

BUILDING ENERGY SIMULATION

FOR USERS OF ENERGYPLUS, SPARK, DOE-2, BLAST, GENOPT, BUILDING DESIGN ADVISOR, ENERGY-10 AND THEIR DERIVATIVES

U
S
E
R
N
E
W
S

What's New ?

VisualSPARK 1.0 Release

VisualSPARK 1.0 is now available! See the article on p. 10 for details.

To purchase VisualSPARK, go to

<http://SimulationResearch.lbl.gov>

EnergyPlus Beta 4

The fourth planned beta test version of EnergyPlus was released in October. To get a no-cost license for Beta 4 go to

www.gard.com/eplustest.htm

If you already have a license for testing previous versions of EnergyPlus, you don't need a new license for Beta 4.

Beta 5 is planned for release in January. April 2001 is the target month for release of EnergyPlus 1.0.

DOE-2 Named in the Energy 100 Awards..

The DOE-2 program received one of the Energy 100 Awards. This award honors 100 of the best scientific and technological accomplishments sponsored by the U. S. Dept. of Energy during the past 30 years. These discoveries demonstrate DOE's commitment to save consumers money and improve the quality of life. Visit the Energy100 Awards website at

www.ma.doe.gov/energy100/list.html

New DOE-2 Consultant

We are pleased to add **The Deringer Group, Inc.** of Berkeley, California, to the list of DOE-2 consultants.

Joseph Deringer and Qiang (Peter) Zhang are DOE-2 experts who offer years of building energy analysis experience. See p. 18 for listing.

www.DeringerGroup.com

What's Inside ?

Features

- 2 Web-Based Building Performance Assessment: The CBIP Screening Tool
- 22 Index to the *User News*, Vol 1 through Vol 21

Software

- 11 BLAST News
- 5 Building Design Advisor 2.0
- 8 DOE-2.1E
 - 8 Help Desk, Training
 - 8 DOE-2.1E Documentation Update
- 12 Directory of DOE-2 Software and Services
- 14 Pre- and Post-Processors for DOE-2
- 15 Special Versions of DOE-2
- 16 International DOE-2 Resource Centers
- 17 International DOE-2 Consultants
- 18 U.S. DOE-2 Consultants
- 7 ENERGY-10 1.3 (with WeatherMaker)
- 4 GenOpt 1.1
- 8 THERM 2.1
- 6 VisualSPARK 1.0
- 9 Software from Lawrence Berkeley Lab

Departments

- 7 Lighting Research Center
- 10 Meetings, Conferences, Symposia

Web-based DOE-2 Building Analysis for Canadian Users

Curt Hepting, DOE-2 consultant based in British Columbia, reports that Natural Resources Canada (NRCan) has put together a web site that **performs live building energy analysis** to provide the user an estimate of the end-use energy requirements and costs for commercial buildings.

**Web-Based Building Performance Assessment:
The CBIP Screening Tool**

**Curt Hepting and Diane Ehret
EnerSys Analytics, Inc.**

**Maria Mottillo
Natural Resources Canada**

OVERVIEW

Natural Resources Canada (NRCan) has instituted a program to encourage energy-efficient design practices and to bring about lasting changes in attitudes and practices in the Canadian commercial building design and construction industry. The Commercial Building Incentive Program (CBIP) offers a financial incentive for incorporating energy efficient features into new commercial and institutional building designs. An eligible building design must demonstrate a reduction in energy use by at least 25 percent when compared to the requirements of Canada’s Model National Energy Code for Buildings. The compliance process is very similar to ASHRAE’s “Building Energy Cost Budget Method,” following the reference building approach.

To help building owners and designers determine whether or not their building is a good candidate for the program, NRCan has developed a web-based building energy performance assessment tool. This tool quickly provides information about the building’s anticipated energy use, energy costs, and emissions savings from implementing energy-efficient design options.

USING THE SCREENING TOOL

The screening tool is designed to rapidly provide feedback based on inputs for a select set of building characteristics. It allows users to enter values for their proposed design, limiting the inputs to the characteristics that affect energy use the most. Selected first are the building location, building type, and primary HVAC system type from over 2,500 possible combinations. Next, information is input about building characteristics. This includes the building envelope (insulation and window performance ratings), the mechanical system (focusing on elements that typically impact energy savings the most), lighting controls and density levels, and marginal utility rates. Each building characteristic input

Mechanical System		
	<u>Reference Building</u>	<u>Your Design</u>
Heating efficiency:	80.00%	<input type="text" value="80.00"/> %
Minimum outside air:	1.20	<input type="text" value="1.20"/> l/s/m ²
Percent of floor area cooled:	38.00%	<input type="text" value="38.00"/> %
Cooling efficiency:	2.50	<input type="text" value="2.50"/> COP
Outdoor air economizer?	Yes	<input checked="" type="checkbox"/> Yes
Efficiency of exhaust air heat recovery:	0.00%	<input type="text" value="0.00"/> %
Service water heating fuel type:	Fossil	<input type="text" value="Fossil"/>
Service water heating efficiency:	80.00%	<input type="text" value="80.00"/> %

Figure 1: Sample Inputs

displays the corresponding “reference case” value for a similar building as if it were built to just meet the code (Fig. 1). This serves as a guideline and for quick comparison.

CBIP provides almost instantaneous results, including:

- a clear indicator if the building design is likely to qualify for a CBIP incentive, and the estimated incentive amount;
- estimated percent energy savings, annual energy cost savings, and emissions savings as compared to the reference case;
- an end-use breakdown of the total energy consumption for both the proposed design and the reference case (Fig. 2); and
- a summary report of the inputs and results.

CBIP also allows users to return to the input screen, change the input values, and view the resulting differences between the current and previous iteration, as shown in Fig. 2. Thus, the screening tool serves as an educational device, that allows the user to investigate how various building characteristics impact energy use and costs.

THE CALCULATION ENGINE

CBIP includes a database of results from over 75,000 DOE-2.1E energy performance simulations. While the interface intentionally limits the number of input data, the background database system contains default values for approximately 80 different building characteristics.

These characteristics represent a mix of “fixed” and “variable” parameters. The fixed parameters are non-changeable through the screening tool and are essentially used for setting up unique DOE-2 prototypes. The HVAC system type, for instance, is an example of a fixed parameter that defines a unique “prototype cell.” Variable parameters can be changed instantly and are available through CBIP (see Fig. 1 for examples). Within CBIP, the variable parameters are assigned using standard design practice or prescribed energy code values, but can be assigned a full range of possible values as is appropriate.

CBIP’s calculation methodology is based on engineering practices and thermodynamic principles, which are embodied in the hourly simulations. The calculation engine (DOE-2.1E) uses a unique process for rapidly accessing the results from a vast range of building energy simulations. More specifically, we make use of response factors derived from performing dozens of simulations on a specific prototype cell. Each simulation represents a discrete change to a building characteristic (lighting density, for instance). We then apply the appropriate functional relationships to a variable building characteristic based on how the change affects energy use by end-use. The results agree closely with actual DOE-2 simulations (Hepting et al, 1996) but take less than 1 percent of the time to calculate—an important factor for an Internet application.

This engineering-based “bottom-up approach” of using response factors allows for much more flexibility than econometric “top-down approaches.” With statistically based econometric approaches there rarely, if ever, are enough building characteristics data available to make statistically valid correlations to monthly or hourly end-use energy by fuel type. Using CBIP’s calculation approach, the user can change key building characteristics and can calibrate the model to known energy and demand requirements. Moreover, users

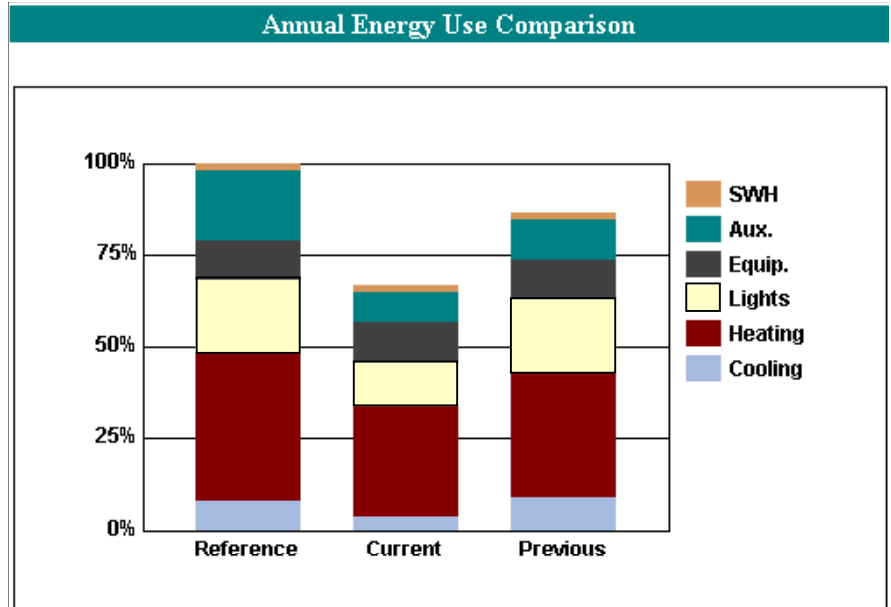


Figure 2: Sample End-Use Results Chart

can modify any characteristic to immediately observe the impacts—as if a full building energy simulation had been run, but in a fraction of the time.

CONCLUSION

CBIP is currently in wide use, both by building professionals and by NRCAN program administrators, to determine whether or not their building may qualify for an incentive before undergoing the time-consuming and relatively expensive task of building performance modeling. In addition, the tool provides valuable information about the key building characteristics that influence energy use. This can be valuable in helping establish conceptual design energy performance targets and the general means for how such targets can be met.

ACKNOWLEDGEMENTS

This article was adapted from *Web-Based Building Performance Assessment: First Steps with the CBIP Screening Tool*, published in the proceedings for the “Sustainable Buildings 2000” international conference held in Maastricht, The Netherlands, October 20–26, 2000 (<http://www.novem.nl/SB2000>).

REFERENCES

Hepting, C., G. Jung, and L. Herman. 1996. “Hourly End-Use Energy Analysis as a Value-Added Customer Service.” *ACEEE 1996 Summer Study on Energy Efficiency in Buildings, Commercial Buildings: Program Design, Implementation, and Marketplace Issues*. American Council for an Energy Efficiency Economy: Washington, DC.

WEB REFERENCES

- Visit the screening tool <http://nrm3.nrcan.gc.ca/cbipscreen/index.html>
- Information about CBIP <http://cbip.nrcan.gc.ca/cbip.htm>

Curt Hepting, P.Eng., P.E.
EnerSys Analytics Inc.
2989 Delahaye Drive
Coquitlam, B.C. V3B 6Y9
Canada



Tel (604) 552-0700
Fax (604) 552-0713
enersys@infoserve.net
<http://www.enersys.ca/info/>



GenOpt[®] 1.1: Beta 2 Version

The Beta 2 version of GenOpt 1.1 has been released. It contains an additional algorithm for multi-dimensional optimization, new algorithms for one-dimensional optimization, and an algorithm for parametric runs in a multi-dimensional space. The new version also allows processing of multiple function values and has an improved graphical user interface.

GenOpt is a multi-parameter optimization program, available free of charge 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 EnergyPlus, SPARK, DOE-2, BLAST, TRACE, 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.

Genopt 1.1, Beta 2 (with user manual) may be downloaded from

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

Building Design Advisor 2.0

*Decision making through the
integrated use of multiple
simulation tools and databases*

The **Building Design Advisor (BDA)** is a Windows program that addresses the needs of building decision-makers from the initial, schematic phases of building design through the detailed specification of building components and systems. The BDA is built around an object-oriented representation of the building and its context, which is mapped onto the corresponding representations of multiple tools and databases. It then acts as a **data manager** and **process controller**, automatically preparing input to simulation tools and integrating their output in ways that support multi-criterion decision making. The latest public release of BDA (version 2.0) is linked to three main applications:

- A **Schematic Graphic Editor (SGE)**, for graphic input of building components and systems,
- **DElight**, a simplified daylighting simulation tool, and
- the **DOE-2.1E** building energy simulation program.

The following **enhancements** have been made to BDA 2.0 (as of 09/15/00):

- Greater flexibility in project development with features such as "Save as.."
- Greater user control over object properties with editing of Solution and Story properties, building azimuth, etc.
- User interface enhancements allow easier navigation of the building model with less ambiguities.
- Several bug fixes.
- Extended documentation.

Current research and development efforts are focused on the development of links to:

- **Desktop Radiance**, a Windows 95/98/NT version of the **Radiance** lighting/daylighting simulation and rendering software, and
- **Athena**, a life-cycle analysis of embodied energy and environmental impact of materials.

The minimum and recommended system **requirements** to run the BDA software are as follows:

Minimum

Pentium 75
Windows 95, 98, NT 4.0.
16 / 32MB RAM under Windows 95
30 MB of larger hard disk space.
640x480 or higher screen resolution.

Recommended

Pentium 200 or better.
Windows 95, 98, NT 4.0.
24 / 64MB RAM under Windows NT 4.0.
60 MB of larger hard disk space.
1024x768 or higher screen resolution.

The BDA source code is available for licensing; if interested, please contact Dr. Papamichael at K_Papamichael@lbl.gov.

To learn more about the BDA software and to download a copy of the latest public version, please visit

<http://kmp.lbl.gov/BDA>



VisualSPARK



Release of Version 1.0

Available from Lawrence Berkeley National Laboratory, *VisualSPARK 1.0 allows you to build customized models of complex physical processes by connecting calculation objects. It is aimed at the simulation of innovative and/or complex building systems that are beyond the scope of programs like DOE-2 and EnergyPlus.*

VisualSPARK Features:

- solves non-linear systems of arbitrary complexity
- solves from a few equations up to thousands of equations simultaneously
- user-specified time step
- robust solution methods
- HVAC component library
- easy to change variables from input to calculated
- dynamic plotting: plot results while simulation is running
- up to 20 times faster execution times than related programs (due to the use of graph-theoretic methods for problem partitioning and reduction in number of iteration variables)

The main elements of VisualSPARK are a **user interface**, a **network specification language**, a **solver** for solving simultaneous algebraic and differential equations, and a **results processor**. With the network specification language you link the calculation objects into networks that represent a building's envelope and/or HVAC system. The solver solves this network for user-specified input parameters. With the results processor you graphically display the results of the calculation.

VisualSPARK runs under the Windows 95/98/NT/2000, SunOS, Solaris, Linux and HPUNIX operating systems.

VisualSPARK costs \$250. To purchase the program, go to
<http://SimulationResearch.lbl.gov> > VisualSPARK > Purchase

If you would like to get an idea of what the program does before purchasing it, 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, Drury Crawley, program manager

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

New DOE-2 Consultant

Marco Rapella marco.rapella@libero.it
Via Bonfadini 33
I-23100 Sondrio
ITALY

The Building Energy Simulation User News is published bi-monthly and distributed electronically 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 or fax us at (510) 486-4089. Direct BLAST-related inquiries to the Building Systems Laboratory, email support@blast.bso.uiuc.edu or phone (217) 333-3977. © 2001 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

DOE-2

DOE-2

DOE-2

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 such as 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

To order, call Ed Kidd or Walt Kelly at ESTSC (865) 576-2606, or email to estsc@adonis.osti.gov.

DOE-2.1E Documentation Update

Corrections to Appendix A (Hourly Report Variables) of the DOE-2.1E *Supplement* may be downloaded from the SRG web site (<http://SimulationResearch.lbl.gov>). Click on "Documentation" under DOE-2 in the left menu. You want "Update Package #3."

DOE-2 Help Desk

Bruce Birdsall - Phone/Fax: (925) 671-6942, M-F 10 a.m. to 3 p.m. PDT.

Contact Bruce if you have a DOE-2 problem or question. If you need to send a fax, please be sure to phone him first. This is a free service, supported by the U. S. Department of Energy.

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

DOE-2

DOE-2

DOE-2

ENERGY-10, Version 1.3

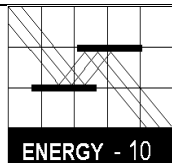
Version 1.3 of ENERGY-10 is now available. It includes the much-anticipated *WeatherMaker* function. *WeatherMaker* allows users to create their own weather files based on information available from nearly 4,000 weather stations throughout the U.S. Revisions to the program itself include some minor fixes, an improved and expanded Help section, and greater clarity in titling and identification of various sections. Contact the Sustainable Buildings Industries Council for more information, or to order your upgrade disc (the cost is \$15, which covers production and shipping).

ENERGY-10, written in C⁺⁺, is a design tool for smaller residential or commercial buildings that are less than 10,000 ft² floor area, or buildings that can be treated as one- or two-zone increments. It performs whole-building energy analysis for 8760 hours/year, including dynamic thermal and daylighting calculations. ENERGY-10 was specifically designed to facilitate the evaluation of energy-efficient building features in the very early stages of the design process.

Input: Only four inputs required to generate two initial generic building descriptions. Virtually everything is defaulted but modifiable. As the design evolves, the user adjusts descriptions using fill-in menus (utility-rate schedules, construction details, materials).

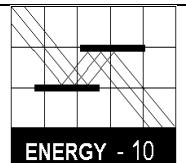
Output: Summary table and 20 graphical outputs available, generally comparing current design with base case. Detailed tabular results also available.

Platform: PC-compatible, Windows 3.1/95/98, Pentium processor with 16 MB of RAM is recommended.



Sustainable Buildings Industries Council
Douglas K. Schroeder
Associate Director
1331 H Street, NW, suite 1000
Washington, D.C. 20004 USA

Tel: (202) 628-7400 ext 210
Fax: (202) 393-5043
SBICouncil@sbicouncil.org
www.psic.org/energy10.htm



Software Available From Lawrence Berkeley National Laboratory

Downloads	
BDA 2.0 (Building Design Advisor)	kmp.lbl.gov/BDA
COMIS (multi-zone air flow and contaminant transport model)	www-epb.lbl.gov/comis
EnergyPlus™ (new-generation whole-building energy analysis program, combining best features of BLAST and DOE-2)	To beta test EnergyPlus go to SimulationResearch.lbl.gov > EnergyPlus
GenOpt® 1.1 (generic optimization program)	SimulationResearch.lbl.gov > GenOpt
RADIANCE (analysis and visualization of lighting in design)	radsite.lbl.gov/radiance/
Desktop Radiance (integrates the Radiance Synthetic Imaging System with AutoCAD Release 14)	radsite.lbl.gov/deskrad/
RESEM (Retrofit Energy Savings Estimation Model) (calculates long-term energy savings directly from actual utility data)	eetd.lbl.gov/btp/resem.htm
SUPERLITE (calculate illuminance distribution for room geometries)	eetd.lbl.gov/btp/superlite20.html
THERM 2.1 (model two-dimensional heat-transfer effects in building components where thermal bridges are of concern)	windows.lbl.gov/software/therm/therm.html
WINDOW 4.1 (thermal analysis of window products)	windows.lbl.gov/software/window/window.html

Request by Fax from 510.486.4089	
RESFEN 3.1 (choose energy-efficient, cost-effective windows for a given residential application)	windows.lbl.gov/software/resfen/resfen.html

Web Based	
Home Energy Saver (quickly compute home energy use)	hes.lbl.gov

Purchase	
SPARK (Simulation Problem Analysis and Research Kernel) (build simulations of innovative building envelope and HVAC systems by connecting component models)	For Windows, SUN, Linux, go to SimulationResearch.lbl.gov > SPARK
ADELINE 2.0 (day/lighting performance in complex spaces)	radsite.lbl.gov/adeline/

Meetings, Conferences, Symposia

FEMP Energy 2001 Workshop

To be held
June 4-6, 2001 in Kansas City, MO
Contact: Rick Klimkos (FEMP)
Tel: 202.586.8287
fax: 202.586.3000
Net: <http://www.energy2001.ee.doe.gov>

CLIMA 2001

To be held
September 15-18, 2001 in Naples, Italy
Contact the secretariat at
Tel: +39.02.55.193.446
Email: clima@clima2000.it
Net: <http://www.clima2000.it>

9th National Conference on Building Commissioning

To be held
May 9-11, 2001, in Cherry Hills, NJ
Contact: Carolyn Dasher, Conference Manager
Tel: 503.248.4636 x 204

Fax: 503.295.0820
Email: cdasher@peci.org
Net: <http://www.peci.org/ncbc>

ASHRAE

ASHRAE Winter Meeting
To be held
January 27-31 in Atlanta, GA

ASHRAE Annual Meeting
To be held
June 23-27, 2001 in Cincinnati, OH

I B P S A

BUILDING SIMULATION 2001

To be held
August 13-15, 2001 in Rio de Janeiro, Brazil
All information may be found at the BS2001
web site:
WWW.LABEEE.UFSC.BR/BS2001/

Contact: jyoung@ashrae.org
ASHRAE Meetings Section
1791 Tullie Circle NE
Atlanta, GA 30329
Tel: 404.636.8400 -- Fax: 321.5478
Net: <http://www.ashrae.org>

Disclaimer: The Building Energy Simulation User News was prepared as an account of work sponsored by the United States Government (USG). While this document is believed to contain correct information, neither the USG nor any agency thereof, nor the Regents of the University of California (RUC), nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process or service by its trade name, trademark, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the USG or any agency thereof, or the RUC. The views and opinions of authors expressed herein do not necessarily state or reflect those of the USG or any agency thereof or of the Regents of the University of California

BLASTnews

www.bso.uiuc.edu

Building Systems Laboratory (BSL)
30 Mechanical Engineering Building
University of Illinois
1206 West Green Street
Urbana, IL 61801
Telephone: (217) 333-3977
Fax: (217) 244-6534
support@blast.bso.uiuc.edu

The **Building Loads Analysis and System Thermodynamics (BLAST)** program predicts energy consumption, energy system performance and cost for new or existing (pre-retrofit) buildings.

BLAST contains three major sub-programs:

- **Space Load Prediction** computes hourly space loads in a building based on weather data and user inputs detailing the building construction and operation.
- **Air Distribution System Simulation** uses the computed space loads, weather data, and user inputs.
- **Central Plant Simulation** 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. 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. The Building Systems Laboratory offers such training courses on an as needed basis typically at our offices in Urbana, Illinois.

WINLCCID 98

LCCID (Life Cycle Cost in Design) was developed to perform Life Cycle Cost Analyses (LCCA) for the Department of Defense and their contractors.

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

Program Name	Order Number	Price
PC BLAST 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 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
PC BLAST Package Upgrade from level 295+	4B486E3-0898	\$450
WINLCCID 98: executable version for 386/486/Pentium	3LCC3-0898	\$295
WINLCCID 98: 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.

DOE-2 Directory of Program Related Software and Services¹

ESTSC Versions of DOE-2

Program Name	Description	Cost
DOE-2.1E (Ed Kidd or Walt Kelly) estsc@adonis.osti.gov	Source code, executable code and complete current documentation for:	Windows \$300 \$455 \$500 SUN-UNIX VAX \$500
Energy Science & Technology Software Center (ESTSC) P.O. Box 1020 Oak Ridge, TN 37831-1020 Ph: 865-576-2606 / Fx: 576-2865 www.doe.gov/html/osti	DOE-2.1E/Version 103 for Windows and SUN UNIX DOE-2.1E DEC-VAX Operating System: Windows, SUN UNIX, DEC-VAX	US, Mexico, Canada \$575 \$1365 \$1835 Other Foreign \$1075 \$2120 \$2716
	<u>Support</u> From ESTSC, limited operational support (telephone assistance concerning installation, media or platform questions). Help with modeling available free of charge from Bruce Birdsall at (925) 671-6942 10am to 3pm Pacific time.	

Commercial Versions of DOE-2

Program Name	Description	Cost
ADM-DOE-2 (Richard Burkhardt) ADM Associates adm_asc@ns.net 3239 Ramos Circle Sacramento, CA 95827-2501 Ph: 916-363-8383, Fx: 363-1788	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 available. Operating System: DOS, Windows 95	\$395 + \$15/SH including one set weather data (your choice) and documentation
Compare-IT (Matt Brost) RLW Analytics, Inc. info@rlw.com 1055 Broadway, Suite G Sonoma, CA 95476 Ph: 707-939-8823, Fx: 939-9218 www.rlw.com	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. Based DOE-2.1E. Operating System: DOS, Windows (98, 95, NT)	\$500 consultant \$2000 client Documentation available
DOE-Plus (Steve Byrne) Item Systems byrne@item.com 321 High School Road NE #344 Bainbridge Island, WA 98110 Ph: 206-855-9540 / Fx: 855-9541 www.halcyon.com/byrne	Complete support for all DOE-2 commands. Utility programs included: Prep, Demand Analyzer, weather processor. Over 500 worldwide weather files. Imports BDL files created with a text editor or other program. Based DOE-2.1E. Operating System: DOS, Windows (3.1, 95, NT)	\$895 with DOE-2 and doc \$495 without DOE-2 Source code not available.
	<u>Input</u> Input: Customizable windows GUI dynamically built based on DOE-2 macros. <u>Output</u> Output: Customizable tables and graphics <u>Support</u> Support: Unlimited, except modeling advice. On-line help.	
	<u>Input</u> Input: Interactive, graphical, fill-in-the-blanks <u>Output</u> Output: Customizable tables and graphics <u>Support</u> Support: Unlimited, except modeling advice. On-line help.	

¹ 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.

Commercial Versions of DOE-2 (continued)

Program Name	Description	Input/ Output/ Support	Cost
<p>EnergyPro demian@energysoft.com</p> <p>(D. Vonderkullen) Gabel Dodd/EnergySoft LLC 100 Galli Drive #1 Novato, CA 94949-5657 Ph: 415-883-5900, Fx: 883-5970 www.energypro.com</p>	<p>Performs nonresidential load calculations for HVAC equipment sizing. Electronically exports forms to AutoCad for inclusion on blueprints. On-line help. 344 weather files for the U.S. and Canada. Operating System: DOS, Windows (95, NT). For California Users: Performs Title 24 compliance calculations, includes state-certified HVAC and DHW Equipment directories, Title 24 tailored lighting calculations. Based on ESTSC DOE-2.1E</p>	<p><u>Input:</u> Graphical</p> <p><u>Output:</u> Graphs, forms</p> <p><u>Support:</u> Unlimited support</p>	<p>DOE-2 Module: Non-residential \$ 700^{1,2} Residential \$ 250^{1,2} Program Interface \$ 195³ ¹ price reflects cash discount ² includes documentation ³ required</p>
<p>EZDOE Elite Software P.O. Box 1194 Bryan, TX 77806 Ph: 409-846-2340 / Fx: 846-4367 www.elitesoft.com</p> <p>(Bill Smith) bsmith @ elitesoft.com</p>	<p>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. Full implementation of DOE-2 on DOS-based 386 and higher computers. On-line help. Some weather files. Based on DOE-2.1E. Operating System: DOS</p>	<p><u>Input:</u> Fill-in-the-blanks</p> <p><u>Output:</u> Standard DOE reports plus some custom graphic reports</p> <p><u>Support:</u> Unlimited phone support</p>	<p>\$1295 w/documentation</p> <p>Source code not available.</p>
<p>FTI/DOE2 Finite Technologies Inc. 3763 Image Drive Anchorage, Alaska 99504 Ph: 907-333-8937, Fx: 333-4482 www.finite-tech.com</p> <p>(Scott Henderson) info @ finite-tech.com</p>	<p>FTI/DOE is 100% compatible with LBNL version. Source code versions will compile with most F77-compliant compilers. On-line help: 344 weather files for the U.S. and Canada. Based on ESTSC DOE-2.1E. No demo, 30-day trial period Operating System: DOS, Windows (3.x, 95, NT) AIX, ULTRIX, VMS, Linux, NeXTStep,</p>	<p><u>Input:</u> Version 2.x: text based Version 3.x: graphical</p> <p><u>Output:</u> All standard DOE-2 reports Run time and status graphics</p> <p><u>Support:</u> 90-days free; then cost is \$ 35 each email per incident \$ 55 per hour per incident \$125 per hour for engineering advice.</p>	<p>\$ 995.99 US w/documentation \$1066 Int'l w/documentation \$4999.99 Source code</p>
<p>PRC-DOE-2 Paul.Reeves@DOE2.com Partnership for Resource Conservation 140 South 34th Street Boulder, CO 80303 Ph: 303-499-8611, Fx: 554-1370</p> <p>(Paul Reeves)</p>	<p>Text-based version of DOE-2 includes documentation. Extensive information on new features, including information on new system types, new commands, new options, etc., added to later versions of 2.1E. Operating System: DOS, Windows (95, NT)</p>	<p><u>Input:</u> Standard text-based</p> <p><u>Output:</u></p> <p><u>Support:</u> Unlimited support.</p>	<p>\$ 495 w/documentation</p> <p>Source code not available.</p>

Commercial Versions of DOE-2 (continued)

Program Name	Description	Input	Cost
<p>VisualDOE 2.61 (Eric Kolderup) support@eley.com Charles Eley Associates 142 Minna Street San Francisco, CA 94105 Ph: 415-957-1977 Fx: 415-957-1381 www.eley.com</p>	<p>Fast 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. Rotate-able 3-D image of model. Custom hourly outputs, customized graphs. On-line help. 400+ US weather files, 12+ for Canada, plus selected locations around the world. Operating System: DOS, Windows (3.1, 95, NT)</p>	<p>Graphical</p> <hr/> <p>Output Graphical</p> <hr/> <p>Support. 90 days free phone and email support.; thereafter \$195/hear</p>	<p>Version 2.61 is \$495 w/documentation</p> <p>Source code not available.</p>

Pre- and Post Processors for DOE-2

Program Name	Description	Cost
<p>DrawBDL Joe Huang & Associates 6720 Potrero Avenue El Cerrito, CA 94530 Ph/Fx: 510-236-9238</p>	<p>DrawBDL, Version 2.1, is a graphic debugging and drawing tool for DOE-2 building geometry. DrawBDL reads your BDL input and makes a rotate-able 3-D drawing of your building with walls, windows, and building shades shown in different colors for easy identification. Operating System: DOS, Windows (3.1, 95, 98, NT) [Works with 2.1E]</p>	<p>\$125.00 plus shipping</p>
<p>PRC-TOOLS P R C (Paul Reeves) 140 South 34th Street Boulder, CO 80303 Ph: 303-499-8611 / Fx: 554-1370</p>	<p>PRC-Tools aid in extracting, analyzing, and formatting DOE-2 output. PRC-Grab automates the process of extracting any number of answers from DOE-2 standard output files. PRC-Hour and PRC-Peak 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. Operating System: Windows (95, 98, NT) [Works with 2.1E]</p>	<p>\$99.00</p>
<p>Visualize-IT RLW Analytics, Inc. mattb@rlw.com 1055 Broadway, Suite G Sonoma, CA 95476 Ph: 800-472-6716 Fx: 707-939-8823 www.rlw.com</p>	<p>Visualize-IT 2.0 is a Windows application designed to help you explore and summarize short-interval time series data, e.g., measurements taken once every 15 minutes over a period of weeks, months or years. Visualize-IT has been developed specifically for electric and gas load data measuring class profiles, market-segments, individual customer sites or specific end uses. Customized DOE2.1e hourly output importer. Visualize-IT is highly useful and informative for looking at DOE2 output and/or comparing to interval metered data. It is equally useful for other time series measurements such as weather, industrial process control, and water quality. Operating System: Windows 95, 98 and NT</p>	<p>\$500.00 per set Volume Discounts Available</p>

Special Versions of DOE-2

Program Name	Description	Cost
<p>CBIP pebc.mcan.gc.ca/cbip.htm Office of Energy Efficiency Natural Resources Canada 580 Booth St., 18th Floor Ottawa ON K1A 0E4 CANADA</p>	<p>Natural Resources Canada's Commercial Building Incentive Program (CBIP) offers a financial incentive for the incorporation of energy efficiency features in new commercial and institutional building designs. The objective of this new incentive is to encourage energy-efficient design practices and to bring about lasting changes in the Canadian building design and construction industry.</p> <p>The program will be offered until March 31, 2004.</p>	<p>Web Based</p>
<p>Cool Tools (Peter Turnbull) Pacific Gas & Electric Company pwt1@pge.com www.hvacexchange.com/cooltools/</p>	<p>The CoolTools™ project objective is to develop, disseminate and promote an integrated set of tools for design and operation of chilled water plants. CoolTools™ products are Internet based, public domain resources available to building owners, design professionals, and operators involved in both new construction and retrofits.</p>	<p>Web Based</p>
<p>DesiCalc GRI-98/0127 (Doug Kosar) www.desicalc.com Order from: GRI Fulfillment Center Ph: 773-399-5414, Fx: 630-406-5995</p>	<p>DesiCalc 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 US. Includes the latest TMY2 meteorological database [Based on DOE-2.1E] Operating System: Windows 3.1, 95, 98, NT</p>	<p>\$295 w/doc +8.75% tax in IL +4.5% tax in VA S/H add \$20</p>
<p>Energy Gauge USA (Danny Parker) Florida Solar Energy Center 1679 Clearlake Road Cocoa, FL 32922 Ph: 407-638-1405, Fx: 407-638-1439</p>	<p>Energy Gauge USA allows the simple calculation and rating of residential building energy use in the US. 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 US locations. [Based on DOE-2.1E] Operating System: Windows 95, 98, NT</p>	<p>Contact Danny Parker at FSEC for availability.</p>
<p>Home Energy Saver (Residential DOE-2) http://hes.lbl.gov</p>	<p>Calculation of residential energy 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.</p>	<p>Web Based</p>
<p>PERFORM 98 California Energy Commission P.O. Box 944295, MS-13 Sacramento, CA 94244-2950 Ph: 916-654-5385</p>	<p>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. DOS 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. [Based on DOE-2.1E]</p>	<p>\$250 including PERFORM 98, Version 100 program and manual. (VISA/MC) Order #P440960006</p>
<p>RESFEN-3.1 Building Technologies, MS 90-3111 Lawrence Berkeley Laboratory Berkeley, CA 94720</p>	<p>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, also the peak heating and cooling demand for specific window products. [Based on DOE-2.1E] Operating System: Windows 95, 98, NT</p>	<p>Free! Download from windows.lbl.gov/software/resfen</p>

INTERNATIONAL DOE-2 RESOURCE CENTERS

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. Users may make arrangements to photocopy the new material for a nominal cost. We hope to establish centers in other countries; please contact us if you want to establish a center in your area.

Australasia

P. C. Thomas, SOLARCH, University of New South Wales, Sydney 2052, Australia

Tel: +61 2 9385 6373 / Fax: +61 2 9385 6735, email PC.Thomas@unsw.edu.au www.fbe.unsw.edu.au/units/solarch

Australia

Murray Mason, ACADS BSG, 16 High Street, Glen Iris, VIC. 3146, Australia / Tel: +61 885 6586 / Fax: +61 885 5974

Brazil

Prof. Roberto Lamberts, Universidade Federal de Santa Catarina, Campus Universitario-Trindade, Cx. Postal 476, 88049-900 Florianopolis SC, BRASIL
lamberts@ecv.ufsc.br / Tel: +55 48 331 9272/ Fax: +55 48 331 9770

Czech Republic

Ing. Zuzana Krtkova, Faculty of Civil Engineering, Dept. of Environmental and Building Services Engineering, Czech Technical University in Prague, Thakurova 7, 166 29 Praha 6, CZECH REPUBLIC krtkova@fsv.cvut.cz Tel: +42 2 2435 4327

Egypt

Dr. Ossama A. Abdou, Center for Building Environmental Studies and Testing (C-Best), 15-El-Shibani Street, Almanza, Cairo, Egypt Tel: +20 2 391 1137 or +20 2 417 4583 / Fax: +20 2 519 4343 / oabdou@hotmail.com

Germany

B. Barath or G. Morgenstern, Ingenieurbüro Barath & Wagner GmH, Postfach 20 21 41, D-41552 Kaarst, Germany
Tel: +49 2 131 7574 9012 G. Morgenstern / Fax: +49 2 131 7574 9029

Hong Kong, China, Taiwan, Japan

Dr. Sam C. M. HUI or K.P. Cheung, Dept of Architecture, University of Hong Kong, Pokfulam Road, Hong Kong (SAR), CHINA / cmhui@hku.hk or kpcheung@hku.hk / <http://arch.hku.hk/research/BEER/DOE-2/DOE-2.htm>
Tel: +852 2859 2123 Sam Hui / Fax: +852 2559 6484

India

Jiten Prajapati or Anil K. Anand, Energy Systems Engineering, IIT-Mumbai, Powai, Mumbai 400 076, INDIA
Tel : +91 022 578 2545 x7378

Italy

Marco Rapella, Via Bonfadini 33, I-23100 Sondrio, ITALY Tel: +390342511168, marco.rapella@libero.it, cell phone number: +393474756858

Korea (Chungnam)

Dr. Jun Tae Kim, Department of Architectural Engineering, Kongju National University, 182 Sinkwan-dong, Kongju, Chungnam 314-701, Republic of Korea / jtkim@knu.kongju.ac.kr / Tel: +82 416 850 8653 / Fax +82 416 856 9388

Korea (Taejon)

Dr. Euy-Joon Lee and Jong-Ho Yoon, Passive Solar Research Team, Bldg 2, Room 202, Korea Institute of Energy Research, Daeduk Science Town, 71-2 Jang-Dong, Yuseong-Gu, Taejon 305-343, Republic of Korea, Lee: ejlee@kier.re.kr, Yoon: yesru@kier.re.kr
Tel: +82 42 860 3514 / Fax: +82 42 860 3132

INTERNATIONAL DOE-2 RESOURCE CENTERS (continued)

New Zealand

Tan Yune, Architecture Department, The University of Auckland, Private Bag 92019, Auckland, New Zealand tanyune@ccu1.auckland.ac.nz / Tel: +64 9 373 7999
x5647 / Fax: +64 9 373 7410

Portugal, Spain, Italy, and Greece

Antonio Rego Teixeira, ITIME, Unidade de Energia, Estrada do Paco do Lumiar, 1699 Lisboa, Portugal
art@itime.ineti.pt / Tel: +35 11 350 2931 / Fax: +35 11 716 4305

Singapore, Malaysia, Indonesia, Thailand, and the Philippines

WONG Yew Wah (Raymond), Nanyang Technological University, School of Mechanical and Production Engineering, Nanyang Avenue, Singapore 2263, Republic of
Singapore, mywwong@ntu.edu.sg / Tel: +65 790 5543 / Fax: +65 791 1859

South Africa

Prof. L. J. Grobler, School of Mechanical and Materials Engineering, University of Potchefstroom, Private Bag X6001, Potchefstroom 2520, South Africa,
mgiljg@puknet.puk.ac.za / Tel: +27 148 299 1328 / Fax: +27 148 299 1320

Switzerland

René Meldem, Meldem Energie SA, Avenue de Cour 61, CH-1007 Lausanne, Switzerland
Tel: +41 21 401 4090, Fax: +41 21 401 4091, meldem.energie@bluewin.ch

INTERNATIONAL DOE-2 ENERGY CONSULTANTS

Australia

P. C. Thomas, Sustainable Building & Energy Consultants, 6/52 Houston Road, Kingsford NSW 2032, Australia.
Tel/Fax: +61 2 9662 0205, Mobile +61 417 405 478, pc_thomas@iname.com

Belgium

Andre Dewint, S.A. Alpha Pi n.v., Av Winston Churchill 232 Box 7, B-1180 Bruxelles, BELGIUM
Tel: +32 2 343 4251 / Fax: +32 2 343 0377

Canada

Curt Hepting, P.Eng. EnerSys Analytics, 2989 Delahaye Drive, Coquitlam, B.C. V3B 6Y9 Canada enersys@infoserve.net / www.enersys.bc.ca/homepage / Tel:
(604) 552-0700 / Fax (604) 552-0713

Dejan Radoicic, D. W. Thomson Consultants, Ltd., 1985 West Broadway #200, Vancouver, BC V6J 4Y3, Canada Tel (604) 731-4921 / Fax (604) 738-4420

Neil A. Caldwell, PE, DukeSolutions Canada, Inc., 1730 - 401 West Georgia St., Vancouver, BC V6B 5A1 Canada ncaldwe@duke-energy.ca

Dr. Stephane Bilodeau, PE, President, Groupe Enerstat, Inc., 79 Wellington North #202, Sherbrooke (Quebec) J1H 5A9, Canada
sbilodeau@groupeenerstat.com / Tel: (819) 562-8040 / Fax (819) 562-5578

Gordon Shymko, G.F. Shymko & Associates, Inc., 129 Evergreen Crescent S.W., Calgary, Alberta T2Y 3R2, Canada

Germany

Jens Grundt and Ludwig Michel, GMW-Ingenieurburo, Die Planer Villa, Bünteweg 10a, 30559 Hannover, Lower Saxony, Germany
Tel: +49 0511 58 59 48 -11/Fax +49 0511 58 59 48 -48 www.gmw-ingenieurbuero.de j.grundt@gmw-ingenieurbuero.de

INTERNATIONAL DOE-2 ENERGY CONSULTANTS (continued)

Italy

Marco Rapella, Via Bonfadini 33, I-23100 Sondrio, ITALY Tel: +390342511168, marco.rapella@libero.it, cell phone number: +393474756858

Ireland

Paul Overy, Overy + Associates, Mechanical and Electrical Consulting Engineers, 43 Parnell Street, Clonmel, Co Tipperary, Ireland
Tel: +353 (0)52-27667, Fax: +353 (0)52-29238 www.overy-assoc.com

New Zealand

Paul Bannister, Energy Group, Ltd., 14a Wickliffe Street (P.O. Box 738), Dunedin New Zealand egstaff@earthlight.co.nz
Tel: +64 3479 0148, Fax: 3479 0759

Switzerland

René Meldem, Meldem Energie SA, Avenue de Cour 61, CH-1007, Lausanne, Switzerland.
Tel: +41 21 401-4090, Fax: +41 21 401-4091, meldem.energie@bluewin.ch

Philip Schluchter, Institut für Bauphysik Klein, Urs Graf-Strasse 1, CH-4052 Basel, Switzerland

Gerhard Zweifel, Hochschule Technik + Architektur Luzern, Technikumstrasse 21 Abt. HLK, CH-6048 Horw, Switzerland gzweifel@ztl.ch
Tel: +41 349 3349, Fax: 349 3960

Markus Koschenz, Building Equipment Section 175, EMPA, 129 Überlandstrasse, CH-8600 Dübendorf, Switzerland
Markus.Koschenz@empa.ch, Tel: +41 1823 5511, Fax: 821-6244

United Kingdom

Dr. Peter Simmonds, Ove Arup and Partners, Ltd., 13 Fitzroy Street, London W1P 6BQ, UNITED KINGDOM.
Tel: +44 20-7465-3637 / Fax: 7465-3667, peter.simmonds@arup.com / www.arup.com

U. S. DOE-2 ENERGY CONSULTANTS

Arizona

Henry van Lambalgen, P.E.
henny@questenergy.com Quest Energy Group, LLC 4324 East Pearce Road Phoenix, AZ 85044 (480) 753-5590
fax 753-1215

Marlin S. Addison
marlin.addison@doe2.com M. S. Addison & Associates 1215 West 12th Place Tempe, AZ 85281 (480) 968-2040
fax: 968-2053

Chuck Sherman
ces@essinc.com ESSengineering 2141 East Broadway, #211 Tempe, AZ 85282 (480) 784-4500
fax: 784-4800

Sarat Kanaka
nexus@nexusenergy.com EcoGroup, Inc., Suite 301 2085 E. Technology Circle Tempe, AZ 85284 (602) 777-3000

California

Joseph Deringer,
jderinger@deringergroup.com The Deringer Group, Inc. 1349 Addison Street Berkeley, CA 94703 (510) 843-9000
fax: 843-9005

Qiang (Peter) Zhang
peter@deringergroup.com Gabel Associates, LLC 1818 Harmon Street Berkeley, CA 94703 (510) 428-0803
office@gabelenergy.com www.gabelenergy.com fax: 428-0324

George Marton 1129 Keith Avenue Berkeley, CA 94708 (510) 841-8083

U. S. DOE-2 ENERGY CONSULTANTS (continued)

California (continued)					
John R. Aulbach, PE jrascab36@earthlink.net	23508 Naffa Avenue		Carson, CA 90745		(310) 549-7118
Leo Rainer lrainer@davisenergy.com	Davis Energy Group, Inc. www.davisenergy.com	123 C Street	Davis, CA 95616		(916) 753-1100
L. Heshong and D. Mahone lheshong@h-m-g.com dmahone@h-m-g.com	The Heshong Mahone Group www.h-m-g.com	11626 Fair Oaks Blvd. #302	Fair Oaks, CA 95628		(916) 962-7001 fax: 962-0101
Cliff Gustafson	Taylor Systems Engineering, Inc. www.tse-inc.net	9801 Fair Oaks Blvd., #100	Fair Oaks, CA 95628		(916) 961-3400 fax: 961-3410
Tom Lunneberg, PE info@ctg-net.com	Constructive Tech. Group www.ctg-net.com/main.htm	16 Technology Dr., #109	Irvine, CA 92618		(714) 790-0010
David J. Schwed rma@as.net	Romero Management Associates www.asnet/~rma/index.htm	1805 West Avenue K	Lancaster, CA 93534		(805) 940-0540
Martyn C. Dodd support@energysoft.com	Gabel Dodd/EnergySoft, LLC www.energysoft.com	100 Galli Drive, # 1	Novato, CA 94949		(415) 883-5900 fax: 883-5970
Jim Kelsey, Kevin Warren info@kw-energy.com	KW Energy Engineering www.kw-energy.com	175 Filbert Street #205	Oakland, CA 94607-2541		(510) 834-6420 fax: 834-6373
Patrick Nkwocha, PE UPat@worldnet.att.net	Global Tech Services	3360 Foothill Blvd., #108	Pasadena, CA 91107		(626) 583-8205 fax: 583-8206
James Trowbridge, PE Greg Cunningham gwc@essinc.com	Trowbridge Engineering ESSengineering	8240 Caribbean Way 114 Sansome St., #1201	Sacramento, CA 95826 San Francisco, CA 94104		(916) 381-4753 (415) 296-9760 fax: 784-9761
Charles Eley, T. Tathagat info@eley.com	Eley Associates www.eley.com	142 Minna Street	San Francisco, CA 94105		(415) 957-1977 fax: 957-1381
John F. Kennedy, PE info@geopraxis.com	GeoPraxis, Inc. www.geopraxis.com	205 Keller Street	Petaluma, CA 94952-3874		(707) 766-7010 fax: 766-7014
Chandra Shinde, PE	Envirodesign Group	19613 El Camino Esplanade	Walnut, CA 91789-2138		(909) 598-1980
Colorado					
Fred Porter	Architectural Energy Corp	2540 Frontier Ave, #201	Boulder, CO 80301		(303) 444-4149 fax: 444-4304
Dr. Ellen Franconi ellenf@schiller.com	Schiller Associates www.schiller.com	1401 Walnut Street, #403	Boulder, CO 80302		(303) 440-4343 fax: 440-6644
Paul Reeves	PRC	140 South 34 th Street	Boulder, CO 80303		(303) 499-8611
Susan Reilly denver@enermodal.com	Enermodal Engineering	1554 Emerson Street	Denver, CO 80218		(303) 861-2070 fax: 830-2016
Charles Fountain	Burns & McDonnell www.burnsmcd.com	8055 E. Tufts Avenue, #330	Denver, CO 80230		(303) 721-9292
Joel Neymark, PE neymarkj@qwest.net	J. Neymark & Associates	2140 Ellis Street	Golden, CO 80401		(303) 384-3672 fax: 384 9427
Norm Weaver, PE	Interweaver Consulting	P.O. Box 775444	Steamboat Springs, CO 80477		(970) 870-1710

U. S. DOE-2 ENERGY CONSULTANTS (continued)

Connecticut				
Adrian Tuluca swa@swinter.com	Steven Winter Associates www.swinter.com	50 Washington Street	Norwalk, CT 06854	(203) 852-0110 fax: 852-0741
District of Columbia				
Kurmit Rockwell, PE	XENERGY, Inc., Suite 1110 www.xenergy.com	1025 Connecticut Ave., N.W.	Washington, DC 20036	(202) 872-1626
Florida				
Philip Wemhoff	1512 South McDuff Avenue		Jacksonville, FL 32205	(904) 632-7393
Dr. Paul Hutchins PE,CEM	Reynolds Smith & Hills, Inc. www.rsandh.com	4651 Salisbury Road	Jacksonville, FL 32256	(904) 279-2277 fax: 279-2491
Georgia				
Lung-Sing Wong, PE lswong@bpe-inc.com	Building Performance Engrs. www.bpe-inc.com	3060 Wanda Woods Drive	Atlanta, GA 30340	(770) 270-0100
Glenn L. Bellamy gbellamy@heery.com	Heery International, Inc. www.heery.com	999 Peachtree St., N.E.	Atlanta, GA 30367-5401	(404) 946-2208 fax: 875-1283
Illinois				
Gary H. Michaels, PE	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, PE rhenninger@gard.com	GARD Analytics, Inc. www.gard.com	1028 Busse Highway	Park Ridge, IL 60068-1802	(847) 698-5686
Kansas				
Dr. Brian A. Rock, PE barock@ukans.edu	A/E Dept, Marvin Hall	University of Kansas	Lawrence, KS 66045-2222	(785) 864-3603
Massachusetts				
C. Kalasinsky PE, T.Chan	R.G. Vanderweil Engrs., Inc. www.vanderweil.com	274 Summer Street	Boston, MA 02458-1113	(617) 423-7423 fax: 423-7401
Mark Mullins mmullins@hecenergy.com	HEC Energy & Design Services www.hecenergy.com	24 Prime Parkway	Natick, MA 01760	(508) 653-0456 fax: 653-0266
Michael Andelman andelman@jrma-ae.com	JRMA & Associates www.jrma-ae.com	421 Watertown St.	Newton, MA 02210	(617) 964-8889 fax: 964-7881
Missouri				
Mike Roberts	Roberts Engineering Co.	11946 Pennsylvania	Kansas City, MO 64145	(816) 942-8121
Bruce A. Leavitt, PE	Wm. Tao & Associates Inc.	2357-59 th Street	St. Louis, MO 63110	(314) 644-1400
Montana				
Michael W Harrison, PE	Harrison Engineering	139 Bluebird Lane	Whitehall, Montana 59759	(406) 287-5370

U. S. DOE-2 ENERGY CONSULTANTS (continued)

Nebraska					
Philip M. Schreier, PE FEI-OMA@worldnet.att.net	Farris Engineering www.nebraska.org/4/4/01/00/co.htm	11239 Chicago Circle	Omaha, NE 68154-2634	(402) 330-5900 fax: 330-5902	
New York					
Robert E. Gibeault gibeault@pbworld.com	PB Power, Inc. www.pbworld.com	1873 Western Avenue #201	Albany, NY 12203	(518) 862-0012 fax: 862-1608	
J. Fireovid, K. Yousef	SAIC Energy Solutions Div. www.saic.com	1 Marcus Boulevard	Albany, NY 12205	(518) 458-2249	
Dave Pruitt, Scott Frank	Jaros, Baum & Bolles www.jbb.com	80 Pine Street	New York, NY 10005	(212) 530-9300	
H. Henderson henderson@cdhenergy.com S. Carlson carlson@cdhenergy.com	CDH Energy Corporation www.cdhenergy.com	P.O. Box 641 (132 Albany Street)	Cazenovia, NY 13035	(315) 655-1063 or (315) 655-1058	
North Carolina					
Gopal Shiddapur, PE gsshidda@duke-energy.com	DukeSolutions (MC: ST05A) duke-energy.com	230 S. Tryon Street, # 400	Charlotte, NC 28202	(704) 373-4439 fax: 373-4872	
Hank Jackson, PE hzjackson@junco.com	R, C, & I Engineering Services Inc. www.geexchange.com/public/oppor tunity/JACKSON.html	P.O. Box 675	Weaverville, NC 28787-0675	(704) 691-0785 fax: 658-0474	
Oregon					
Carol Gardner gems@teleport.com	Gardner Energy Management Services	PO Box 12549	Portland, OR 97212-0549	(503) 223-4847 fax: 223-8486	
John P. Karasaki, P.E. john_karasaki@pgn.com	Portland General Electric	121 SW Salmon Street MC: 1WTC0706	Portland, OR 97204	(503) 464-7803 fax: 464-2485	
Texas					
Jeff S. Haberl jhhaberl@esl.tamu.edu	Energy Systems Laboratory esl.tamu.edu	Texas A&M University	College Station, TX 77843-3123	(409) 845-6065	
Virginia					
Dave Walker walkeng@swva.net	Walker Engineering www.swva.net/walkeng	P.O. Box 366	Staffordsville, VA 24167	(540) 921-4544 fax: 921-4548	
Washington					
Steve Byrne byrne@item.com	ITEM Systems, suite 344 www.halcyon.com/byrne/item.htm	321 High School Road NE	Bainbridge Island, WA 98110	(206) 855-9540	
Gregory J. Banken, PE gbanken@qmetrics.com	Q-Metrics, Inc. www.qmetrics.com	P.O. Box 3016	Woodinville, WA 98072-3016	(425) 825-0200 fax: 825-0136	

Index to the User News

volume 1, Number 1 (August 1980) through Volume 21, Number 6 (Nov/Dec 2000)

The index lists *User News* volumes, issues, and page numbers as follows: title of the article, program version that was current when the article appeared, volume number, and page number. Current and recent issues of the newsletter are available as PDF files on the Simulation Research Group website at <http://SimulationResearch.lbl.gov> > Newsletter. All back issues are available free of charge. Email requests to kleillington@lbl.gov.

<p>ADELINE Program ADELINE 1.0...16:3-6 ADELINE 2.0...17:4,36-39</p> <p>ADVANCED SIMULATION Advanced Simulation (2.1C)...7:4,4-8 BestOf Program ... see EnergyPlus Program Calling all Simulation Educators ... 21:4,9 DOE-2 and the Next Generation (2.1C)...6:4,1-2 EnergyBase ... see EnergyPlus Program IBPSA (2.1C)...8:2,4-7 IBPSA Conferences 93 Abstracts...14:3,13, 14:4, 15 97 Call for Papers...17:1,15, 17:3, 13 SPARK ... see SPARK Program USDOE Launches High-Performance Building Project ... 21:4, 10</p> <p>BEST Program (Canada) BEST: B.C. Hydro's Interface to DOE-2... 18:2, 10-16</p> <p>BestOf Program see EnergyPlus</p> <p>BinMaker Program BinMaker from GRI ...19:2,24</p> <p>BLAST Atmospheric Pollution Prediction in BLAST... 18:3,4-11 BLAST...17:1,31 Combining the BLAST Loads / Systems Simulations through the Zone Heat Balance Equation.. 17:2,30-35 DOE-2 and BLAST Unitel... 16:4, 1</p>	<p>HBLC...17:1,31; 19:3,6-7 Heat Balance Method of Calculating Building Heating and Cooling Loads...17:1,32-35 Improved Procedures for Calibrating Hourly Simulation Models. 18:1,25-30 Integrating the BLAST Fan System and Central Plants Using a Simple Model of the Fluid Loops ...17:4,1-5 Use of Multiple Time-Steps in IBLAST...17:3,30-31 WinLCCID 96 ... 16:4,5 WinLCCID 98 ... 19:3,8</p> <p>BLAST/DOE-2 Combined Program see EnergyPlus</p> <p>BLUEPRINT, Newsletter... 21:4, 13</p> <p>BUGS, DOE-2 in DOE-2.1 About bugs... 1:1,3 BDL...1:1,4-6; 1:2,6 LOADS...1:1,6 SYSTEMS...1:1,7; 1:2,7-8 PLANT ...1:1,9-10; 1:2,8 Weather...1:2,6</p> <p>in DOE-2.1A All bugs...3:4,3-6 BDL...2:1,3-6; 2:2,9-10; 2:3,5;3:1,9-10; 3:1,13; 3:3,3 LOADS...2:1,7; 2:3,5; 3:1,10 SYSTEMS...2:1,8-12; 2:2,10-11; 2:3,5;3:1,10-12; 3:2,5; 3:3,3 PLANT ...2:1,12-14; 2:3,5; 3:1,12 ECON...2:2,11 Weather...2:1,6</p> <p>in DOE-2.1B All bugs...5:4,3-6 BDL...4:4,5; 5:1,4</p>	<p>LOADS...4:4,6; 5:1,5 PLANT ...4:4,6; 5:1,5 SYSTEMS...4:4,6; 5:1,5 Weather...4:4,6; 5:1,5</p> <p>in DOE-2.1C All bugs...9:3,4-16 BDL...7:1,9-33; 9:1,4; 9:2,2 ECON...7:1,9-33 LOADS...7:1,9-33; 7:3,13-14; 8:1,6; 8:4,5 PLANT ...7:1,9-33; 8:4,6 Reports...7:1,9-33; 8:1,6 SYSTEMS...7:1,9-33; 8:4,4-5; 9:1,3-5 Weather...7:1,9-33; 8:2,3</p> <p>in DOE-2.1D BDL...11:1,5;11:3,17,20 LOADS...11:3,11,17,19 PLANT ...11:3,12 Reports...11:3,17,20 SYSTEMS...11:3,11-15,21-23</p> <p>in DOE-2.1E BDL...15:3,8,10,12; 15:4,7 DKEY...15:3,8,11 DRLC...15:3,8 LOADS...15:3,9,10; 15:4,7 PLANT ...15:3,11 SIM...15:3,10 SYSTEMS...15:3,8,10,11,12; 15:4,6 WTH...15:4,6</p> <p>BUILDING DESIGN ADVISOR (BDA) Program Beta 1 Release ...19:1,29; 19:3,2-3 Beta 2 Release...21:2,7; 21:3,9</p> <p>BUILDING SIMULATION "BLDG SIM" mailing list ... 20:1,14</p>
--	---	--

<p>Newsletter Round-Up ... 21:1,2 Pacific Gas & Electric's HVAC Educational Programs ... 20:3,24</p> <p>CIRA Program CIRA (2.1A)...3:2,2</p> <p>COMIS Program COMIS: The Multizone Air Flow and Contaminant Transport Model for EnergyPlus ... 19:4, 8-15</p> <p>CoolTools CoolTools from PG&E ... 20:2,8-9</p> <p>DAYLIGHTING Glazing Optimization Study (2.1A)...3:3,4-5 Daylighting Design Tool Survey ... 11:2,12-17; 12:3,19-24; 14:2,2-8 Daylighting Dimming & Energy Savings (2.1E)... 17:1,7-14 Daylighting Network of North America (2.1C)... 6:1,1-2 Daylighting w/ Multiple Skylights (2.1D)...13:2,2-5 Modeling Complex Daylighting (2.1C)...11:1,6-15 Orientation Info for Exterior Walls (2.1E)...19:1,21 Optimizing Solar Control in a Commercial Building (2.1D)...14:1,16 Seeing Daylight in So. Calif. (2.1C)...6:3,1 Spectrally Selective Glazings in Cooling-Dominated Climates (2.1D)...14:2,16 Sunspace/Atrium Model in 2.1C...5:4,1-2 SUPERLITE (2.1C)...8:2,1 Switchable Window Modeling (2.1D)... 14:3,12</p>	<p>System type: RESYS...11:3,8-10 System type: SZRH...10:4,2-5 System type: TPFC...11:3,5-7 System type: VAVS...11:1,23-25 BDL Summary...1:1,11-14; 1:2,9-12; 2:1,15; 4:4,3,6,4,4; 9:4,2-3; 11:3,1,27; 12:1,21-24; 12:2,51 Engineers Manual...7:1,7-8; 13:2,6-14 Update--Gas Heat Pump Calcs (2.1D)...14:3,9-11 Reference Manual...1:1,11-14; 2:1,16-20,4:1,4; 4:4,3; 5:1,3; 5:4,7 Weather Processor (rewrite) ... 20:1,insert Sample Run Book...1:1,11-14; 8:3,5; 9:4,2-3 Supplement...4:4,3; 5:1,3; 6:4,4; 11:4,2-3; 12:3,1,31; 13:3,16 Loads: Negative Time Zone Bug (PC) (2.1D)...14:1,15 Users Guide...1:1,11-14; 2:1,16 Weather Processor (rewrite) ... 20:1,insert</p>	<p>New Features in 2.1D ... 9:2,3-6 Plant Operating Strategies (2.1D)...12:3,2-15 PG&E's Pacific Energy Center...13:1,15; 15:1,6 Resource Centers Australasia...15:1,3 Australia...16:1,43 Brazil ... 15:1,3 Egypt... 19:4,33 Czech Republic ... 20:4, 15 Egypt Germany...16:1,43 Hong Kong...16:4,1 India ...20:2,7 Italy ... 20:4, 15 Korea...19:3,18; 19:4, 33 New Zealand...18:3,23 Portugal...15:2,20 Singapore...15:3,3 South Africa...18:2,1,33 Switzerland...16:2,1,25 Sky Simulator at LBL (2.1B)...4:2,3 SOCAL Edison's Design Assistance Program (2.1D)...12:2,48 Start Thinking Metric!...14:1,8-9 Thermal Properties of Food...14:3,19 User Survey Results...16:3,2-3 Using DOE-2 to Estimate Component Heating and Cooling Loads of the Entire U.S. Building Stock ... 19:4, 4-6 Using DOE-2 in the Design Process (2.1A)...3:2,4 Utah's Building Design Center...13:2,53</p>
<p>DesiCalc Program DesiCalc from GRI...19:2,15</p> <p>Desktop RADIANCE Program Desktop RADIANCE ... 20:3,7; 21:3,3-6</p> <p>DOCUMENTATION, DOE-2, through version 2.1E BASIC Manual...12:3,1,28-29 Plant...12:4,10 System type: HP...11:1,21-22 System type: PIU...11:1,16-20 System type: PMZS...11:2,5-7 System type: PSZ...11:2,2-4 System type: PTAC...11:3,2,4 System type: PVAVS...11:2,8-10</p>	<p>DOE-2 (general topics) Analyze DOE-2 Outputs Quickly (2.1C)...10:2,7-12 ASHRAE/IES Standard 90 (2.1C)...6:1,3 CECDOEDC California Compliance Tool... 12:4,1,12-14 COMPLY24 California Compliance Tool...12:2,2-6 Cooling Towers: Hot Tips for...13:3,2-3 Discovering the Unexpected w/DOE-2 (2.1C)... 7:1,3-6 DOE-2 and CCIP (2.1E)...12:3,16-18 DOE-2 and Research at LBL (2.1A)...3:2,1-8 DOE-2.1E PC Version Release...21:1,1 DOE-2.1E Release...14:3,2-8 DOE-2.1E/32: A 32-Bit Compilation of DOE-2...18:3,3 DOE-2.2: Announcement of "Non-Release" ...20:2,1 DOE-Plus Pre/Post-Processor (2.1D)...11:4,4-13 DOE-SCAN Output Interpreter (2.1D)...12:4,2-3 Electric Ideas Clearinghouse...11:3,1 Energy Analysis: Texas State Capitol Restor ... 13:4,2-10 Energy Efficiency in Singapore (2.1B)...5:1,1-2 The Energy FinAnswer (2.1D)...14:1,2 Energy Science & Technology Center...12:4,1 EPRI/DOE Collaboration...12:4,4-5 Graphical Tools Calibrate DOE-2...13:1,5-14 Guidelines for Simulation of Bldgs...13:3,4-8 Improved Procedures for Calibrating Hourly Simulation Models...18:1,25-30 Life beyond DOE-2.2 ???...19:1,1 National Energy Software Center...11:2,11 New Features in 2.1A ...2:1,1; 2:2,1</p>	<p>DOE-2 (specific topics) Atrium Buildings, How to Model (2.1C)...7:3,2-7 BDL fix: symbol table full (all)...9:2,2; 11:1,5 Caution and Error Messages (2.1)...1:2,2-3 COMBINE (2.1D)...11:2,1 Cooling Systems, How to Size (2.1C)...10:1,2-8 Cross index of commands and keywords (2.1D) ... 12:2,7-46 Custom Weighting Factors (Automatic) (2.1A)...2:2,2-3 Input Guidelines (2.1)...1:1,15-16 Daylighting: Orientation Info for Exterior Walls (2.1E) ... 19:1,21 DSNFL, File structure for (2.1A)...3:1,6-8 Economic Evaluation Methods (2.1A)...3:1,3-5 ECONOMICS, Electric Rate Structure (2.1C) ...5:3,1-3 Electrical Generation Strategies (2.1B)...4:2,1-2 Functional Values, Development of (2.1B)...3:4,1-2</p>

Functional Values, Example Inputs (2.1D)...12:1,2-4
 Glazing Optimization Study (2.1A)...3:3,4-5
 Graphs from DOE123 (2.1C,D)...10:3,5-7
 Hourly reports...13:1,4
 LOADS: High heating loads with low cooling loads (2.1C vs D)...12:2,47
 Ice Storage Systems, How to Model (2.1C)...8:1,2-5
 Input Macros for Residential Windows (2.1D) ...12:1,5-17
 LDSOUT, File structure for (2.1A)...3:1,6-8
 Metric Option in 2.1C...4:3,1
 Optimizing Solar Control in a Commercial Building (2.1D) ...14:1,16
 Output Reports (2.1A)...2:2,4-6
 PLANT, Direct Cooling in (2.1A)...3:1,2
 Powered Induction Units (2.1B)...4:1,2
 Reading Measured Schedule Values From a File (2.1D) ...14:1,3-4
 Reports (Upgraded) in 2.1B...4:4,1-2
 Schedules, Preparing (2.1B)...4:1,3; 4:2,4;9:3,2-3
 Systems, Developments in (2.1C)...5:3,3-4
 SYSTEMS, Schedules (2.1E) ... 15:4,2-5
 SYSTEMS, Sizing Option in (2.1A)...2:3,3
 Stud Wall Construction (2.1A)...2:3,4
 Sample Run Book Overview (2.1C)...6:2,1
 Spectrally Selective Glazings in Cooling-Dominated Climates (2.1D)...14:2,16
 Sunspace/Atrium Model in 2.1C...5:4,1-2
 Surface Temperature Calculations in DOE-2.1E ... 20:2,4-7
 VAV: Elevated Supply Air Temps (2.1B)...4:3,2-3
 VAV: Fan Sizing (2.1A)...2:2,7-8
 Weather, Processing Nonstandard (2.1D)...10:3,2-6

DOE-2, Validation of

Collins Building (2.1C)...8:3,2-4
 DOE-2 vs BLAST Comparison (2.1A)...3:3,1-3
 DOE-2 vs CERL Data: VAV and Reheat (2.1A)... 3:2,3
 Daylighting Dimming & Energy Savings (2.1E)... 17:1,7-14
 Validation Studies of DOE-2 ... 19:3,14

DOE-2.1

Articles related to Version 2.1
 CWF Input Guidelines...1:1,15-16
 Caution and Error Messages...1:2,2-3
 WRISC...1:2,4

Bugs
 About bugs...1:1,3
 BDL...1:1,4-6; 1:2,6
 LOADS...1:1,6
 SYSTEMS...1:1,7; 1:2,7-8
 PLANT...1:1,9-10; 1:2,8
 Weather...1:2,6
Documentation Updates
 BDL Summary...1:1,11-14; 1:2,9-12
 Reference Manual...1:1,11-14
 Sample Run Book...1:1,11-14
 Users Guide...1:1,11-14
LOADS
 EQUIPMENT-KW...1:1,19
 verification reports...1:1,17-18
 passed from SYS to PLT...1:1,17
 SHADING COEF...1:1,17
 schedules ...1:2,14
PLANT
 BEPS (report)...1:1,20
 minimum input...1:1,20
 HOT-WATER...1:2,13
SYSTEMS
 COOL-CONTROL...1:2,13
 EQUIPMENT KW...1:1,19
 MIN CFM RATIO...1:1,19
 RETURN CFM...1:2,13
 PTAC...1:2,13
 SYSTEM-FANS...1:2,13
 thermostat, how to model...1:2,14
WEATHER
 Tapes...1:1,17

DOE-2.1A

Articles related to Version 2.1A
 Automatic Custom Weighting Factors...2:2,2-3
 CIRA...3:2,2
 Direct Cooling in PLANT...3:1,2
 DOE-2 vs BLAST Comparison...3:3,1-3
 DOE-2 vs CERL Data for VAV and Reheat...3:2,3
 DOE-2 on a PC...2:3,1-2
 DOE-2 and Research at LBL...3:2,1-8
 Economic Evaluation Methods...3:1,3-5
 Fan Sizing for VAV Systems...2:2,7-8
 File Structure for LDSOUT and DSNFIL...3:1,6-8
 Glazing Optimization Study...3:3,4-5
 Output Reports...2:2,4-6
 New Features in 2.1A...2:1,1; 2:2,1
 Sizing Option in SYSTEMS...2:3,3

Stud Wall Construction...2:3,4
 Using DOE-2 in the Design Process...3:2,4
Bugs
 All bugs...3:4,3-6
 BDL...2:1,3-6; 2:2,9-10; 2:3,5; 3:1,9-10; 3:1,13; 3:3,3
 LOADS...2:1,7; 2:3,5; 3:1,10
 SYSTEMS...2:1,8-12; 2:2,10-11; 2:3,5; 3:1,10-12; 3:2,5; 3:3,3
 PLANT...2:1,12-14; 2:3,5; 3:1,12
 ECON...2:2,11
 Weather...2:1,6
Documentation Updates
 BDL Summary...2:1,15
 Reference Manual...2:1,16-20
 Users Guide...2:1,16
ECONOMICS
 symbol table...2:1,21
 INCREMENTAL-INVESTMENTS...2:2,13
LOADS
 building shades...2:3,6
 DHW heater...2:1,22
 DHW temp...2:1,12
 heat recovery...2:2,12
 MULTIPLIER...2:3,6
 symbol table...2:1,21
PLANT
 BEPS (report)...2:3,6
 cooling towers...2:2,12
 equipment combinations...3:2,6
 symbol table...2:1,21
SYSTEMS
 ABORT command...2:1,22
 DDS system...3:1,13
 residential ground water heat pump...3:2,6
 sizing/behavior of systems...2:1,22-23
 symbol table...2:1,21

DOE-2.1B

Articles related to Version 2.1B
 Electrical Generation Strategies...4:2,1-2
 Elevated Supply Air Temps: VAV...4:3,2-3
 Energy Efficiency in Singapore...5:1,1-2
 Functional Values, Development of...3:4,1-2
 New Features in 2.1B...2:1,1; 2:2,1
 Powered Induction Units...4:1,2
 Preparing Schedules...4:1,3; 4:2,4
 Sky Simulator at LBL...4:2,3
 Upgraded Reports in 2.1B...4:4,1-2

Bugs

<p>All bugs...5:4,3-6 BDL...4:4,5; 5:1,4 LDS...4:4,6; 5:1,5 SYS...4:4,6; 5:1,5 PLT...4:4,6; 5:1,5 WTH...4:4,6; 5:1,5</p> <p><u>Documentation Updates</u> BDL Summary...4:4,3 Reference Manual...4:1,4; 4:4,3; 5:1,3; 5:4,7 Sample Run Book...8:3,5 Supplement...4:4,3; 5:1,3</p> <p><u>LOADS</u> daylighting...5:4,7 hourly report variables...4:1,5</p> <p><u>PLANT</u> BEPS (lighting)...5:4,6 ice storage...5:4,7</p> <p><u>SYSTEMS</u> cooling/heating, LOADS to PLANT...4:1,5 dual systems...3:4,7 fan coil units...5:4,6 heating/cooling unit ventilation...4:2,6 kitchen exhaust...4:2,5 radiant panel heating/cooling...4:2,5 startup controls...3:4,7 steam radiation, with vent...4:2,5 steam radiation, without vent...4:2,5</p> <p>DOE-2.1C <u>Articles related to Version 2.1C</u> A Minute Per Zone on PC's...11:1,2-4 ADM-2...7:2,6-9 Advanced Simulation...7:4,4-8 ASHRAE/IES Standard 90...6:1,3 Discovering the Unexpected w/DOE-2...7:1,3-6 Cooling Systems, How to Size...10:1,2-8 DOE-2 and the Next Generation...6:4,1-2 Functional Values, Development of...3:4,1-2 Metric Option in 2.1C...4:3,1 MICRO-DOE2...7:4,2-3 Modeling Atrium Buildings...7:3,2-7 Modeling Complex Daylighting...11:1,6-15 Modeling Ice Storage Systems...8:1,2-5 PC-DOE Overview...7:2,2-3 PC Update...6:1,2 New Elec. Rate Structure. ECONOMICS...5:3,1-3 Sample Run Book Overview...6:2,1 Seeing Daylight in Southern California...6:3,1 Sunspace/Atrium Model in 2.1C...5:4,1-2</p>	<p>Systems, Developments in 2.1C...5:3,3-4 Using PC-DOE...7:2,4-5 Validation of DOE-2: the Collins Building...8:3,2-4 Weather Data for DOE-2...7:4,9-14 Weather Processor Update...7:3,8-10 Weather Utility Program...7:3,10-12</p> <p><u>BDL</u> schedules...9:3,2-3 symbol table full...9:2,2</p> <p><u>BUGS</u> All bugs...9:3,4-16 BDL...7:1,9-33; 9:1,4 ECO...7:1,9-33 LDS...7:1,9-33; 7:3,13-14; 8:1,6; 8:4,5 SYS...7:1,9-33; 8:4,4-5; 9:1,3-5 PLT...7:1,9-33; 8:4,6 RPT...7:1,9-33; 8:1,6 WTH...7:1,9-33; 8:2,3</p> <p><u>Documentation Updates</u> BDL Summary...6:4,4 Engineers Manual...7:1,7-8 Supplement...6:4,4</p> <p><u>LOADS</u> run times 2.1B vs 2.1C...7:1,2 SET-DEFAULT, ROOF + EXT-WALL...8:3,5</p> <p><u>SYSTEMS</u> bypass system...6:1,3 specifying occupancy...6:4,2 BEPS (hourly report variable)...6:4,2 warm-up cycle...8:3,5 WVT systems...9:1,2</p> <p>DOE-2.1D <u>Articles related to Version 2.1D</u> Alphabetical cross index of commands/keywords...12:2,7-46 BDL Summary...9:4,2-3 CECDOEDC California Compliance Tool...12:4,1,12-14 Cooling Towers, Hot Tips for...13:3,2-3 DOE-Plus Pre- and Post-Processor...11:4,4-13 Energy Analysis of the Texas State Capitol Restoration...13:4,2-10 Energy FinAnswer...14:1,2 Functional Values, Example Inputs...12:1,2-4 Evaporative Cooling...12:4,1 Graphical Tools Calibrate DOE-2...13:1,5-14 Hourly reports...13:1,4</p>	<p>Input Macros for Residential Windows ...12:1,5-17 LOADS: High heating loads with low cooling loads (2.1C vs 2.1D)...12:2,4,7 New Features in 2.1D...9:2,3-6 Optimizing Solar Control in a Commercial Building...14:1,16 Plant Operating Strategies (2.1D)...12:3,2-15 Reading Measured Schedule Values From a File...14:1,3-4 Reports...14:4,2 Sample Run Book...9:4,2-3 Southern California Edison's Design Assistance Program ...12:2,48 Spectrally Selective Glazings in Cooling-Dominated Climates ...14:2,16 Switchable Window Modeling...14:3,12</p> <p><u>BDL</u> symbol table full (2.1D)...11:1,5</p> <p><u>Documentation Updates</u> Basic Manual System type: HP...11:1,21-22 System type: PIU...11:1,16-20 System type: PMZS...11:2,5-7 System type: PSZ...11:2,2-4 System type: PVAVS...11:2,8-10 System type: SZRH...10:4,2-5 System type: VAVS...11:1,23-25 BDL Summary...11:3,27; 12:1,21-24 Supplement...11:4,2-3; 12:3,31</p> <p>DOE-2.1E <u>Articles related to Version 2.1E</u> Calculation of Surface Temperatures...16:2,4-6 Changing the Holiday List...16:1,5-13 Daylighting: Orientation Information for Interior Walls...19:1,21 DOE-2 Validation: Daylighting Dimming and Energy Savings: Window Orientation and Blinds...17:1,7-14 DOE-2.1E/32: A 32-Bit Compilation of DOE-2...18:3,3 Greening of the White House...15:2,6 Input Functions to Determine Building Load w/Outside Air...15:2,3-5 Metric Unit Values for ENERGY-RESOURCE...16:1,2-3 New Features in 2.1E...13:1,2-3 RIUSKA and SMOG ...20:3,2-5 PC version of DOE-2.1E ...21:1,1 Release of DOE-2.1E ...14:3,2-8 Simplified Tool for Design of Compressor-less Houses...16:3,7-15 Surface Heat Transfer Calculation ...19:1,6-13</p>
--	--	--

Surface Temperature Calculations in DOE-2.1E ... 20:2,4-7
 Switch-Off Dimming Systems...16:1,4
 2-Dimensional Wall Response Factors...17:3,6-12
 Underground Surfaces:
 Surface Heat Transfer Calculation ...19:1,6-13;
 19:4, 40
 User Survey: Input Functions ...15:3,23
 Using DOE-2 to Estimate Component Heating and Cooling Loads of the Entire U.S. Building Stock ... 19:4, 4-6
 Using DOE-2 to Study Apartment Indoor Temperatures During the July 1995 Chicago Heat Wave...17:3,2-5

BDL
 Saving Hourly Output for Postprocessing ... 18:1,31
Bugs in DOE-2.1E
 BDL...15:3,8,10,12;15:4,7;17:2,10-14; 18:2,9;
 19:2,5; 21:5, 13-15
 DEDT ... 17:2,10-14;17:2,10-14; 19:2,5; 21:5,13-15
 DKEY...15:3,8,11;17:2,10-14; 21:5,13-15
 DRLC...15:3,8;17:2,10-14; 21:5,13-15
 HRP ... 17:2,10-14; 21:5,13-15
 LDS...15:3,9,10;15:4,7;17:2,10-14; 18:2,9; 19:2,5;
 21:5,13-15
 PLT...15:3,11;17:2,10-14; 21:5,13-15
 SIM...15:3,10;17:2,10-14; 18:2,9; 19:2,5; 21:5,13-15
 SYS...15:3,8,10,11,12;15:4,6;17:2,10-14; 19:2,5;
 21:5,13-15
 WTH...15:4,6;17:2,10-14; 18:2,9; 19:2,5; 21:5,13-15

Loads

DESIGN-DAY ... 15:1,2

Systems

Overview of SYSTEMS Schedules...15:4,2-5
 System Type: VAVS...15:2,2
Documentation
 BASIC Manual...16:1,14
 BDL Summary...16:1,14-18
 Sample Run Book Metric I/O...16:3,32
 Supplement...16:3,19-26; 19:3, 15

DOE-2.2

A New Generation in DOE-2 Building Energy Analysis. 19:2,2-5
 DOE-2.2: Announcement of "Non-Release" ...20:2, 1

ECONOMICS Subprogram, DOE-2
 INCREMENTAL-INVESTMENTS (2.1A)...2:2,13
 New Electrical Rate Structure (2.1C)...5:3,1-3
 symbol table (2.1A)...2:1,21

ENERGY-10 Program

ENERGY-10 Program ... 21:2,6; 21:3, 13; 21:4,13;
 21:5,11
 WeatherMaker ... 20:3,8-13

EnergyPlus Program

Become an EnergyPlus Program Developer ... 20:3,18
 Best of BLAST and DOE-2... 16:3,1
 Frequently Asked Questions (Beta 2) ... 21:2,2-5
 COMIS: The Multizone Air Flow and Contaminant Transport Model for EnergyPlus ... 19:4, 8-15
 DOE-2 and BLAST Unites!... 16:4,1
 EnergyBase: The Best of DOE-2 and BLAST ... 17:3,28
 EnergyPlus: A New-Generation Building Energy Simulation Program ... 20:1,2-13
 EnergyPlus meets Bestest ... 21:4,2-8
 EnergyPlus: The Merger of DOE-2 and BLAST... 19:4,2
 Heat Balance Method of Calculating Building Heating and Cooling Loads... 17:1,32-35
 Software Engineering in the "Best Of" Project...17:2,28-29

EZFrame Program

EZFRAME (Calif Energy Comm) ...15:1,10-12

GenOpt, Generic Optimization Program

GenOpt: Generic Optimization...19:2,12-14; 19:3,15;
 20:2,19; 20:3,22; 20:4,13; 21:1,9; 21:2,7
 GenOpt 1.1 ... 21:3,13; 21:4,10; 21:5,12
 "Design Optimization with GenOpt"... 21:5, 19-28

Interoperability

The Build-IT Project ... 21:5,2-3
 BSPro COM-Server ... 21:5,4-5

LIGHTING

Lighting Design Lab ... 21:5,11

LOADS Subprogram, DOE-2

building shades (2.1A)...2:3,6
 EQUIPMENT-KW (2.1)...1:1,19

Daylighting (2.1B)...5:4,7
 Daylighting w/ Multiple Skylights (2.1D)... 13:2,2-5
 DHW heater (2.1A)...2:1,22
 DHW temp (2.1A)...2:1,12
 heat recovery (2.1A)...2:2,12
 high heating loads with low cooling loads (2.1C vs 2.1D)...12:2,47
 hourly report variables (2.1B)...4:1,5
 MULTIPLIER (2.1A)...2:3,6
 run times 2.1B vs 2.1C...7:1,2
 schedules (2.1)...1:2,14
 SET-DEFAULT, ROOF + EXT-WALL (2.1C)...8:3,5
 SHADING COEF (2.1)...1:1,17
 symbol table (2.1A)...2:1,21
 SYSTEMS to PLANT (2.1)...1:1,17
 verification reports (2.1)...1:1,17-18

Microcomputer Program

DOE-2 Related

A Minute Per Zone on PC's (MicroDOE2), 11:1,2-4
 ADM-2 (2.1C)...7:2,6-9
 BDL Builder (MicroDOE2) (2.1E)... 16:2,7-12
 Compare-IT from RLW Analytics... 19:1,14-15; 19:2,18
 CECDOEDC Cal Compliance Tool... 12:4,1,12-14
 COMPLY24 Cal Compliance Tool...12:2,2-6
 Demand Analyzer (DOE-Plus)... 16:1,28-32
 DOE-2 on a PC (2.1A)...2:3,1-2
 DOE-Plus Pre/Post-Proc (2.1D)...11:4,4-13; 13:2,54-56
 DRAWBDL A Graphic Debugging and Drawing Tool for DOE-2... 14:1,5-7; 14:4,16-17; 15:2,8; 16:1,37; 20:4,12
 D2E Conversion (MicroDOE2) (2.1E)... 15:3,4-5
 E2BB (MicroDOE2) (2.1E)...16:4,7-8
 Energy Gauge USA ... 19:4, 16-18
 EnergyPro...18:2,2-7, 18:4,21
 Evaporative Cooling ...12:4,1
 EZDOE (from Elite Software) (2.1D)...14:2,10,14:4,8-14
 Graphs from DOE123 (2.1C,D)...10:3,5-7
 MICRO-DOE2 (2.1C)...7:4,2-3, 15:1,8-9
 PC-DOE Overview (2.1C)...7:2,2-3
 Perform 98 (2.1E) ... 21:1,3
 PRC-DOE2 Description (2.1D)... 13:4,11, 15:1,5
 PRC-Tools (2.1D)...14:2,9
 Quick Analysis of Outputs (2.1C,D)...10:2,7-12
 Quickce 1.0 (GeoPraxis) ... 20:2,11
 RIUSKA: 3-D Space Modeling with DOE-2. 18:4,12
 RIUSKA and SMOG ... 20:3,2-5
 Using PC-DOE (2.1C)...7:2,4-5
 VisualDOE (Eley Assoc) (2.1E)...15:2,10-18; 16:4,9-16
 VisualDOE 2.5... 17:4,8-13, VisualDOE 3.0 ... 20:2,12-14

VISUALIZE-IT, New Data Visualization Tools for
 DOE-2 Calibration (RLW Analytics)
 (2.1E)...17:2,2-6

Web-Based Building Performance Assessment:
 The CBIP Screening Tool ... 21:6,2-4

Other

ADELINE 1.0...16:3,6
 ADELINE 2.0...17:4,36-39
 BinMaker from GRI ...19:2,24
 BEST: B.C. Hydro's Interface to DOE-2 .18:2,10-16
 Building Design Advisor (BDA), Release 2.0...
 21:4,12
 CIRA (2.1A)...3:2,2
 COMIS: The Multizone Air Flow and Contaminant
 Transport Model for EnergyPlus ... 19:4, 8-15
 CoolTools from PG&E ... 20:2,8-9
 Daylighting Design Tool Survey ...11:2,12-17;
 12:3,19-24, 14:2,2-8
 DesiCalc from GRI...19:2,15
 Desktop RADIANCE ... 20:3,7; 21:3,3-6
 EZFRAME (Calif Energy Comm) ...15:1,10-12
 GenOpt: Generic Optimization ...19:2,12-14;
 19:3,15; 20:2,19; 20:3,22; 20:4,13
 PC Update (2.1C)...6:1,2
 PEAR (2.1C)...8:2,2
 PSYCHART 1.4...16:2,28
 RESFEN-2.4...16:3,31; 16:4,1 17:1,14
 RESFEN-3.0...18:3,1-2
 RESFEN-3.1...20:2,7
 SUPERLITE-2.0 (2.1C)...8:2,1, 17:1,14
 THERM...17:1,14
 THERM 2.0 ... 19:3,14; 20:3,14-17
 UMIDUS: A PC Program for the prediction of heat
 and moisture transfer in Porous building Elements
 ... 20:4, 2-8
 WINDOW-2.0 (2.1C)...8:4,2-3
 WINDOW-3.1 (2.1C,D)...10:2,5-6
 WINDOW-4.1 (2.1E)...15:1,7, 15:2,31, 17:1,14
 WINDOW-4.1 Spectral Data...17:2,1
 WRISC (2.1)...1:2,4

PLANT Subprogram, DOE-2
 BEPS (report) (2.1)...1:1,20
 BEPS (report) (2.1A)...2:3,6
 BEPS (lighting) (2.1B)...5:4,6
 cooling towers (2.1A)...2:2,12
 Direct Cooling in PLANT (2.1A)...3:1,2
 equipment combinations (2.1A)...3:2,6
 HOT-WATER (2.1)...1:2,13

ice storage (2.1B)...5:4,7
 minimum input (2.1)...1:1,20
 Plant Operating Strategies (2.1D)...12:3,2-15
 symbol table (2.1A)...2:1,21

PEAR Program
 PEAR (2.1C)...8:2,2

RADIANCE Program (see Desktop RADIANCE)
 Desktop RADIANCE ... 20:3,7; 21:3,3-6

RESFEN Program
 RESFEN-2.4...16:3,31; 16:4,1 17:1,14
 RESFEN-3.0...18:3,1-2
 RESFEN-3.1...20:2,7

SPARK Program
 SPARK ... 17:1,2-6
 Beta Test Report ... 19:2,25
 Call for Beta Testers...16:4,36; 17:1,36, 17:2,36
 SPARK Simulation Environment: A Non-Graphical
 Primer...17:1,2-6
 Update...16:2,2-3
 VisualSPARK, call for beta testers ... 20:2,2-3;
 20:3,25; 20:4,9; 21:1,5; 21:2,6; 21:3,9
 VisualSPARK, Release of Version 1.0 ... 21:5,1

SUPERLITE Program
 SUPERLITE-2.0 (2.1C)...8:2,1, 17:1,14

SYSTEMS Subprogram, DOE-2
 ABORT command (2.1A)...2:1,22
 BEPS (hourly report variable) (2.1C)...6:4,2
 bypass system (2.1C)...6:1,3
 COOL-CONTROL (2.1)...1:2,13
 cooling/heating, LOADS to PLANT (2.1B)...4:1,5
 DDS system (2.1A)...3:1,13
 dual systems (2.1B)...3:4,7
 EQUIPMENT-KW (2.1)...1:1,19
 fan coil units (2.1B)...5:4,6
 Gas Heat Pump Calculations (2.1D)...14:3,9-11
 heating/cooling unit ventilation (2.1B)...4:2,6
 kitchen exhaust (2.1B)...4:2,5
 MIN-CFM-RATIO (2.1)...1:1,19
 PIU (2.1D)...11:1,16-20
 PMZS (2.1D)...11:2,5-7
 PSZ (2.1D)...11:2,2-4
 PTAC (2.1D)...1:2,13
 PVAVS (2.1D)...11:2,8-10

radiant panel heating/cooling (2.1B)...4:2,5
 residential ground water heatpump (2.1A)...3:2,6
 RETURN-CFM (2.1)...1:2,13
 sizing/behavior of systems (2.1A)...2:1,22-23
 specifying occupancy (2.1C)...6:4,2
 startup controls (2.1B)...3:4,7
 steam radiation, with vent (2.1B)...4:2,5
 steam radiation, without vent (2.1B)...4:2,5
 symbol table (2.1A)...2:1,21
 SYSTEM-FANS (2.1)...1:2,13
 SYSTEMS, Sizing Option in (2.1A)...2:3,3
 SYSTEMS, Overview of Schedules...15:4,2-5
 SZRH...10:4,2-5
 thermostat, how to model (2.1)...1:2,14
 VVT systems (2.1C)...9:1,2
 Warm-up cycle (2.1C)...8:3,5

WINDOW Program
 WINDOW-2.0 (2.1C)...8:4,2-3
 WINDOW-3.1 (2.1C,D)...10:2,5-6
 WINDOW-4.1 (2.1E)...15:1,7, 15:2,31, 17:1,14
 WINDOW-4.1 Spectral Data...17:2,1

Validation of DOE-2
 Collins Building (2.1C)...8:3,2-4
 DOE-2 vs BLAST Comparison (2.1A)...3:3,1-3
 DOE-2 vs CERL Data: VAV and Reheat (2.1A)... 3:2,3
 Daylighting Dimming & Energy Savings (2.1E)... 17:1,7-14
 Validation Studies of DOE-2 ... 19:3,14

VisualSPARK (see SPARK)

Weather
 Canadian Weather Tapes (2.1E)...15:4,8,9
 Data for DOE-2 (2.1C)...7:4,9-14
 DOE-2 Validation: Daylighting Dimming and Energy
 Savings: The Effects of Window Orientation and
 Blinds...17:1,7-14
 DOE-2 Weather Processor (rewrite) ... 20:1,insert
 Does it Matter Which Weather Data You use in Energy
 Simulations? ...18:1,2-12
 EnergySoft: Weather Files on a CD ...15:3,13
 Has the Sun Set on Weather Data? ... 20:3,6-7
 Nonstandard Weather Data (2.1C,D)...10:3,2-6
 Processor Update (2.1C)...7:3,8-10
 Tapes (2.1)...1:1,17
 TMY/TMY2-Download from the WWW...17:1,1; 17:2,1
 TMY2 to TMY Converter ... 19:2,23
 TMY2 Weather for DOE-2...16:3,4-6

WeatherMaker ... 20:3,8-13 (see **ENERGY-10**)
 Weather Utility Program (2.1C)...7:3,10-12

World Wide Web

ACEEE...16:2,23
 ASHRAE...16:3,31
 ASME ... 20:4,23
 BLAST Support Office...17:1,28
 Building Tools Directory ... 18:2,30
 Building Design Advisor...19:1, 19:2
 CADDET...16:2,23
 California, State Of
 Energy Commission...16:1,42
 Energy Standards...17:2,25
 Canadian Office of Energy Efficiency ... 21:3,12
 CIE: Int'l Commission on Illumination ... 16:1,44
 CIEE ... 20:4,23
 Consulting/Specifying Engineer Magazine...18:2,30
 Danish Energy Agency ... 21:3,12
 Energy Guy ... 21:1,11
 EnergyPlus Program... 19:1,26
 Energy Star Products ... 21:1,11
 Energy Systems Lab (TAMU) ... 20:4,23
 EREN: Energy Efficiency/Renewable Energy...16:1,44
 FedWorld...16:2,22
 Florida, State of -- Design Initiative...17:2,25
 Solar Energy Center...17:1,29
 Bldg Design Assistance Center...17:1,29

Bldg Energy Efficiency Rating System...17:1,29
 e-design newsletter...17:2,25
 Home Energy Magazine...17:1,29
 IBPSA...16:4,35
 IEA Solar Heating and Cooling Programme ... 21:3,12; 21:3,12
 Institute for Research in Construction ...16:3,31
 Joint Center for Energy Management (CSU) ... 20:4,23
 Lawrence Berkeley National Lab:
 Building Design Advisor... 19:1, 19:2
 Center for Building Science...17:3,26
 Home Energy Saver ... 20:4,23
 Leaking Electricity Home Page ... 19:4, 37
 RESFEN...17:1,14
 SUPERLITE...17:1,14
 WINDOW-4.1...17:1,14
 Virtual Home Energy Advisor...17:3,26
 Lighting Design Laboratory ...19:1,26; 20:3,25
 Linric Company ... 19:3, 24
 Nat'l Climatic Data Center ... 19:2,26
 Nat'l Oceanic & Atmospheric Admin (NOAA)...19:2,26
 New Buildings Institute ... 19:4, 37
 Numerical Logics of Canada ... 19:3,24
 Oak Ridge National Laboratory
 Building Technology Center ... 21:1,11
 Whole-Wall Thermal Performance Calculator
 Moisture Control in Roofing Calculator
 Modified Zone Method Calculator

Zip Code Insulation Program
 Whole-Wall Thermal Performance Calculator
 R-value Recommendation
 PG&E's Energy Center...17:4, 18
 REED: Residential Energy Efficiency Database ... 20:4,23
 SOLARCH (Australia) ... 20:4,23
 Status of State Energy Codes ... 20:4,23
 UCLA School of Architecture ... 21:4,14
 Solar 5.7
 TMY Climate Data
 Solar-2
 Opaque
 Daylit
 Datalit
 U.S. Dept of Energy...15:4,1
 Building Energy Tools Directory...17:3,5
 Building Standards...19:2,26
 Information Bridge...19:2,26
 Washington, State of
 Energy Ideas Clearinghouse...17:3,26
 Washington State Energy Office...16:4,35
 Washington State Univ Energy Program...17:3,26
 Watsun Simulation Laboratory...17:4, 28
 White House...15:4,1
 Windows, Efficient Windows Site ... 20:3,17

UMIDUS Program

UMIDUS: A PC Program for the prediction of heat and moisture transfer in Porous building Elements . 20:4, 2-8

How to contact us:

Simulation Research Group

MS: 90-3147

LAWRENCE BERKELEY NATIONAL LABORATORY

Berkeley, CA 94720-0001 U.S.A.

Fax: (510) 486-4089

Email: KLEllington@lbl.gov

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