*EnergyPlus*SPARK*DOE-2*BLAST*EnergyPlus***VisualSPARK***DOE-2***BLAST***GenOpt*EnergyPlus*
*EnergyPlus*VisualSPARK***DOE-2***BLAST*GenOpt*EnergyPlus*VisualSPARK*DOE-2*BLAST***GenOpt***

BUILDING ENERGY SIMULATION ●● USER NEWS

*EnergyPlus*SPARK*DOE-2*BLAST*EnergyPlus***VisualSPARK***DOE-2***BLAST***GenOpt*EnergyPlus*
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Highlights

Software

Departments

The ✎ Buzz

Happy New Year!
This issue marks our 27th year
of publication. Thank you for
your continuing support and
interest in our research.

The Great Experiment
Starting with this issue, we
are going to try and publish
the newsletter every month.
In order to streamline it
somewhat, we will print a
complete listing of interfaces
and consultants in alternate
months. You can always find a
complete list of interfaces,
complementary software,
consultants, etc. at either
www.energyplus.gov
or SimulationResearch.lbl.gov.

If you want to be listed as an
EnergyPlus or DOE-2
consultant in the newsletter
and on the Building Simulation
web site, please email
klellington@lbl.gov.

EnergyPlus – New Features in Release 1.2.3

Datasets

- Updated all design conditions to match new 2005 ASHRAE Fundamentals data in the weather files and associated design day data
- Extensive set of new example summary report templates for:
  - Space Gains/Envelope/Daylight/Comfort
  - Peak Demand and Consumption
  - Unglazed Transpired Solar Collector
  - HVAC/Electrical Systems/Loops/Components
  - Outdoor Conditions

Input

- Example input files for all new features (more than 200 example files available)
- All example input files have been updated and new documentation of features added
- New weather data for 100 international weather locations including India, Portugal, Brazil, China, Ethiopia, Ghana, Kenya, and Nepal in the EnergyPlus/ESP-r weather format (975 locations available worldwide)
- Revised design days to accommodate "enthalpy" and "humidity ratio" as potential humidity indicating types based on 2005 ASHRAE Fundamentals

Geometry/Windows/Walls/Shading

- User-definable radiation view factors

Zone Model

- User-definable room air temperature distribution model (at this time, for research only)

Electrical Power

- Demand limiting controls

HVAC

- Simple Water to Water GSHP
- Packaged Terminal Heat Pump
- Return air bypass
- Heat Pump Water Heater
- Desuperheater Water Heating Coil
- Steam loop, steam coil, steam boiler
- Restructured plant loop modeling to support branch pumps and future headered pumps and extensions of controls simulation
- Branch supply pumps for supply side equipment such as chillers, boilers, heat pumps, and water heaters
- Simple ice storage tank

On-Site Energy Supply

- Solid Oxide Fuel Cells (research only--for more information on this model contact EnergyPlus-Support@gard.com)

EnergyPlus – New Features in Release 1.2.3

Continued

Output

- DXF:Wireframe
- New report variables including power and breakout of separate object-level variables for all internal gains objects.
- New report variables to monitor zone temperature when heating and cooling setpoints are not met and when they are not met during occupancy, when zone temperatures oscillate due to poor simulation, and when zone conditions are outside the ASHRAE Standard 55-2004 comfort region.
- Output reporting enhancements including optional unit conversion for J into kWh, MJ or GJ in tabular output; new schedule support for TimeBins report; and table of contents for HTML tabular output files.

Utilities

- New features in EP-Launch including new quick open panel for opening output files, composite error file for group simulations, and integration with the Transition utility to automatically update files to the latest version.
- Many IDF Editor improvements including resizable window regions, opening DDY files, and pull-down list of report variable names from RDD output file.
- New unit conversion utility produces output in user-definable units
- Many new HVAC Diagram capabilities including draws "dangling" pieces that fit together that were not drawn as part of loop, draws lines to represent the loop coming back to the start, long names now wrap to two lines within boxes, and faintly drawn lines connect items that appear in multiple loops such as coils.

Documentation and Guides

- Input/Output Reference and Engineering Reference have been updated and extended for all new features and updates, bringing total documentation to more than 2500 pages.

EnergyPlus Version 1.2.3 ✦ Interim Build (#31) ✦ Released December 14, 2005

A new version of EnergyPlus (1.2.3 build 31) was released for both the Windows and Linux operating systems. Download v 1.2.3 from http://www.energyplus.gov. Why a new version just two months after the last one? There are a few cool new features that we wanted to get out to you and some bug fixes that we didn't want to leave till Version 1.3 (scheduled for release in April 2006).

What's New in EnergyPlus Version 1.2.3 Build 31 ???

- UFAD (Underfloor Air Distribution) for interior zones is now available as an alternative RoomAir option. (Exterior zones UFAD are planned for April 2006.)
- Detailed coil models can now be auto-sized.
- Ventilation improved with the addition of maximum indoor temperature, minimum/maximum outdoor temperatures, and maximum wind speed to help control natural ventilation.

Design**Builder** – Version 1.0.1

http://www.designbuilder.co.uk

Andy Tindale

DesignBuilder Software of the United Kingdom announces the release of **DesignBuilder Version 1.0.1**, the first comprehensive user interface to the EnergyPlus dynamic thermal simulation engine. DesignBuilder provides a powerful yet easy-to-use building energy modeling environment for users at all levels of expertise, suitable for consulting engineers, architects, researchers and students.

The Software Offers

- Accurate environmental performance data generated by EnergyPlus.

- Performance data when it is most needed ... during the early stages when the design is still fluid.

- Novel software features that enable easier and faster modeling.

- Stunning rendered images/movies at any stage in the design process

- DesignBuilder is competitively priced and, perhaps more importantly, cost-effective to learn and use.

- Intuitive user interface and intelligent defaults allow you to concentrate on energy modeling without getting lost in the detail of using the software.

- A significant tool for the design of environmentally friendly buildings.
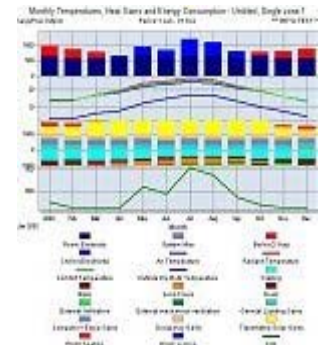
Run EnergyPlus simulations at the click of a button

The Interface

- OpenGL building modeler allows building models to be assembled by positioning 'blocks' in 3-D space. Blocks can be cut and stretched allowing you to work with just about any geometry.

- Global changes can be made to the model at building, block or zone level.

- Control the level of detail in each building model allowing the tool to be used effectively at any stage of the design or evaluation process.

- Building geometry can be imported from CAD data. DXF files can be imported and then traced over within DesignBuilder to create blocks and to partition blocks up into zones.

- Generate impressive rendered images and movies of your building design including the effect of site shading.

- Extensible architecture of the internal graphics engine will allow rapid development of the new modeling features, planned for future versions.

Quickly and accurately trace over CAD data

The Simulation

- Environmental performance data is displayed without having to run external modules and import data and any simulations required to generate the data are started automatically.
- EnergyPlus 'Compact HVAC' descriptions provide an easy way into detailed analysis of commonly used heating and cooling systems.
- Natural ventilation can be modeled with the option for windows to open based on a ventilation set point temperature.
- Daylighting - models lighting control systems and calculates savings in electric lighting.
- Shading by louvers, overhangs and side-fins as well as internal and mid-pane blinds.
- A comprehensive range of simulation data can be shown in annual, monthly, daily, hourly or sub-hourly intervals:
- Energy consumption may be broken down by fuel and end-use.
- Internal temperatures
- Weather data
- Heat transmission through building fabric including walls, roofs, infiltration, ventilation, etc.
- Heating and cooling loads.
- CO_2 generation.
- Heating and cooling plant sizes can be calculated using design weather data.
- Parametric analysis screens allow you to investigate the effect of variations in design parameters on a range of performance criteria.
- Use DesignBuilder to generate IDF files and work with these outside DesignBuilder to access system functionality not provided by DesignBuilder.
- Choose from a range of different EnergyPlus simulators including the current DOE executable release, the current DLL release and any interim releases made available by DOE.

The Data

- Latest ASHRAE worldwide design weather data and locations (4429 data sets) are included with the software and 975 EnergyPlus hourly weather files are available free using the DesignBuilder 'Install on Demand' feature.
- Data templates allow you to load common building constructions, activities, HVAC & lighting systems into your design by selecting from drop-down lists.
- Add your own templates if you often work on similar types of buildings.

You can find more information, review pricing structure and
get a free fully-functional 30-day evaluation copy of DesignBuilder
www.designbuilder.co.uk

Free! **Residential Lighting Design Guide (California)**
Best practices and lighting designs to help builders comply with California's 2005 Title 24 energy code.
http://www.cltc.ucdavis.edu/

Ask an EnergyPlus Expert

COMPACT MODULE

Is it possible to use the compact module and the general module to configure the HVAC system and central plants together?

Answer
In some cases this can be done with some care to match node names and component names. It is possible to use COMPACT HVAC ZONES and then add air loops and plant loops using the general HVAC objects. And it is possible to use COMPACT HVAC ZONES and SYSTEMS and then add general plant loops. However, it is not possible to do the reverse such as general zones and systems served by a COMPACT HVAC PLANT.

To mix the two types of input, one must study the expidf file and learn what objects are created for each COMPAC HVAC object and to see what the automatically generated node names and component names are. Then general HVAC objects can be added to match.

An easier approach may be to use the COMPACT HVAC objects that most closely describe the desired system, and then edit the expidf file as needed.

EXTRACTION FANS

I'm trying to model various extraction fans within the bathroom areas of a building. The fans have flow rates of around 0.03m^3/s with no supply air at all. What I want is purely an extraction fan serving a few zones, but only an extraction fan. Any information on whether this is possible with EnergyPlus and any help on how to get it started would be greatly appreciated.

Answer
You want to use ZONE EXHAUST FAN objects. You can have more than one exhaust per zone, but not a single one that serves multiple zones. There will also be changes in CONTROLLED ZONE EQUIP CONFIGURATION and ZONE EQUIPMENT LIST objects for the zone. Check out the example file "TermReheatZoneExh.idf." It sounds like you have no air system conditioning the space so you may want to add MIXING objects to declare exactly where the makeup air is coming from.

SET POINT NOT MET

I'm simulating a building that has high internal gains; it requires cooling year round. It also requires humidity control. I installed a terminal reheat coil and a boiler. In the design file (eio) the message states that the design hot water flow is "Design Boiler Water Flow Rate [m^3/s], 0.31956E-02" which is approximately 3.1956 kg/s. However, the spreadsheet states that the demand bypass flow is never less than 3.17 kg/s. I don't understand how this design flow rate is possible; the gas consumption is almost equal to the chiller electric consumption. Am I doing something wrong?

Answer
The sizing routines will size the reheat coils to be large enough to raise the full flow rate from the cooling supply temperature to the heating supply temperature. For a system like this, the reheat coils will tend to be significantly oversized and the entire hot water plant will also be oversized. We would suggest lowering the design heating supply temperature in the zone sizing objects for zones that will not require heating.

Ask an EnergyPlus Expert

CURVE-FIT VALIDATION

Components, i.e., chillers, fans, etc., are defined according to a performance curve-fit policy. Curves, however, are often based on real working conditions and real equipment capacities. Are EnergyPlus users supposed to use the same coefficients as we did previously, after the equipment capacity has been changed? Should we use the curves and parameters in the example files if we cannot get the data from the equipment producers?

Answer
Keep in mind that there are at least two possible "policies" for curve-fits. One option is to use curves that are normalized with respect to capacity (or efficiency) at a single operating point. The other is to use curves that directly fit the capacity/efficiency data without normalization. It is not unreasonable practice to use normalized curves for components that have a different nominal capacity or efficiency than the one used to produce the curves. Clearly it is better to use performance curves that apply to the unit being modeled, but this isn't always practical. On the other hand, direct performance curves (that aren't normalized) are basically limited to the original unit and cannot be used to model components with a different size or nominal performance.

Developers have different opinions on which is the best way to go. The normalized-curve group wants curves to be more general so that one can easily adjust equipment capacities when doing a simulation study. The direct-curve group is more wary of the pitfalls of abusing curves and want to force the user to use curves that match the component. I am not sure if it is true across the board, but curves tend to be of the normalized type in EnergyPlus. So it is not wrong to re-use such curves for different capacities. However, do not assume that the example files that are shipped with EnergyPlus represent best modeling practice; it is better to think of them as test and demonstration files.

Question
Another question is whether the object SINGLE DUCT:VAV REHEAT can deal with heating condition alone in a zone without an additional heating device (such as a baseboard heater), especially in a cold area?

Answer
The VAV reheat terminal unit is capable of meeting the heating load in a zone without additional heating equipment.

Question
So can I assume that the "normalization" means a ratio of a real-condition parameter to a rated-point one? Then how about curves for Electric Chiller, WindAC,Direct-fired absorption Chiller? Are they called normalized curves?

Answer
We are not aware of any EnergyPlus HVAC equipment curves that are <u>not</u> normalized.

Become An EnergyPlus Consultant

If you would like to be listed as an EnergyPlus consultant in this newsletter and on our website, please send email to **klellington@lbl.gov**.

Ask an EnergyPlus Expert

ZONE LOAD PREDICTION

I am confused about the Zone Load Prediction. According to the Engineering Documentation, Zone Load is predicted with Eqn. 3, neglecting the air capacitance. However, in the ZoneTempPredictorCorrector.f90\SUBROUTINE PredictSystemLoads,

  TempDepZnLd(ZoneNum) = (11.0/6.0) * AirCap + TempDepCoef
  TempIndZnLd(ZoneNum) = TempHistoryTerm + TempIndCoef

Is TempDepZnLd(ZoneNum) = Predicted Zone Load? Or have I misunderstood?

Answer
Eqn. 3 is shown without zone air capacitance and shows the quasi steady state solution that is used to derive Eqn. 4. Then Eqn. 4 is substituted into the unsteady Eqn. 2 to derive the equation for the unsteady solution on the zone air. Later on you will see that the Cz dT/dt is replaced with a Taylor Series expansion and the fully derived equations that are used in Predictor Corrector are Eqns. 8-11. I am not sure why you got stuck on Eqn. 3, but if you look at the form of the algorithm and the equations that I mentioned above you should start seeing the similarities.

COORDINATE SYSTEMS

What's the difference between relative and world coordinates?

Answer
EnergyPlus Documentation is searchable. Open EPlusMainMenu.idf and press the "search" button. Searching for "world coordinates" yields this article from the Input Output Reference.

Field: CoordinateSystem
Vertices can be specified in two ways: using "Absolute"/"World" coordinates, or a relative coordinate specification. Relative coordinates allow flexibility of rapid change to observe changes in building results due to orientation and position. "World" coordinates will facilitate use within a CADD system structure. Relative coordinates make use of both Building and Zone North Axis values as well as Zone Origin values to locate the surface in 3D coordinate space. World coordinates do not use these values. Typically, all zone origin values for "World" coordinates will be (0,0,0) but Building and Zone North Axis values may be used in certain instances (namely the Daylighting Coordinate Location entries).

In other words, with World Coordinates, you specify each coordinate for the surfaces as a stand-alone, absolute entry. With Relative coordinates, you specify coordinates in the Zone with respect to the Zone Origin Coordinates. And with relative coordinates, you can use building and Zone North Axes to change the placement of your building.

WINDOWS

1. How can I change the Glazing type for individual windows on the same wall?
2. Can I import windows data (from Window 5 for example) ?

Answer
1. Describe more than one window subsurface on the wall. And then, for each subsurface, specify a different Construction name.
2. Yes, see "CONSTRUCTION FROM WINDOW5 DATA FILE"

Ask an EnergyPlus Expert

BASEBOARDS

The zones in my office building simulation have three types of equipment: a low temperature hydronic radiant system, a direct air component, and a baseboard heater. Sometimes, during the winter, the baseboard heater heats the zone even when the zone temperature is above the zone setpoint. I tried to track the problem down by simplifying the model to be only one zone (to be served with constant 18°C air via a DIRECT AIR component and an electric baseboard heater). However, the simple model still has the same problem, with the baseboard heater heating (at low level) even when the zone temperature is above the zone setpoint temperature!

Answer
It appears that the baseboard control logic does not recognize that the zone is in the thermostat deadband. "Zone/Sys Sensible Load Predicted" is zero. The 18°C DIRECT AIR cools the zone, and the baseboard turns on to offset the cooling from the ventilation air, seeking to provide a net load of zero to the zone. A Change Request has been posted to fix this problem. You can accomplish the equivalent simulation using SINGLE DUCT:CONST VOLUME:REHEAT instead of DIRECT AIR plus baseboard. The SINGLE DUCT:CONST VOLUME:REHEAT control logic does not have the same problem. When the zone is above the heating setpoint, the reheat coil is off.

DESIGN DAY

How do I decide the maximum dry-bulb temperature in the DesignDay object? Is it the highest dry-bulb temperature in summer and the lowest one in winter? And what about the"Day of Month" object? Is it the corresponding date?

Answer
Using extreme high and low temperatures is an option, but this usually results in equipment that is larger than necessary. The best solution is to use one of the predefined DesignDay objects from the *.ddy file (included with each weather file). The temperatures in these objects are from ASHRAE and are based on a statistical analysis of weather data over 20-30 years. Jan 21 and Jul 21 are typically used, but you must also consider solar angles at other times of the year and it may be necessary to add spring or fall design days.

SOLAR ARRAY WITH BOILER FOR DHW

I am attempting to simulate the following system to provide hot water for a building.

System:
    A solar array and a gas-fired boiler combine to provide the DHW load. The solar array provides as much as it can and the rest of the load is picked up by the boiler.

Can anyone suggest how to emulate this kind of system? Is there an object in EnergyPlus that acts as a buffer vessel for hot water and can be heated using two disparate loops?

Answer
The example file "SolarCollectorFlatPlateWater.idf" illustrates a solar hot water system with DHW load, solar collectors, and storage tank (WATER HEATER:MIXED). You can connect a boiler, or another auxiliary WATER HEATER:MIXED (perhaps configured as instantaneous water heater), in series with the storage tank.

2006 EnergyPlus Training

February 13-14   Washington, D.C. -- Registration closes after February 5, 2006

?

May ???

Seattle, Washington or Portland, Oregon
We are currently seeking hosts for a Portland/Seattle workshop in May 2006, or for additional sites if is sufficient interest. If your organization would like to host an EnergyPlus workshop, please contact EnergyPlus-Training@gard.com Hosting may cover a range of services, and can be as simple as providing a meeting room for up to 20 participants with laptops. Free registrations may be made available to the host organization.

August 01

Cambridge, Massachusetts (at MIT)
Immediately before the IBPSA-USA SimBuild Conference at MIT
Early registration deadline is June 28, 2006; Registration closes after July 24

http://www.gard.com/training.htm

No Workshop in Your Location???

Why Not Host Your Own EnergyPlus Workshop ??

If your organization would like to host an EnergyPlus workshop, please contact EnergyPlus-Training@gard.com Hosting may cover a range of services, and can be as simple as providing a meeting room for up to 20 participants with laptops. Free registrations may be made available to the host organization depending on the level of support provided*!!!*

Building Energy Software Tools Directory

This directory provides information on over 300 building software tools for evaluating energy efficiency, renewable energy, and sustainability in buildings. The energy tools listed in this directory include databases, spreadsheets, component and systems analyses, and whole-building energy performance simulation programs. Know of a tool (yours?) that isn't in the directory? Send email to Dru Crawley at Drury.Crawley@ee.doe.gov.

Visit **http://www.eere.energy.gov/buildings/tools_directory/about.cfm**

Links to EnergyPlus Documentation
http://www.eere.energy.gov/buildings/energyplus/documentation.html

Input/Output Reference (PDF 4.2 MB)	*Module Developer's Guide (PDF 539 KB)*
Output Details and Examples (PDF 493 KB)	*Interface Developer's Guide (PDF 200 KB)*
Engineering Document (PDF 4.5 MB)	*Programming Standard (PDF 168 KB)*

EnergyPlus Version 1.2.3

Download a free copy of the program

http://www.energyplus.gov/

Support Tools

Support software is listed on our website (http://SimulationResearch.lbl.gov/EP/ep_tools.html) and in Section 2 of this newsletter.

Weather Data from http://www.eere.energy.gov/buildings/energyplus/cfm/weather_data.cfm

Weather data for more than 800 locations are now available in EnergyPlus weather format. See the write-up on how to create Meteonorm files for EnergyPlus.

Ask an EnergyPlus Expert

Questions from EnergyPlus users are answered promptly via email by program developers. To submit questions, join the EnergyPlus User Group at http://groups.yahoo.com/group/EnergyPlus_Support/.
A selection of questions/answers are compiled (yearly) into a downloadable PDF document: Q and A for 2002, Q and A for 2003, Q and A for 2004.

Are you an EnergyPlus Consultant ?

If you are engaged in EnergyPlus consulting, and would like to be listed in the *Building Energy Simulation User News* and on our website (http://SimulationResearch.lbl.gov), please send details to klellington@lbl.gov.

Join the EnergyPlus User Group

The developers of EnergyPlus have formed a support group to foster discussion and maintain an archive of information for program Users. We invite questions about program usage and suggestions for improvement to the code. Go to http://groups.yahoo.com/group/EnergyPlus_Support/

Testing and Validation http://www.eere.energy.gov/buildings/energyplus/testing.html.

EnergyPlus is being developed by University of Illinois and Lawrence Berkeley National Laboratory, with the assistance of DHL Consulting, C. O. Pedersen Associates, Florida Solar Energy Center, GARD Analytics, the National Renewable Energy Laboratory, Oklahoma State University and others. Development of EnergyPlus is supported by the U. S. Department of Energy, Assistant Secretary for Energy Efficiency and Renewable Energy, Office of Building Technologies Program (Program Manager, Dru Crawley).

The Forecast Looks Favorable for …

(Free!) *Weather Data on Demand*

Access archived weather data from around the world through this U.S. DOE web interface:

www.eere.energy.gov/buildings/energyplus/cfm/weatherdata/weather_request.cfm

Hourly weather data is continuously collected and stored into a local database, available through this web interface. Most stations have information for dry bulb temperature, wet bulb temperature, wind speed/direction, atmospheric pressure, visibility, cloud conditions, and precipitation type.

New Version of EP-Quick

EP-Quick

EP-Quick creates an EnergyPlus input file for a building, without HVAC, with templates for the shape and zone layout.

Get **EP-Quick**, Version 1.2, from **http://www.glazersoftware.com**

Easy
- Save hours of time creating EnergyPlus files
- Intuitive navigation of building features
- Simple pull down options
- Choice of IP or SI units
- Predefined internal gains and schedules

Powerful
- For use with EnergyPlus
- Construction and window libraries
- Instantly reports total areas
- Up to 10 internal gain profiles
- Define additional templates

Flexible
- Many building shapes possible
- Almost any size building
- Use defaults or make every surface different
- Supports multiple versions of EnergyPlus

Economical
- Quickly pays for itself
- $89 for single user license
- Academic discount available

Contact Jason Glazer, Glazer Software, at **jglazer@gard.com**

GenOpt 2.0
Generic Optimization Program

GenOpt is an optimization program for the minimization of a cost function, such as annual energy use, that is evaluated by an external simulation program. GenOpt can be used with any simulation program -- such as EnergyPlus, SPARK or DOE-2 -- that has text-based input and output. It also offers an interface for adding custom optimization algorithms to its library.

GenOpt **processes discrete independent variables, such as different window constructions, either for optimization problems with mixed discrete and continuous independent variables or for doing parametric studies. Some simulation programs, such as EnergyPlus, cannot pre-process the independent variables or post-process values that are computed during the simulation. For such situations,** *input function objects* **and** *output function objects* **can be used without having to modify** *GenOpt* **source code.**

GenOpt 2.0 **(with documentation) may be downloaded free of charge from**

http://SimulationResearch.lbl.gov

JAVA ERROR IN GENOPT

Recently I started using GenOpt with EnergyPlus. However, I cannot run the provided example. I am using windows ME and I get a java.lang.exception response when running GenOpt.

Answer (from Michael Wetter, author of GenOpt, at michael@mwetter.com)
The most frequently encountered problem is that the Java classpath variable is not set correctly. Please consult the manual for the proper declaration of the classpath variable. As a test, you can run

java genopt.WinGenOpt

and a dialog box should appear. If that does not work, then you most likely have either not set the classpath variable correctly, or your Java version is older than Sun's version 1.4.2

DOE-2

DOE-2.1E (version 121) 1,000-Zone version for Windows from ESTSC; other vendors of DOE-2 based programs are listed on our website: http://SimulationResearch.lbl.gov/.

Cost is as follows: ESTSC Package # 000158IBMPC04
$ 300 U.S. Government/Non-Profits/Education
$ 575 U.S. Public, Mexico, Canada
$1129 to $1268 Other Foreign   All ordering info at http://www.osti.gov/estsc/orders.jsp

DOE-2 Documentation on a CD from ESTSC - Cost US$100

What is included on the CD?
DOE-2 Reference Manual (Part 1) and (Part 2)   DOE-2 BDL Summary (2.1E)
DOE-2 Engineers Manual (2.1A)   DOE-2 Supplement to the Reference Manual (2.1E)

Order Software and ESTSC Documentation

Ed Kidd or Kim Buckner
NCI Information Systems, Inc.
Energy Science and Technology Software Center (ESTSC)
P.O. Box 1020
Oak Ridge, TN 37831

Phone: 865/576-1037 (2606)
Fax: 865/576-6436
Email: estsc@adonis.osti.gov

Purchase DOE-2 Documentation

DOE-2 Sample Run Book (2.1E) -- The Sample Run book is the only DOE-2 manual not available electronically. It must be purchased separately from NTIS; ordering information may be found at http://SimulationResearch.lbl.gov > DOE-2 > Documentation

Free DOE-2 Documentation (http://simulationresearch.lbl.gov/> DOE-2 > Documentation)

DOE-2 Basics Manual (2.1E)

Update Packages: Update Packages are not cumulative; each one contains different information. Download all four packages then print and insert the pages into your existing DOE-2 manuals.

   Update Package #1: DOE-2.1E Basics, the Supplement and BDL Summary

   Update Package #2: BDL Summary and Supplement.

   Update Package #3: Appendix A of the Supplement.

   Update Package #4: (1000-zone DOE-2.1E) BDL Summary.

DOE-2 Modeling Tips (pdf files) for 2004   for 2003   for 2002
   A compilation of all the "how to" and "DOE-2 Puzzler" articles from the newsletter.

Changes and Bug Fixes to DOE-2.1E (txt file)
   Description of all changes and bug fixes in a text document.

Be Listed As A DOE-2 Consultant

If you would like to be listed as a **DOE-2** consultant in this newsletter and on our website, please send email to **klellington@lbl.gov**

The DOE-2
"Doctors"
Answer Your
Questions

by
Fred Buhl
and
Joe Huang

CLARIFICATION ON USING RESYS

The DOE-2 Basics manual says that you shouldn't use RESYS if you have unconditioned spaces, i.e., attics or crawl spaces. If I do have unconditioned spaces but don't want to use the operable window feature of RESYS should I just use the PSZ system? If yes, what defaults should I use to override for a residential system? If no, what system should I use and are there precautions?

I would also like to use the SUM system which is not discussed in the DOE-2 Basics manual. The DOE-2 Reference manual says you cannot get the SUM of unconditioned spaces. If I specify SUM for the conditioned space will it calculate the temperatures for unconditioned spaces to pass on the real load for the conditioned space?

Answer from Fred Buhl
I can't think of a any reason not to use RESYS with unconditioned zones. The zones should be denoted as unconditioned. DOE-2 will calculate air temperatures for them. The big deal with RESYS is that it can't include outside air. For that you need to use RESYS2 (basically PSZ with different defaults and on/off fan).

As far as I know, SUM has no problem with unconditioned zones, either. The temperatures will be calculated but there will be no heating or cooling for the unconditioned zones.

Answer from Joe Huang
I think the warning about not using RESYS for unconditioned spaces is really a warning about the capabilities of DOE-2 itself to correctly model floating temperature conditions. I agree with Fred that I see no reason for using some other system instead of RESYS for modeling unconditioned spaces. In fact, RESYS has the benefit of modeling natural ventilation through attic and crawl space vents, so I would argue that RESYS would give you more realistic results.

I don't have much experience in using SUM, though I assume if you use SUM with very low heating and very high cooling setpoints, you would, in essence, get the same floating condition as you would get with RESYS (or any other system); the only difference being that with RESYS you can model some natural ventilation.

- -
You might want to check out "*Improving DOE-2's RESYS Routine: User-Defined Functions to Provide More Accurate Part Load Energy Use and Humidity Predictions*" August 2000, LBNL-46034 http://gundog.lbl.gov/dirpubs/46304.pdf

The latest edition of **Blueprint** – the State of California's Title 24 On-Line Newsletter – is now available. Issue # 83 is all about Cool Roofs. http://www.energy.ca.gov/efficiency/blueprint/

New DOE-2 Consultants

Thomas J. White, P.E. twhite@glumac.com
Lead Engineer, Energy Services
GLUMAC   http://www.glumac.com
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Hank Jackson, P.E.   **hzjackson@juno.com**
ETech Solutions   **Tel: 336.691.0785**
P.O. Box 2355
Weaverville, North Carolina 28787

The "Plus" in DrawBDL+ 3.1 refers to EnergyPlus . . .

DrawBDL+3.1

The *DrawBDL* program reads and displays EnergyPlus IDF files, as well as converts the building surface descriptions from DOE-2 BDL to EnergyPlus IDF. In addition to a different "look and feel" from earlier versions, 3.1 has the following improvements:

1. New user interface with a hierarchical tree showing all building surfaces.
2. No limit on the number of building surfaces.
3. For building surfaces, the expanded data window shows not only the input values, but also their locations in the global coordinate system; for spaces, the data window shows the gross and net areas of walls, windows, doors, roofs, and skylights.
4. Displays surfaces as 2-D or 3-D polygons.
5. Ability to change the sort order of building surfaces used in the display; this allows users to "touch up" the shaded drawings for use in presentations.
6. Interprets both *EnergyPlus* IDF files as well as *DOE-2.1* BDL files.
7. Surface data is output as an *EnergyPlus* IDF file. This allows *DrawBDL+* users to convert their *DOE-2* building descriptions to *EnergyPlus* with a single mouseclick.
    However, since *DrawBDL+* processes only building geometry data, the converted IDF file is a partial file containing only the inputs for building surfaces.

The price for *DrawBDL+3.1* remains $125 plus shipping (shipping charge only applies to mailed diskettes). Updates from previous *DrawBDL* Versions 1.X or 2.X cost $62.50 plus shipping. Shipping costs are $5 US, $10 international.

For more information about *DrawBDL+* or to order, please contact

Joe Huang and Associates -- joe@drawbdl.com
31 Sarah Lane
Moraga CA   94556-2563
Phone 925-247-9180

♦ www.drawbdl.com ♦ www.drawbdl.com ♦ www.drawbdl.com ♦

Free Building Energy Software from Lawrence Berkeley National Laboratory

BDA 3.1 *(Building Design Advisor)* gaia.lbl.gov/BDA
(building decision-making from design through completion)

COMIS www-epb.lbl.gov/comis (multi-zone air flow and contaminant transport model)

EnergyPlus 1.2.3 www.energyplus.gov/
(next-generation whole-building energy analysis program, based on BLAST and DOE-2)

GenOpt® 2.0 SimulationResearch.lbl.gov (generic optimization program)

Optics 5.2 windows.lbl.gov/materials/optics5/
(for analyzing optical properties of glazing systems)

RADIANCE 3.5 radsite.lbl.gov/radiance/ (analysis and visualization of lighting in design)

  Desktop Radiance 2.0β radsite.lbl.gov/deskrad/
(integrates the Radiance Synthetic Imaging System with AutoCAD Release 14)

  Radiance Control Panel www.squ1.com/site.html
(automates some Radiance tasks once the model has been created)

THERM 5.2 windows.lbl.gov/software/therm/therm.html (models two-dimensional heat-transfer effects in building components where thermal bridges are of concern)

VisualSPARK 2.0 SimulationResearch.lbl.gov
(Simulation Problem Analysis and Research Kernel) (connect component models to simulate innovative building envelope and HVAC systems)

WINDOW 5.2 windows.lbl.gov/software/window/window.html
(thermal analysis of window products)

Free Software / Request by Fax from 510.486.4089

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

Web Based

Home Energy Saver hes.lbl.gov (quickly computes home energy use)

Hey!! Free Book!!!

The **2005 Buildings Energy Data Book** includes statistics on residential and commercial building energy consumption. Data tables contain statistics related to construction, building technologies, energy consumption, and building characteristics.

http://buildingsdatabook.eere.energy.gov/

The Office of Policy, Budget, and Analysis within the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy has developed this Buildings Energy Data Book to provide a current and accurate set of comprehensive buildings- and energy-related data. The Data Book is an evolving document and is periodically updated.

Newsletter Roundup

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

The Blueprint   http://www.energy.ca.gov/efficiency/blueprint/index.html

Newsletter of the California Energy Commission's Efficiency Standards Office.

Buildings Inside and Out   http://www.swinter.com/Services/06Tech_Trans/co_sbic.html

Sustainable Buildings Industry Council – renewables in buildings

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Buildings Research Post   http://fsec.ucf.edu/bldg/resources/newsletter/index.htm

Building news and publications at Florida Solar Energy Center

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CARB-News   http://www.carb-swa.com/carbfax.html

CARB, the Consortium for Advanced Residential Buildings, presents updates on the Building America program

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Conservation Update   http://www.www.eere.energy.gov/state_energy_programs/update/

Energy conservation projects, broken down state-by-state for the United States.

EETD News   http://eetd.lbl.gov/newsletter/eetd_nl.html

Reports on research from Lawrence Berkeley National Laboratory's Environmental Energy Technologies Division.

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e-FFICIENCY NEWS   http://www.ase.org/section/_audience/eprofessionals/e_fficiency/

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

E-nnouncements   www.greentie.org

E-nnouncements is a free, monthly electronic news service for the energy and environmental community

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Energy Chronicle   http://www.fsec.ucf.edu/echronicle/archives/index.htm

The Florida Solar Energy Center's (FSEC) online quarterly newsletter.

Energy User News   http://www.energyusernews.com/

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

EREN News   http://www.eren.doe.gov/news/

Energy Efficiency and Renewable Energy Network of the U.S. Department of Energy.

Green Energy News   http://www.nrglink.com/index.html

Weekly e-publication offers news about energy efficiency and "green" energy issues for non-residential buildings.

Home Energy Magazine   http://homeenergy.org/hewebsite/

Not a newsletter, but the best resource for home energy.

IBPSA News   http://www.ibpsa.org/newslett.htm

Newsletter of the International Building Performance Simulation Association (IBPSA).

PartyWalls   http://www.swinter.com/Services/06Tech_Trans/co_partywalls.html

R&D in the multi-family buildings industry.

Rush   http://www.swinter.com/Services/06Tech_Trans/co_rush.html

Technology transfer and news vehicle for various HUD offices

SBSE News   http://www.sbse.org

A delightful read from the Society of Building Science Educators.

Setting the Standard   http://www.energycodes.gov/news/

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

WinterGreen   http://www.swinter.com/Services/06Tech_Trans/co_wintergreen.html

WinterGREEN reports on the energy-efficiency activities of Steven Winter Associates, Inc.

BLAST*news*

www.bso.uiuc.edu

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

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

BLAST contains three major sub-programs:

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

Air Distribution System Simulation uses the computed space loads, weather data, and user inputs.

Central Plant Simulation computes monthly and annual fuel and electrical power consumption.

Heat Balance Loads Calculator (HBLC) -- Graphical interface for producing BLAST input files.

WINLCCID 98 -- LCCID (Life Cycle Cost in Design) performs Life Cycle Cost Analyses.

Program Name and Description	Order Number	Price
PC BLAST Includes: BLAST, HBLC, BTEXT, WIFE, CHILLER, Report Writer, Report Writer File Generator, Comfort Report program, Weather File Reporting Program, Control Profile Macros for Lotus or Symphony, and the Design Week Program. The single CD-ROM includes s the BLAST Manual, technical articles and theses, nearly 400 processed weather files, browsing engine, source code.	3B486E3-0898	$1500
PC BLAST Package Upgrade from level 295+	4B486E3-0898	$450
WINLCCID 98: executable version for 386/486/Pentium	3LCC3-0898	$295
WINLCCID 98: update from WINLCCID 97	4LCC3-0898	$195

The last four digits of the catalog number indicate the month and year the item was released or published.

ENERGY-10, VERSION 1.7

ENERGY-10 is a design tool for residential or smaller commercial buildings that can be treated as 1- or 2-zone increments. It performs whole-building energy analysis for 8760 hours/year, including dynamic thermal and daylighting calculations. ENERGY-10 was specifically designed to facilitate the evaluation of energy-efficient building features in the very early stages of the design process.

NEW FEATURES

New Window Construction Dialogue
extensively revised to make it easier to directly use National Fenestration Rating Council (NFRC) window data.

New HVAC System Types
expanded to include: "Variable Air Volume (VAV) DX Cooling" and "Fixed COP Heat Pump."

New International Weather Data
3D Bar Graphs, with most simple bar graphs now displayed in "3D" by default.

http://www.sbicouncil.org/store/e10.php

IBPSA-USA ● SimBuild 2006 ● August 2-4, 2006

To be held at the Massachussets Institute of Technology in Cambridge, MA, USA
For details, access the website: http://ceae.colorado.edu/ibpsa/SimBuild06/index.html

IBPSA-USA will hold its second national conference, August 2-4, 2006 on the campus of the Massachusetts Institute of Technology. Technical sessions over two days will feature presentations on a wide range of topics related to the simulation of HVAC equipment, airflow in buildings, energy usage, and the visual and acoustic environment in buildings, as well as demonstrations of simulation software and of hardware and software needed to emulate or measure the performance of buildings.   Friday will be a practitioner day, offering case studies, hands-on software demonstrations and other presentations aimed at giving practicing architects and engineers the information they need to be more informed collaborators with simulation experts. The practitioner day will be coordinated with local US Green Building Council chapters and affiliates.

Free Membership for 2006 ● IBPSA-USA
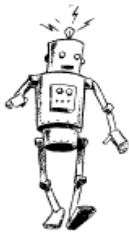
The IBPSA-USA Board of Directors has voted unanimously to extend our policy of free membership. Those interested in renewing their membership or becoming new members may do so by expressing their desire to be IBPSA-USA members and providing updated contact information (Affiliation, Mailing address, Phone number, Email address)

Establishing membership may be done on-site at any IBPSA-USA meeting or by sending an email to the IBPSA-USA Secretary, Peter Ellis, at
peter_ellis@nrel.gov.
[P] 303.384.7443, [F] 303.384.7540

Meetings, Conferences, Symposia and Workshops

2006		
March 19-21	10th Annual Nat'l Symposium on Market Transformation	www.aceee.org
March 21-22	CIBSE National Conference	www.cibse.org
March 30-April 3	Architectural Engineering National Conference	www.asce.org/conferences/aei06
April 19-21	National Conference on Building Commissioning	http://www.peci.org/.
April 23-27	Light+Building	www.light-building.messefrankfurt.com.
May 17–19	International Conference on Air Conditioning & Ventilation	www.acv2006.cz
May 21–24	5th International Conference HVAC+R Technologies	www.ttmd.org.tr
May 31– June 2	International Conference on Thermal Energy Storage	www.stockton.edu/ecostock
June 4-8	Healthy Buildings 2006	www.hb2006.org.
June 24-28	ASHRAE Annual Meeting	www.ashrae.org
July 08-13	SOLAR 2006	http://www.ases.org/
August 2-4	SimBuild 2006 – IBPSA USA	http://www.ibpsa.us/
August 13-18	ACEEE Summer Study on Energy Efficiency in Buildings	www.aceee.org
October 07	Start of National Solar Tour	http://www.ases.org/