). Technical articles about innovative building simulation techniques. Membership is required to receive newsletter. Inquire about sample copies. Proceedings from past IBPSA conferences are still available; see p. 31 for details.	**U.S. Contact:** Larry Degelman larry@archone.tamu.edu Dept of Architecture Texas A&M University College Station, TX 77843 **Int'l Contact**: Marion Bartholomew 100572.3163@compuserve.com David Bartholomew Associates 16 Nursery Gardens Purley-on-Thames, Reading RG8 8AS United Kingdom	Ph: 409-845-1015 Fx: 409-862-1571 Ph/Fx: +44-118 984 2861

Lighting Design Lab News **www.light-link.com/ldl** Lighting lab activities in the Pacific Northwest. Lots of workshops and classes listed	**Contact:** Randy Smith, editor Lighting Design Lab 400 East Pine Street, Suite 100 Seattle, WA 98122	Ph: 206-325-9764 Fx: 206-329-9532

Lighting Futures **www.rpi.edu/dept/lrc/futures/futures.html** Articles on emerging lighting technologies. Great resource list of lighting websites and contacts.	**Contact:** Catherine Luo, editor luoc@rpi.edu Lighting Research Center Rensselaer Polytechnic Institute Troy, NY 12180-3590	Fx: 518-276-2999

Recent Research **http://eande.lbl.gov/EAP/BEA** Short, one-page one-subject newsletter. Recent topics were high-albedo roof coatings, straw bale construction, the Energy Edge Project, EnergyStar computers, etc.	**Contact:** Alan Meier, editor AKMeier@lbl.gov MS: 90-2000 Building Energy Analysis Group Lawrence Berkeley National Lab Berkeley, CA 94720	Ph: 510-486-4740 Fx: 510-486-4673

Setting the Standard **http://www.energycodes.org/news/setting.htm/** Newsletter of the U.S. Department of Energy's Building Standards and Guidelines Program.	**Contact:** Rosalind Schrempf Pacific Northwest Nat'l Laboratory P.O. Box 999-MSIN K5-16 Richland, WA 99352	Ph: 1-800-270-CODE

Solar Update Newsletter of the International Energy Agency Solar Heating and Cooling Programme. Articles, publications, and announcements directed toward solar researchers.	**Contact:** Pamela Murphy Kunz Pmurphykunz@compuserve.com Morse Associates, Inc. 1808 Corcoran Street NW Washington, DC 20009	Ph: 202-483-2393 Fx: 202-265-2248

"Building Loads Analysis and System Thermodynamics"

blastnews

The **Building Loads Analysis and System Thermodynamics (BLAST)** system is a comprehensive set of programs for predicting energy consumption and energy system performance and cost in buildings. The BLAST system was developed by the U.S. Army Construction Engineering Research Laboratory (USACERL) under the sponsorship of the Department of the Air Force, Air Force Engineering and Services Center (AFESC), and the Department of the Army, Office of the Chief of Engineers (OCE). After the original release of BLAST in December 1977, the program was extended and improved under the sponsorship of the General Services Administration, Office of Professional Services; BLAST Version 2.0 was released in June 1979. Under the sponsorship of the Department of the Air Force, Aeronautical System Division, and the Department of Energy, Conservation and Solar Energy Office, the program was further extended; BLAST Version 3.0 was completed in September 1980. Since 1983, the BLAST system has been supported and maintained by the BLAST Support Office at the University of Illinois at Urbana-Champaign.

BLAST can be used to investigate the energy performance of new or retrofit building design options of almost any type and size. In addition to performing peak load (design day) calculations necessary for mechanical equipment design, BLAST also estimates the annual energy performance of the facility, which is essential for the design of solar and total energy (cogeneration) systems and for determining compliance with design energy budgets. Repeated use of BLAST is inexpensive; it can be used to evaluate, modify, and re-evaluate alternate designs on the basis of annual energy consumption and cost.

The BLAST analysis program contains three major subprograms:

- The Space Load Prediction subprogram computes hourly space loads in a building based on weather data and user inputs detailing the building construction and operation.

- The Air Distribution System Simulation subprogram uses the computed space loads, weather data, and user inputs describing the building air- handling system to calculate hot water, steam, gas, chilled water, and electric demands of the building and air-handling system.

- The Central Plant Simulation subprogram uses weather data, results of the air distribution system simulation, and user inputs describing the central plant to simulate boilers, chillers, on-site power generating equipment and solar energy systems; it computes monthly and annual fuel and electrical power consumption.

BLAST Support Office (BSO)

30 Mechanical Engineering Bldg

University of Illinois

1206 West Green Street

Urbana, IL 61801

Telephone: (217) 333-3977

FAX: (217) 244-6534

email: support@blast.bso.uiuc.edu

http://www.bso.uiuc.edu

Heat Balance Loads Calculator (HBLC)

The BLAST graphical interface (HBLC) is a Windows-based interactive program for producing BLAST input files. HBLC allows the user to visualize the building model as it is developed and modify previously created input files. Within HBLC, each story of the building is represented as a floor plan which may contain several separate zones. Numerous other building details may be investigated and accessed through simple mouse operations. On-line helps provide valuable on-the-spot assistance that will benefit both new and experienced users. HBLC is an excellent tool which will make the process of developing BLAST input files more intuitive and efficient. You can download a demo version of HBLC (for MS Windows) from the BLAST website (User manual included!).
A FREE UPGRADE IS AVAILABLE to registered users, as of July 11. To obtain a password and instructions for downloading, email to: support@blast.bso.uiuc.edu, or call (217) 333-3977. This upgrade may also be obtained by post for a nominal fee.

WINLCCID 96

LCCID (Life Cycle Cost in Design) has been a standard in the DoD community since its initial release in 1986. LCCID was developed to perform Life Cycle Cost Analyses (LCCA) for the Department of Defense 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. The WinLCCID96 life cycle cost program [See *User News* Vol. 16, No. 4, p. 5].
You can download a demo version of WINLCCID 96 (for MS Windows) from the BLAST website.

PC BLAST Package

The standard PC BLAST Package includes the following programs: BLAST, HBLC, BTEXT, WIFE, CHILLER, Report Writer, Report Writer File Generator, Comfort Report program, and the Weather File Reporting Program. A soft copy of the BLAST manual will be included as help files with the software. The Portable BLAST Package does not include HBLC or HBLC source. Executable version of BLAST Software Package for an IBM 386/486/Pentium with a Numeric Co-Processor

	3B386E3-0695	$ 950.00
PORTABLE BLAST (on DOS Formatted Disks)	3BPORA3-0695	$1500.00
Source code plus PC Executables and HBLC		
Separate Programs	**Order Number**	**Price**
WINLCCID 96 (initial purchase)	3LCC3-0396	$ 295.00
WINLCCID 96 (update from Level 92)	4LCC3-0396	$ 195.00
SOLFEAS (initial purchase)	3SOL3-1194	$ 100.00
Control Profile Macros for Lotus or Symphony	3010-0388	$ 35.00
Design Week Creation Program	3DWEE3-0494	$ 35.00
BLAST 3.0 Documentation Set (Enter Quantity)		
Printed version in a 3-ring binder	1001-0695	$ 250.00

The last four digits of the catalog number indicate the month and year the item was released or published. This will enable you to see if you have the most recent version. All software will be shipped on 3.5" high density floppy disks unless noted otherwise.

DOE-2 DIRECTORY
Program Related Software and Services
Contact the vendors for prices and ordering information

Mainframe and Workstation Versions of DOE-2

DOE-2.1D and 2.1E
(Source code, executable code and documentation)
    For 2.1E DEC-VAX, Order #000158-DOVAX-02
    For 2.1E SUN-4, Order #000158-SUN-0000
    For 2.1D DEC-VAX, Order #000158-D6220-01
For a complete listing of the software available from ESTSC order their "Software Listing" catalog ESTSC-2. [See *User News* Vol. 16, No. 3, p. 21]
	Energy Science / Technology-
	    Software Center (ESTSC)
	P.O. Box 1020
	Oak Ridge, TN 37831-1020
	Phone: (615) 576-2606
	Fax: (615) 576-2865
	ESTSC@ADONIS.OSTI.GOV
	www.doe.gov/html/osti/

FTI-DOEv2.1E (Source code and documentation) Source code for both the Lawrence Berkeley National Laboratory distribution and FTI/DOE. The LBNL version is the combined SUN and VAX versions. FTI/DOE is fully portable and ready to compile. This is the source code distribution only. No executables are included with the package. Executables for most platforms are available. [See *User News* Vol. 12, No. 4, p. 16]	Finite Technologies, Inc 3763 Image Drive Anchorage, AK 99504 Contact: Scott Henderson Phone: (907) 333-8933 Fax: (907) 333-4482 info@finite-tech.com www.finite-tech.com/

PC Versions of DOE-2

ADM-DOE2 ADM-DOE2 (DOE-2.1E) is compiled for use on 386/486 PCs with a math co-processor and 4MB of RAM. It runs in a DOS or Windows environment and is a highly reliable and tested version of DOE-2 which contains all of the 1994/95 enhancements to the program. The package contains everything needed to run the program: program files, utilities, sample input files, and weather files. More than 300 weather files are available (TMY, TRY, WYEC, CTZ formats) for the U.S. and Canada. [See *User News* Vol. 7, No. 2, p. 6]	ADM Associates, Inc. 3239 Ramos Circle Sacramento, CA 95827 Contact: Marla Sullivan, Sales Phone: (916) 363-8383 Fax: (916) 363-1788
CECDOEDC (Version 1.0A) A microcomputer version of DOE-2.1D with a pre- and post-processor designed strictly for compliance use within the State of California. It generates some of the standard compliance forms as output. Order P40091009 for the CECDOEDC Program with Manuals. Order P40091010 for the DOE-2.1 California Compliance Manual. [See *User News* Vol. 12, No. 4, p. 13]	MS: 13 – Publication Office California Energy Commission P.O. Box 944295 Sacramento, CA 94244-2950 Phone: (916) 654-5106
EnergyPro (Win/DOE) A new Windows-based building energy analysis program designed to run on WindowsNT and Windows95. EnergyPro provides a next-generation interface for fast inputting and analyzing, including drag-and-drop, cut/copy/paste, and full graphic printout. Nonresidential modules include heating and cooling loads, California Title 24 Prescriptive Method compliance calculations, and tailored lighting calculations. A version of DOE-2 is available for use outside California. [See *User News* Vol. 18, No. 2, p. 2-8]	Gabel-Dodd / EnergySoft, LLC 100 Galli Drive, Suite 1 Novato, CA 94949 Contact: Eric Walstad Phone: (415) 883-5900 Fax: (415) 883-5790 Martyn@energysoft.com www.energysoft.com

Caveat : We list third-party DOE-2-related products and services for the convenience of program users, with the understanding that the Simulation Research Group does not have the resources to check the DOE-2 program adaptations and utilities for accuracy or reliability.

PC Versions of DOE-2 (continued)

DOE-Plus DOE-Plus, a complete implementation of DOE-2.1D, is used to interactively input a building description, run DOE-2, and plot graphs of simulation results. Interactive error checking, context-sensitive help for all DOE-2 keywords, a 3-D view of the building that can be rotated, and several useful utilities. Also from ITEM Systems: **Demand Analyzer,** uses templates of building types and vintages to simplify DOE-2 input requirements. Online help feature. **Prep,** a batch preprocessor, ideal for parametric studies, that enables conditional text substitution, expression evaluation, and spawning of other programs. [See *User News* Vol. 11, No. 4, p. 4 and Vol. 13, No. 2, p. 54, and Vol. 16, No. 1, p. 28-32	ITEM Systems 321 High School Road NE, #344 Bainbridge Isl., WA 98110 Contact: Steve Byrne Phone: (206) 855-9540 Fax: (206) 855-9541 byrne@item.com
EZDOE EZDOE is an easy-to-use PC version of DOE-2.1D. It provides full screen, fill in the blank data entry, dynamic error checking, context-sensitive help, mouse support, graphic reports, a 750-page user manual, extensive weather data, and comprehensive customer support. EZDOE integrates the full calculation modules of DOE-2 into a powerful, full implementation of DOE-2 on DOS-based 386 and higher computers. [See *User News* Vol. 14, No. 2, p. 10 and No. 4, p. 8-14]	Elite Software, Inc. P.O. Drawer 1194 Bryan, TX 77806 Contact: Bill Smith Phone: (409) 846-2340 Fax: (409) 846-4367 76070.621@compuserve.com
FTI-DOEv2.1E Highly optimized version of DOE-2.1E software, available for most computing systems. Current support: MSDOS and Windows 3.x, Windows NT, (AIX), NeXT, and SUN. Call for platforms not listed. Documentation and weather files are available. [See *User News* Vol. 12, No. 4, p. 16]	Finite Technologies, Inc 821 N Street, #102 Anchorage, AK 99501 Contact: Scott Henderson Phone: (907) 272-2714 Fax: (907) 274-5379 info@finite-tech.com www.finite-tech.com/fti/
MICRO-DOE2ä MICRO-DOE2 (2.1E), running in a DOS or Windows environment, is a widely used, reliable, and tested PC version of DOE-2.1E. It includes automatic weather processing, batch file creation, and a User's Guide with instructions on how to set up a RAM drive. System requirements: 386/486 PC with 4 MB of RAM and math co-processor. Also from ACROSOFT/CAER Engineers: **NETPath**, a network edition of MICRO-DOE2 for up to five users, allows you to store and run DOE-2 application files on one machine using input files from another machine. The result is improved space usage and project file management. **POWERPath**, for single machines, allows you to keep MICRO-DOE2 application files in one directory and submit input from any other directory. **BDL Builder** is a user-friendly Windows-implemented pre-processor for DOE-2.1E that allows the description of specific building and HVAC characteristics with numeric input by preparing databases, or building blocks, and then selecting records from the databases to assemble a complete input. **E2BB** translates existing DOE-2.1E text input to BDL Builder. **Weather Files** for most U.S., Canadian, and European cities are available in various formats, including TRY, TMY, CTZ, and WYEC. [See *User News* Vol. 7, No. 4, p. 2; Vol. 11, No. 1, p. 2; Vol. 15, No. 1, p. 8; Vol. 15, No. 3, p. 4; Vol. 16, No. 2, p. 1,7; Vol. 16, No. 4, p. 7-8]	ACROSOFT / CAER Engineers 1204-1/2 Washington Avenue Golden, CO 80401 Contact: Don Croy Phone: (303) 279-8136 Fax: (303) 279-0506 102447.2611@COMPUSERVE.COM

PC Versions of DOE-2 (continued)

PRC-DOE2 A fast, robust and up-to-date PC version of DOE-2.1E. Runs in extended memory, is compatible with any VCPI compliant memory manager and includes its own disk caching. 377 weather data files available (TMY, TRY, WYEC, CTZ) for the U.S. and Canada **PRC-TOOLS** is a set of PC programs that aids in extracting, analyzing and formatting hourly DOE-2 output. Determines energy use, demand, and cost for any number of end-uses and periods. Automatically creates 36-day load shapes. Custom programs also available.	Partnership for Resource Conservation 140 South 34th Street Boulder, CO 80303 Contact: Paul Reeves Phone: (303) 499-8611 FAX: (303) 554-1370 paulreeves@aol.com
VisualDOE 2.5 for Windows TM VisualDOE 2.5, which uses DOE-2.1E as the calculation engine, enables architects and engineers to quickly evaluate the energy savings of HVAC and other building design options. Program is supported by a graphical interface and on-line help. Program includes climate data for the 16 California weather zones. A demo can be downloaded from http://www.eley.com. [See *User News* Vol. 15, No. 2, p. 10; Vol. 16, No. 4, p. 9-16; Vol. 17, No. 4, p. 8-13]	Eley & Associates 142 Minna Street San Francisco, CA 94105 Charles Eley or John Kennedy Phone: (415) 957-1977 / Fax: -1381 celey@eley.com www.eley.com

Pre- and Post-Processors for DOE-2

DrawBDL DrawBDL, Version 2.02, is a graphic debugging and drawing tool for DOE-2 building geometry; it runs on PCs under Microsoft Windows. DrawBDL reads your BDL input and makes a rotatable 3D drawing of your building with walls, windows, and building shades shown in different colors for easy identification. [See *User News*, Vol. 14, No. 1, p. 5-7, Vol. 14, No. 4, p. 16-17, and Vol. 16, No. 1, p.37]	Joe Huang & Associates 6720 Potrero Avenue El Cerrito, CA 91364 Contact: Joe Huang Phone/Fax: (510) 236-9238

Visualize-IT Visual Data Analysis Tools
 	
The *Energy Information Tool* is a Microsoft Windows 3.1 program for looking at and understanding metered or DOE-2.1E hourly input data. It provides the unprecedented ability to see all 8760 (or 35040) data points for a year's worth of data. You get an overview of the data with an EnergyPrintTM and can then explore the data with a variety of tools including load shapes, load duration curves, etc. This program requires a 486 computer and SVGA graphics capabilities.
The *Calibration Tool* is a Microsoft Windows 3.1 program for comparing DOE-2.1E hourly output data to total load and/or end-use metered data. Options include monthly demand and load 2D graphs, maximum and seasonal load shapes, average load profiles, end use residuals, monthly average week and weekend days, and dynamic comparison load shapes. This program requires a 486 computer and SVGA graphics capabilities. [See *User News* Vol. 17, No. 2, p. 2-6]
	RLW Analytics, Inc.
	1055 Broadway, Suite G
	Sonoma, CA 95476
	Contact:
	    Jim McCray
	    Pat Bailey
	    Jedd L. Parker
	
	Phone: (707) 939-8823
	Fax: (707) 939-9218
	info@rlw.com
	www.rlw.com

D O E 1 2 3 Uses Lotus 1-2-3 to graphically display DOE-2.1D output as bar charts, pie charts, and line graphs. [See *User News* Vol. 10, No. 3, p. 5]	Ernie Jessup 4977 Canoga Avenue Woodland Hills, CA 91364 Phone: (818) 884-3997
Graphs for DOE-2 2-D, 3-D, hourly, daily, and psychrometric plots [See *User News* Vol. 13, No. 1, p. 5]	Energy Systems Laboratory Texas A&M University College Station, TX 77843 Contact: Jeff Haberl Phone : (409) 845-6065 Fax: (409) 862-2762
Pre-DOE A math pre-processor for BDL.	Nick Luick 19030 State Street Corona, CA 91719 Phone: (714) 278-3131

TOOLS AND TRAINING

User News **(a quarterly newsletter)** Sent without charge, the newsletter prints documentation updates and changes, bug fixes, inside tips on using the programs more effectively, and articles of special interest to users of DOE-2, BLAST, SPARK and their derivatives. The winter issue features an index of articles printed in all the back issues. Also available electronically at http://eande.lbl.gov/BTP/srg.html	Simulation Research Group Bldg. 90, Room 3147 Lawrence Berkeley National Laboratory Berkeley, CA 94720 Contact: Kathy Ellington Fax: (510) 486-4089 kathy@gundog.lbl.gov
Help Desk Bruce Birdsall Call or fax Bruce Birdsall if you have a question about using DOE-2. If you need to fax an example of your problem to Bruce, please be sure to telephone him prior to sending the fax. This is a free service provided by the Simulation Research Group at Lawrence Berkeley National Laboratory.	Bruce Birdsall Phone/Fax: (510) 829-8459 Monday through Friday 10 a.m. to 3 p.m. Pacific Time
Training DOE-2 courses for beginning and advanced users.	Energy Simulation Specialists, Inc. 64 E. Broadway, Suite 230 Tempe, AZ 85282 Contact: Marlin Addison Phone: (602) 784-4500
Instructional DOE-2 Video and Manual Takes you step-by-step in DOE-2.1D input preparation and output interpretation.	Dr. Michael Brandemuehl, Director JCEM/U. Colorado CEAE Dept CB 428 Boulder, CO 80309-0428 Phone: (303) 492-3915, fax 492-7317

DOE-2.1E Bug Fixes via FTP

If you have Internet access you can obtain the latest bug fixes to the LBNL version of DOE-2.1E by anonymous ftp. Here's how…

   ftp to either gundog@lbl.gov or to 128.3.254.10
    login: *type* anonymous
    passwd: *type in your email address*

After logging on, go to directory pub/21e-mods ; bug fixes are in files that end with **.mod** . A description of the fixes is in file **VERSIONS.txt** in directory **pub** . Each fix has its own version number, *nnn* , which is printed out as DOE-2.1E- *nnn* on the DOE-2.1E banner page and output reports when the program is recompiled with the fix. You may direct questions about accessing or incorporating the bug fixes to Ender Erdem (ender@gundog.lbl.gov).

WEATHER RESOURCES

TMY2 weather data for DOE-2. ENERGOS will provide TMY2 data for 239 cities converted for use with DOE-2 for PC versions of the program (DOE-2.1C through DOE-2.1E).	Kurmit Rockwell ENERGOS 1705-14th Street, #401 Boulder, CO; 80302 Phone: (303) 499-7907 / Fax: (303) 449-7605
Comprehensive collection of **TRY**, **TMY** and **CTZ** weather file libraries, from NCDC, which can be used on all PC versions of DOE-2. Includes original source data and pre-formatted packed versions on a single IBM format CD. For Canadian users, the CD contains five weather files representing the five climate regions established by the Canadian energy codes. Individual sites available.	Jenny Lathum or Martyn Dodd Gabel-Dodd / EnergySoft, LLC 100 Galli Drive, Suite 1 Novato, CA 94949 Phone: (800) 467-4738 Fax: (415) 883-5970
European Weather Files	Andre Dewint Alpha Pi, s.a. rue de Livourne 103/12 B-1050 BRUXELLES, Belgium Phone: 32-2-649-8359 / Fax: 32-2-649-9437
TMY data sets - download from the World Wide Web **TMY2** data sets and **TMY2 User Manual** - download from the World Wide Web [See *User News* Vol. 18, no. 2, p. 17]	TMY: http//oipea- www.rutgers.edu/html_docs/ TMY/tmy.html (TMY) TMY2: http://rredc.nrel.gov/solar/ (TMY2)
TMY (Typical Meteorological Year) **TRY** (Test Reference Year)	National Climatic Data Center 151 Patton Avenue, #120 Asheville, NC 28801 Phone: (704) 271-4871 order / Fax 271-4876
CTZ (California Thermal Climate Zones)	California Energy Commission Bruce Maeda, MS-25 1516-9th Street Sacramento, CA 95814-5512 1-800-772-3300 Energy Hotline
WYEC (Weather Year for Energy Calculation)	ASHRAE 1791 Tullie Circle N.E. Atlanta, GA 30329 Phone: (404)636-8400 / Fax: (404)321-5478
Canadian Weather Files in WYEC2 Format [Note: the original long-term data sets, up to 40 years of data, from which the CWEC files were derived can also be obtained directly from Environment Canada. Contact Mr. Robert Morris at (416) 739-4361.]	Dr. Didier Thevenard Watsun Simulation Lab University of Waterloo Waterloo, Ont., N2L-3G1 Canada Phone: (519) 888-4904 / Fax: (519) 888-6197 watsun@helix.watstar.uwaterloo.ca

DOE-2 ENERGY CONSULTANTS

Arizona

Chuck Sherman	Energy Simulation Specialists	64 East Broadway, #230	Tempe, AZ 85282	(602) 784-4500

California

George Marton	1129 Keith Avenue		Berkeley, CA 94708	(510) 841-8083
Jeff Hirsch	James J. Hirsch Associates	12185 Presilla Road	Camarillo, CA 93012	(805) 532-1045
Leo Rainer	Davis Energy Group, Inc.	123 C Street	Davis, CA 95616	(916) 753-1100
L. Heshong, D. Mahone	The Heshong Mahone Group	11622 Fair Oaks Blvd, #111	Fair Oaks, CA 95628	(916) 962-7001
Steven D. Gates, P.E.	11608 Sandy Bar Court		Gold River, CA 95670	(916) 638-7540
David J. Schwed	Romero Management Assoc	1805 West Avenue K	Lancaster, CA 93534	(805) 940-0540
Robert E. Gibeault	A-TEC	5515 River Avenue, # 301	Newport Beach, CA 92663	(714) 548-6836
Martyn C. Dodd	Gabel-Dodd/EnergySoft, LLC	100 Galli Drive, # 1	Novato, CA 94949	(415) 883-5900
Robert Mowris, P.E.	10 Ridge Road		Orinda, CA 94563	(510) 254-9770
Greg Cunningham	EnerSys Solutions LLC	114 Sansome St., #1201	San Francisco, CA 94104	(415) 296-9760
Charles Eley	Eley Associates	142 Minna Street	San Francisco, CA 94105	(415) 957-1977
Chandra Shinde, P.E.	ENVIRODESIGN GROUP	385 S. Lemon Ave., E-266	Walnut, CA 91789	(909) 598-1980

Colorado

David A. Cohen	Architectural Energy Corp	2540 Frontier Ave, #201	Boulder, CO 80301	(303) 444-4149
Ellen Franconi	P.O. Box 1284		Boulder, CO 80306	(303) 786-7319
Kurmit Rockwell	Rocky Mtn Energy Services	1705 14th Street, # 401	Boulder, CO 80302	(303) 499-7907
Charles Fountain	Burns & McDonnell	8055 E. Tufts Avenue, #330	Denver, CO 80230	(303) 721-9292
Susan Reilly	Enermodal Engineering	1554 Emerson Street	Denver, CO 80218	(303) 861-2070
Donald E. Croy	Acrosoft/CAER Engineers	814 Eleventh Street	Golden, CO 80401	(303) 279-8136
Joel Neymark, P.E.	2140 Ellis Street		Golden, CO 80401	(303) 384-3672
Norm Weaver	Interweaver Consulting	P.O. Box 775444	Steamboat Spgs, CO 80477	(970) 870-1710

Connecticut

Adrian Tuluca	Steven Winter Associates	50 Washington Street	Norwalk, CT 06854	(203) 852-0110

Florida

Philip Wemhoff	1512 South McDuff Avenue		Jacksonville, FL 32205	(904) 632-7393
Dr. Paul Hutchins PE,CEM	Reynolds Smith & Hills, Inc.	4651 Salisbury Road	Jacksonville, FL 32256	(904) 279-2277

Georgia

Lung-Sing Wong	Building Performance Engrs.	1351 Oakbrook Dr., #100	Norcross, GA 30093	(770) 409-0400

Illinois

Michael P. Doerr	Skidmore Owings Merrill	224 S Michigan Ave # 1000	Chicago, IL 60604	(312) 360-4623
Gary H. Michaels, P.E.	G.H. Michaels Associates	1512 Crain Street	Evanston, IL 60202	(847) 869-5859
Prem N. Mehrotra	General Energy Corp.	230 Madison Street	Oak Park, IL 60302	(708) 386-6000
Robert Henninger, P.E.	GARD Analytics, Inc.	1028 Busse Highway	Park Ridge, IL 60068-1802	(847) 698-5686

Kansas

Dr. Brian A. Rock, P.E.	Marvin Hall	University of Kansas	Lawrence, KS 66045-2222	(913) 864-3434

Missouri

Mike Roberts	Roberts Engineering Co.	11946 Pennsylvania	Kansas City, MO 64145	(816) 942-8121
Bruce A. Leavitt, P.E.	Wm. Tao & Associates Inc.	2357-59th Street	St. Louis, MO 63110	(314) 644-1400

Montana

Michael W Harrison, P.E.	139 Bluebird Lane		Whitehall, Montana 59759	(406) 287-5370

New York

J. Fireovid, K. Yousef	SAIC Energy Solutions Div.	1 Marcus Boulevard	Albany, NY 12205	(518) 458-2249

North Carolina

Hank Jackson, P.E.	P.O. Box 675		Weaverville, NC 28787-0675	(704) 658-0298

Oregon

J. Karasaki PE, R. Ogle PE	CBG Consulting Engineers	6650 SW Redwood Lane, #355	Portland, OR 97224	(503) 620-3232

Texas

Jeff S. Haberl	Energy Systems Laboratory	Texas A&M University	College Stn., TX 77843-3123	(409) 845-6065

Washington

Steve Byrne	ITEM Systems, suite 344	321 High School Road NE	Bainbridge Isl, WA 98110	(206) 855-9540
Gregory Banken, P.E.	Q-Metrics, Inc.	P.O. Box 3016	Woodinville, WA 98072	(205) 915-8590
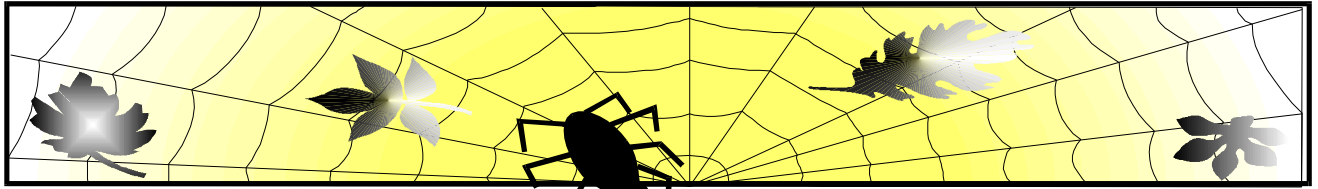
World-Wide Web and Internet Sites for Building Energy Efficiency

The first two listings are newsgroups, not websites	
(net) sci.engr.heat-vent-ac	**HVAC** discussion group.
(net) sci.engr.lighting	**Lighting** discussion group.

These URLs, on the World-Wide Web, start with http://	
www.bso.uiuc.edu	**BLAST** Support Office
www.energy.ca.gov/energy/cectext/ ETEC.html	**California Energy Commission's Energy Technology and Education Center**. See *User News* , Vol. 16, No. 1, p. 42.
www.hike.te.chiba-u.ac.jp/ikeda/ CIE/publ/110-94.html	**The International Commission on Illumination – CIE** See *User News* , Vol. 16, No. 1, p. 44.
www.eren.doe.gov/	**EREN**: Energy Efficiency and Renewable Energy Network of the U.S. Department of Energy . See *User News* , Vol. 16, No. 1, p. 44.
www.doe.gov/	**U.S. Department of Energy** . See *User News* , Vol. 15, No. 4, p. 1.
www.whitehouse.gov/	**The White House** home page contains an Interactive Citizens Handbook that lists U.S. Government servers by agency. Use this site as a jumping-off point to explore other Federal agencies. See *User News* , Vol. 15, No. 4, p. 1.
www.fedworld.gov/	**FedWorld** is the U.S. Government's Federal Information Network home page. It lists web servers, ftp, gopher, and telnet sites and is organized by subject categories. See *User News*, Vol. 16, No. 2, p. 22.
www.fedworld.gov/ntis/ntishome.html	**National Technical Information Service** NTIS gathers and markets scientific, technical and business-related information.
www.caddet-ee.org	**Center for the Analysis and Dissemination of Demonstrated Energy Technologies** An IEA program for collecting and disseminating information on, energy-efficient and renewable energy technologies. See *User News* , Vol. 16, No. 2, p. 23.
crest.org/aceee	**American Council for an Energy-Efficient Economy** A non-profit organization for the advancement of energy efficiency. See *User News* , Vol. 16, No. 2, p. 23.
www.ashrae.org	**American Society of Heating, Refrigeration and Air-Conditioning** An international membership organization for HVAC professionals. *User News* , Vol. 16, No. 3, p. 31.
www.cisti.nrc.ca/irc/irccontents.html	**[Canadian] Institute for Research in Construction** IRC is part of the NRC, Canada's premier science and technology agency. See *User News* , Vol. 16, No. 3, p. 31.
next1.mae.okstate.edu/ibpsa/	**International Building Performance Simulation Association** An international society of building performance simulation professionals. See *User News*, Vol. 16, No. 4, p. 35.
www.fsec.ucf.edu/	**Florida Solar Energy Center** State of Florida's energy institute specializing in energy research and education in partnership with private and public organizations. See *User News,* Vol. 17, No. 1, p. 29.
www.homeenergy.org	**Home Energy Magazine** An impartial source of analysis to aid the energy practitioner and the public in making informed decisions on energy conservation measures. See *User News,* Vol. 17, No. 1, p. 29 and Vol. 17, No. 4, p. 1.

eande.lbl.gov/BTP/WDG/
      /RESFEN/resfen.html
 	
 /SUPERLITE/superlite2.html
      /WDG.html
	Download Fenestration software from LBNL See *User News*, Vol. 17, No. 1, p. 14.
	
	 RESFEN-2.4 – calculates residential fenestration heating and cooling energy use/costs
	 SUPERLITE-2.0 – calculates daylight illuminance distributions for room geometries
	 WINDOW-4.1 – thermal analysis program characterizes window performance

http://www.energy.ca.gov/reports/ title24/index.html	**State of California's Title 24 Building Energy Standards** See *User News*, Vol. 17., No. 2, p. 25.
fcn.state.fl.us/fdi/fdi-home.htm	**State of Florida's Design Initiative (FDI)** See *User News*, Vol. 17, No. 2, p. 25.
fcn.state.fl.us/fdi/edesign/online/ edo.htm	*e-design*, the online newsletter for Florida's Design Initiative See *User News*, Vol. 17, No. 2, p. 25.

www.energy.wsu.edu/ep/
 	
      wsu.edu/ep/eic/
 	
      wsu.edu/ep/eic/eicsoft.htm
 	
      wsu.edu/ep/eic/eicfiles.htm
	The **EnergyProgram (EP)** of Washington State U. *User News*, Vol. 17, No. 3, p.26.
	 Energy Ideas Clearinghouse, 925 Plum St S.E., Olympia, WA 98504-3171 (360) 956-2237
	 Software and files from the Energy Ideas Clearinhouse
	
	 More download-able energy software from the Energy Ideas Clearinhouse

eande.lbl.gov/CBS/VH/advisor.html	The **Virtual Home Energy Advisor** from LBNL's Center for Building science. Run a quick heating-cooling model and see how much homes in your region can save. See *User News*, Vol. 17, No. 3, p.26.
www.pge.com/customer_services/ other/pec/homepage/pec.html	Pacific Gas & Electric's **Energy Center** located in San Francisco, CA. See *User News*, Vol. 17, No. 4, p. 35
dial.uwaterloo.ca/~watsun/home.htm	**Watsun Simulation Laboratory** was established with the support of the National Research Council of Canada. Its mission is to develop general purpose simulation software for solar energy system simulation performance. See *User News*, Vol. 17, No. 4, p. 35.
www.eren.doe.gov/buildings/ tools_directory/	**Building Energy Tools Directory** (U.S. Department of Energy) A directory of software programs under four headings: Whole-Building Analysis, Codes and Standards, Materials/Components/Equipment/Systems, and Other Applications
www.csemag.com/	An online version of **Consulting-Specifying Engineer Magazine**

* * * Featured Sites This Issue * * *

World-Wide Web Sites for Building Energy Efficiency

Building Energy Tools Directory	**Consulting-Specifying Engineer** *Online*
U.S. Department of Energy	Consulting-Specifying Engineer Magazine
www.eren.doe.gov/buildings/tools_directory/	**www.csemag.com/**

This electronic directory provides information on more than 100 tools--from research grade software to commercial products with thousands of users. The common thread for all the software is providing information for sustainable design, improving energy efficiency or incorporating renewable energy concepts in buildings. The energy tools listed in this directory include databases, spreadsheets, component and systems analyses, and whole-building energy performance simulation programs. For each tool in the directory, a short description is provided along with other information including expertise required, users, audience, input, output, computer platforms, programming language, strengths, weaknesses, technical contact, and availability. The directory is organized in four major categories: <u>Whole-Building Analysis</u>, <u>Codes and Standards</u>, <u>Materials, Components, Equipment, and Systems</u>, and <u>Other Applications</u> (like Indoor Air quality, Atmospheric Pollution, and Energy Economics).

DOE developed this directory because many Office of Building Technology, State and Community Program (BTS) programs develop software tools to evaluate and rank potential energy-efficiency technologies and renewable energy strategies in new or existing buildings.

Consulting-Specifying Engineer is the magazine for professional engineers who design mechanical, electrical, electronic, and related systems for commercial, industrial and institutional new building and retrofit projects.

From their home page, click on "Back Issues" to get to the Online Editions page. From there, you can read the current issue, scan back issues, look at new products, subscribe to the maga-zine, or visit their site map (definitely worth a look).

CSE *Online* also offers something so useful: they print links to related sites at the end of their feature stories. For example, after an article entitled *"Hybrid Cogen/Ice-Storage Plant Offers an Energy Efficient Remedy for a Toledo, Ohio, Hospital/Office Complex,"* there were links to the Navy Energy News (*"Load Shifting With Thermal Energy Storage"*), to Oak Ridge Nat'l Laboratory (*"Second-Law Optimization of a Sensible-Heat TES System"*), and to the California Energy Commission (*"Thermal Energy Storage Systems Collaborative"*).

Conference Proceedings For Sale

ACEEE
Summer Study on Energy Efficiency In Buildings

◆ 1996 "*Profiting from Energy Efficiency*"
$200 printed set (10 volumes+index)
$150 CD-ROM (Adobe Acrobat)
includes full proceedings for both 1996 and 1994

◆ 1994 "*Building Tomorrow: The Path to Energy Efficiency*"
$180

◆ 1992 "*Achieving Technical Potential: Programs and Technologies that Work*"
$160

◆ 1990 "*Summer Study on Energy Efficiency in Buildings*"
$150

◆ 1982 Summer Study Papers: "*What Works: Documenting the Results of Energy Conservation in Buildings*"
$30

IBPSA
International Building Performance Simulation Association

◆ 1995 BS-95
$ 70/US Member
$105/US Non-member

◆ 1993 BS-93
$ 55/US Member
$ 90/US Non-member

◆ 1991 BS-91
$ 55/US Member
$ 90/US Non-member

◆ 1989 BS-89 (photocopy)
$ 40/US Member
$ 75/US Non-member

◆ 1985 BS-85 (photocopy)
$ 40/US Member
$ 75/US Non-member

Contact
Eric Strager (202) 429-0063
ACEEE, #801
1001 Connecticut Ave NW
Washington, DC 20036
Ph: (202) 429-8873
Fx: (202) 429-0193

Contact
Larry Degelman
Dept of Architecture
Texas A&M University
College Station, TX 77843

Ph: (409) 845-1015
Fx: (409) 862-1571
larry@archone.tamu.edu

DOE-2 R E S O U R C E C E N T E R S

The people listed here have agreed to be primary contacts for DOE-2 program users in their respective countries. Each resource center has the latest program documentation, all back issues of the User News, and recent LBNL reports pertaining to DOE-2. These resource centers will receive copies of all new reports and documentation. Program users can then make arrangements to get photocopies of the new material for a nominal cost. We hope to establish resource centers in other countries; please contact us if you are interested in establishing a center in your area.

South America Prof. Roberto Lamberts Universidade Federal de Santa Catarina Campus Universitario—Trindade Cx. Postal 476 88049 Florianopolis SC BRASIL Telephone: (55)482-31-9272 Fax: (55)48-231-9770 Lamberts@ecv.ufsc.BR	**Australasia** Dr. Deo K. Prasad/P. C. Thomas SOLARCH University of New South Wales P.O. Box 1 Kensington, N.S.W. 2033 AUSTRALIA Telephone: (61)-2-697-5783 (P.C. Thomas) Fax: (61) 2-662-4265 or –1378 PC.Thomas@unsw.EDU.AU
Portugal, Spain, Italy, and Greece Antonio Rego Teixeira ITIME Unidade de Energia Estrada do Paco do Lumiar 1699 Lisboa PORTUGAL Telephone: (351) 1-716-4096 Fax: (351) 1-716-4305 itime.ue@mail.telpac.pt	**Australia** Murray Mason ACADS BSG 16 High Street Glen Iris VIC. 3146 AUSTRALIA Telephone: (61) 885 6586 Fax: (61) 885 5974
Singapore, Malaysia, Indonesia, Thailand, and the Philippines WONG Yew Wah, Raymond Nanyang Technological University School of Mechanical and Production Engineering Nanyang Avenue Singapore 639798 REPUBLIC OF SINGAPORE Telephone: (65)799-5543 Fax: (65)791-1859 mywwong@ntu.edu.sg	**Germany** B. Barath or G. Morgenstern Ingenieurbüro Barath & Wagner GmnH Postfach 20 21 41 D-41552 Kaarst GERMANY Telephone: (0049) 2131 75 74 90 12 G. Morgenstern Fax: (0049) 2131 75 74 90 29
Hong Kong, China, Taiwan, Japan and Korea Dr. Sam Chun-Man HUI or K.P. Cheung Department of Architecture The University of Hong Kong Pokfulam Road HONG KONG http://arch.hku.hk/research/BEER/doe2/doe2.htm Telephone: (852) 2123 (direct to Sam Hui) Fax: (852) 2559-6484 Hui pager 7116 3808 a/c 1830 cmhui@hku.hk	**Switzerland** René Meldem Meldem Energie SA Ch. De l'Ancienne Pointe 1 CH-1920 Martigny SWITZERLAND Telephone: (41) 26 22 96 96 Fax: (41) 26 22 96 97 meldem.energie@bluewin.ch

DOE-2 RESOURCE CENTERS -- continued

South Africa
  Prof. L. J. Grobler
  School of Mechanical and Materials Engineering
  University of Potchefstroom
  Private Bg X6001
  Potchefstroom 2520
  SOUTH AFRICA
  Telephone: (27 148) 299 1328
  Fax: (27 148) 299 1320
  mgiljg@puknet.puk.ac.za

INTERNATIONAL DOE-2 ENERGY CONSULTANTS

René Meldem (meldem.energie@bluewin.ch) Meldem Energie SA Ch. De l'Ancienne Pointe 1 CH-1920 Martigny Switzerland	Philip Schluchter Institut fur Bauphysik Klein Urs Graf-Strasse 1 CH4052 Basel Switzerland
Andre Dewint rue de Livourne 103/12 B-1050 BRUXELLES Belgium	Gerhard Zweifel (Gzweifel@ztl.ch) Zentralschweizerisches Technikum Luzern (ZTL) Abt. HLK CH-6048 Horw Switzerland
Curt Hepting, P.Eng. (EnerSys@infoserve.net) EnerSys Analytics, Inc. 2989 Delhaye Drive Coquitlam, B.C. V3B 6Y9 Canada	Joerg Tscherry Building Equipment Section 175 EMPA 8600 Dubendorf Switzerland
Dejan Radoicic D. W. Thomson Consultants, Ltd. 1985 West Broadway Vancouver, BC V6J 4Y3 Canada	Neil A. Caldwell, P.Eng. Tescor Pacific Energy Services, Inc. 200-1985 West Broadway Vancouver, BC V6J 4Y3 Canada
Paul Bannister (eglstaff@earthlight.co.nz) Energy Group, Ltd. 14a Wickliffe Street (P.O. Box 738) Dunedin New Zealand	

DOE-2.1E Documentation Corrections

Correction to the Supplement

Under the heading of "Saving Files of Hourly Output for Postprocessing" on p. 1.30 of the *DOE-2.1E Supplement*, please add the following information on how to save formatted ASCII files of DOE-2 hourly results so that they can be easily imported into postprocessing programs like Excel:

Saving Hourly Output for Postprocessing

Using HOURLY-DATA-SAVE=FORMATTED in the LOADS-REPORT, SYSTEMS-REPORT, or PLANT-REPORT command produces an ASCII file containing the hourly data specified in the corresponding HOURLY-REPORT commands. The file produced is CEC1_0n.DAT, where n=1 for LOADS, 2 for SYSTEMS, and 3 for PLANT. Each line of the file contains month, day, hour followed by hourly values, all separated by one or more blanks. The first few lines of a file, starting with month 1, day 1, hour 1, and for three hourly variables, might look like this:

```
1  1  1    18.0    10.1    90.2
1  1  2    18.5    10.7    90.7
1  1  3    18.8    11.7    90.6
```

Note that the column headers (variable names and units) are not saved in the file, so you have to be careful that the values you import into your postprocessor have the meaning you think they do.

Correction to the Supplement

On p. 2.115 in the LOADS section, please replace the existing drawing with the following.
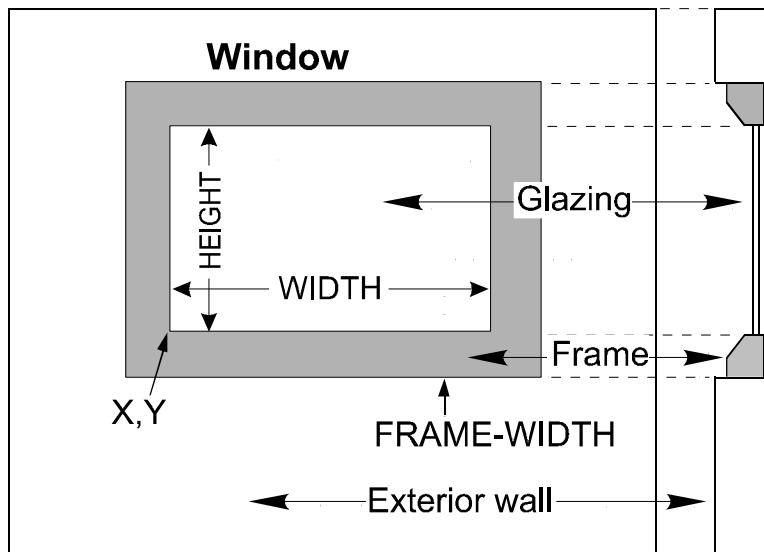

Figure 2.23: The dimensioning of a window with a frame. The WINDOW keywords X and Y, which indicate the position of the window on the wall, refer to the lower left corner of the glazed portion, *not* the lower left corner of the frame.

Correction to the BDL Summary

On p. 13 the definition for keyword SPACER-TYPE-CODE should read as follows:

SPACER-TYPE-CODE (S-T-C) (1; 0 to 5) * [see revised table below]

* Used only for glass types from Window Library (GLASS-TYPE-CODE ≥ 1000); default obtained from the Window Library.

Between-Glass Spacers	
SPACER-TYPE-CODE	Spacer type
0	Spacer is taken from Window Library
1 (default)	Aluminum
2	Stainless Steel
3	Butyl/Metal
4	Wood or Fiberglass
5	U-edge = U-center

Correction to the BDL Summary
On pp. 94 and 100 under SYSTEM, change GAS-FURNACE to FURNACE.

What's New? (continued)

❈ **Welcome Aboard!** Three more DOE-2 energy consultants have been added to our "family." They are

Lung-Sing Wong of Building Performance Engineers, Inc., at 1351 Oakbrook Drive, Norcross, GA 30093. Phone (770) 409-0400

Bruce A. Levitt, P.E., Executive Vice President of William Tao & Associates, Inc., 2357-59th Street, St. Louis, MO 63110-2811. Phone (314) 644-1400, Fax (314) 644-6152, email WTACE@AOL.COM.

John P. Karasaki, P.E. and Rick Ogle, P.E. of CBG Consulting Engineers, Suite 355, 6650 SW Redwood lane, Portland, OR 97224. Phone (503) 620-3232, email cbgkl@199.2.194.10.

❈ **Changes of Address**

The **Heshong Mahone Group,** DOE-2 consultants, have moved to 11622 Fair Oaks Boulevard, #111, in Fair Oaks, CA 95628. They also have a new web site at http://h-m-g.com. Phone and fax are 916-962-7001 and email is info@h-m-g.com.

ACROSOFT/CAER Engineers (MicroDOE2) has moved to 1204-½ Washington Avenue, Golden, CO 80401. Phone, fax and email are unchanged.

❈ **Changes of Address (continued)**
Consultant Curt Hepting, of the Canadian company, **EnerSys Analytics,** has moved to 2989 Delahaye Drive, Coquitlam V3B 6Y9 British Columbia. Their new phone number is (604) 552-0700, fax is (604) 552-0713, email enersys@infoserve.net.

❈ **News from Scott Henderson of FTI**…
Scott is finishing up a new web site (www.finite-tech.com) for his company, Finite Technologies, Inc., of Anchorage, Alaska. The web site will include a discussion area open to all DOE-2 users. Scott hopes to provide a forum where users can exchange ideas and support issues. Scott is also assembling a free weather file library on the net (non-US files are especially welcome). He will post any files sent to him (unpacked versions). There will be no charge for this service and files will be available to everybody. Nice work, Scott. Also, Finite Technologies hopes to release version 3.0 of FTI/DOE in late summer; it will include a Java-based interface.

DOE-2   PROGRAM   DOCUMENTATION

DOE-2 documentation is available from two sources.

- The National Technical Information Service offers a complete set of DOE-2 manuals, available for purchase separately; prices and ordering information are below.

- The Energy Science Technology Software Center at Oak Ridge, TN, offers the DOE-2.1E updated documentation (which includes the *Supplement, Sample Run Book, and BDL Summary)* free of charge when you purchase the mainframe or workstation version of DOE-2. See the "DOE-2 Directory of Program Related Software and Services" in this issue for ESTSC's address.

Also, many of the PC vendors of DOE-2 offer some or all of the documentation when you buy their program. Names and addresses of all DOE-2 vendors are found in the "DOE-2 Directory of Program Related Software and Services" in this issue.

To order any or all of the DOE-2 manuals from the National Technical Information Service:

National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161

Phone (703) 487-4650, FAX (703) 321-8547, http://www.fedworld.gov/ntis/home.html

Document Name	Order Number	Prices - 4/1/96	Foreign Prices
DOE-2 Basics Manual (2.1E)	DE-940-13165	49.00	
BDL Summary (2.1E)	DE-940-11217	28.00	Double
Sample Run Book (2.1E)	DE-940-11216	100.00	the
Reference Manual (2.1A)	LBL-8706, Rev.2	174.00	prices
Supplement (2.1E)	DE-940-11218	100.00	shown
Engineers Manual (2.1A) [algorithm descriptions]	DE-830-04575	57.00	at left