

# BUILDING ENERGY SIMULATION

Volume 21    ✿    Number 1    ✿    Spring 2000

For Users of EnergyPlus, DOE-2, BLAST, SPARK, Genopt and their Derivatives

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## What's New ?

### PC Version of DOE-2.1E from ESTSC .....

DOE-2.1E (version 107) for Windows is available from the Energy Science and Technology Software Center (ESTSC). Previously, ESTSC licensed only UNIX and VAX versions. This updated version of DOE-2 incorporates bug fixes and new features like a Cooled Beam HVAC system and polygon input for walls, floors and ceilings. Like previous DOE-2.1E products from ESTSC, this version accepts textual BDL input but does not have a graphical user interface.

Cost of DOE-2.1E-WIN (Version 107) is:

- \$ 300 U.S. Government, non-profit Educational
- \$ 575 U.S., Mexico, Canada
- \$ 1075 Other Foreign

For information, call Ed Kidd or Walt Kelly at ESTSC (423) 576-2606, or email to [estsc@adonis.osti.gov](mailto:estsc@adonis.osti.gov).

### Beta Test EnergyPlus Now! .....

The second of four planned beta test versions of EnergyPlus will be available in April; go to

<http://SimulationResearch.lbl.gov> > EnergyPlus

### New DOE-2 Consultants .....

Please welcome **Carol Gardner** as a DOE-2 consultant. **Gardner Energy Management Services** specializes in energy analysis, energy audits and code compliance.

#### Gardner Energy Management Services

PO Box 12549                      Tel: (503) 223-4847  
Portland, OR 97212-0549      Fax: (503) 223-8486  
email: [gems@teleport.com](mailto:gems@teleport.com)

Another new consultant is **Henny van Lambalgen, P.E., CEM**, of **Energy Quest Group**. EQG provides design assistance, building automation systems design, energy audits, performance contracting and custom software and training.

**Henny van Lambalgen, P.E.**    Tel: (480) 753-5590  
**Quest Energy Group, LLC**    Fax: (480) 753-1215  
4324 East Pearce Road  
Phoenix, AZ 85044  
email: [henny@questenergy.com](mailto:henny@questenergy.com)  
<http://www.questenergy.com>

## What's Inside ?

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### Go to <http://SimulationResearch.lbl.gov> for

Latest information on EnergyPlus, SPARK, GenOpt  
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DOE-2 Documentation, Ordering Information  
Web sites for Building Energy Efficiency  
International DOE-2 Resource Centers  
International DOE-2 Energy Consultants  
U. S. DOE-2 Energy Consultants



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**

Newsletter of the Royal Architectural Institute of Canada. Building simulation activities in Canada..

<http://greenbuilding.ca/GBIC.htm>

**CADDET**

IEA's international newsletter on energy efficiency. Practical and innovative articles by international energy researchers and practitioners.

<http://www.caddet.co.uk/>

**e-EFFICIENCY NEWS**

The bi-monthly electronic newsletter from the Alliance to Save Energy.

<http://www.ase.org/about/about.htm>

**Energy User News**

Trade publication covers energy efficiency in new and existing non-residential buildings.

<http://www.energyusernews.com>

**EREN News**

Energy Efficiency and Renewable Energy Network of the U.S. Department of Energy. EREN Network News is a weekly electronic newsletter covering energy efficiency and renewable energy news.

<http://www.eren.doe.gov/newsletter/archive.html>

**Green Energy News**

Weekly online publication offers news about energy efficiency and related "green" energy issues for non-residential facilities, etc.

<http://www.nrglink.com/index.html>

**IAEEL Newsletter**

International Association for Energy-Efficient Lighting. Lighting research and discussions of lighting energy efficiency and safety issues.

<http://www.iaeel.org>

**IBPSA News**

Newsletter of the International Building Performance Simulation Association (IBPSA). Technical articles about innovative building simulation techniques.

<http://www.mae.okstate.edu/ibpsa/newslett.htm>

**Lighting Design Lab**

Lighting lab activities in the Pacific Northwest. Lots of workshops and classes listed.

<http://www.northwestlighting.com/ldl>

**Lighting Futures**

Articles on emerging lighting technologies. Great resource list of lighting web sites and contacts.

<http://www.lrc.rpi.edu/Futures/index.html>

**Setting the Standard**

Newsletter of the U.S. Department of Energy's Building Standards and Guidelines Program.

<http://www.energycodes.org/news/setting.htm>

**DOE-2 Training**

DOE-2 courses for beginning and advanced users: phone Marlin Addison at (602) 968-2040, or send email to [marlin.addison@doe2.com](mailto:marlin.addison@doe2.com)

**DOE-2 Help Desk**

Bruce Birdsall - Phone/Fax: (925) 671-6942, M-F 10 a.m. to 3 p.m. PDT. Call or fax Bruce Birdsall if you have a DOE-2 problem or question. If you need to fax Bruce, please be sure to phone him first. This is a free service.

The *Building Energy Simulation User News* is published quarterly by the Simulation Research Group at Lawrence Berkeley National Laboratory with cooperation from the Building Systems Laboratory at the University of Illinois. Direct comments or submissions to Kathy Ellington, MS: 90-3147, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, or email [KLEllington@lbl.gov](mailto:KLEllington@lbl.gov) or fax us at (510) 486-4089. Direct BLAST-related inquiries to the Building Systems Laboratory, email [support@blast.bso.uiuc.edu](mailto:support@blast.bso.uiuc.edu) or phone (217) 333-3977 04/00--2000  
© 2000 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 Technology, State and Community Programs, Office of Building Systems of the U.S. Dept. of Energy, under Contract No. DE-AC03-76SF00098

# California Energy Commission



## **PERFORM 98, Version 1.0 Computer Program for California Title 24 Compliance**

Using DOE-2.1E, PERFORM 98 calculates the energy consumption of a non-residential building for space heating, space cooling and water heating. It automatically compares the energy consumption of your building design against the requirements of the standard. If the building design does not meet the standard, you can use PERFORM 98 to evaluate alternative building strategies to reduce energy consumption. When the building design meets the standard, the program can automatically produce the (California *only*) compliance forms needed for building department review of the design. (Technical Support is available for \$100/yr from Gabel Dodd/EnergySoft, LLC. For info call Eric Walstad at (415) 883-5900).

Order **PERFORM 98** from the California Energy Commission. Call the Commission's Publication Office at (916) 654-5106 using VISA or MasterCard or order by mail with a check or money order to:

**California Energy Commission  
Publications Office MS-13  
P.O. Box 944295  
Sacramento, CA 94244-2950**

Order Number	Title	Quantity	Price Each	Total
P400-98-006	PERFORM 98, Version 1.0. Computer program with instructional manual		\$250.00	

### Also available are Compliance Manuals

Order Number	Title	Quantity	Price Each	Total
400-98-014	<i>Residential Manual</i> , CD-ROM version (manual and full standards)		\$12.00	
400-98-015	<i>Non-Residential Manual</i> , CD-ROM version (manual and full standards)		\$12.00	
P400-98-002	<i>Residential Manual</i> , paper version (manual only)		\$40.00	
P400-98-005	<i>Non-Residential Manual</i> paper version (manual only)		\$35.00	
P400-98-001	1998 Energy Efficiency Standards (July 1998)		Free	

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# Recent LBNL Reports

*These reports are available from Kathy Ellington of the LBNL Simulation Research Group. Please fax your request to Kathy at (510) 486-4089; be sure to include the LBNL number.*

**LBL-37208**

## **Commercial Heating and Cooling Loads Component Analysis: Final Report**

by  
Joe Huang and Ellen Franconi  
Lawrence Berkeley National Laboratory  
Berkeley, CA 94720

### **Abstract**

This study uses computer simulations of 120 commercial building prototypes to quantify the contributions of building components such as roofs, walls, windows, infiltration, outside air, lighting, equipment and people to the aggregate heating and cooling loads in U.S. commercial buildings, and the efficiencies of typical commercial heating and cooling systems in meeting these loads. The prototypical buildings are based on previous LBNL work and were refined following an extensive review of existing commercial building prototypes developed in 17 previous engineering studies. A novel procedure was developed to extract the component load on an hourly basis from DOE-2 simulations. The results are presented as split pie charts, first at the national level, and then by building type, region and vintage. The largest contributors to heating loads are found to be windows, walls and infiltration; the largest contributors to cooling loads are lighting, solar gain and equipment. "Free heating" from lights, equipment, occupants and solar gain displaces half the heating load in commercial buildings; however, "free cooling" from outside air and heat loss through the building shell has a much smaller effect.

The concept of System and Plant Factors is used to quantify the net efficiencies of air-handling systems in meeting building loads and of central plants in providing the energy needed for heating and cooling. System Factors in heating can vary from 0.12 in hospitals, with constant-volume systems and 100% outside air, to slightly over 1.00 in small offices due to heat gain from fans. System Factors for cooling can vary from less than 0.50 in old large offices, with reheat systems, to over 1.00 for small buildings due to the free cooling of economizer cycles. Plant Factors are typically 0.60-0.70 for boilers and 3.50-4.80 for chillers. When the parasitic energy use of fans and pumps, along with a source-to-site multiplier of 3 for electricity, are taken into account the Net Plant Factors drop to 0.29-0.57 for heating and 0.56-0.89 for cooling. The overall source efficiency of the space conditioning system in commercial buildings, taking into account both System and Plant Factors, is 0.33 for heating and 0.57 for cooling.

**LBNL-44636**

## **Residential Heating and Cooling Loads Component Analysis: Final Report**

by  
Joe Huang, James Hanford, and Fuqiang Yang  
Lawrence Berkeley National Laboratory  
Berkeley, CA 94720

### **Abstract**

This study uses parametric computer simulations of 112 single-family and 63 multi-family residential building prototypes to quantify the contributions of building components such as roofs, walls, windows, infiltration, outside air, lighting, equipment and people to the aggregate heating and cooling loads in U.S. residential buildings, and the overall efficiencies of typical residential heating and cooling systems in meeting these loads. The prototypical buildings are based on previous LBNL work that defined prototypical buildings by vintage and location to represent existing and new U.S. residential buildings. Parametric simulations were done using the DOE-2.1E program to determine the building's total heating and cooling loads. The computed building loads are presented in two formats: first as pie charts and then as conventional bar charts, aggregated at the national level and then by building type, region and vintage.

The total residential energy use for space conditioning, taking into account heating and cooling equipment efficiencies, is estimated as 5.93 Quads/heating and 0.48 Quads/cooling. These figures agree with the 1993 RECS estimates to within 10% for heating and 6% for cooling; they are also roughly consistent with other statistically-derived national estimates by the U.S. Department of Energy and the Gas Research Institute. The net national residential heating load is nearly 4 Quads, 5.2 Quads due to heat losses minus 1.2 Quads displaced by "free heat" from internal and solar gain through windows. Of the heat losses, infiltration and window conduction are the two largest components, each comprising roughly 25% of the total load, followed by walls (20%), floors (15%) and roofs (12%). The net national cooling load is approximately 1 Quad, 1.15 Quads due to heat gains minus 0.15 Quad displaced by "free cooling" through the building foundation. Of the heat gains, the largest component is solar gain (32%), followed by internal gains from equipment and people (27%), infiltration (16%), roofs (14%) and walls (10%). In new buildings cooling loads are relatively more important, increasing from one-fourth to nearly one-half of the heating loads. At the same time, the relative magnitude of building loads through opaque surfaces (walls and roofs) are reduced for both heating and cooling due to increased levels of insulation. Consequently, window and infiltration now make up 60% of the total heating load, while window solar gain and internal loads make up 60% of the total cooling load.



## Senior Analyst Energy Engineering



Progressive and growing energy services firm seeks senior analyst for Phoenix and San Francisco. Primary responsibilities include site investigation, energy analysis, modeling and schematic design for building system infrastructure improvements in large central plants, campus, health care and large commercial facilities. Develop cost effective energy saving projects, system reconfigurations and investment grad savings and energy studies in support of performance based agreements. Requires 3 to 5 years energy analysis experience with DOE-2 or similar software. Excellent writing, communication and computer skills required. MS or BS in ME/EE required; PE preferred. Fax resume to Comfort Systems USA, Business Solutions Group, HR dept (480) 784-4800 or email [hr@essinc.com](mailto:hr@essinc.com).

## VisualSPARK

Available for Beta Testing



<http://SimulationResearch.lbl.gov> > SPARK

VisualSPARK allows you to build models of complex physical processes by connecting calculation objects. It is aimed at simulation of innovative and/or complex building systems that are beyond the scope of programs like DOE-2 and BLAST.

The main elements of VisualSPARK are a *user interface*, a *network specification language*, an *HVAC toolkit* containing calculation modules for building components, a *solver* for solving the set of simultaneous algebraic and differential equations that correspond to the physical problem being simulated, a *results display processor* for graphically plotting results and an *interactive graphical editor* (not available in the initial beta release of VisualSPARK). With the network specification language or the graphical editor you link the calculation objects into networks that represent a building's envelope and/or HVAC systems.

The UNIX version of VisualSPARK runs under the SunOS, Solaris, Linux and HPUNIX operating systems. The PC version of VisualSPARK runs under the Windows 95, 98 and NT operating systems. Both versions require a minimum of 30MB of disk space.

There is no charge for the beta version of VisualSPARK; however, a signed beta test license agreement must have been received by the Simulation Research Group at Lawrence Berkeley National Laboratory prior to testing. The agreement and all the instructions may be downloaded from the web address listed above. After the agreement is received, you will be emailed a password. If you would like to get an idea of what SPARK does before testing VisualSPARK, you can review the SPARK User's Manual, which can be downloaded from <http://SimulationResearch.lbl.gov> > SPARK > SPARK User's Manual.

VisualSPARK was developed by the LBNL Simulation Research Group and Ayres Sowell Associates, with support from the U.S. Department of Energy.

## Meetings, Conferences, Symposia

Improving Building Systems in  
Hot and Humid Climates

To be held

May 15-17 in San Antonio, TX

Contact: [drosen@esl.tamu.edu](mailto:drosen@esl.tamu.edu)

Building Systems Symposium

Energy Systems Lab

Wisnbacker Building, Rm. 053

Texas A&M University

College Station, TX 77843-3581

Tel: 409.847.8950 -Fax: 862.8687

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ASHRAE Annual Meeting

To be held

June 24-28 in Minneapolis, MN

Contact: [jyoung@ashrae.org](mailto:jyoung@ashrae.org)

ASHRAE Meetings Section

1791 Tullie Circle NE

Atlanta, GA 30329

Tel: 404.636.8400 -- Fax: 321.5478

Net: [www.ashrae.org](http://www.ashrae.org)

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Healthy Buildings 2000

To be held

August 6-10, 2000 in Espoo, Finland

Contact: [info@sisailmayhdistys.fi](mailto:info@sisailmayhdistys.fi)

Ms. Leila Sarajärvi

P.O. Box 25

FI-02131 ESPOO

Finland

Tel: +358.9.4355 x5612 / Fax: x5655

Net: [www.hb2000.org](http://www.hb2000.org)

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2000 ACEEE Summer Study:  
Efficiency & Sustainability

To be held

August 20-25 in Pacific Grove, CA

Contact: [rlunetta@erols.com](mailto:rlunetta@erols.com)

Rebecca Lunetta, Conference

Manager

P.O. Box 7588

Newark, DE 19714-7588

Tel: +302.292.3966 / Fax: 292.3965



## DOE-2 Directory of Program Related Software and Services<sup>1</sup>

### ESTSC Versions of DOE-2

Program Name	Operating System	Description
<b>DOE-2.1E</b>  From the Energy Science and Technology Software Center (ESTSC)	Windows SUN UNIX DEC-VAX	Source code, executable code and complete current documentation for:  DOE-2.1E/Version 103 for Windows and SUN UNIX  DOE-2.1E DEC-VAX

### Commercial Versions of DOE-2

Program Name	Operating System	Description
<b>ADM-DOE-2</b>  Based on J.J. Hirsch DOE-2.1E	DOS Windows 95	ADM-DOE-2 (DOE-2.1E) is compiled for use on 386/486 PCs with a math co-processor and 4MB of RAM. 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 <i>User News</i> Vol. 7, No. 2, p. 6]
<b>Compare-IT</b>  Based on J.J. Hirsch DOE-2.1E	Windows (98, 95, NT)	Compare-IT allows DOE-2 professionals to add value to their projects by giving clients "what-if" scenarios using DOE-2. The interface is designed for novice energy analysts and the GUI can be customized for each client's particular interests. A tabbed main window is configured based on the user's DOE-2 macro organization. All labels, drop-down list boxes, tool-tips, error checking, and help files are created dynamically from a "Compare-IT-ized" DOE-2 input file. Output are tables and powerful graphs of annual costs, annual energy and end-use and hourly end-use values. [See <i>User News</i> Vol. 19, No. 1]
<b>DOE-PLUS</b>  Based on J.J. Hirsch DOE-2.1E Demo: <a href="http://www.halcyon.com/byrne">www.halcyon.com/byrne</a>	DOS Windows (3.1, 95, NT)	Complete support for all DOE-2 commands. Imports BDL files created with a text editor or other program. Interactive error checking. 3-D view of building can be rotated and zoomed. Windows, walls, etc., identified by DOE-2 U-name and allow component editing. User-defined libraries of schedules, HVAC systems, plant equipment, building components, etc. Exports results to spreadsheets and database programs. Graphical display of schedules. Utility programs included: Prep, Demand Analyzer, weather processor. Over 500 worldwide weather files. [See <i>User News</i> Vol. 13, No. 2, p. 54, Vol. 16, No. 1, p. 28-32]
<b>EnergyPro</b>  Based on ESTSC DOE-2.1E Demo: <a href="http://www.energysoft.com">www.energysoft.com</a>	Windows (95, NT)	Performs nonresidential load calculations for HVAC equipment sizing. Produces typeset quality reports/forms. Electronically exports forms to AutoCad for inclusion on blueprints. On-line help. 344 weather files for the U.S. and Canada. <b>For California Users:</b> Performs Title 24 compliance calculations, includes state-certified HVAC and DHW Equipment directories, Title 24 tailored lighting calculations. [See <i>User News</i> Vol. 18, Nos. 2, 4]
<b>EZDOE</b>  Based on J.J. Hirsch DOE-2.1D Demo: <a href="http://www.elitesoft.com">www.elitesoft.com</a>	DOS	Provides full screen, fill-in-the-blank data entry, dynamic error checking, context-sensitive help, mouse support, graphic reports, a 750-page user manual, and extensive weather data. EZDOE integrates the full calculation modules of DOE-2 into a powerful, full implementation of DOE-2 on DOS-based 386 and higher computers. On-line help. Includes some weather files. [See <i>User News</i> Vol. 14, No. 2, p. 10 and No. 4, p. 8-14]
<b>FTI/DOE</b>  Based on ESTSC DOE-2.1E  No demo, 30-day trial period	DOS Windows (3.x, 95, NT) AIX, ULTRIX, VMS, Linux, NeXTStep,	FTI/DOE is 100% compatible with LBNL version. Highly optimized and extremely reliable. Version 3.1 will include a graphical user interface and will provide full command functionality and access to all reporting features of the original. Interface is Java-based and will be available for any system supporting Java. Source code versions will compile with most F77-compliant compilers. On-line help: Yes for Version 3.x, No for Version 2.x. 344 weather files for the U.S. and Canada. [See <i>User News</i> Vol. 12, No. 4, p. 16]
<b>PRC-DOE-2</b>  Based on J.J. Hirsch DOE-2.1E No demo	DOS Windows (95, NT)	This text-based version of DOE-2 is fast, reliable, and very up to date. Documentation includes 2.1E Supplement, 2.1E BDL Summary; original Reference Manual. Extensive information on new features is included on the disk as well, including information on new system types, new commands, new options, etc., added to later versions of 2.1E.
<b>VisualDOE 2.61</b>  Based on J.J. Hirsch DOE-2.1E, Demo: <a href="http://www.eley.com">www.eley.com</a>	DOS Windows (3.1, 95, NT)	Dramatically faster construction of building geometry using pre-defined blocks and/or drawing interface. Import zone shapes from CADD file (dxf format). Point-and-click to define zone properties and HVAC systems. Define up to 20 design alternatives in each project file. View rotatable 3-D image of model. Create custom hourly output reports and customized graphs. Edit and expand library of constructions, schedules, equipment, and utility rates. Add custom performance curves. Network version allows sharing of libraries. On-line help. 400+ weather files for the U.S., 12+ weather files for Canada, plus selected locations around the world. [See <i>User News</i> Vol. 15, No. 2, p. 10; Vol. 16, No. 4, p. 9-16; Vol. 17, No. 4]

<sup>1</sup> 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.

**DOE-2 Directory of Program Related Software and Services**  
**ESTSC Versions of DOE-2**

Input Output	Support	Program Price	Vendor Information																												
	Limited "operational" support, which includes telephone assistance concerning installation, media or platform questions.	<table border="0"> <tr> <td></td> <td align="center"><b>Windows</b></td> <td align="center"><b>SUN-UNIX</b></td> <td align="center"><b>VAX</b></td> </tr> <tr> <td>Govt/Educ</td> <td align="right">\$ 300</td> <td align="right">\$400</td> <td align="right">\$500</td> </tr> <tr> <td>US</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Mexico</td> <td align="right">\$575</td> <td align="right">\$1305</td> <td align="right">\$1835</td> </tr> <tr> <td>Canada</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Foreign</td> <td align="right">\$1075</td> <td align="right">\$2000</td> <td align="right">\$2716</td> </tr> </table>		<b>Windows</b>	<b>SUN-UNIX</b>	<b>VAX</b>	Govt/Educ	\$ 300	\$400	\$500	US				Mexico	\$575	\$1305	\$1835	Canada				Other				Foreign	\$1075	\$2000	\$2716	<b>Energy Science &amp; Technology Software Center (Ed Kidd and Walt Kelly)</b> P.O. Box 1020 Oak Ridge, TN 37831-1020 Ph: 423-576-2606 / Fx: 423-576-2865 ESTSC@ADONIS.OSTI.GOV www.doe.gov/html/osti
	<b>Windows</b>	<b>SUN-UNIX</b>	<b>VAX</b>																												
Govt/Educ	\$ 300	\$400	\$500																												
US																															
Mexico	\$575	\$1305	\$1835																												
Canada																															
Other																															
Foreign	\$1075	\$2000	\$2716																												

**Commercial Versions of DOE-2**

Input Output	Support	Program Price	Vendor Information
No information given	None	\$395 + \$15/SH including one set weather data (your choice) and documentation	<b>ADM-DOE-2 (Richard Burkhart)</b> ADM Associates adm_asc@ns.net 3239 Ramos Circle Sacramento, CA 95827-2501 Ph: 916-363-8383 / Fx: 916-363-1788
No information given			
Customizable windows GUI dynamically built based on DOE-2 macros.	Support price is negotiable; online help included with the program.	\$500 consultant \$2000 client  Documentation available	<b>Compare-IT (Ed Erickson)</b> RLW Analytics, Inc. 1055 Broadway, Suite G Sonoma, CA 95476 Ph: 707-939-8823 / Fx: 707-939-9218 Info@rlw.com or www.rlw.com
Tables/graphs exportable to MS Excel 97. Custom reports dynamically generated (Word 97).			
Interactive, graphical, fill-in-the-blanks	Unlimited, except for DOE-2 modeling advice. On-line help.	\$895 with DOE-2 and doc  \$495 without DOE-2  Source code not available.	<b>DOE-Plus (Steve Byrne)</b> Item Systems 321 High School Road NE #344 Bainbridge Island, WA 98110 Ph: 206-855-9540 / Fx: 206-855-9541 byrne @ item.com
Customizable tables and graphics			
Graphical	Unlimited support	DOE-2 Module: Non-residential \$ 700 <sup>1,2</sup> Residential \$ 250 <sup>1,2</sup> Program Interface \$ 195 <sup>3</sup> <sup>1</sup> price reflects cash discount <sup>2</sup> includes documentation <sup>3</sup> required	<b>EnergyPro (Demian Vonderkulen)</b> Gabel Dodd/EnergySoft LLC 100 Galli Drive #1 Novato, CA 94949-5657 Ph: 415-883-5900 / Fx: 415-883-5970 demian@energysoft.com
Graphs, forms			
Fill-in-the-blanks	Unlimited phone support	\$1295 w/documentation  Source code not available.	<b>EZDOE (Bill Smith)</b> Elite Software P.O. Box 1194 Bryan, TX 77806 Ph: 409-846-2340 / Fx: 409-846-4367 bsmith @ elitesoft.com
Standard DOE reports plus some custom graphic reports			
Version 2.x: text based Version 3.x: graphical	Free support, 90 days from date of purchase. After 90 days, support is: \$35 email per incident \$55 hour per incident \$125 per hour for engr advice. Bugs reports free.	\$ 995.99 US w/documentation \$1066 Int'l w/documentation \$4999.99 source code	<b>FTI/DOE2 (Scott A. Henderson)</b> Finite Technologies Inc. 3763 Image Drive Anchorage, Alaska 99504 Ph: 907-333-8937 / Fx: 907-333-4482 info @ finite-tech.com
All standard DOE-2 reports Run time and status graphics			
Standard text-based	Unlimited support.	\$ 495 w/documentation  Source code not available.	<b>PRC-DOE-2 (Paul Reeves)</b> Partnership for Resource Conservation 140 South 34 <sup>th</sup> Street Boulder, CO 80303 Ph: 303-499-8611 / Fx: 303-554-1370 Paul.Reeves@DOE2.com
Graphical	90 days free phone and email support.  Support is \$195 per year after first 90 days	Version 2.6 is \$495 w/documentation  Source code not available.	<b>VisualDOE 2.61 (Charles Eley, Erik Kolderup)</b> Charles Eley Associates 142 Minna Street San Francisco, CA 94105 Ph: 415-957-1977 / Fx: 415-957-1381 support@eley.com www.eley.com
Graphical			



**DOE-2 Directory of Program Related Software and Services (continued)**

**Pre- and Post-Processors for DOE-2**

Program Name	Description
<b>DrawBDL</b>	<b>DrawBDL</b> , Version 2.1, is a graphic debugging and drawing tool for DOE-2 building geometry. DrawBDL reads your BDL input and makes a rotatable 3-D drawing of your building with walls, windows, and building shades shown in different colors for easy identification. [See <i>User News</i> , Vol. 14, No. 1, p. 5-7, Vol. 14, No. 4, p. 16-17, and Vol. 16, No. 1, p.37]
<b>Visualize-IT</b> (Visual Data Analysis Tools)	The <b>Energy Information Tool</b> is used to review and understand metered or DOE-2.1E hourly output data. It provides the ability to see all 8760 (or 35040) data points for a year's worth of data. Use <i>Energy/Print</i> to get an overview of the data and then apply a variety of tools (load shapes, load duration curves, etc.). The <b>Calibration Tool</b> compares 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. Both programs requires a 486 or higher computer and SVGA graphics capabilities. [See <i>User News</i> Vol. 17, No. 2, p. 2-6]
<b>PRC-TOOLS:</b> <b>PRC-Grab</b> <b>PRC-Hour</b> <b>PRC-Peak</b>	<b>PRC-Tools</b> aid in extracting, analyzing, and formatting DOE-2 output. <b>PRC-Grab</b> automates the process of extracting any number of answers from DOE-2 standard output files. <b>PRC-Hour</b> and <b>PRC-Peak</b> format the hourly output and create Peak-Day and Average-Day load shapes for any number of periods and for any combination of hourly values.

**Special Versions of DOE-2**

Program Name	Description
<b>DesiCalc</b>  No demo	DesiCalc, from the Gas Research Institute, screens desiccant cooling applications. It estimates annual or monthly energy loads, using hour-by-hour simulations, and costs for 11 typical commercial buildings in 236 geographical locations in the United States. The tool uses electrical equipment from a library of five typical systems and compares the performance of any of the systems with an alternative configuration, the chosen electric system supplemented with a desiccant dehumidifier. Includes the latest TMY2 meteorological database
<b>Energy Gauge USA</b> <b>(Residential DOE-2)</b>	<i>Energy Gauge USA</i> allows the simple calculation and rating of residential building energy use in the United States. The simulation calculates a six-zone model of the residence (conditioned zone, attic, crawlspace, basement, garage and sunspace) with the various buffered spaces linked to the interior as appropriate. TMY weather data for the program are available for 239 locations around the U.S.
<b>Home Energy Saver</b> <b>(Residential DOE-2)</b> Free, interactive, Web-based program	The <i>Home Energy Saver</i> (HES) is designed to help consumers identify the best ways to save energy in their homes, and find the resources to make the savings happen. The HES calculates heating and cooling consumption using DOE-2.1E. The program performs a full annual simulation for a typical weather year (involving 8760 hourly calculations) from 239 locations around the United States in about 10-20 seconds.
<b>PERFORM 98</b>	Created for the State of California Energy Commission's, Title 24 energy code. Perform 98 is an interface shell with DOE-2 as the engine. Standard text-based input. Output is only California Title 24 compliant. Technical support available for \$100/year from Gabel-Dodd Energy Soft LLC, 100 Galli Drive #1, Novato, CA 94960. Call 415-883-5900 for details.
<b>RESFEN-3.1</b>  Web site: <a href="http://windows.lbl.gov/software/resfen">http://windows.lbl.gov/software/resfen</a>	RESFEN calculates the energy and cost implications of a building's windows compared to insulated walls. The relative energy and cost impacts of two different windows can also be compared against each other. RESFEN calculates the heating and cooling energy use and associated costs as well as the peak heating and cooling demand for specific window products. Users define a problem by specifying the house type (single story or two story), geographic location, orientation, electricity and gas cost, and building configuration details (such as wall type, floor type, and HVAC systems). Window options are defined by specifying the window's size, shading, and thermal properties: U-factor, Solar Heat Gain Coefficient, and air leakage rate.

**Energy Professionals**



**Steven Winter Associates, Inc.**  
**Building Systems Consultants**

Energy Professionals with 5-30 years experience in energy-efficient design or analysis for award-winning firm specializing in green buildings and cutting-edge projects. Candidates will have a solid background in HVAC and an understanding of simulations using major energy software such as DOE-2 or TRACE. Alternately, candidates will be very experienced in energy analysis and have a basic familiarity with HVAC. Duties may include energy audits, simulations, writing reports, quality control, management, and business development. Responsibilities within the firm commensurate with experience from project manager to principal track. Excellent opportunity for growth.

Address inquiries to Jacqui Ham at Steven Winter Associates, Inc., 50 Washington Street, Norwalk, CT 06854 fax (203) 852-0741, email: [swinter@swinter.com](mailto:swinter@swinter.com), web: [www.swinter.com](http://www.swinter.com)



## DOE-2 Directory of Program Related Software and Services

### Pre- and Post-Processors for DOE-2

Operating System	Works With This Version of DOE-2	Price	Vendor
Windows 3.1, 95, 98, NT	DOE-2.1E	\$125.00 plus shipping	<b>Joe Huang &amp; Associates</b> 6720 Potrero Avenue El Cerrito, CA 94530 Ph/Fx: 510-236-9238
Windows 3.1	DOE-2.1E		<b>RLW Analytics, Inc.</b> (Ed Erickson) 1055 Broadway, G Sonoma, CA 95476 Ph: 707-939-8823 Fx: 707-939-9218 Info@rlw.com / www.rlw.com
Windows 95, 98 NT	DOE-2.1E	\$99.00	<b>Partnership for Resource Conservation</b> (Paul Reeves) 140 South 34 <sup>th</sup> Street Boulder, CO 80303 Ph: 303-499-8611 / Fx: 303-554-1370 Paul.Reeves@DOE2.com

### Special Versions of DOE-2

Operating System	Based on this version of DOE-2	Price	Vendor
Windows 3.1, 95, 98, NT	DOE-2.1E	\$295 with documentation +8.75% tax in IL +4.5% tax in VA Shipping and Handling \$20	<b>DesiCalc GRI-98/0127</b> (Doug Kosar) Order from: GRI Fulfillment Center Ph: 773-399-5414 Fx: 630-406-5995
Windows 95, 98, NT	DOE-2.1E	Contact Danny Parker at FSEC for availability.	<b>Energy Gauge USA</b> (Danny Parker) Florida Solar Energy Center 1679 Clearlake Road Cocoa, FL 32922 Ph: 407-638-1405 /Fx: 407-638-1439
Web-based	DOE-2.1E	free	<b>Home Energy Saver</b> WWW interactive program at <a href="http://hes.lbl.gov">http://hes.lbl.gov</a>
DOS	DOE-2.1E	\$250 including PERFORM 98, Version 100 program and manual. Order #P400-98-006	<b>California Energy Commission</b> Publications MS-13 P.O. Box 944295 Sacramento, CA 94244-2950 Ph: 916-654-5385 VISA/MC
Windows 95, 98, NT	DOE-2.1E	free	<b>RESFEN 3.1</b> Fax: (510) 486-4089 or mail your request to: Windows & Daylighting Group MS 90-3111 Lawrence Berkeley National Laboratory Berkeley, CA 94720

Optimize your Building Designs with ...

## GenOpt<sup>®</sup>: Generic Optimization Program

GenOpt 1.0, a multi-parameter optimization program, is available from LBNL. It automatically finds the values of user-selected design parameters that minimize an *objective function*, such as annual energy use calculated by an external simulation program like DOE-2, BLAST, TRACE, SPARK, TRNSYS, etc. GenOpt can be used with any simulation program that has text-based input and output. It also offers an interface for adding custom optimization algorithms to its library.

The Genopt 1.0 program and user's manual may be downloaded free of charge from <http://SimulationResearch.lbl.gov>  
> GenOpt.

# blastnews

**Building Systems Laboratory (BSL)**  
 30 Mechanical Engineering Building  
 University of Illinois  
 1206 West Green Street  
 Urbana, IL 61801

Telephone: (217) 333-3977 / Fax: 244-6534  
[support@blast.bso.uiuc.edu](mailto:support@blast.bso.uiuc.edu) / [www.bso.uiuc.edu](http://www.bso.uiuc.edu)

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 Building Systems Laboratory 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 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** sub-program 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.

### 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 web site (User manual included!).

### HBLC/BLAST Training Courses

Experience with the HBLC and the BLAST family of programs has shown that new users can benefit from a session of structured training with the software. Such training helps to define the steps necessary to produce accurate and consistent output from BLAST and its auxiliary programs and gives users a solid foundation from which they can explore the more advanced features of the program with confidence. The Building Systems Laboratory offers such training courses on an as needed basis typically at our offices in Urbana, Illinois and lasting 2 or 3 days depending on the specific needs of the participants. Call the Building Systems Laboratory for additional information on pricing and availability.

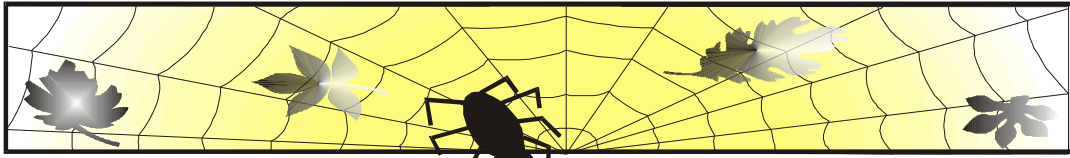
### WINLCCID 98

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. You can download a demo version of WINLCCID 98 (for MS Windows) from the BLAST web site <http://www.bso.uiuc.edu> [see *User News* Vol. 16, No. 4, p. 5]

To order BLAST-related products, contact the Building Systems Laboratory at the address above.

Program Name	Order Number	Price
<b>PC BLAST Package</b> The standard PC BLAST Package includes: BLAST, HBLC, BTEXT, WIFE, CHILLER, Report Writer, Report Writer File Generator, Comfort Report program, Weather File Reporting Program, Control Profile Macros for Lotus or Symphony, and the Design Week Program. The package is on a single CD-ROM and also includes soft copies of the BLAST Manual, 65 technical articles and theses related to BLAST, nearly 400 processed weather files with a browsing engine, and complete source code for BLAST, HBLC, etc. Requires an IBM PC 486/Pentium II or compatible running MS Windows 95/98/NT.	3B486E3-0898	\$1500
<b>PC BLAST Package</b> Upgrade from level 295+	4B486E3-0898	\$450
<b>WINLCCID 98:</b> executable version for 386/486/Pentium	3LCC3-0898	\$295
<b>WINLCCID 98:</b> update from WINLCCID 97	4LCC3-0898	\$195

*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.*



## World-Wide Web and Internet Sites for Building Energy Efficiency

### 🕸 [www.TheEnergyGuy.com](http://www.TheEnergyGuy.com)

The theme of Ray Darby's web site is *Energy Solutions for a Sustainable Future*. It features a Marketplace section to help you find energy products and professional services and a huge Links section which covers the usual building energy issues plus indoor air quality, green buildings, transportation alternatives, utility restructuring, etc.

### 🕸 [www.ornl.gov/ORNL/BTC](http://www.ornl.gov/ORNL/BTC)

The Buildings Technology Center (BTC) at Oak Ridge National Laboratory is devoted to the development of technologies that improve the energy efficiency and environmental compatibility of residential and commercial buildings. The BTC is a designated "National User Facility," which means that its facilities are available to manufacturers, universities, and other organizations for proprietary and nonproprietary research and development.

#### [www.ornl.gov/roofs+walls/whole\\_wall/index.html](http://www.ornl.gov/roofs+walls/whole_wall/index.html)

The Whole-Wall Thermal Performance Calculator provides an on-line, interactive method for determining the whole-wall R-value for a variety of wall systems and house plans.

#### [www.ornl.gov/~roofs/Zip/ZipHome.html](http://www.ornl.gov/~roofs/Zip/ZipHome.html)

The ZIP-Code Insulation Program will tell you the most economic insulation level for your new or existing house.

#### [www.ornl.gov/roofs+walls/insulation/ins\\_16.html](http://www.ornl.gov/roofs+walls/insulation/ins_16.html)

The R-Value Recommendation Program will tell you the most economic insulation level for your new or existing house.

#### [www.ornl.gov/roofs+walls/wetroof/wetroof.html](http://www.ornl.gov/roofs+walls/wetroof/wetroof.html)

This Moisture Control in Roofing Calculator allows the roofing practitioner to determine if a roofing system design requires a vapor retardant or if the system can be modified to enhance its tolerance for small leaks.

#### [www.ornl.gov/roofs+walls/mod\\_zone/index.html](http://www.ornl.gov/roofs+walls/mod_zone/index.html)

This Modified Zone Method Calculator calculates R-values for metal stud walls with insulated cavities.

### 🕸 [www.energystar.gov](http://www.energystar.gov)

This web site provides lists of ENERGY STAR qualified products and a store locator to help you find qualified products at a retailer near you. ENERGY STAR products are made by all major manufacturers and are available at stores everywhere.

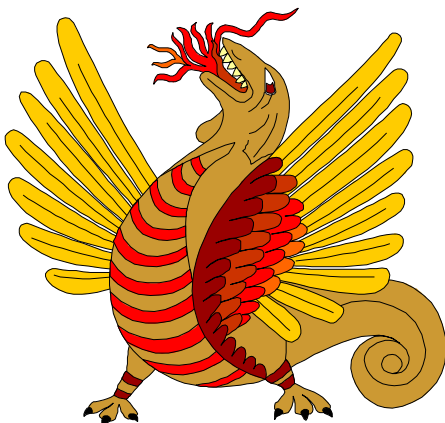
## Software Available From Lawrence Berkeley National Laboratory

Downloads	
<b>BDA (Building Design Advisor) Beta 3</b> (for building decision-makers)	<a href="http://kmp.lbl.gov/BDA">kmp.lbl.gov/BDA</a>
<b>COMIS</b> (multi-zone air flow and contaminant transport model)	<a href="http://www-epb.lbl.gov/comis">www-epb.lbl.gov/comis</a>
<b>EnergyPlus™</b> (new-generation whole-building energy analysis program, combining best features of BLAST and DOE-2; developed by University of Illinois, CERL, Oklahoma State Univ. and LBNL)	To beta test EnergyPlus for Windows, go to <a href="http://SimulationResearch.lbl.gov">SimulationResearch.lbl.gov</a> > EnergyPlus
<b>GenOpt®</b> (generic optimization program)	<a href="http://SimulationResearch.lbl.gov">SimulationResearch.lbl.gov</a> > GenOpt
<b>RADIANCE</b> (analysis and visualization of lighting in design)	<a href="http://radsite.lbl.gov/radiance/license.html">radsite.lbl.gov/radiance/license.html</a>
<b>Desktop Radiance</b> (integrates the Radiance Synthetic Imaging System with AutoCAD Release 14)	<a href="http://kmp.lbl.gov/dt-rad">kmp.lbl.gov/dt-rad</a>
<b>RESEM (Retrofit Energy Savings Estimation Model)</b> (calculates long-term energy savings directly from actual utility data)	<a href="http://eetd.lbl.gov/btp/resem.htm">eetd.lbl.gov/btp/resem.htm</a>
<b>SPARK (Simulation Problem Analysis and Research Kernel)</b> (build simulations of innovative building envelope and HVAC systems by connecting component models)	To beta test VisualSPARK - for Windows, SUN or UNI X operating systems, go to <a href="http://SimulationResearch.lbl.gov">SimulationResearch.lbl.gov</a> > SPARK
<b>SUPERLITE</b> (calculate illuminance distribution for room geometries)	<a href="http://eetd.lbl.gov/btp/superlite20.html">eetd.lbl.gov/btp/superlite20.html</a>
<b>THERM</b> (model two-dimensional heat-transfer effects in building components where thermal bridges are of concern)	<a href="http://windows.lbl.gov/software/therm/therm.html">windows.lbl.gov/software/therm/therm.html</a>
<b>WINDOW 4.1</b> (thermal analysis of window products)	<a href="http://windows.lbl.gov/software/window/window.html">windows.lbl.gov/software/window/window.html</a>

Request by Fax from 510.486.4089	
<b>RESFEN 3.1</b> (choose the most energy-efficient and cost-effective window for a given residential application)	<a href="http://windows.lbl.gov/software/resfen/resfen.html">windows.lbl.gov/software/resfen/resfen.html</a>

Web Based	
<b>Home Energy Saver</b> (quickly compute a home's energy use)	<a href="http://hes.lbl.gov">hes.lbl.gov</a>

Purchase	
<b>ADELINE 2.0</b> (daylighting/lighting performance in complex spaces)	<a href="http://radsite.lbl.gov/adeline/HOME.html">radsite.lbl.gov/adeline/HOME.html</a>



*Run for safety, foolish pedestrians!*

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