BUILDING ENERGY SIMULATION

Volume 19 ¨ No 3 ¨ Fall 1998

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

What's New?

¨ **Resource Center News ¼**

Korea is the location of the newest DOE-2 resource center. Dr. Jun Tae Kim, Senior Lecturer in the Department of Architectural Engineering at Kong Ju National University in Chungnam, has agreed to establish a center for DOE-2 users in the Republic of Korea. See p. 18 for the complete list of resource centers.

Also, the email and telephone number for Antonio Rego Teixeira in **Portugal** have changed. The new email address is art@itime.ineti.pt; the new phone number is (351) 1-350 29 31.

¨ **GenOpt Alpha Testers Wanted ¼**

In Vol. 19, No. 2 of the *User News* we invited readers to become alpha testers of **GenOpt**, a generic optimization program. If you want to participate, check out the article on p. 15 then download the program from http://eetd.lbl.gov/btp/simulations/

· **EnergyPro Price Reduction ¼**

Gabel Dodd/Energysoft has dropped the price of **EnergyPro** to $895 ($700 for the DOE-2 nonresidential module plus $195 for the program interface); for details phone (415) 883-5900 or fax 883-5970.

¨ **Update your address books ¼**

New phone and fax numbers for DOE-2 consultant **Greg Banken** of Woodinville, WA: Phone (425) 825-0200, Fax (425) 825-0136, Email: gbanken@qmetrics.com

What's Inside?

Building Design Advisor*

***The Pre-release of the 1.0 version of the
Building Design Advisor software is now available for review
and evaluation at http://kmp.lbl.gov/BDA***

The Building Design Advisor (BDA) is an advanced decision-making tool intended to allow architects and building designers to quickly and efficiently explore the energy implications of design decisions very early in the conceptual design process (see *User News* Volume 19, No. 1, p. 29).

BDA is a Windows application that acts as a data manager and process controller for the concurrent, integrated use of multiple simulation tools and databases. The BDA maintains a single, object-oriented representation of the building and its context, which is mapped to the data models of the simulation tools that are linked to the BDA. The 1.0 version of the BDA is linked to a Schematic Graphic Editor (Figure 1) and two simulation tools: DElight and RESEGY.
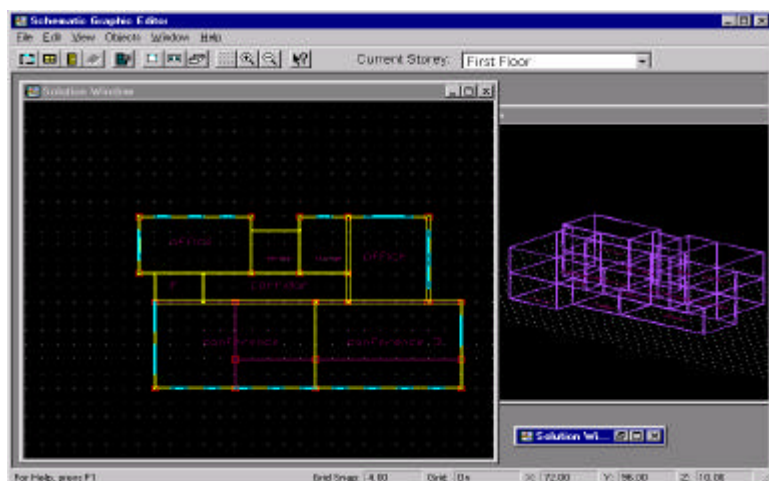
**Figure 1:
The Schematic Graphic Editor is a CAD-like application designed to support the early, schematic phases of building design. It allows the movement of whole spaces while it automatically identifies interior and exterior wall segments for the assignment of proper construction materials.**

- DElight uses DOE-2-like algorithms to compute spatial and temporal distributions of daylight work-plane illuminance and glare index, as well as potential electric lighting savings for various control schemes, in rectangular spaces.

- RESEGY uses a modified bin method to compute monthly and annual energy requirements by end use and energy source, based on TMY2 weather data. RESEGY is also used for HVAC auto-sizing calculations, using design day weather data.

Using a default value mechanism that is based on building type and location and space type, the BDA allows immediate use of simulation tools as soon as geometry has been specified in the Schematic Graphic Editor. All input parameters to simulation tools can be edited in a user interface element called Building Browser (Figure 2).
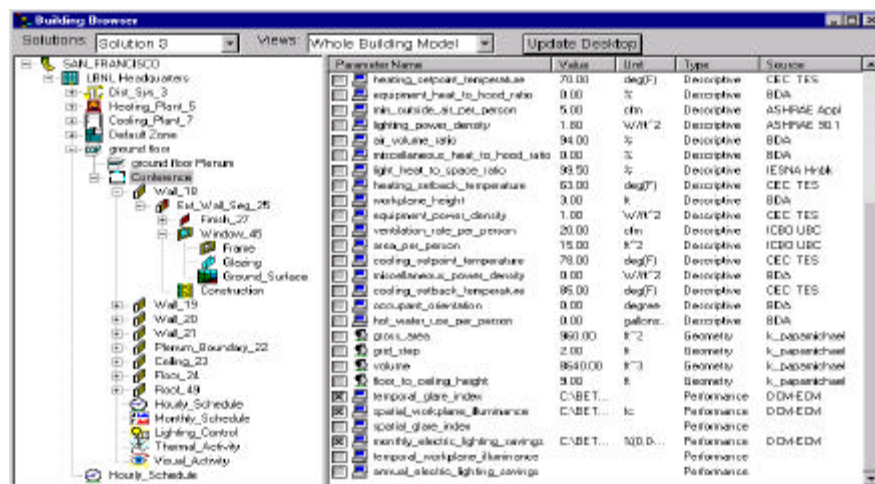
The values of any number of parameters (input and output to simulation tools) can be displayed graphically for any number of design alternatives in a user interface element called Decision Desktop (Figure 3).

The 1.0 version of the BDA is mainly targeted to academia, for teaching as well as research, to expand capabilities and explore ideas for automation, user interface elements, advisor modules, etc. It can also be used for the consideration of daylighting and energy issues during the schematic design of actual buildings. However, it has not yet been thoroughly tested for accuracy of computations. While the 1.0 version is being finalized, work is already underway for the development of BDA 2.0 with links to more sophisticated simulation tools like DOE-2 or EnergyPlus, Radiance, etc. For information on licensing BDA, contact:

Kostas Papamichael
Lawrence Berkeley National
Laboratory
MS: 90-3111
Berkeley, CA 94720

Email: K_Papamichael@lbl.gov
Tel: (510) 486-6854
Fax: (510) 486-4089
http://eande.lbl.gov/BTP/KOSTAS.html

"Building Loads Analysis and System Thermodynamics"

blastnews

Building Systems Laboratory (BSL)

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 website (User manual included!).

HBLC/BLAST Training Courses

The BLAST graphical interface (HBLC) is a Windows-based interactive program for producing 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 website 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 University of Illinois at Urbana-Champaign.

BLAST Order Information		
Program Name	**Order Number**	**Price Each**
PC BLAST Package The standard PC BLAST Package includes the following programs: BLAST, HBLC, BTEXT, WIFE, CHILLER, Report Writer, Report Writer File Generator, Comfort Report program, Weather File Reporting Program, Control Profile Macros for Lotus or Symphony, and the Design Week Program. The programs are provided on a single CD-ROM which also includes soft copies of the BLAST Manual, 65 technical articles and theses related to BLAST, nearly 400 processed weather files with an easy-to-use browsing engine, and complete source code for BLAST, HBLC, and other programs in the BLAST package. Requires an IBM PC 486/Pentium II or compatible running MS Windows 95/98/NT.	3B486E3-0898	$1500.00
PC BLAST Package Upgrade from level 295+	4B486E3-0898	$450.00
WINLCCID 98: executable version for 386/486/Pentium	3LCC3-0898	$295.00
WINLCCID 98: update from WINLCCID 97	4LCC3-0898	$195.00
The last four digits of the catalog number indicate the month and year the item was released or published. This will enable you to see if you have the most recent version. All software will be shipped on 3.5" high density floppy disks unless noted otherwise.		

New Version of HBLC Released!

Now Available on CD-ROM

The Building Systems Laboratory (formerly the BLAST Support Office) at the University of Illinois is pleased to announce that a new and enhanced version of the **HBLC** (Heat Balance Loads Calculator) **graphical interface for BLAST** has been released and is now available. HBLC is also being supplied with an upgraded version of BLAST and now comes on a single CD-ROM disk instead of multiple 3.5" floppies. The 650MB capacity of CD-ROM disks has allowed a wide range of new items to be included with the standard HBLC package:

3 394 processed weather files and raw data with a browser

3 65 technical articles, theses, and all manuals

3 Source code for BLAST, HBLC and all associated programs

3 Easy installation

A new and simpler pricing structure for the HBLC/BLAST package has been created. Current users of BLAST level 295 and upwards will be able to upgrade at a cost of $450 + S&H, while the cost to users with older versions of BLAST and new users will be $1500 + S&H

New HBLC Features

In response to comments and suggestions from users since it initially became available, many new features have been incorporated into HBLC. These features have been extensively tested on several "real world" projects and substantially enhance the capabilities of the program as an interface to BLAST. The new feature list includes:

3 Network capabilities

3 Full-Function Systems Editor
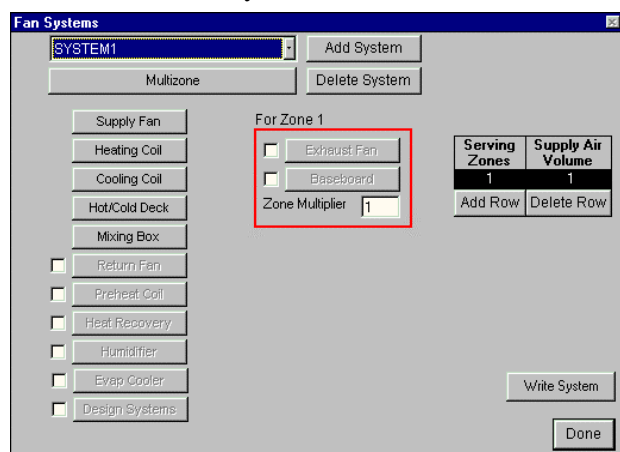
3 Graphic interface for all of the BLAST libraries

3 New and Improved output viewer

3 New Report Writer variables

3 Complete Plants Editor
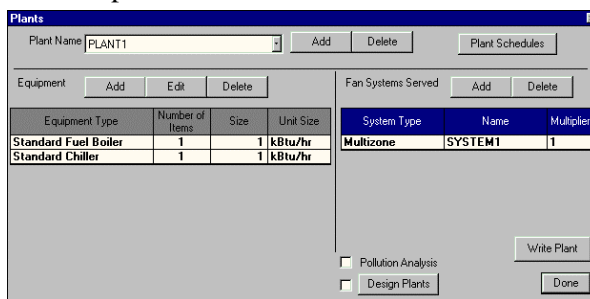
3 Graphical interface for WIFE (Weather Information File Encoder)

3 Pollution analysis

3 Ability to edit and resize roofs and floors and add skylights

3 Ability to enter custom building elements, materials, controls and schedules

☟ Graphical Interfaces for Report Writer (which makes it very easy to generate custom output reports)

Report Variables (dialog box)

Zone/System/Plant Name: Zone 1

Type: ⦿ Zone ○ System ○ Plant

Variables Available To Report:
- ☐ Number of Occupants
- ☐ Convected Heat Gain from People
- ☐ Radiated Heat Gain from People
- ☐ Latent Heat Gain from People
- ☐ Electric Demand for Lights
- ☐ Convected Heat Gain from Lights
- ☐ Radiated Heat Gain from Lights
- ☐ Visible Heat Gain from Lights
- ☐ Return Air Gain from Lights
- ☐ Electric Demand from Elec. Equip.
- ☐ Convected Heat Gain from Elec Equip
- ☐ Radiated Heat Gain from Elec. Equip.
- ☐ Latent Heat Gain from Elec. Equip.
- ☐ Gas Demand from Gas Equipment
- ☐ Convected Heat Gain from Gas Equip.
- ☐ Radiated Heat Gain from Gas Equip.
- ☐ Latent Heat Gain from Gas Equip.
- ☐ Convected Heat Gain from Other Eq.
- ☐ Radiated Heat Gain from Other Equip
- ☐ Latent Heat Gain from Other Equip.

Schedule
From: 01Jan
To: 31Dec

[OK] [Cancel]

☟ Ability to edit individual wall heights and tilts

☟ Ability to track progress through BLAST runs, does initial interpretation of any errors in BLAST output Ability to edit thermal comfort parameters for thermal comfort reports

☟ New, easier to use scheduled load editor

Scheduled Loads (dialog box)

Tabs: People | Lights | Electric Equipment | Radiant Equipment | Infiltration / Outside system Air | Daylight | Other | Gas Equipment | Baseboard Heating

[Add Load] [Delete Load]

◀ 1 of 1 ▶

Zone 1   Schedule CONSTANT   From 01JAN   To 31DEC

Peak kBtu/hr: 0
Percent Return Air: 0
Percent Radiant: 40
Percent Visible: 20
Percent Replaceable: 0

[Edit in a Table]   [Done]

☟ Windows 95/98/NT Compatible (will run on Windows 3.11 but some features will be disabled)

☟ Requires IBM Compatible 486 with a Numeric Co-Processor (Pentium or Pentium II recommended)

New Features in BLAST and Auxiliary Programs

Although an improved HBLC has been the main focus of this release, several major enhancements have been made to the other programs in the HBLC/BLAST package along with the correction of all previously known bugs in BLAST itself. Among these enhancements are:

☟ All programs in the package are Year 2000 compliant

☟ It is now possible to use DOE WINDOW-4 windows in calculations

☟ WIFE now processes TMY2 format weather data

Availability

The HBLC/BLAST package on CD-ROM is available for purchase from:

Building Systems Laboratory
University of Illinois at Urbana-Champaign
140 MEB, MC-244
1206 W. Green St
Urbana, IL 61801

E-Mail: **support@blast.bso.uiuc.edu**
FAX: **(217) 244-6534**
Telephone: **(217) 333-3977**

WinLCCID 98 is Released!

LCCID (Life Cycle Cost in Design) has been a standard in the DOD (U.S. Department of Defense) 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.

Following the initial release in 1996, WinLCCID has been released with the latest fuel escalation values and discount rates.

WinLCCID Features:

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

Order WinLCCID 98 today!

The purchase price for this release is only $295; the update for LCCID Level 92 users is only $195. To order your copy of WinLCCID 98 or to obtain more information on the program, please contact the Building Systems Laboratory by phone at 1-217-333-3977, by fax at (217)244-6534, or by e-mail at support@blast.bso.uiuc.edu. Or, **download a free demo copy** of WINLCCID 98 from the BLAST home page at www.bso.uiuc.edu.

Meetings, Conferences, Symposia

SSB '98: SYSTEM SIMULATION IN BUILDINGS

To be held
December 14-16 , 1998
Liege, Belgium

Contact:
Thermodynamics Laboratory
Univ of Liège, Sart-Tilman
Bâtiment B49 - Parking P33
B-4000 Liège, Belgium

Tel: +32 (0) 4 366 48 00
Fax: +32 (0) 4 366 48 12
michele.deprez@ulg.ac.be

ASHRAE Winter Meeting

To be held
January 23-27, 1999
Chicago, IL

Contact:
ASHRAE Meetings Section
1791 Tullie Circle NE
Atlanta, GA 30329

Tel: 404.636.8400
Fax: 404.321.5478
jmarshal@ashrae.org
www.ashrae.org

Thermal Performance of the Exterior Envelopes of Buildings (Thermal VII)

To be held
December 7-11, 1998
Clearwater Beach, FL

Contact:
Mia Prater (Bldg 3147)
Oak Ridge Nat'l Lab
Thermal Envelope Conf.
P.O. Box 2008
Oak Ridge, TN 37831-6070

Tel: 423.576.7942
Fax: 423.574.9331
unb@ornl.gov
www.ornl.gov/ORNL/
Energy_Eff/tectrans.html

IBPSA's Building Simulation '99

**To be held
September 13–15, 1999
Kyoto, Japan**

Call for Papers   go to www.mae.okstate.edu/ibpsa;
refer to the IBPSA web page for all deadlines.

Contact
Masaya Okumiya
CIRSE
Nagoya University
Furo-cho, Chikusa-ku,
Nagoya 464-8603   Japan

Fax: +81-52-789-5318 / e-mail BS99@archi.kyoto-u.ac.jp

ASHRAE Annual Meeting

To be held
June 19-23, 1999
Seattle, WA

Contact:
ASHRAE Meetings Section
1791 Tullie Circle NE
Atlanta, GA 30329

Tel: 404.636.8400
Fax: 404.321.5478
jmarshal@ashrae.org
www.ashrae.org

DOE-2 Directory of Program Related Software and Services[*]

Mainframe/Workstation Versions of DOE-2

Program Name	Operating System	Description	
DOE-2.1E From the Energy Science and Technology Software Center (ESTSC)	SUN-4 DEC-VAX	Source code, executable code and complete current documentation for: DOE-2.1E/Version 094 for SUN-4 DOE-2.1E DEC-VAX	For a complete listing of the software available from ESTSC, order their "Software Listing" catalog, ESTSC-2. [See *User News* Vol. 16, No. 3, p. 21]
FTI/DOE (see FTI/DOE listing under PC Versions of DOE-2, below)			

PC Versions of DOE-2

Program Name	Operating System	Description
ADM-DOE-2 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 *User News* Vol. 7, No. 2, p. 6]
Compare-IT 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 *User News* Vol. 19, No. 1]
DOE-PLUS Based on J.J. Hirsch DOE-2.1E Demo: www.halcyon.com/byrne	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 *User News* Vol. 13, No. 2, p. 54, Vol. 16, No. 1, p. 28-32]
EnergyPro Based on ESTSC DOE-2.1E V. 092 Demo: www.energysoft.com	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. For California Users: Performs Title 24 compliance calculations, includes state-certified HVAC and DHW Equipment directories, Title 24 tailored lighting calculations. [See *User News* Vol. 18, Nos. 2, 4]
EZDOE Based on J.J. Hirsch DOE-2.1D Demo: www.elitesoft.com	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 User News Vol. 14, No. 2, p. 10 and No. 4, p. 8-14]*
FTI/DOE Based on ESTSC DOE-2.1E V. 092 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 User News Vol. 12, No. 4, p. 16]*

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[*] This information is based on a December 1997 survey of DOE-2 product vendors.

DOE-2 Directory of Program Related Software and Services

Mainframe/Workstations Versions of DOE-2

Input / Output	Support	Program Price	Vendor Information
	Limited "operational" support, which includes telephone assistance concerning installation, media or platform questions.	SUN version: Govt/Educ $400 U.S., Mexico, Canada $1305 Other Foreign $2000 VAX version: Govt/Educ $500 U.S., Mexico, Canada $1835 Other Foreign $2716	**Energy Science and Technology Software Center** 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
FTI/DOE (see FTI listing under PC Versions of DOE-2, below)			

PC Versions of DOE-2

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

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

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

PC Versions of DOE-2 (continued)

Program Name	Operating System	Description
MICRO-DOE2 Based on ESTSC DOE-2.1E V. 088 Demo: call vendor	DOS Windows (3.1, 95, NT)	Widely-used, reliable, and tested. Includes automatic weather processing, batch file creation, and a *Users Guide* with instructions on how to set up a RAM drive. System requirements: 386/486 PC with 4 Mb of RAM and math co-processor. Optional BDL-Builder simplifies input (see "Pre- and Post-Processors for DOE-2). On-line help. Program includes some weather files. [See *User News* Vol. 7, No. 4, p. 2; Vol. 11, No. 1, p. 2; Vol. 15, No. 1, p. 8; Vol. 15, No. 3, p. 4; Vol. 16, No. 2, p. 1,7; Vol. 16, No. 4, p. 7-8]
Perform-95 Based DOE-2.1E No demo	DOS	Created for the State of California Energy Commission's, Title 24 energy code. Perform-95 is an interface shell with DOE-2 as the engine.
PRC-DOE-2 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 available. 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.
VisualDOE2.6 Based on J.J. Hirsch DOE-2.1E, V. 083 Demo: www.eley.com	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 User News Vol. 15, No. 2, p. 10; Vol. 16, No. 4, p. 9-16; Vol. 17, No. 4, p. 8-13]*

Pre- and Post-Processors for DOE-2

Program Name	Description
BDL Builder and **E2BB**	**BDL Builder** is a user-friendly Windows-implemented pre-processor for DOE-2.1E that allows the description of specific building and HVAC characteristics with numeric input by preparing databases, or building blocks, and then selecting records from the databases to assemble a complete input. **E2BB** translates existing DOE-2.1E text input to **BDL Builder**.
DrawBDL	**DrawBDL,** Version 2.02, 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 User News, Vol. 14, No. 1, p. 5-7, Vol. 14, No. 4, p. 16-17, and Vol. 16, No. 1, p.37]*
Visualize-IT (Visual Data Analysis Tools)	The *Energy Information Tool* 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 *Energy/Print* to get an overview of the data and then apply a variety of tools (load shapes, load duration curves, etc.). The *Calibration Tool* 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 User News Vol. 17, No. 2, p. 2-6]*

PRC-TOOLS:
    PRC-Grab
    PRC-Hour
    PRC-Peak
	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.

DOE-2 Directory of Program Related Software and Services

PC Versions of DOE-2 (continued)

Input / Output	Support	Program Price	Vendor Information
Input: Fill-in-the-blanks **Output:**	Assistance provided to install and initially use program. Reasonable support thereafter. Training available at Users office. Support price negotiated individually.	$500 w/documentation Source code available, call for price.	**MICRO-DOE2** (Don Croy) Acrosoft/CAER Engineers 1204-1/2 Washington Avenue Golden, CO 80401 Ph: 303-279-8136 / Fx: 303-279-0506 102447.2611@compuserve.com
Input: Standard text-based **Output:** 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..	$250 including Perform-95 manual. Order #P440-96-0006	**California Energy Commission** Publications MS-13 P.O. Box 944295 Sacramento, CA 94244-2950 Contact the Energy Hotline (in California, call 800-772-3300) at Ph: 916-654-5106
Input: Standard text-based **Output:**	Unlimited support.	$ 495 w/documentation Source code not available.	**PRC-DOE-2** (Paul Reeves) Partnership for Resource Conservation 140 South 34th Street Boulder, CO 80303 Ph: 303-499-8611 / Fx: 303-554-1370 Paul.Reeves@DOE2.com
Input: Graphical **Output:** Graphical	90 days free phone and email support. Support is $195 per year after first 90 days	$495 w/documentation Source code not available.	**VisualDOE2.6** (C. Eley or Erik Kolderup) Charles Eley Associates 142 Minna Street San Francisco, CA 94105 Ph: 415-957-1977 / Fx: 415-957-1381 support@eley.com

Pre- and Post-Processors for DOE-2

Operating System	Works with this version of DOE-2	Price	Vendor
Dos or Windows 3.1, 95	All DOE-2.1E standard versions	BDL Builder $750.00 E2BB $45.00	**MICRO-DOE2** (Don Croy) Acrosoft/CAER Engineers 1204-1/2 Washingtin Avenue Golden, CO 80401 Ph: 303-279-8136 / Fx: 303-279-0506 102447.2611@compuserve.com
Windows 3.1, 95, NT	DOE-2.1E	$125.00 plus shipping	**Joe Huang & Associates** 6720 Potrero Avenue El Cerrito, CA 91364 Ph/Fx: 510-236-9238
Windows 3.1	DOE-2.1E		**RLW Analytics, Inc.** (Ed Erickson) 1055 Broadway, G Sonoma, CA 95476 Ph: 707-939-8823 Fx: 707-939-9218 Info@rlw.com www.rlw.com
Windows 95, NT	All versions of DOE-2	$99.00	**Partnership for Resource Conservation** 140 South 34th Street (Paul Reeves) Boulder, CO 80303 Ph: 303-499-8611 / Fx: 303-554-1370 Paul.Reeves@DOE2.com

Recent LBNL Reports

LBNL-42241

Final Report: Validation Studies of the DOE-2 Building Energy Simulation Program

Robert Sullivan
Lawrence Berkeley National Laboratory
Berkeley, CA 94720

Summary

This report documents many of the validation studies of the DOE-2 building energy analysis simulation program that have taken place since 1981. Results for several versions of the program are presented with the most recent study conducted in 1996 on Version 2.1E and the most distant study conducted in 1981 on Version DOE-1.3. This work is part of an effort related to continued development of DOE-2, particularly its use as a simulation engine for new, specialized versions of the program such as the recently released RESFEN-3.1.

RESFEN-3.1 is a program that specifically deals with analyzing the energy performance of windows in residential buildings. The intent in providing the results of these validation studies is to give potential users of the program a high degree of confidence in the calculated results.

LBNL-37371, Rev. 2

THERM 2.0: Program Description
A PC Program for Analyzing the Two-Dimensional Heat Transfer through Building Products

Elizabeth Finlayson, Robin Mitchell, and Dariush Arasteh
Lawrence Berkeley National Laboratory
Berkeley, CA 94720

Charlie Huizenga
Center for Environmental Design Research
University of California
Berkeley, CA 94720

Dragan Curcija
Department of Mechanical Engineering
University of Massachusetts
Amherst, MA

Overview

THERM is a state-of-the-art Windows-based computer program developed at Lawrence Berkeley National Laboratory for use by building component manufacturers, engineers, educators, students, architects and researchers interested in heat transfer. Using THERM, you can model two-dimensional heat-transfer effects in building components such as windows, walls, foundations, roofs and doors, appliances and other products where thermal bridges are of concern. THERM's heat-transfer analysis allows you to evaluate a product's energy efficiency and local temperature patterns, which may relate directly to problems with condensation, moisture damage and structural integrity.

THERM's two-dimensional conduction heat-transfer analysis is based on the finite-element method, which can model the complicated geometries of building products. The program's graphic interface allows you to draw cross-sections of products or components to be analyzed. To create the cross-sections, you can trace imported files in DXF or bitmap format, or input the geometry from known dimensions. Each cross-section is represented by a combination of polygons. You define the material properties for each polygon and introduce the environmental conditions to which the component is exposed by defining the boundary conditions surrounding the cross-section. Once the model is created, the remaining analysis (mesher and heat transfer) is automatic. You can view results from THERM in several forms, including U-factors, isotherms, heat-flux vectors and local temperatures.

THERM 2.0 includes several new technical and user interface features, the most significant of which is a radiation view-factor algorithm. This feature increases the accuracy of calculations in situations where you are analyzing non-planar surfaces that have different temperatures and exchange energy through radiation heat transfer. This heat-transfer mechanism is important in greenhouse windows, hollow cavities and some aluminum frames.


GenOpt: A Generic Optimization Program
Version 1.0 Ready for Alpha Testing

GenOpt is a generic multi-parameter optimization program being developed for system optimization. It automatically determines the values of user-selected design parameters that lead to the best operation of a given system. It can also determine unknown parameters in a data-fitting process. GenOpt optimizes a user-selected *objective function,* such as a building's calculated annual energy use. It also offers an interface for easily implementing your own optimization algorithms into its library. See the Summer 1998 *User News* (Vol. 19, No. 2) for an in-depth look at GenOpt.

GenOpt has an open interface on both the simulation program side and the optimization algorithm side. It allows you to easily couple any external program (like DOE-2 SPARK, BLAST or any user-written program) by modifying a configuration file. GenOpt is currently being developed as a console application, written entirely in Java so that it is platform independent. The interface for coupling external simulation programs and adding custom optimization algorithms is ready. GenOpt currently works under Unix Solaris 2.5.1, Windows NT and Windows 95.
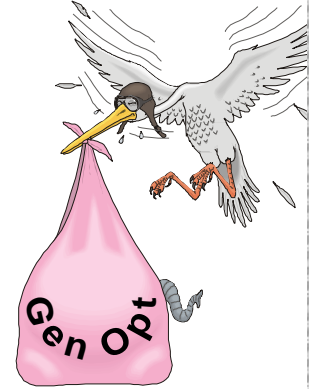
The alpha version of GenOpt is ready to be tested by a limited number of users. For further information and to register as a tester, please visit the GenOpt web page at

http://eetd.lbl.gov/btp/simulations/

Corrections to DOE-2.1E Supplement

Appendix D, p. D.3: The Emis2 value for glass types 501 and 550 should be changed from .030 to .040:

ID	GLASS	d(mm)	Tsol	Rfsol	Rbsol	Tvis	Rfvis	Rbvis	Tir	Emis1	Emis2	k
501	SPEC SEL CLEAR	6.000	.430	.300	.420	.770	.070	.060	.000	.840	.040	900
550	SPEC SEL TINT	6.000	.260	.140	.410	.460	.060	.040	.000	.840	.040	900

On p. 2.107 (Table 2.12) of the "Index to the Window Library," the GLASS-TYPE-CODE description for entries 2840 to 2865 should be changed from (e2=.029) to (e3=.04):

DOUBLE LOW-E (e3=.04) ELECTROCHROMIC ABS G BLEACHED/COLORED AIR

| 2840 | 2.33 | 0.41 | .51 | .44 | .34 | .33 | .66 | .14 | 704F | 6.0 | Air | 6.3 | 708F | 5.7 |
| 2841 | 2.33 | 0.41 | .18 | .16 | .06 | .19 | .10 | .08 | 705F | 6.0 | Air | 6.3 | 708F | 5.7 |

DOUBLE LOW-E (e3=.04) ELECTROCHROMIC ABS G BLEACHED/COLORED AIR

| 2842 | 1.64 | 0.29 | .59 | .51 | .34 | .33 | .66 | .14 | 704F | 6.0 | Air | 12.7 | 708F | 5.7 |
| 2843 | 1.64 | 0.29 | .15 | .13 | .06 | .19 | .10 | .08 | 705F | 6.0 | Air | 12.7 | 708F | 5.7 |

DOUBLE LOW-E (e3=.04) ELECTROCHROMIC ABS G BLEACHED/COLORED ARGON

| 2844 | 1.33 | 0.23 | .60 | .52 | .34 | .33 | .66 | .14 | 704F | 6.0 | Arg | 12.7 | 708F | 5.7 |
| 2845 | 1.33 | 0.23 | .14 | .12 | .06 | .19 | .10 | .08 | 705F | 6.0 | Arg | 12.7 | 708F | 5.7 |

DOUBLE LOW-E (e3=.04) ELECTROCHROMIC REF IG BLEACHED/COLORED AIR

| 2860 | 2.33 | 0.41 | .54 | .46 | .32 | .32 | .64 | .14 | 706F | 6.0 | Air | 6.3 | 708F | 5.7 |
| 2861 | 2.33 | 0.41 | .18 | .16 | .07 | .22 | .12 | .08 | 707F | 6.0 | Air | 6.3 | 708F | 5.7 |

DOUBLE LOW-E (e3=.04) ELECTROCHROMIC REF IG BLEACHED/COLORED AIR

| 2862 | 1.64 | 0.29 | .55 | .47 | .32 | .32 | .64 | .14 | 706F | 6.0 | Air | 12.7 | 708F | 5.7 |
| 2863 | 1.64 | 0.29 | .16 | .14 | .07 | .22 | .12 | .08 | 707F | 6.0 | Air | 12.7 | 708F | 5.7 |

DOUBLE LOW-E (e3=.04) ELECTROCHROMIC REF IG BLEACHED/COLORED ARGON

| 2864 | 1.33 | 0.23 | .56 | .48 | .32 | .32 | .64 | .14 | 706F | 6.0 | Arg | 12.7 | 708F | 5.7 |
| 2865 | 1.33 | 0.23 | .15 | .13 | .07 | .22 | .12 | .08 | 707F | 6.0 | Arg | 12.7 | 708F | 5.7 |

What's New? (continued from front page)

♦ **New DOE-2 Consultants ¼**

GeoPraxis, Inc., of Sonoma, CA, offers energy analysis and DOE-2 consulting.
John F. Kennedy, PE, M.E.,
Pat Bailey and Tom Conlon
GeoPraxis, Inc.
18850 Robinson Road
Sonoma, CA 95476
www.geopraxis.com ♦ info@geopraxis.com
Phone (707) 996-9408 ♦ Fax (707) 939-8702

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Walker Engineering specializes in the design and optimization of building systems for new construction and for the renovation of older buildings.
Dave Walker
Walker Engineering
PO Box 366
Staffordsville, VA 24167
www.swva.net/walkeng ♦ walkeng@swva.net
Phone (540) 921-4544 ♦ Fax (540) 921-4548

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In the Sacramento area, Jim Trowbridge of **Trowbridge Engineering** offers engineering and whole-building energy analysis.
James Trowbridge
Trowbridge Engineering
8240 Caribbean Way
Sacramento, CA 95826
jim@trowbridge-eng.com
Phone (916) 381-4753

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And in Massachusetts, please welcome energy conservation specialist Mark Mullins of **DMI, Inc**.
Mark Mullins
DMI, Inc.
450 Lexington Street
Newton, MA 02466
staff@dmiinc.com
Phone (617) 527-1525x102 ♦ Fax 527-6606

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Mike Andelman is a partner in a new architect/ engineering firm that focuses on sustainable design.
Michael Andelman
JRMA & Associates
421 Watertown Street
Newton, MA 02458-1113
Phone (617) 964-8889 ♦ Fax (617) 964-7881
mikea@jrma&a

User News Deadlines for 1998 and 1999

Shaded days on the calendar indicate deadline dates for either submission of articles or changes to vendor information. We always welcome articles about innovative uses for DOE-2, BLAST and their derivative programs.

```
                    1998

       Oct       |      Nov      |      Dec
  M Tu  W Th  F  | M Tu  W Th  F | M Tu  W Th  F
           1  2  |    3  4  5  6 |    1  2  3  4
   5  6  7  8  9 | 9 10 11 12 13 | 7  8  9 10 11
  12 13 14 15 16 |16 17 18 19 20 |14 15 16 17 18
  19 20 21 22 23 |23 24 25 26 27 |21 22 23 24 25
  26 27 28 29 30 |30             |28 29 30 31
  --------------------------------------------------
                    1999

       Jan       |      Feb      |      Mar
  M Tu  W Th  F  | M Tu  W Th  F | M Tu  W Th  F
              1  | 1  2  3  4  5 | 1  2  3  4  5
   4  5  6  7  8 | 8  9 10 11 12 | 8  9 10 11 12
  11 12 13 14 15 |15 16 17 18 19 |15 16 17 18 19
  18 19 20 21 22 |22 23 24 25 26 |22 23 24 25 26
  25 26 27 28 29 |               |29 30 31
  --------------------------------------------------
       Apr       |      May      |      Jun
  M Tu  W Th  F  | M Tu  W Th  F | M Tu  W Th  F
           1  2  | 3  4  5  6  7 |    1  2  3  4
   5  6  7  8  9 |10 11 12 13 14 | 7  8  9 10 11
  12 13 14 15 16 |17 18 19 20 21 |14 15 16 17 18
  19 20 21 22 23 |24 25 26 27 28 |21 22 23 24 25
  26 27 28 29 30 |31             |28 29 30
  --------------------------------------------------
       Jul       |      Aug      |      Sep
  M Tu  W Th  F  | M Tu  W Th  F | M Tu  W Th  F
           1  2  | 2  3  4  5  6 |       1  2  3
   5  6  7  8  9 | 9 10 11 12 13 | 6  7  8  9 10
  12 13 14 15 16 |16 17 18 19 20 |13 14 15 16 17
  19 20 21 22 23 |23 24 25 26 27 |20 21 22 23 24
  26 27 28 29 30 |30 31          |27 28 29 30
  --------------------------------------------------
       Oct       |      Nov      |      Dec
  M Tu  W Th  F  | M Tu  W Th  F | M Tu  W Th  F
              1  | 1  2  3  4  5 |       1  2  3
   4  5  6  7  8 | 8  9 10 11 12 | 6  7  8  9 10
  11 12 13 14 15 |15 16 17 18 19 |13 14 15 16 17
  18 19 20 21 22 |22 23 24 25 26 |20 21 22 23 24
  25 26 27 28 29 |29 30          |27 28 29 30 31
```

Note that the newsletter is usually mailed out three to four weeks after the deadline.

The Answer Man by Fred Buhl

Question:
I'm trying to simulate a fuel cell using the gas turbine model in the DOE-2.1E PLANT subprogram. Basically I want to replace the performance curves with new ones that will make the gas turbine perform like a fuel cell. However, I have run into problems with information contained in the DOE-2.1E *Supplement*. There is conflicting data about the gas turbine performance curves; p. 4.58 does not agree with p. 4.83.

Answer:
The coefficients for GTURB-I/O-FPLR given on p. 4.58 of the DOE-2.1E *Supplement* are correct. The values on p. 4.83 seem to reflect an older version of DOE-2. I reviewed the description of the gas turbine in the *Supplement* and it seems to be a little confusing. Let me clarify how the model works. The basic equation is

```
GFUEL = CAP*(1.0/GTURB-GEN-EFF)*
        (FUELG(1) + FUELG(2)*PLR + FULEG(3)*PLR*PLR)
```

where:

`GFUEL`	is the fuel consumed by the gas turbine
`CAP`	is the capacity, a fixed number not altered by any curve
`GTURB-GEN-EFF`	is the PLANT-PARAMETERS keyword, the fuel to electric conversion efficiency at full load (default is .19)
`FUELG(1), FUELG(2), FUELG(3)`	are the coefficients of the EQUIPMENT-QUAD keyword GTURB-I/O-FPLR; the default coefficients are .442979, .3974, .1569621
`PLR`	is the part load ratio PLR = LOAD/CAP; PLR must be bigger than the minimum operating load ratio RMIN which defaults to .1 (not .3 as indicated on p. 4.57)

The amount of high temperature recoverable heat is set with a similar equation:

```
EEXHG = CAP*(1.0/GTURB-GEN-EFF)*GTURB-EXH-EFF*
        (THMXH(1) + THMXH(2)*PLR + TH MXH(3)*PLR*PLR)
```

where:

`EEXHG`	is the recoverable heat available for the hour
`GTURB-EXH-EFF`	is the PLANT-PARAMETERS keyword, the fraction of fuel energy turned into recoverable heat at full load (default .55)
`THMXH(1), THMXH(2) THMXH(3)`	are the coefficients of the EQUIPMENT-QUAD keyword GTURB-EXH-FPLR; default coefficients. are 0.295626, 0.4930194, 0.2113548

That's it. Note that GTURB-TEX-FPLR does not exist and GTURB-CAP-FT is never used, contrary to what is stated on p. 4.56 of the *Supplement*. To simulate a fuel cell you need to just put in the correct full load efficiency GTURB-GEN-EFF and put in the correct part load performance with your own GTURB-I/O-FPLR.

Note very carefully the form of the equation for GFUEL. GTURB-I/O-FPLR multiplies the capacity, CAP, not the load for the hour. So, if you want a constant efficiency as a function of part load, your GTURB-I/O-FPLR curve should be 0.0 + 1.0*PLR + 0.0*PLR*PLR. That is, your coefficients should be 0.0, 1.0, 0.0. The same is true for all DOE-2 FPLR curves.

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. These resource centers will receive copies of all new reports and documentation. Program users can then make arrangements to get photocopies of the new material for a nominal cost. We hope to establish resource centers in other countries; please contact us if you are interested in establishing a center in your area.

Australasia
Dr. Deo K. Prasad/P. C. Thomas, SOLARCH, University of New South Wales, P.O. Box 1, Kensington, N.S.W. 2033, Australia
PC.Thomas@unsw.EDU.AU / Tel: (61)-2-9311-7136 (P.C. Thomas) / Fax: (61) 2-9662-1378

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

Germany
B. Barath or G. Morgenstern, Ingenieurbüro Barath & Wagner GmnH, Postfach 20 21 41, D-41552 Kaarst, Germany
Tel: (0049) 2131 75 74 90 12 G. Morgenstern / Fax: (0049) 2131 75 74 90 29

Hong Kong, China, Taiwan, Japan
Dr. Sam Chun-Man HUI or K.P. Cheung, Department of Architecture, The University of Hong Kong, Pokfulam Road, Hong Kong (SAR), CHINA
cmhui@hku.hk / http://arch.hku.hk/research/BEER/DOE-2/DOE-2.htm
Tel: (852) 2123 (direct to Sam Hui) / Fax: (852) 2559-6484 / Hui pager 7116 3808 a/c 1830

Korea
Dr. Jun Tae KIM, Room #114 New Engineering Building, Department of Architectural Engineering, Faculty of Engineering, Kong Ju National University, 182 Sinkwan-dong, Kongju, Chungnam, 314-701, Republic of Korea /
jtkim@knu.kongju.ac.kr / Tel: (82) 416 50 8653 / Fax (82) 416 856 9388

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: (351) 1-350-29 31 / Fax: (351) 1-716-43 05

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@ntuvax.ntu.ac.sg / Tel: (65)799-5543 / 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

South America
Prof. Roberto Lamberts,Universidade Federal de Santa Catarina, Campus Universitario-Trindade, Cx. Postal 476, 88049 Florianopolis SC, BRASIL lamberts@ecv.ufsc.BR / Tel: (55)482-31-9272 / Fax: (55)48-231-9770

Switzerland
René Meldem, Meldem Energie SA, 30 a ch. de la Fauvette, CH-1000 Lausanne 12, Switzerland
meldem.energie@bluewin.ch / Tel: +41 21 653-8044 / Fax: +41 21 653-8054

INTERNATIONAL DOE-2 ENERGY CONSULTANTS

Belgium

Andre Dewint, rue de Livourne 103/12, B-1050 BRUXELLES Belgium

Canada

Curt Hepting, P.Eng. EnerSys Analytics, 2989 Delahaye Drive, Coquitlam, B.C. V3B 6Y9 Canada
enersys@infoserve.net / www.enersys.bc.ca/homepage

Dejan Radoicic, D. W. Thomson Consultants, Ltd., 1985 West Broadway, Vancouver, BC V6J 4Y3,
Canada

Neil A. Caldwell, PE, Tescor Pacific Energy Services, Inc., 1730 - 401 W. Georgia St., Vancouver, BC
V6B 5A1 Canada   caldwell@tescor.dwg.com / http://www.dwg.com/tescor

Stephane Bilodeau, PE, Groupe Enerstat, Inc., 79 Wellington N. #202, Sherbrooke (Quebec) J1H 5A9,
Canada   bill@aramis.gme.usherb.ca / Tel: (819) 562-8040 / Fax (819) 562-5578

Gordon Shymko, G.F. Shymko & Associates, Inc., 202-1738 Alberni Street, Vancouver, BC V6G 1B2
Canada   gshymko@direct.ca / Tel: (604) 685-5350 / Fax: (604) 685-5301

Germany

Jens Grundt and Ludwig Michel, GMW-Ingenieurburo, Vahrenwalder Str. 7, D-30165 Hannover,
Germany, GMW-Ing.buero@t-online.de / Tel: 0049-511 9357440/Fax 0049-511-935744

New Zealand

Paul Bannister Energy Group, Ltd., 14a Wickliffe Street (P.O. Box 738), Dunedin New Zealand
eglstaff@earthlight.co.nz

Switzerland

René Meldem, Meldem Energie SA, 30 a ch. de la Fauvette, CH-1000 Lausanne 12, Switzerland
Meldem.energie@bluewin.ch / Tel: +41 21 653-8044 / Fax: +41 21 653-8054

Philip Schluchter, Institut fur Bauphysik Klein, Urs Graf-Strasse 1, CH4052 Basel, Switzerland

Gerhard Zweifel, Zentralschweizerisches Technikum Luzern (ZTL), Abt. HLK, CH-6048 Horw,
Switzerland gzweifel@ztl.ch

Joerg Tscherry, Building Equipment Section 175, EMPA, 129 Überlandstrasse, CH-8600 Dübendorf,
Switzerland

U.S. DOE-2 ENERGY CONSULTANTS

Arizona

Marlin S. Addison	M. S. Addison & Associates	1215 West 12th Place	Tempe, AZ 85281	(602) 968-2040
Chuck Sherman	Energy Simulation Specialists	64 East Broadway, #230	Tempe, AZ 85282	(602) 784-4500
Sarat Kanaka	EcoGroup, Inc., Suite 301	2085 E. Technology Circle	Tempe, AZ 85284	(602) 777-3000

California

M. Gabel, R. Howley	Gabel Associates, LLC	1818 Harmon Street	Berkeley, CA 94703	(510) 428-0803
George Marton	1129 Keith Avenue		Berkeley, CA 94708	(510) 841-8083
Jeff Hirsch	James J. Hirsch Associates	12185 Presilla Road	Camarillo, CA 93012	(805) 532-1045
Leo Rainer	Davis Energy Group, Inc.	123 C Street	Davis, CA 95616	(916) 753-1100
L. Heshong, D. Mahone	The Heshong Mahone Group	11622 Fair Oaks Blvd., #111	Fair Oaks, CA 95628	(916) 962-7001
Cliff Gustafson	Taylor Systems Engrg. Inc.	9801 Fair Oaks Blvd., #100	Fair Oaks, CA 95628	(916) 961-3400
Steven D. Gates, PE	11608 Sandy Bar Court		Gold River, CA 95670	(916) 638-7540
Tom Lunneberg, PE	Constructive Tech. Group	16 Technology Dr., #109	Irvine, CA 92618	(714) 790-0010
David J. Schwed	Romero Management Assoc	1805 West Avenue K	Lancaster, CA 93534	(805) 940-0540
Robert E. Gibeault	A-TEC	5515 River Avenue, # 301	Newport Beach, CA 92663	(714) 548-6836
Martyn C. Dodd	Gabel Dodd/EnergySoft, LLC	100 Galli Drive, # 1	Novato, CA 94949	(415) 883-5900
Robert Mowris, PE	10 Ridge Road		Orinda, CA 94563	(925) 254-9770
Greg Cunningham	EnerSys Solutions LLC	114 Sansome St., #1201	San Francisco, CA 94104	(415) 296-9760
Charles Eley	Eley Associates	142 Minna Street	San Francisco, CA 94105	(415) 957-1977
John F. Kennedy, PE	GeoPraxis, Inc.	18850 Robinson Road	Sonoma, CA 95476	(707) 996-9408
Chandra Shinde, PE	ENVIRODESIGN GROUP	385 S. Lemon Ave., E-266	Walnut, CA 91789	(909) 598-1980

Colorado

David A. Cohen	Architectural Energy Corp	2540 Frontier Ave, #201	Boulder, CO 80301	(303) 444-4149
Paul Reeves	PRC	140 South 34th Street	Boulder, CO 80303	(303) 499-8611
Ellen Franconi	P.O. Box 1284		Boulder, CO 80306	(303) 786-7319
Charles Fountain	Burns & McDonnell	8055 E. Tufts Avenue, #330	Denver, CO 80230	(303) 721-9292
Susan Reilly	Enermodal Engineering	1554 Emerson Street	Denver, CO 80218	(303) 861-2070
Donald E. Croy	Acrosoft/CAER Engineers	814 Eleventh Street	Golden, CO 80401	(303) 279-8136
Joel Neymark, PE	2140 Ellis Street		Golden, CO 80401	(303) 384-3672
Norm Weaver	Interweaver Consulting	P.O. Box 775444	Steamboat Spgs, CO 80477	(970) 870-1710

Connecticut

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

District of Columbia

Kurmit Rockwell, PE	XENERGY, Inc., Suite 1110	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.	4651 Salisbury Road	Jacksonville, FL 32256	(904) 279-2277

Georgia

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

Illinois

Michael P. Doerr	Skidmore Owings Merrill	224 S Michigan Ave # 1000	Chicago, IL 60604	(312) 360-4623
Gary H. Michaels, 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	GARD Analytics, Inc.	1028 Busse Highway	Park Ridge, IL 60068-1802	(847) 698-5686

Kansas

Dr. Brian A. Rock, PE	A/E Dept, Marvin Hall	University of Kansas	Lawrence, KS 66045-2222	(785) 864-3603

Massachusetts

Michael Andelman	JRMA & Associates	421 Watertown St.	Boston, MA 02210	(617) 964-8889
C. Kalasinsky PE, T.Chan	R.G. Vanderweil Engrs., Inc.	274 Summer Street	Newton, MA 02458-1113	(617) 423-7423
Mark Mullins	DMI, Inc.	450 Lexington Street	Newton, MA 02466	(617) 527-1525

Missouri

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

Montana

Michael W Harrison, PE	Harrison Engineering	139 Bluebird Lane	Whitehall, Montana 59759	(406) 287-5370

New York

J. Fireovid, K. Yousef	SAIC Energy Solutions Div.	1 Marcus Boulevard	Albany, NY 12205	(518) 458-2249
H. Henderson, S. Carlson	CDH Energy Corporation	P.O. Box 641	Cazenovia, NY 13035	(315)-655-1063
Dave Pruitt, Scott Frank	Jaros, Baum & Bolles	80 Pine Street	New York, NY	(212) 530-9300

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Hank Jackson, PE	P.O. Box 675		Weaverville, NC 28787-0675	(828) 658-0474
Gopal Shiddapur, PE	DukeSolutions (MC: ST05A)	230 S. Tryon Street, # 400	Charlotte, NC 28202	(704) 373-4439

Oregon

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

Texas

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

Virginia

Dave Walker	Walker Engineering	P.O. Box 366	Staffordsville, VA 24167	(540) 921-4544

Washington

Steve Byrne	ITEM Systems, suite 344	321 High School Road NE	Bainbridge Island, WA 98110	(206) 855-9540
Gregory J. Banken, PE.	Q-Metrics, Inc.	P.O. Box 3016	Woodinville, WA 98072-3016	(425) 825-0200
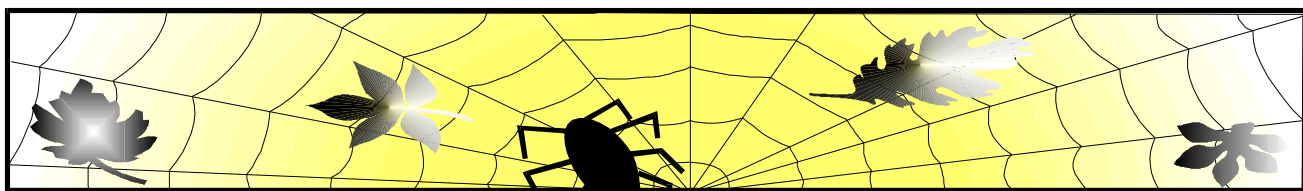
World-Wide Web and Internet Sites for Building Energy Efficiency

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

These URLs, on the World-Wide Web, start with http://	
www.eren.doe.gov/buildings/ tools_directory/	**Building Energy Tools Directory** from theU.S. Department of Energy An electronic directory of software programs under four headings: Whole-Building Analysis, Codes and Standards, Materials/Components/Equipment/Systems, and Other Applications. See *User News*, Vol. 17, No. 4, p. 35.
www.eren.doe.gov/buildings/ energy_tools/energyplus.htm/	**EnergyPlus** Information on EnergyPlus capabilities, structure, and development schedule. See *User News,* Vol. 17, No. 3; Vol. 18, No. 4, Vol. 19, No. 1, p.1, 25.
www.bso.uiuc.edu	**Building Systems Laboratory (BLAST)**
www.hike.te.chiba-u.ac.jp/ikeda/ CIE/publ/110-94.html	**The International Commission on Illumination – CIE** See *User News*, Vol. 16, No. 1, p. 44.
www.eren.doe.gov/	**EREN**: Energy Efficiency and Renewable Energy Network of the U.S. Department of Energy. See *User News*, Vol. 16, No. 1, p. 44.
www.doe.gov/	**U.S. Department of Energy**. See *User News* , Vol. 15, No. 4, p. 1.
www.whitehouse.gov/	**The White House** home page contains an Interactive Citizens Handbook that lists U.S. Government servers by agency. Use this site as a jumping-off point to explore other Federal agencies. See *User News*, Vol. 15, No. 4, p. 1.
www.fedworld.gov/	**FedWorld** is the U.S. Government's Federal Information Network home page. It lists web servers, ftp, gopher, and telnet sites and is organized by subject categories. See *User News*, Vol. 16, No. 2, p. 22.
www.fedworld.gov/ntis/ ntishome.html	**National Technical Information Service** NTIS gathers and markets scientific, technical and business-related information.
www.caddet-ee.org	**Center for the Analysis and Dissemination of Demonstrated Energy Technologies** An IEA program for collecting and disseminating information on, energy-efficient and renewable energy technologies. See *User News*, Vol. 16, No. 2, p. 23.
crest.org/aceee	**American Council for an Energy-Efficient Economy** A non-profit organization for the advancement of energy efficiency. See *User News*, Vol. 16, No. 2, p. 23.
www.ashrae.org	**American Society of Heating, Refrigeration and Air-Conditioning** An international membership organization for HVAC professionals. *User News*, Vol. 16, No. 3, p. 31.
www.cisti.nrc.ca/irc /irccontents.html	**[Canadian] Institute for Research in Construction** IRC is part of the NRC, Canada's premier science and technology agency. See *User News*, Vol. 16, No. 3, p. 31.
next1.mae.okstate.edu/ibpsa/	**International Building Performance Simulation Association** An international society of building performance simulation professionals. See *User News*, Vol. 16, No. 4, p. 35.
www.fsec.ucf.edu/	**Florida Solar Energy Center** State of Florida's energy institute specializing in energy research and education in partnership with private and public organizations. See *User News,* Vol. 17, No. 1, p. 29.
fcn.state.fl.us/fdi/fdi-home.htm	**State of Florida's Design Initiative (FDI)** See *User News*, Vol. 17, No. 2, p. 25.
edesign.state.fl.us	*e-design,* the online newsletter for Florida's Design Initiative See *User News*, Vol. 17, No. 2, p. 25.
www.csemag.com/	An online version of **Consulting-Specifying Engineer Magazine** See *User News*, Vol. 17, No. 4, p. 35.

	Fenestration software from LBNL See *User News*, Vol. 17, No. 1, p. 14.
windows.lbl.gov/software/resfen/ resfen.html	**RESFEN-2.4** – calculates residential fenestration heating and cooling energy use/costs
eande.lbl.gov/btp/superlite2.html	**SUPERLITE-2.0** – calculates daylight illuminance distributions for room geometries
windows.lbl.gov/software/window/ window.html	**WINDOW-4.1** – thermal analysis program to characterize window product performance
www.energy.ca.gov/reports/title24/ index.html	**State of California's Title 24 Building Energy Standards** See *User News*, Vol. 17., No. 2, p. 25.
www.energy.wsu.edu/ **www.energy.wsu.edu/ep/eic/** **www.energy.wsu.edu/ep/eic/eicsoft.htm** **www.energy.wsu.edu/ep/eic/eicfiles.htm**	The **Energy Program (EP)** of WSU. *User News*, Vol. 17, No. 3, p.26. **Energy Ideas Clearinghouse**, 925 Plum St S.E., Olympia, WA 98504-3171 Software and files from the Energy Ideas Clearinghouse More downloadable energy software from the Energy Ideas Clearinghouse
eande.lbl.gov/CBS/VH/advisor.html	The **Virtual Home Energy Advisor** from LBNL's Center for Building science. Run a quick heating-cooling model and see how much homes in your region can save. See *User News*, Vol. 17, No. 3, p.26.
www.pge.com/customer_services/ other/pec/homepage/pec.html	Pacific Gas & Electric's **Energy Center** located in San Francisco, CA. See *User News*, Vol. 17, No. 4, p. 35
www.homeenergy.org	**Home Energy Magazine** An impartial source for making informed decisions on energy conservation measures. See the *User News,* Vol. 17, No. 1, p. 29 Vol. 17, No. 4, p.1.
kmp.lbl.gov/bda	The **Building Design Advisor** (BDA) is a software environment that supports the integrated use of multiple analysis and visualization tools throughout the building design process, from the initial, schematic design phases to the detailed specification of building components and systems. See the *User News,* Vol. 18, No. 4, p. 26.
sabu.weea.org	The **World Energy Efficiency Association** (WEEA) was founded in June 1993 as a private, non-profit organization composed of developed and developing country institutions and individuals charged with increasing energy efficiency. See the *User News,* Vol. 18, No. 4, p. 26
www.noaa.gov	**National Oceanic and Atmospheric Administration** (NOAA). NOAA conducts research and gathers data about the oceans, atmosphere, space, and sun. See the *User News,* Vol. 19, No. 2, p. 26.
www.ncdc.noaa.gov	**National Climatic Data Center (NCDC).** NCDC has the world's largest active archive of weather data. See the *User News,* Vol. 19, No. 2, p. 26.
www.energycodes.org	The U.S. Department of Energy's **Building Standards & Guidelines Program.** See the *User News,* Vol. 19, No. 2, p. 26.
https: // apollo.osti.gov/dds	The U.S. Department of Energy's **Information Bridge** makes DOE scientific and technical information electronically available. The Information Bridge is now available to the public at http://www.doe.gov/bridge. See the *User News,* Vol. 19, No. 2, p. 26.

Happy Halloween

DOE-2.1E Bug Fixes via FTP

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

   ftp to either aeerdem@lbl.gov or to 128.3.254.10

   login: *type* anonymous

   passwd: *type in your e-mail address*

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

* * * Featured Sites This Issue * * *

World-Wide Web Sites for Building Energy Efficiency

Linric Company **www.linric.com**	**Numerical Logics, Inc. of Canada** (Source of Canadian Weather Files) **www3.sympatico.ca/numlog**

Linric Company is a software developer and HVAC engineering company. They specialize in the development of time-saving tools for engineers and manufacturers.
 	
PsyCalc 1.5
A unique tool for HVAC professionals who use psychrometrics to perform their work. A 30-day trial version is available.
 	
PsyFunc 1.2
A collection of psychrometric functions for Excel 5.0.
 	
PsychLib 1.0
A collection of psychrometric functions packaged in a standard Windows Dynamic Link Library (DLL).
 	
GlyFunc 1.0
A collection of five Ethylene and five Propylene functions that will eliminate looking up and interpolating these properties.
 	
➢ *Download a free Psychrometric Chart in Word* ◁
	Numerical Logics Inc. was established in 1996 to provide consulting services for software development, renewable energy systems simulation and analysis, and weather processing.
	
	The company also distributes and maintains the **Watsun** family of programs, as well as Typical Meteorological Year (**TMY**) weather files and Canadian Weather for Energy Calculations (**CWEC**) weather files, under a service agreement with the University of Waterloo.
	
	Software for simulation of solar energy systems
	• Watsun family of programs:
	  simulation of active solar and photovoltaic systems
	• Solar C/C++ Library:
	  a collection of C functions and C++ objects for solar energy system simulation
	
	Weather data
	• Typical Meteorological Year (TMY) weather files in WATSUN format
	
	• Canadian Weather for Energy Calculations (CWEC) weather files
	
	Other software
	• Sundials for Windows: sundial design program
	• Prosim simulation platform

Jim Judge, PE **Linric Company** **44 Green Meadow Lane** **Bradford, NH 03110** Tel: (603) 472-5640 Fax: (603) 472-4823 e-mail: judge@linric.com	**Dr. Didier Thevenard** **Numerical Logics Inc.** **119 University Avenue East, 3rd floor** **Waterloo, Ont., Canada N2J 2W1** Tel: +1 (519) 886-7820 Fax: +1 (519) 747-0881 e-mail: numlog@sympatico.ca

WEATHER DATA SOURCES

BinMaker: The Weather Summary Tool (www.binmaker.com) (from the Gas Research Institute) BinMaker is a CD-ROM based program that runs under Windows 95 or 3.1. It allows you to create summaries of U.S. hourly weather data (TMY2) then exports the results into spreadsheets or other analysis programs. Cost is $59.95 + $9.00 shipping (with a discount to GRI members).	Order No. GRI/98-0026 GRI Fulfillment Center 1510 Hubbard Drive Batavia, IL 60510 Phone: (773) 399-5414 / Fax (630) 406-5995 Email: Fillit@compuserve.com
DOE-2-Processed Versions of all TMY2 files for PC implementation (except CEARE)	ftp://anonymous:weather@gundog.lbl.gov/pub/ JJHTMY2.zip
Comprehensive collection of **TRY**, **TMY** and **CTZ** weather file libraries, from NCDC, which can be used on all PC versions of DOE-2. Includes original source data and pre-formatted packed versions on a single IBM format CD. Individual sites available.	Jennie Lathum or Martyn Dodd Gabel Dodd / EnergySoft, LLC 100 Galli Drive, Suite 1 Novato, CA 94949 Phone: (415) 883-5900 / Fax: (415) 883-5970
European Weather Files	Andre Dewint Alpha Pi, s.a. rue de Livourne 103/12 B-1050 BRUXELLES, Belgium Phone: 32-2-649-8359 / Fax: 32-2-649-9437
TMY data sets - download from the World Wide Web **TMY2** data sets and **TMY2 User Manual** - download from the World Wide Web [See *User News* Vol. 18, no. 2, p. 17]	TMY: http//oipea-www.rutgers.edu/ html_docs/TMY/tmy.html TMY2: http://rredc.nrel.gov/solar/
TMY (Typical Meteorological Year) **TRY** (Test Reference Year)	National Climatic Data Center 151 Patton Avenue, #120 Asheville, NC 28801 Phone: (704) 271-4871 order Fax 271-4876
CTZ (California Thermal Climate Zones)	California Energy Commission Bruce Maeda, MS-25 1516-9th Street Sacramento, CA 95814-5512 1-800-772-3300 Energy Hotline
WYEC (Weather Year for Energy Calculation)	ASHRAE 1791 Tullie Circle N.E. Atlanta, GA 30329 Phone: (404) 636-8400 / Fax: (404) 321-5478
Canadian Weather Files in WYEC2 Format	Dr. Didier Thevenard Numerical Logics, Inc. 119 University Avenue East, 3rd Floor Waterloo, ON N2J 2W1, Canada Phone: (519) 886-7820 / Fax: (519) 747-0881 www3.sympatico.ca/numlog numlog@sympatico.ca

DOE-2.1E Documentation for International Users

(except Canada and Mexico)

The National Technical Information Service (NTIS) is the central resource for government-sponsored U.S. and world-wide scientific, technical, engineering, and business-related information. It is self-supporting and covers its operating expenses through product sales. NTIS has arrangements with cooperating organizations throughout the world to provide information on new and existing products and services, to process orders, resolve order-related problems, coordinate and accept payment in local currency, and clear orders through the local Customs office. If you live in a country that is not listed below, contact the agency nearest you. You may order by document name or order number (listed below).

Document Name	Order Number	Document Name	Order Number
DOE-2 Basics Manual (2.1E)	DE-940-13165	Reference Manual (2.1A)	LBL-8706, Rev.2
BDL Summary (2.1E)	DE-940-11217	Supplement (2.1E)	DE-940-11218
Sample Run Book (2.1E)	DE-940-11216	Engineers Manual (2.1A)	DE-830-04575
		[algorithm descriptions]	

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World Data
Mr. Boris Prassoloff
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75004 Paris, FRANCE
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Teldan Information Systems Ltd.
Mr. Asher Sofrin, Manager
7 Derech Hashalom
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teldan@netvision.net.il
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MRI Information Network Inc.
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DOE-2.1E Documentation for U.S., Canadian and Mexican Users

DOE-2 documentation is available from two sources.

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

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

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

To order DOE-2 manuals from the National Technical Information Service:
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   Phone 1-800-553-6847, FAX (703) 321-8547, http://www.fedworld.gov/ntis/home.html

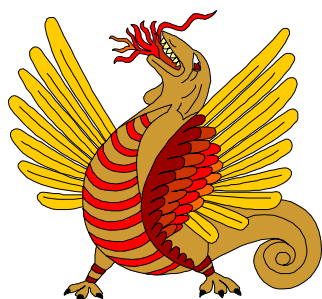| Document Name	Order Number	Price*
DOE-2 Basics Manual (2.1E)	DE-940-13165	49.00
BDL Summary (2.1E)	DE-940-11217	28.00
Sample Run Book (2.1E)	DE-940-11216	100.00
Reference Manual (2.1A)	LBL-8706, Rev.2	174.00
Supplement (2.1E)	DE-940-11218	100.00
Engineers Manual (2.1A) [algorithm descriptions]	DE-830-04575	57.00
		*as of 12/01/97

Subscriptions ·· Help Desk ·· DOE-2 Training

Building Energy Simulation User News **(a quarterly newsletter)** Sent without charge, the newsletter prints documentation updates and changes, bug fixes, inside tips on using the programs more effectively, and articles of special interest to users of DOE-2, BLAST, SPARK and their derivatives. The winter issue features an index of articles printed in all the back issues.	Simulation Research Group Bldg. 90, Room 3147 Lawrence Berkeley National Laboratory Berkeley, CA 94720 Contact: Kathy Ellington Fax: (510) 486-4089 kathy@srge.lbl.gov
Help Desk: Bruce Birdsall Call or fax Bruce Birdsall if you have a DOE-2 problem or question. If you need to fax an example of your problem to Bruce, please be sure to telephone him prior to sending the fax. This is a free service provided by the Simulation Research Group at Lawrence Berkeley National Laboratory.	Bruce Birdsall Phone/Fax: (925) 671-6942 Monday through Friday 10 a.m. to 3 p.m. Pacific Time
Training DOE-2 courses for beginning and advanced users.	Marlin Addison Phone: (602) 968-2040 Maddiso@ix.netcom.com

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