RHH ✓
RLH ✓
JG ✓
MJW ✓
TLC
FILE

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

PUB-439
Vol. 15, No. 4
Winter 1994

THE USER NEWS

Energy and Environment Division
Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720

* * * Keywords!! * * * *

* DOE-2.1E Documentation Update

Good News! You can now order DOE-2.1E documentation from NTIS. See p.24 for order numbers and prices. NTIS offers overnight order processing so you can get the manuals shipped to you immediately.

* New Phone Numbers at NCDC

The National Climatic Data Center phone numbers have changed. New number for the order desk is (704) 271-4871; new main number is (704) 271-4800.

* MICRO-DOE2 Has Moved!

New address for ERG/Acrosoft (the vendors of MICRO-DOE2) is 12138 West Brittany Avenue, Littleton, CO 80127. Phone number is the same at (303) 233-4453, fax number is new (303) 904-3245. New email address is erga@igc.apc.org

Gene Tsai, the MICRO-DOE2 contact, has a direct phone line at (303) 721-6556, direct fax number is (303) 721-0203.

* Caught in the Web!

The U.S. Department of Energy recently unveiled its Internet "home page" on the World Wide Web. The home page provides information about the Department of Energy, departmental news of general interest, announcements of new information resources as they become available, contact information, and various pathways for finding and directly accessing information produced by the DOE's staff and program offices, national laboratories, and other facilities. To check out the home page, use the URL http://www.doe.gov

As an added bonus, if you'd like to "tour" the White House and meet the Clintons, try http://www.whitehouse.gov

Table of Contents

The User News is written by members of the Simulation Research Group. Direct suggestions, comments or submissions to Kathy Ellington, Editor, MS: 90-3147, Lawrence Berkeley Laboratory, Berkeley, CA 94720. Fax (510)486-4089/email kathy%gundog@lbl.gov

User News, Vol.15, No.4, 1994

THE HEAT EXCHANGER

" Overview of SYSTEMS Schedules in DOE-2 "

by

Rene' Meldem

The appropriate use of schedules is necessary for a reliable DOE-2 simulation. In some schedules specific numbers have special meanings; however, the same numbers may not have the same significance in other schedules. It's easy to become confused by schedule use if, for instance, you try to use the same schedule for fans and domestic hot water pumps. A value of –999 in the fan schedule acts as a flag value for optimum start, but in the domestic hot water schedule the same value is treated simply as a multiplier, thus producing unexpected results.

To shed some light on the proper use of schedules, we have compiled a summary of the available schedules in SYSTEMS along with their possible hourly values and corresponding effects. In the "Value" column of the following table, "0-1" means any value between 0 and 1, including 0 and 1; "0,1" means 0 or 1, specifying an off/on schedule; "DEFAULT" indicates that the consequence of *not* specifying the schedule is shown under "Meaning"; and "ANY NUMBER" means that the schedule value is unrestricted.

Command Keyword	Value	Meaning
ZONE–CONTROL		
HEAT–TEMP–SCH/ COOL–TEMP–SCH	DEFAULT	No zone-level heating or cooling control.
	>0	Zone thermostat heating/cooling setpoint.
ZONE–AIR		
SS–VENT–SCH	DEFAULT	No sunspace venting.
	0,1	Specifies when a sunspace can be vented.
SS–VENT–T–SCH	ANY NUMBER	Specifies the sunspace air temperature above which venting occurs.
SS–FLOW–SCH	0-1	Modifies the air flow between a sunspace and its adjacent rooms.
SS–FLOW–T–SCH	DEFAULT	74F
	ANY NUMBER	Specifies the adjacent room temperature above which the air flow from the sunspace is cut off.
ZONE–FANS		
ZONE–FAN–T–SCH	ANY NUMBER between the heating and cooling setpoints.	For a parallel-type induction unit, gives the room temperature at which the unit blower turns on. This should normally be between the heating and cooling setpoints.

ZONE

MIN–CFM–SCH/ MIN–FLOW–SCH	0-1	Allows an hourly variation of the minimum air flow by overriding MIN–CFM/RATIO (MIN–FLOW–RATIO).
	-999	For the hour, takes the calculated value of MIN–CFM–RATIO (MIN–FLOW–RATIO).
TROM–VENT–SCH	0,1	Specifies when natural convection can occur between a Trombe wall and its adjacent space.

SYSTEM–CONTROL

HEATING–SCHEDULE/ COOLING–SCHEDULE	1 (DEFAULT)	Heating/cooling available from PLANT.
	≤0	Heating/cooling not available from PLANT.
	>1	For HEATING–SCHEDULE, the outside air temperature above which heating is not available from PLANT. For COOLING–SCHEDULE, the outside air temperature below which cooling is not available from PLANT.
HEAT–RESET–SCH/ COOL–RESET–SCH		Defines a relationship between the heating/cooling supply air temperature and the outside air temperature when HEAT– or COOL–CONTROL = RESET.
HEAT–SET–SCH/ COOL–SET–SCH		Specifies the heating/cooling air supply temperature when HEAT– or COOL–CONTROL = SCHEDULED.
MIN–SUPPLY–SCH		Specifies the minimum cold air supply temperature when simulating a chilled water reset or other type of capacity control.
BASEBOARD–SCH		Defines a relationship between the baseboard heat output and outside air temperature when BASEBOARD–CTRL = OUTDOOR–RESET.

SYSTEM–AIR

MIN–AIR–SCH	0-1	Specifies the minimum outside air as a ratio of the design flow rates.
	0	Outside air damper is closed (no outside air).
	-999	Takes the values specified under SYSTEM–AIR or ZONE–AIR.
VENT–TEMP–SCH	DEFAULT	(HEAT–TEMP–SCH)+½ * (THROTTLING–RANGE).
	ANY NUMBER	Specifies the indoor air temperature below which natural ventilation or night ventilation is suppressed.
NATURAL–VENT–SCH (RESYS)	0	The windows remain closed.
	1	The windows are open only if they provide enough cooling to keep the zone temperature within or below the throttling range for cooling.
	-1	Same as 1, with the additional condition that the outside air enthalpy must be below the indoor air enthalpy.
OPEN–VENT–SCH	0-1	Specifies the probability that the window is open when VENT–TEMP–SCH and NATURAL–VENT–SCH are satisfied.

User News, Vol.15, No.4, 1994

SYSTEM–FANS		
FAN–SCHEDULE	1	Fans are on.
	0	Fans are off but can be turned on if NIGHT–CYCLE–CTRL and zone temperature allow it.
	-1	Fans are off in any circumstances.
	-999	Allows an early start of the fan so that the desired zone temperatures are achieved during the first hour following the optimum start period.
NIGHT–VENT–SCH	0,1	Specifies when fans are allowed to turn on at night when NIGHT–VENT–CTRL = WHEN–SCHEDULED or SCHEDULED+DEMAND.
SYSTEM–FLUID		
INDUC–MODE–SCH	>0	The zone coils of a two-pipe induction unit (TPIU) provide cooling only.
	<0	The zone coils of a two-pipe induction unit (TPIU) provide heating only.
SYSTEM		
EVAP–PCC–SCH	0	Evaporative precooler for the air cooled condenser of a DX unit is not operating.
	1	Evaporative precooler is operating.
	>1	Evaporative precooler is operating only if the outside temperature is less than the value in the schedule.
	<0	Evaporative precooler is operating only if the outside temperature is greater than the absolute value of the schedule value.
PLANT–ASSIGNMENT		
BOILER–MAX–SCH	DEFAULT	BOILER–MAX–RATIO; boiler's maximum operating capacity as a fraction of design output (given by boiler size).
BOILER–SCH	DEFAULT	CIRC–PUMP–SCH.
	0	Boiler is off.
	1	Boiler is on.
	>1	Outside air temperature below which heating is available. Note: should be compatible with CIRC–PUMP–SCH when applicable.
BOILER–SET–SCH	DEFAULT	BOILER–SET–POINT allows adjustment of the boiler's set point.
DHW–INLET–T–SCH	DEFAULT	The domestic hot water inlet temperature is set to the ground temperature from the weather file.
	ANY NUMBER	Specifies the domestic hot water inlet temperature.
DHW–PUMP–SCH	0,(DEFAULT)	Domestic hot water pump is off.
	1	Domestic hot water pump is on.
DHW–SCH	0-1	Specifies the building-level hot water use; multiplies DHW–GAL/MIN.

INT–FUEL–SCH/ EXT–FUEL–SCH	0-1	Specifies the building-level interior/exterior fuel use as a function of time. The number entered is a fraction that multiplies INT– or EXT–FUEL–BTU/HR (INT– or EXT–FUEL–POWER).
INT–ELEC–SCH	0-1	Specifies, as a fraction of INT–ELEC–KW, the building-level electricity that does not contribute to space loads (elevators, etc.).
EXT–ELEC–SCH	0-1	Same as INT–ELEC–KW but for exterior electricity consumption (exterior lighting, etc.).
EXT–LIGHT–SCH	0-1	Schedule for exterior lighting; modifies EXT–LIGHT–KW.
PROCESS–HW–SCH/ PROCESS–CHW–SCH	0-1	Specifies the building process hot/chilled water use. Multiplies PROCESS–HW–BTU/HR (PROCESS–HW–POWER) or PROCESS–CHW–BTU/HR (PROCESS–CHW–POWER).
CIRC–PUMP–SCH	DEFAULT 0,1	Always on. Allows control of the HP system circulation pump.
TWR–SCH	DEFAULT 0 1 >1	CIRC–PUMP–SCH. Tower is not available. Tower is available. Outside air temperature above which the tower is available Note: Should be compatible with CIRC–PUMP–SCH.
TWR–SETPT–SCH	DEFAULT OTHER	TWR–SETPT–T. Specifies the tower setpoint; overrides the value given by TWR–SETPT–T.

##

* Recent LBL Report on Envelope/Lighting Controls *

A recent LBL report that used DOE-2 in the research is available from the Building Technologies Program. Please fax your request to Pat Ross at (510) 486-4089, and be sure to reference both the title and report number.

LBL-34638

The Design and Evaluation of Integrated Envelope and Lighting Control Strategies for Commercial Buildings

by

E.S. Lee and S.E. Selkowitz

This study investigates control strategies for coordinating the variable solar-optical properties of a dynamic building envelope system with a daylight-controlled electric lighting system to reduce electricity consumption and increase comfort in the perimeter zone(s) of commercial buildings. Control strategy design can be based on either simple, instantaneous measured data, or on complex, predictive algorithms that estimate the energy consumption for a selected operating state of the dynamic envelope and lighting system. The potential benefits of optimizing the operation of a dynamic envelope and lighting system are (1) significant reductions in electrical energy end uses – lighting and cooling due to solar and lighting heat gains – over that achieved by conventional static envelope and lighting systems, (2) significant reductions in peak demand, and (3) increased occupant visual and thermal comfort. The DOE-2 building energy simulation program was used to model two dynamic envelope and lighting systems, an automated Venetian blind and an electrochromic glazing system, and their control strategies under a range of building conditions. The energy performance of simple control strategies is compared to the optimum performance of a theoretical envelope and lighting system to determine the maximum potential benefit of using more complex, predictive control algorithms. Results indicate that predictive control algorithms may significantly increase the energy efficiency of systems with non-optimal solar-optical properties such as the automated Venetian blind, and simpler, non-predictive control strategies may suffice for more advanced envelope systems incorporating spectrally-selective narrow-band electrochromic coatings.

User News, Vol.15, No.4, 1994

DOE-2.1E Bug Fixes 055 to 058

[Bugs 55 through 58, listed below, were inadvertently left off of the bug list that appeared in the last issue of the newsletter.]

The fixes described below take DOE-2.1E to Version 058 (the current version as of December 1, 1994). Sun and VAX versions of DOE-2.1E with these fixes are available from the Energy Science and Technology Software Center (ESTSC, P.O. Box 1020, Oak Ridge, TN 37831-1020; phone Edwin Kidd at (615) 576-2606). If you purchased DOE-2.1E from ESTSC they will get in touch with you to see if you want to upgrade for a nominal charge. Private vendors of DOE-2.1E are expected to include these bug fixes in their products. Contact your vendor for more information.

Following is a list of bug fixes 055 through 058; see User News, Vol.15, No.3 for fixes through 054. Shown at the left is the version number, which is incremented for each new set of fixes. This is followed on the same line by the subprograms to the which the fixes were made (wth = Weather Processor, bdl = Building Description Language Processor, lds = LOADS program, sys = SYSTEMS program, etc.). Then comes a short description of the set of fixes corresponding to that version number. The author and date of each fix are also shown. Note that a particular version will include all fixes made up to and including that version number. You can determine what version number of DOE-2.1E you are currently using by checking any of the DOE-2 output reports, where version NNN is indicated as "DOE-2.1E-NNN".

Bug Fixes 055 to 058

(The initial release in 12/93 was Version 002)

Version Number	Programs in which fixes were included; description of fix; and author/date of fix
-055:	wth Set version number using the version routine to make it the same as the rest of the program. [JJH 10/30/94] Bug fix in the weather processor. When weather data in CTZ or CD144 format was packed, temperatures in the range -1 to -9 degrees F were turned into positive 1 to 9 degrees F on the packed DOE-2 weather file. [WFB 10/31/94]
-056:	sys Bug fix in system type PIU. A divide-by-zero can occur if the airflow from the induced air zone(s) goes to zero. This can happen when the exhaust flow equals the supply flow such as with MIN–CFM–RATIO < 1 with exhaust flow >= MIN–CFM–RATIO time zone design flow. [JJH 11/10/94] Bug fix in report SS–L. When SS–L was requested, but SS–H was not requested, the SS–L number of hours at part load were not set; the result was that the SS–L report contained zero for all these items. Also, code was added to *not* fill SS–P values when the report was not active (SS–H not on). [JJH 11/10/94]

User News, Vol.15, No.4, 1994

-057: bdl

Bug fix in the window frame heat transfer calculation for metric input. The metric input value for FRAME–CONDUCTANCE in the GLASS–TYPE command was *not* converted to English units for the internal DOE-2 calculation of heat transfer through the frame. This gave values of frame conductance that were too high by a factor of 5.67, leading to frame heat transfer values (for UAΔT conduction and for inward flowing absorbed solar radiation) that were too high by a factor of 3 to 4. This is not a problem for English input. [FCW 11/16/94]

-058: lds

Bypass switchable glazing calculation in CALEXT and DINTIL for windows with GLASS–TYPE(switched) = GLASS–TYPE(unswitched). Previously, switching calculation was done, but (1) there was no switching since switched and unswitched glass types were the the same; and (2) a garbage value of -9 for the switching factor was printed in the hourly reports when switching was attempted. [FCW 11/16/94]

DOE-2.1E Bug Fixes via FTP

If you have Internet access you can now obtain the latest bug fixes to DOE-2.1E by anonymous ftp. The procedure is as follows:

ftp gundog@lbl.gov
(or)
ftp 128.3.254.10
login: anonymous
passwd: your email address

After logging on, go to directory "pub/21e-mods"; bug fixes are in files "*.mod". A description of the fixes is in file VERSIONS.txt in directory "pub". Each fix has its own version number, *nnn*, which is printed out as DOE-2.1E-*nnn* on the DOE-2.1E banner page and output reports when the program is recompiled with the fix.

You may direct questions about accessing or incorporating the bug fixes to Ender Erdem (ender%gundog@lbl.gov).

Is your room getting hot and stuffy? Aside from the air conditioning not working properly, human bodies in a room can be a significant source of heat. At rest each person gives off the heat equivalent of a 75 watt light bulb.

**** Washington State Energy Office ****
Energy Ideas Clearinghouse BBS

How to Log Onto the BBS:

Area	BBS Access
Pacific Northwest.....	800-762-3319
Other Western States..	800-797-7584
Other Areas.....	206-586-6854
Internet.....	eicbbs.wseo.wa.gov

User News, Vol.15, No.4, 1994

Canadian Weather Files in WYEC2 Format For DOE-2

Canadian Weather for Energy Calculations (CWEC) files are "typical year" sets of meteorological data that can be used with the DOE-2 program. The files are in WYEC2 format and include solar radiation (global, diffuse, direct), dry bulb and dew point temperatures, wind speed and direction, atmospheric pressure, etc., on an hourly basis. They were developed by the Watsun Simulation Laboratory under the auspices of the National Research Council of Canada, using meteorological data provided by Environment Canada - Atmospheric Environment Service.

The CWEC files were created by concatenating twelve Typical Meteorological Months selected from a database of, in most cases, 30 years of data. The method is similar to the TMY procedure developed in the 80's by Sandia Laboratories. The months are chosen by statistically comparing individual monthly with long-term monthly means for daily total global radiation, mean, minimum and maximum dry bulb temperature, mean, minimum and maximum dewpoint temperature, and mean and maximum windspeed. The composite index used to select the most "typical" months uses the following weights (in %)

Parameter	Dry Bulb Max	Dry Bulb Min	Dry Bulb Mean	Dew Point Max	Dew Point Min	Dew Point Mean	Wind Speed Max	Wind Speed Mean	Daily Solar Rad.
Weight (%)	5	5	30	2.5	2.5	5	5	5	40

In the selection process, additional consideration is given to the statistics and persistence structures of the daily mean dry bulb temperature and daily total radiation. A complete description of the procedure used can be found in: D.L. Siurna, L.J. D'Andrea, K.G.T. Hollands, *A Canadian Representative Meteorological Year for Solar System Simulation*, Proceedings of the 10th Annual Conference of the Solar Energy Society of Canada (SESCI '84), August 1-6, 1984, Calgary, Alberta, Canada.

In the CWEC files, no missing values will be found in the following WYEC2 fields: extraterrestrial irradiance (101), global horizontal irradiance (102), direct normal irradiance (103), diffuse horizontal irradiance (104), weather (204), station pressure (205), dry bulb temperature (206), dew point temperature (207), wind direction (208), wind speed (209), total sky cover (210), opaque sky cover (211), snow cover (212).

The list of all available CWEC files is given below. The cost of the files is Can$ 75.00 for the first file, Can$ 50.00 for the next four files, and Can$ 40.00 for subsequent files. The files come in compressed form on IBM-PC diskettes. The user manual provided with the files describes the format of the data, the way the files were assembled, and the year of origin for all the typical months selected by the statistical procedure.

To obtain CWEC files please contact:

Dr. Didier Thevenard
Watsun Simulation Laboratory
University of Waterloo
Waterloo, Ont., Canada N2L 3G1

Ph.: (519) 888-4904
Fax: (519) 888-6197
E-mail: watsun@helix.watstar.uwterloo.ca

The original long-term data sets (up to 40 years of data) from which the CWEC files were derived can also be obtained directly from Environment Canada. Contact Mr. Robert Morris at (416) 739-4361.

Note: The Canadian weather files must be run through the DOE-2 weather processor in order to use them with DOE-2.

DOE-2 User News, Vol.14, No.4

AVAILABLE CWEC FILES

Station Name	WBAN	File Name	Based on Years	Max Percent Derived Data*
Abbotsford, BC	24288	W24288W.CW2	1960-1989	100
Calgary, Alta	25110	W25110W.CW2	1960-1989	100
Charlottetown, PEI	14688	W14688W.CW2	1971-1989	10
Churchill, Man	15901	W15901W.CW2	1964-1989	25
Comox, BC	24292	W24292W.CW2	1960-1989	100
Edmonton, Alta	25145	W25145W.CW2	1967-1991	10
Estevan, Sask	24092	W24092W.CW2	1963-1989	100
Fort St John, BC	25231	W25231W.CW2	1960-1989	100
Fredericton CDA, NB	14670	W14670W.CW2	1960-1989	10
Kamloops, BC	25220	W25220W.CW2	1970-1989	100
London, Ont	94805	W94805W.CW2	1960-1989	100
Medicine Hat, Alta	25118	W25118W.CW2	1960-1989	100
Montreal, Que	04770	W04770W.CW2	1964-1986	10
Muskoka, Ont	04704	W04704W.CW2	1953-1978	100
North Battleford, Sask	25012	W25012W.CW2	1960-1989	100
North Bay, Ont	04705	W04705W.CW2	1960-1989	100
Ottawa NRC, Ont	04772	W04772W.CW2	1958-1983	10
Prince George, BC	25206	W25206W.CW2	1973-1989	25
Prince Rupert, BC	25353	W25353W.CW2	1963-1989	100
Quebec, Que	04708	W04708W.CW2	1960-1989	100
Resolute, NWT	17901	W17901W.CW2	1963-1989	25
Sable Island, NS	14642	W14642W.CW2	1969-1989	10
Saint John, NB	14643	W14643W.CW2	1960-1989	100
Sandspit, BC	25346	W25346W.CW2	1967-1992	10
Sault Ste Marie, Ont	94842	W94842W.CW2	1962-1989	100
Schefferville, Que	15619	W15619W.CW2	1960-1989	100
Shearwater, NS	14633	W14633W.CW2	1960-1989	100
Smithers, BC	25225	W25225W.CW2	1960-1989	100
Summerland, BC	94152	W94152W.CW2	1961-1989	10
Thunder Bay, Ont	94804	W94804W.CW2	1960-1989	100
Toronto, Ont	04714	W04714W.CW2	1960-1989	10
Trenton, Ont	04715	W04715W.CW2	1960-1989	100
Vancouver UBC, BC	94238	W94238W.CW2	1960-1989	10
Victoria, BC	24297	W24297W.CW2	1960-1989	100
Whitehorse, YT	26316	W26316W.CW2	1970-1989	25
Windsor, Ont	94810	W94810W.CW2	1953-1989	100
Winnipeg Intl A, Man	14996	W14996W.CW2	1960-1989	10
Yellowknife, NWT	26110	W26110W.CW2	1960-1989	100

* Approximate amount of solar radiation data that was not observed but was modeled using cloud information.

DOE-2 User News, Vol.14, No.4

Index to the DOE–2 User News

Volume 1, No. 1 (August 1980) through Volume 14, No. 4 (Winter 1993)

KEY: The Index lists *User News* volumes, issues, and page numbers as follows: Name of Article, program version that was current when article appeared, then Volume, Number (No. 1=Spring, No. 2=Summer, No. 3=Fall, No. 4=Winter), and page number.

For example, the entry "Advanced Simulation (2.1C)...7:4,4-8" tells the reader that the article titled "Advanced Simulation", which appeared when DOE-2.1C was the current version of the program, will be found in *User News* Volume 7:Number 4, on pages 4 through 8.

DOE-2 User News, Vol.14, No.4

DOE-2 User News, Vol.14, No.4

* * * * DOE-2 DIRECTORY * * * *

Program Related Software and Services

Mainframe and Workstation Versions of DOE-2

DOE-2.1D and 2.1E (Source code, executable code and documentation) For 2.1E DEC-VAX, Order #000158-DOVAX-02 For 2.1E SUN-4, Order #000158-SUN-0000 For 2.1D DEC-VAX, Order #000158-D6220-01 For a complete listing of the software available from ESTSC order their "Software Listing" catalog ESTSC-2.	Energy Science and Technology Software Center P.O. Box 1020 Oak Ridge, TN 37831-1020 Phone: (615) 576-2606 FAX: (615) 576-2865 email: ESTSC@ADONIS.OSTI.GOV
FTI-DOEv2.1E (Source code and documentation) Combined source code package for both VAX and SUN versions of DOE-2.1E. Available on most distribution formats and for most operating systems (1/4" QIC tape, TK50 tape, 3.5" floppy, etc). Note: this is the distribution package only, no executables. Complete documentation for DOE-2.1E, digitally reproduced, spiral bound, and separated into multi-volume sets. [See *User News* Vol.12, No.4, p.16]	Finite Technologies, Inc 821 N Street, #102 Anchorage, AK 99501 Contact: Scott Henderson Phone: (907) 272-2714 FAX: (907) 274-5379 email: scott@finite-tech.com inquiries: info@finite-tech.com support: support@finite-tech.com

PC Versions of DOE-2

ADM-DOE2 This DOE-2.1E release is compiled for use on a 386 or 486 personal computer. It runs in a DOS or Windows environment and is a highly reliable and tested version of DOE-2. The package contains everything needed to run the program: program files, utilities, sample input files, and weather files. More than 300 weather files are available (TMY, TRY, WYEC, CTZ formats) for the U.S. and Canada. [See *User News* Vol.7, No.2, p.6]	ADM Associates, Inc. 3239 Ramos Circle Sacramento, CA 95827 Contact: Marla Sullivan, Sales Alex Lekov, Support Phone: (916) 363-8383 FAX: (916) 363-1788
CECDOEDC (Version 1.0A) A PC version of DOE-2.1D integrated with a pre- and post-processing system designed strictly for compliance use within the State of California. It generates some of the standard compliance forms as output. Order P40091009 for the CECDOEDC Program with Manuals. Order P40091010 for the DOE-2.1 California Compliance Manual. [See *User News* Vol.12, No.4, p.13]	Publication Office California Energy Commission P.O. Box 944295 Sacramento, CA 94244-2950

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

PC Versions of DOE-2 (continued)

DOE-24/Comply-24 DOE-24 is a special DOE-2 release for PCs that is both a California-approved compliance program for the state's 1992 non-residential energy standards, and a stand-alone version of DOE-2.1E that includes a powerful yet easy-to-use input preprocessor. A demonstration program is available upon request. [See *User News* Vol.12, No.2, p.2]	Gabel Dodd Associates 1818 Harmon Street Berkeley, CA 94703-2416 Contact: Rosemary Howley Phone: (510) 428-0803 FAX: (510) 428-0324
DOE-Plus™ DOE-Plus, a complete PC implementation of DOE-2.1D, is used to interactively input a building description, run DOE-2, and plot graphs of simulation results. Features include interactive error checking, context-sensitive help for all DOE-2 keywords, a 3-D view of the building that can be rotated, and several useful utilities. [See *User News* Vol.11, No.4, p.4 and Vol.13, No.2, p.54]	ITEM Systems 1402 - 3rd Avenue, #901 Seattle, WA 98101 Contact: Steve Byrne Phone: (206) 382-1440 FAX: (206) 382-1450 email: byrne@item.com
EZDOE EZDOE is an easy-to-use PC version of DOE-2.1D. It provides full screen, "fill in the blank" data entry, dynamic error checking, context-sensitive help, mouse support, graphic reports, a 750-page user manual, extensive weather data, and comprehensive customer support. EZDOE integrates the full calculation modules of DOE-2 into a powerful, full implementation of DOE-2 on DOS-based 386 and 486 computers. [See *User News* Vol.14, No.2, p.10 and No.4, p.8-14]	Elite Software, Inc. P.O. Drawer 1194 Bryan, TX 77806 Contact: Bill Smith Phone: (409) 846-2340 FAX: (409) 846-4367 email: 76070,621@compuserve.com
FTI-DOEv2.1E Highly optimized version of DOE-2.1E software, available for most computing systems. Current support: MSDOS and Windows 3.x, Windows NT, OS/2, RS/6000 (AIX), NeXT, SUN, UNIX (most systems). Call for platforms not listed. Documentation and weather files are available. Also FTI-DOEv2.1E source code, highly optimized and portable version; will compile for most systems. [See *User News* Vol.12, No.4, p.16]	Finite Technologies, Inc 821 N Street, #102 Anchorage, AK 99501 Contact: Scott Henderson Phone: (907) 272-2714 FAX: (907) 274-5379 email: scott@finite-tech.com inquiries: info@finite-tech.com support: support@finite-tech.com
MICRO-DOE2™ MICRO-DOE2 (2.1E), which runs in a DOS or Windows environment, is a widely used, reliable, and tested PC version of DOE-2. The 2.1E version includes automatic weather processing, batch file creation, and a User's Guide with instructions on how to set up a RAM drive. System requirements: 386/486 PCs with 4 MB of RAM and math co-processor. Also available are NETPath and POWERPath. NETPath is a network edition of MICRO-DOE2 that allows you to store and run DOE-2 application files on one machine using input files from another machine. The result is improved space usage and project file management. POWERPath, for single machines, allows you to keep MICRO-DOE2 application files in one directory and submit input from any other directory. [See *User News* Vol.7, No.4, p.2; Vol.11, No.1, p.2; Vol.15, No.1, p.8; and Vol.15, No.3, p.4]	ERG/Acrosoft International, Inc. 12138 West Brittany Avenue Littleton, CO 80127 Phone: (303) 233-4453 FAX: (303) 904-3245 email: erga@igc.apc.org MICRO-DOE2 Support: Gene Tsai, P.E. Phone: (303) 721-6556 FAX: (303) 721-0203

PC Versions of DOE-2 (continued)

PRC-DOE2 A fast, robust and up-to-date PC version of DOE-2.1E. Runs in extended memory, is compatible with any VCPI compliant memory manager and includes its own disk caching. 377 weather data files available (TMY, TRY, WYEC, CTZ) for the U.S. and Canada [See *User News* Vol.13, No.4, p.11 and Vol.15, No.1, p.5]	Partnership for Resource Conservation 140 South 34th Street Boulder, CO 80303 Contact: Paul Reeves Phone or FAX: (303) 499-8611 email: paulreeves@aol.com
VisualDOE for Windows™ VisualDOE, which uses DOE-2.1E as the calculation engine, enables architects and engineers to quickly evaluate the energy savings of HVAC and other building design options. Program is supported by context-sensitive on-line help. Program includes climate data for the 16 California weather zones. [See *User News* Vol.15, No.2, p.10]	Eley & Associates 142 Minna Street San Francisco, CA 94105 Contact: Charles Eley or John Kennedy Phone: (415) 957-1977 FAX: (415) 957-1381

Pre- and Post-Processors for DOE-2

D O E 1 2 3 Uses Lotus 1-2-3 to graphically display DOE-2.1D output as barcharts, pie charts, and line graphs. [See *User News* Vol.10, No.3, p.5]	Ernie Jessup 4977 Canoga Avenue Woodland Hills, CA 91364 Phone: (818) 884-3997
DrawBDL 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. Runs on PC's under Microsoft Windows. [See *User News* Vol.14, No.1, p.5-7 and Vol.14, No.4, p.16-17]	Joe Huang & Associates 6720 Potrero Avenue El Cerrito CA 94530 Contact: Joe Huang Phone/FAX: (510) 236-9238
Graphs for DOE-2 2-D, 3-D, hourly, daily, and psychrometric plots [See *User News* Vol.13, No.1, p.5]	Energy Systems Laboratory Texas A&M University College Station, TX 77843-3123 Contact: Jeff Haberl Phone : (409) 845-6065 FAX: (409) 862-2762
PRC-TOOLS A set of PC programs that aids in extracting, analyzing and formatting hourly DOE-2 output. Determines energy use, demand, and cost for any number of end-uses and periods. Automatically creates 36-day load shapes. Custom programs also available. [See *User News* Vol.14, No.2, p.9]	Partnership for Resource Conservation 140 South 34th Street Boulder, CO 80303 Contact: Paul Reeves Phone or FAX: (303) 499-8611 email: paulreeves@aol.com

Pre- and Post-Processors for DOE-2 (continued)

Pre-DOE A math pre-processor for BDL.	Nick Luick 19030 State Street Corona, CA 91719 Phone: (714) 278-3131
Prep™ Prep is a batch preprocessor that enables conditional text substitution, expression evaluation, and spawning of other programs. Prep is ideal for large parametric studies that require dozens or even thousands of DOE-2 runs.	ITEM Systems 1402 - 3rd Avenue, #901 Seattle, WA 98101 Contact: Steve Byrne Phone: (206) 382-1440 FAX: (206) 382-1450

R E S O U R C E S

User News Sent without charge to DOE-2 users, the newsletter prints documentation updates and changes, bug fixes, inside tips on using the program more effectively, and articles of special interest to program users. Regular features include a directory of program-related software and services and an order form for documentation. In the summer issue an alphabetical listing is printed of all commands and keywords in DOE-2, and where they are found in the documentation. The winter issue features an index of articles printed in all the back issues.	Simulation Research Group Bldg. 90, Room 3147 Lawrence Berkeley Laboratory Berkeley, CA 94720 Contact: Kathy Ellington Phone: (510) 486-5711 FAX: (510) 486-4089 e-mail: kathy%gundog@lbl.gov
Help Desk – Bruce Birdsall Call or fax our DOE-2 expert, Bruce Birdsall, if you have a question about advanced modeling techniques. If you need to fax an example of your problem to Bruce, please be sure to telephone him prior to sending the fax. This service is supported by the Simulation Research Group.	Bruce Birdsall Ph/Fx: (510) 829-8459 Monday through Friday 10 a.m. to 3 p.m. Pacific Time
Training DOE-2 courses for beginning and advanced users. DOE-2 training for small groups and individuals.	Energy Simulation Specialists 64 East Broadway, Suite 230 Tempe, AZ 85282 Contact: Marlin Addison Phone: (602) 967-5278 Gary H. Michaels, P.E. 1512 Crain Street Evanston, IL 60202 Phone: (708) 869-5859
Instructional DOE-2 Video and Manual Takes you step-by-step in DOE-2.1D input preparation and output interpretation.	JCEM/U. Colorado Campus Box 428 Boulder, CO 80309-0428 Contact: Prof. Jan Kreider Phone: (303) 492-3915

User News, Vol.15, No.4, 1994

Weather Data	
Comprehensive collection of weather files including the latest TRY, TMY and CTZ libraries from NCDC. All files can be used on all PC versions of DOE-2. Includes original source data and pre-formatted packed versions on a single IBM format CD. For Canadian users, the CD contains five weather files representing the five climate regions established by the Canadian energy codes. Individual sites available.	Jenny Lathum or Martyn Dodd EnergySoft 100 Galli Drive, Suite 1 Novato, CA 94949 Phone: (800) 4 NRG SFT or (800) 467-4738 Fax: (415) 883-5970
European Weather Files	Andre Dewint Alpha Pi, s.a. rue de Livourne 103/12 B-1050 BRUXELLES Belgium Phone: 32-2-649-8359 FAX: 32-2-649-9437
TMY (Typical Meteorological Year) TRY (Test Reference Year)	National Climatic Data Center Federal Building Asheville, North Carolina 28801 (704) 271-4871 order desk (704) 271-4800 main number
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 (404)636-8400 / Fax: (404)321-5478
Canadian Weather for Energy Calculations (CWEC) Files in WYEC2 Format	Dr. Didier Thevenard Watsun Simulation Laboratory University of Waterloo Waterloo, Ont., Canada N2L 3G1 Phone: (519) 888-4904 Fax: (519) 888-6197 e-mail: watsun@helix.watstar.uwaterloo.ca
The original long-term data sets (up to 40 years of data) from which the CWEC files were derived can also be obtained directly from Environment Canada.	Contact Mr. Robert Morris Phone: (416) 739-4361

User News, Vol.15, No.4, 1994

* * DOE–2 ENERGY CONSULTANTS * *	
Consulting Engineers Charles Fountain Burns & McDonnell Engineers 8055 E. Tufts Avenue, Suite 330 Denver, CO 80237 (303) 721-9292	**Consultant** Greg Cunningham Cunningham + Associates 512 Second Street San Francisco, CA (415) 495-2220
Consultant Philip Wemhoff 1512 South McDuff Avenue Jacksonville, FL 32205 (904) 632-7393	**Consultant** Jeff Hirsch 12185 Presilla Road Camarillo, CA 93012 (805) 532-1045
Consultants Charles Eley, John Kennedy Eley Associates 142 Minna Street San Francisco, CA 94105 (415) 957-1977	**Computer-Aided Mechanical Engineering** Mike Roberts Roberts Engineering Co. 11946 Pennsylvania Kansas City, MO 64145 (816) 942-8121
Consultant Steven D. Gates, P.E. Building HVAC Design/Performance Modeling 11608 Sandy Bar Court Gold River, CA 95670 (916) 638-7540	**Consultant** Donald E. Croy CAER Engineers, Inc. 814 Eleventh Street Golden, CO 80401 (303) 279-8136
Mechanical Engineers Chuck Sherman Energy Simulation Specialists 64 East Broadway, Suite 230 Tempe, AZ 85282 (602) 967-5278	**Energy Engineering: Commercial & Institutional** Michael W. Harrison, P.E. 139 Bluebird Lane Whitehall, MT 59759 (406) 287-5370
Consultants Shiva Subramanya Criterion, Inc. 5331 SW Macadam Ave., Suite 205 Portland, OR 97201 (503) 224-8606	**Hourly Calibrated DOE-2 Analysis** Jeff S. Haberl Energy Systems Laboratory Texas A&M University College Station, TX 77843-3123 (409) 845-6065
Consultant Martyn C. Dodd Gabel Dodd Associates 100 Galli Drive, Suite 1 Novato, CA 94949 (415) 883-5900	**Consulting Engineers** Prem N. Mehrotra General Energy Corporation 230 Madison Street Oak Park, IL (708) 386-6000
Energy Management Specialists Hank Jackson, P.E. P.O. Box 675 Weaverville, NC 28787-0675 (704) 658-0298	**Consultant/Building Systems Analysis** Robert H. Henninger, P.E. ElectroCom GARD Ltd. 7449 N. Natchez Avenue Niles, IL 60714 (708) 647-3252

* * DOE–2 ENERGY CONSULTANTS (continued) * *	
Consulting Engineers/Computer Simulation Sciences Robert E. Gibeault A-TEC 5515 River Avenue, Suite 301 Newport Beach, CA 92663 (714) 548-6836	**Energy Consultants** Gene Tsai ERG/Acrosoft International, Inc. 12138 West Brittany Avenue Littleton, CO 80127 (303) 233-4453
Consulting Engineers Susan Reilly Enermodal Engineering 1554 Emerson Street Denver, CO 80218 (303) 861-2070	**Technical Real World Analysis** David J. Schwed Romero Management Associates 1805 West Avenue K, #202 Lancaster, CA 93534 (805) 940-0540
Energy Codes – DSM Doug Mahone The Heshong Mahone Group 4610 Paula Way Fair Oaks, CA 95628 (916) 962-7001	**Consulting Engineers** Gregory Banken, P.E. Q-Metrics, Inc. P.O. Box 3016 Woodinville, WA 98072 (205) 915-8590
Energy/DSM-Consultants Adrian Tuluca Steven Winter Associates 50 Washington Street Norwalk, CT 06854 (203) 852-0110	**Consulting Energy Engineers** Gary H. Michaels, P.E. 1512 Crain Street Evanston, IL 60202 (708) 869-5859
Consultant/Building Systems Engineering Ellen Franconi 1504 Grant Street Berkeley, CA 94703 (510) 559-8340	**Consulting Engineer** Robert Mowris, P.E. 1084 Sterling Avenue Berkeley, CA 94708 (510) 549-0557
Consultant Engineers David A. Cohen Architectural Energy Corporation 2540 Frontier Avenue, #201 Boulder, CO 80301 (303) 449-4149	**space available**

* DOE–2 ENERGY CONSULTANTS – INTERNATIONAL *	
Mainframe DOE-2 for European Users Joerg Tscherry EMPA, Section 175 8600 Dubendorf Switzerland	**Energy Consultant** Philipp Schluchter Institut fur Bauphysik Klein Urs Graf-Strasse 1 CH4052 Basel Switzerland
Consultant Werner Gygli Informatik Energietechnik Weiherweg 19 CH-8604 Volketswil Switzerland	**Consultant, Distributor for FTI-DOEv2.1E** Andre Dewint rue de Livourne 103/12 B-1050 BRUXELLES Belgium

User News, Vol.15, No.4, 1994

* * 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 LBL reports pertaining to DOE-2. In the future, these resource centers will receive copies of all new reports and documentation. Program users can then make arrangements to get photocopies of the new material for a nominal cost. We hope to establish resource centers in other countries; please contact us if you are interested in establishing a center in your area.

South America

Prof. Roberto Lamberts
Universidade Federal de Santa Catarina
Campus Universitario--Trindade
Cx. Postal 476
88049 Florianopolis SC
BRASIL

Telephone: (55)482-31-9272
Fax: (55)482-34-1524
email: ECV1RLR@IBM.UFSC.BR

Australasia

Dr. Deo K. Prasad/P. C. Thomas
SOLARCH
University of New South Wales
P.O. Box 1
Kensington, N.S.W. 2033
AUSTRALIA

Telephone: (61)-2-697-5783 (P.C. Thomas)
Fax: (61) 2-662-4265 or -1378
email: PC.Thomas@unsw.EDU.AU

Portugal, Spain, Italy, and Greece

Antonio Rego Teixeira

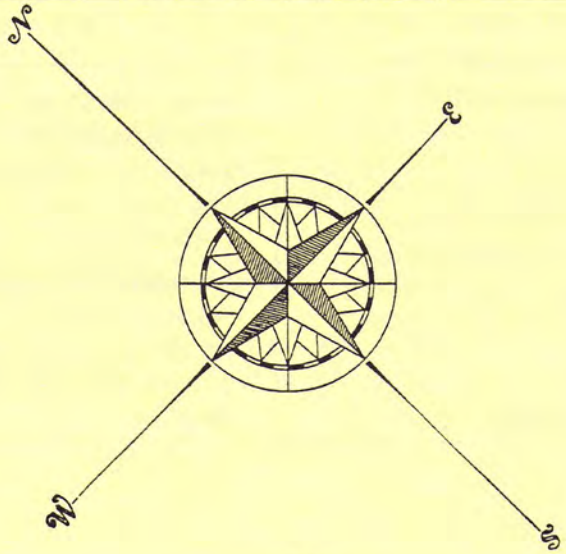
ITIME
Azinhaga dos Lameiros a Estrada
do Paco do Lumiar
1699 Lisboa Codex
PORTUGAL

Telephone: (351) 1-716-4096
Fax: (351) 1-716-4305

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

Telephone: (65)799-5543
Fax: (65)791-1859
email: mywwong@ntuvax.ntu.ac.sg



User News, Vol.15, No.4, 1994

* Calendar of Meetings and Conferences *

Apr 5-6 — *17th National Industrial Energy Technology Conference*

To be held in Houston, Texas.
Contact: "Industrial Energy Technology Conference", Mechanical Engineering Department-ESL, Texas A&M University, College Station, TX 77843-3123.

* *

May 10-12 — *IAQ, Ventilation, and Energy Conservation in Buildings Second International Conference*

to be held in Montreal, Canada.
Contact: Fariborz Haghighat, Centre for Building Studies, Concordia University, 1455 de Maisonneuve Blvd. West, Montreal, Quebec H3G 1MB, Canada. Fax (514) 848-7965.

* *

Jun 6-10 — *ECEEE 1995 Summer Study*

to be held in Latitudes, Mandelieu, France.
Theme: Sustainability and the Reinvention of Government: A Challenge for Energy Efficiency.
Contact: European Council for an Energy-Efficient Economy, c/o NUTEK/DOEE, 117 86 Stockholm, Sweden. Phone +(46) 8681 9588, Fax +(46) 8681 9585.

* *

Jun 18-21 — *Right Light Three: Third European Conference on Energy-Efficient Lighting*

to be held in Newcastle-Upon-Tyne, England.
Sponsor: International Association for Energy-Efficient Lighting and others.
Contact: RightLight Three, Carliol House, Market Street, Newcastle-Upon-Tyne, England NE1 6NE. Phone (44) 91 235 2801, Fax (44) 91 235 2898.

* *

Jun 24-28 — *ASHRAE Annual Meeting*

to be held in San Diego, CA. San Diego Marriott Hotel & Marina.
Contact: AHSRAE Meetings Section, 1791 Tullie Circle NE, Atlanta, GA 30329. Phone (404) 636-8400, Fax (404) 321-5478.

* *

Jun 26-27 — *Preconference Workshops*
Jun 28-30 — *7th Annual DSM Conference*

to be held in Dallas, Texas.
Host Utility: TU Electric
Sponsors: Synergic Resources Corporation, Electric Power Research Institute, U.S. Department of Energy, and Edison Electric Institute.
Registration Information: Pam Turner, EPRI, P.O. Box 10412, Palo Alto, CA 94303. Phone (415) 855-8900, Fax (514) 855-2041.
Technical Information: Bill Leblanc, Phone (415) 855-8900.

* *

Jul 24-26 — *SCSC '95*

Summer Computer Simulation Conference 1995. To be held in Ottawa, Ontario, Canada.
Host: The Ottawa Center of the McLeod Institute of Simulation Sciences, Computer Science Department, University of Ottawa
Sponsored by: The Society for Computer Simulation, 4838 Ronson Court, Suite L, San Diego, CA 92111-1810. Phone: (619) 277-3888, Fax (619) 277-3930, email scs@sdsc.edu

* *

Aug 1-4 — *ACEEE 1995*

Summer Study on Energy Efficiency in Industry. To be held in Grand Island, New York.
Host: New York State Energy Research and Development Authority.
Contact: Katherine Gallagher, ACEEE Conference Office, 2140 Shattuck Avenue Suite 202, Berkeley, CA. Phone: (510) 549-9914, Fax (510) 549-9984, email Kath@bea.lbl.gov

* *

Aug 14-16 — *4th IBPSA Conference*

4th International Building Performance Simulation Association Conference. To be held in Madison, Wisconsin.
Contact: John Mitchell, Mechanical Engineering Dept., University of Wisconsin, 1500 Johnson Drive, Madison, WI 53706-1687. Phone: (508) 262-5972, Fax (508) 262-8464.

User News, Vol.15, No.4, 1994

DOE-2 Program Documentation

Document	Order Number	Price
DOE-2 Basics Manual (2.1E)	DE-940-13165	44.50
BDL Summary (2.1E)	DE-940-11217	27.00
Sample Run Book (2.1E)	DE-940-11216	91.00
Reference Manual (2.1A)	LBL-8706, Rev.2	126.00
Supplement (2.1E)	DE-940-11218	91.00
Engineers Manual (2.1A) [algorithm descriptions]	DE-830-04575	52.00

Order from:

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

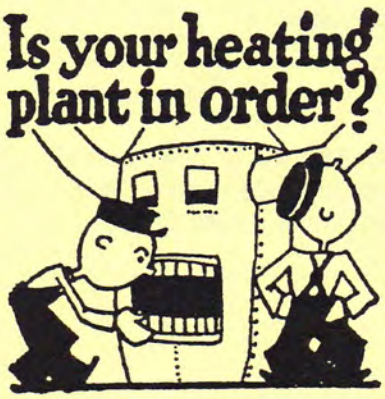
Phone (703) 487-4650
FAX (703) 321-8547

You are traveling in Europe one fine summer day and ask someone the temperature. They say it is 20 degrees. Nonsense, you think. Actually, the U.S. remains virtually the only country where the antiquated Fahrenheit scale lingers. To convert: multiply the centigrade (Celsius) temperature by 1.8 and add 32 . . . 20 times 1.8 = 36, plus 32 = 68°F.

LAWRENCE BERKELEY LABORATORY
SIMULATION RESEARCH GROUP 90-3147
UNIVERSITY OF CALIFORNIA
BERKELEY, CA 94720
U S A

Non - Profit Org.
U.S. POSTAGE
PAID
Berkeley, CA
Permit No. 1123

ADDRESS CORRECTION REQUESTED



60018-3019
Bob Henninger
ElectroCom GARD
2070 Maple Street
Des Plaines, Illinois 60018-3019

User News, Vol.15, No.4, 1994