BUILDING ENERGY SIMULATION

For Users of EnergyPlus, VisualSPARK, DOE-2, BLAST, GenOpt, ENERGY-10 and their Derivatives

EnergyPlus Version 1.2.3

Free download from **http://www.energyplus.gov/**

New Features of v. 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

Geometry/Windows/Walls/Shading
- User-definable radiation view factors

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

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

EnergyPlus Version 1.2.3

Free download from **http://www.energyplus.gov/**

New Features of v. 1.2.3   (continued)

Zone Model

- User-definable room air temperature distribution model (research only)

On-Site Energy Supply

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

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 pulldown 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.

And many other enhancements and speed improvements throughout.

2006 EnergyPlus Training

January 21	**Chicago, Illinois** Immediately before the ASHRAE Winter Meeting in Chicago Early registration deadline is December 18, 2005 Registration closes after January 13, 2006
February 13-14	**Washington, D.C.** Early registration deadline is January 10, 2006 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 there 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 depending on the level of support provided.
August 01	**Cambridge, Massachusetts** Immediately before the IBPSA-USA SimBuild Conference at MIT Early registration deadline is June 28, 2006 Registration closes after July 24, 2006

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

WHY NOT HOST A 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*!!!*

Download this new report:

"*Comparison of Capabilities of 20 Building Simulation Programs*"

Dru Crawley (U. S. Department of Energy), Jon Hand (University of Strathclyde, UK), Michael Kummert (University of Wisconsin Solar Energy Laboratory) and Brent Griffith (National Renewable Energy Laboratory) have released a report comparing the features and capabilities of 20 simulation programs. It is hoped that the report will be a resource for the simulation community and the intent is for it to become a living document. Suggestions for its improvement are definitely welcomed!
You may download a copy of the pdf file from http://www.energyplus.gov. The report is listed under "Additional Resources" in the right-hand menu.

Ask An EnergyPlus Expert

LOADS CONVERGENCE PROBLEM

I'm simulating a simple room, but I always get this warning message:

> *Loads Initialization did not Converge (CheckWarmupConvergence)*

What should I check?

Answer
Possible causes to your convergence problem:

- very high thermal mass such as very thick concrete
  <u>solution</u>: increase max number of warm-up days in the BUILDING object

- moderate mass and inadequate space conditioning such that the building keeps getting warmer and warmer on successive days
  <u>solution</u>: add HVAC, check building thermal properties, check if infiltration is included

- a soil layer modeled below the concrete slab
  <u>solution</u>: remove this layer and read about ground temperatures in the Auxiliary Programs document

HUMIDIFIER

One of the required fields in Humidifier is "rated capacity," which is the humidifier's steam production capacity in m^3/sec. In the output file, the water consumption is presented in m^3(timestep); however, this water consumption is equal to [(steam consumption rate)*(timestep in seconds)]. To me, this result can't be the water consumption, it has to be the steam consumption -- right?

Answer
The "rated capacity" should be described as m^3/s of water converted to steam.

USING COMIS AND VENTILATION TOGETHER

I am trying to simulate the natural ventilation effect of a deep room with windows on both sides. In order to facilitate air flow in the room, there is an exhaust fan inside of the room. Can I use the COMIS module as well as ventilation at the same time?

Answer
When the COMIS air flow model is active, the Simple air flow model objects (VENTILATION, INFILTRATION, MIXING, and CROSS-MIXING) are inactive. It is one or the other, but never both types together. To add a constant airflow to a COMIS model, use COMIS AIR FLOW:Crack with a value of zero for "Air mass flow exponent." This should result in a constant air flow through the crack, thus simulating the exhaust fan. You would also need to associate an appropriate node and pressure with this crack to force the direction of flow.

Ask An EnergyPlus Expert

HELP WITH ENERGYPLUS AND DESIGNBUILDER

I'm a new user of EnergyPlus and DesignBuilder. My problems are these:

I need to draw boundary walls. In TRNSYS there is a specific type of wall that allows that. So, if I have to simulate a single zone of a whole building, can I separate it with a boundary wall and specify the boundary temperature?.

Answers from Andy Tindale of DesignBuilder Software

Answer
You can't directly specify a wall boundary temperature in DesignBuilder, but you could set up zones surrounding your zone of interest and condition the temperature in the surrounding zones to the temperature required. Or you can generate the basic IDF data using DesignBuilder and set up temperature boundary conditions for each surface in your zone by working directly with the IDF data using the OtherSideCoeff option. Future versions of DesignBuilder will allow temperature boundary conditions to be set directly.

Question
Is it possible to draw perimeter walls of different thicknesses?

Answer
Yes, you may draw perimeter walls of different thicknesses; however, each block will have perimeter walls of the same thickness. That is, it is not possible to draw a block with one face having one thickness and another face with a different thickness. To change the thickness of the external perimeter wall, type in the wall thickness in the drawing options dialog in the bottom left ***before*** you start the draw block command. You cannot change the thickness of the block perimeter walls once they have been drawn in the current version of DesignBuilder. Note that the thickness of the walls in the 3-D DesignBuilder model does not affect the thermal properties of the wall. This is governed by the construction associated with the wall surface. But the thickness of the wall will affect the volume of air in the zone and therefore the ventilation heat loss/gain.

Question
How do I account for thermal bridges?

Answer
You can draw thermal bridges, such as concrete lintels and columns, in DesignBuilder by going to the surface level using the draw surface tool. You can draw as many opaque sub-surfaces as you want in this way, but they will all have the same construction (as defined on the constructions tab under the sub-surfaces header).

Question
Can I use Design Builder to generate a file and then modify it in Energy Plus?

Answer
Yes you can use DesignBuilder to create EnergyPlus IDF files and then modify them directly in EnergyPlus. However, you cannot import any changes you make to the IDF file back into DesignBuilder.

Ask An EnergyPlus Expert

GRAPHICAL OUTPUT WITH ENERGYPLUS

I need to show graphs of the output variables. Also, I would like plot a number of different output variables on the same graph.

Answer
If you are using EP-Launch to run, after you have "reported" the variables in the output stream, the CSV files are automatically generated. These can be imported into a spreadsheet program (such as Excel) and you can use the spreadsheet program to create your graphs. This is discussed in depth in the Input Output reference under "Input for Output" as well as in the Output Details manual. See the EnergyPlus documentation links on p. 9 of this newsletter.

Alternatively, other than exporting the data to CSV (which EnergyPlus does automatically), you can also use one of the interfaces which will graph data. Both DesignBuilder and E2AC will graph the data.

Find interface links here: http://www.eere.energy.gov/buildings/energyplus/interfaces_tools.html

Question
I'm simulating a building with two thermal zones and I'm using EnergyPlus with IDF-editor. I want to graphically visualize the outputs for the following:
- air temperature of each zone;
- relative humidity of each zone air;
- sensible energy demand of each zone;
- latent energy demand of each zone.

Answer
The report data dictionary (.rdd) lists all report variables available for a given simulation. All variables you requested will be listed in the file. Add report variables to your input file. As an example, the zone temperature may be output by adding:

```
Report Variable,
   *,                      !- Key_Value
   Zone/Sys Air Temperature,     !- Variable_Name
   hourly;                 !- Reporting_Frequency
```

Use Zone Air Relative Humidity instead of Zone/Sys Air Temperature to provide zone relative humidity information.

Cooling and heating demand may be output by using one of the following as the variable name in the example above:
- Zone/Sys Sensible Load Predicted
- Zone/Sys Sensible Load to Heating Setpoint Predicted
- Zone/Sys Sensible Load to Cooling Setpoint Predicted
- Zone/Sys Moisture Load Rate Predicted

Ask An EnergyPlus Expert

CAD / VERTEX ENTRY

I have a question about vertex entry. In my cad file I have a building divided into two thermal zones by a partition. This partition has a thickness (0,30 m) and perimeter walls with a thickness (0,35 m). The Input/Output Documentation states:

"Surfaces are always specified as being viewed from the outside of the zone to which they belong."

Does this mean that I should insert the coordinates related to the vertices of the external surfaces? In this way, since the walls have a certain thickness, the coordinates of the partition are different according to what zone I analyze. Can someone help me?

Answer
The statement refers to the order of the vertices, not necessarily their values.
- You can specify the coordinates such that the volume is correct for the zone (as the thickness of the wall may change the volume but not the thermal properties of the surface)

OR
- You can enter the volume of the zone in the Zone object.

Question
How important is the starting corner and the vertex entry for shading surfaces?

Answer
As important as it is for walls, generally.

Question
What does it mean in the Input Output Reference Manual when it states that EnergyPlus automatically mirrors the surface?

Answer
This means that you don't have to be as careful of which way the shading "faces" as only things behind the shading surface can be shaded.

Question
Are the chosen entries SurfaceStartingPostion and VertexEntry valid for any shading surface? Is there a difference between horizontal and tilted surfaces?

Answer
Yes, these are valid and the same as for walls, etc.

Question
And is there difference in the geometrical description between detached and attached ones?

Answer
If you choose "relative" coordinates in your Surface Geometry object, then YES, the attached entries are relative to the zone origin coordinates. But the vertex entries are always "3D".

Ask An EnergyPlus Expert

NODE TYPE DEFINITIONS

How are node types defined?

Answer
Node types are defined during input processing by the components that are connected to them (such as coils, chillers, fans, etc.) If the simulation terminates with errors prior to getting all input, it is possible for nodes to be reported as undefined. Otherwise, undefined nodes indicate nodes that were not used properly.

CONSTANT INDOOR TEMPERATURE

I need to simulate a simple "cubic" building where the indoor temperature must be held constant at 20°C. I tried to enter this in EnergyPlus by defining a "single heating setpoint" or defining a "thermostat" but none of these options gave me the constant 20°C indoor temperature after running the simulation. What would be the best way to enter this data into EnergyPlus?

Answer
You need a thermostat plus an HVAC system to serve the load request from the thermostat. Use the "SINGLE HEATING COOLING SETPOINT" to hold a constant indoor temperature and automatically switch between heating and cooling as needed. The simplest form of HVAC system is "Purchased Air", an ideal system with no real equipment. See ExampleFiles\PurchAirTables.idf

QuickLinks to EnergyPlus Documents

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)*

Update to the WINDOW 5.2 Program

WINDOW 5.2 is a publicly available computer program for calculating total window thermal performance indices (i.e. U-values, solar heat gain coefficients, shading coefficients, and visible transmittances). WINDOW 5.2 provides a versatile heat transfer analysis method consistent with the updated rating procedure developed by the National Fenestration Rating Council (NFRC) that is consistent with the ISO 15099 standard. The program can be used to design and develop new products, to assist educators in teaching heat transfer through windows, and to help public officials in developing building energy codes. Download from
http://windows.lbl.gov/software/window/

WINDOW 5.2.17a is an updated version of the program (includes bug fixes for DOE-2.1E and EnergyPlus Files); http://windows.lbl.gov/software/window/52/window5217aUpdate.htm

Ask An EnergyPlus Expert

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 <u>only</u> 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.

INTERNAL MOISTURE GAIN

Is it possible to introduce internal moisture gains (such as from people, plants, etc.) in EnergyPlus?

Answer
YES. Open EPlusMainMenu.idf, click the search button and look for "Internal Gains" (especially people, lights, etc.). There is an "other" option you might use for plants; however, quantification for plants could be problematic.

BAFFLES AND EXTERIOR CONVECTIVE CAVITY

I have an example room with an external baffle outside a wall with a window.

1. Considering that the baffle is opaque, why does the window still transmit a significant amount of solar energy (as if there was no obstruction in front of it)?

2. In the inputs for the baffle, how I specify the distance of the baffle from the wall? Since my baffle is
   vertical, the "Effective Thickness of Cavity Behind Exterior Baffle" field is not used.
   How can I specify the distance between my baffle and wall?

Answer
1. The baffle is associated with the Surface:HeatTransfer object and uses the "net" area. If that surface also has a sub-surface (a window) then the baffle is only on the part of the surface that surrounds the sub-surface. The window is treated in the usual manner and doesn't have the opaque
   baffle in front of it.
2. You would still use the Effective Thickness field. This determines the depth or thickness of the cavity regardless of tilt.

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.

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. A short description is provided for each tool along with other information including expertise required, users, audience, input, output, computer platforms, programming language, strengths, weaknesses, technical contact, and availability.

Know of a tool (yours?) that isn't in the directory? Visit
http://www.eere.energy.gov/buildings/tools_directory/about.cfm
or send email to Dru Crawley at Drury.Crawley@ee.doe.gov.

EP-Quick

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

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

EP-Quick creates input files for many any-sized buildings using built-in templates for the shape and zone layout. By using templates for commonly shaped buildings and zone layouts, the time needed to create an EnergyPlus input file is greatly reduced. You may download EP-Quick and give it a try. The version you download is a demo and only generates EnergyPlus input files for triangular buildings.

Once purchased and registered, EP-Quick will generate EnergyPlus input files based on 26 different templates. Please see the web site for additional information including screen shots and images of each template. EP-Quick costs $89 for a single user license and $39 for an academic license.

EnergyPlus may be freely downloaded from:
http://www.energyplus.gov/

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

EnergyPlus Version 1.2.3

To download a free copy of the program

http://www.energyplus.gov/

EnergyPlus Support Tools

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

EnergyPlus 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.

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

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/

Translate EnergyPlus Web Pages

A new link on the main EnergyPlus web page (www.energyplus.gov/) allows you to view the pages in any of eight languages. Unfortunately, the translator doesn't work with PDF files. Look for the fish at the bottom of the web page. Pages may be translated into Chinese, French, German, Italian, Japanese, Korean, Portuguese and Spanish.

DOE-2

DOE-2.1E (v. 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:
$ 300 U.S. Government/Non-Profits/Education
$ 575 U.S. Public, Mexico, Canada
$1129 to $1268 Other Foreign

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

What is included on the CD?

- DOE-2 Reference Manual (Part 1)
- DOE-2 Reference Manual (Part 2)
  - DOE-2 Supplement to the Reference Manual (2.1E)
- DOE-2 BDL Summary (2.1E)
- DOE-2 Engineers Manual (2.1A)

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
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 remaining 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.

BLAST*news*

www.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, and 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.

JOIN THE BLDG-SIM MAILING LIST

BLDG-SIM is a mailing list for users of building energy simulation programs like EnergyPlus, SPARK, VisualSPARK, DOE-2, Trace-600, HAP, BLAST, ESP, SERIRES, TRNSYS, TASE, ENERGY-10 and others. Because building simulation professionals are located worldwide, the BLDG-SIM list is an attempt to foster the development of a community of those users. Users of all levels of expertise are welcome and are encouraged to share their questions and insights about these programs.

To subscribe, send a blank email message to
BLDG-SIM-SUBSCRIBE@GARD.COM

The web page for BLDG-SIM is http://www.gard.com/ml/bldg-sim.htm

Jason Glazer, P.E., of GARD Analytics, Inc., is the list administrator
(jglazer@gard.com).

(Free!) Weather Data on Demand

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

The

DOE-2

Puzzler

Question:
I am trying to get an hourly report for a slab-on-grade for a recreation center building, but the QUGF (underground floor load) variable under the SPACE variable type list doesn't give me a realistic number; it is constant throughout the 24hour cycle. Does this mean that it's not set up correctly?

```
$ 5" Concrete Underground Slab Floor $
Floor-60-LAYERS = LAYERS   INSIDE-FILM-RES = 0.92
             MAT= (MAT-148,MAT-77,)
             TH= (1.0000,0.4167,) ..
```

I would like to get both the floor temperature and load (in Btuh) from the slab-on-grade.
Are there any other variables available for a report value? Thanks,

Answer: (from Joe Huang (YJHuang@lbl.gov)

The underground flow model in DOE-2 is constant not only through the 24-hour cycle, but for an entire month. In a nutshell, the heat flow through an underground surface is simply the input U-value of the floor layer multiplied by the difference between the room temperature (which is constant in LOADS) and the ground temperature (which is constant for each month of the year). DOE-2 does not calculate inside surface temperatures, and even if it did, I would not give it much credence for the floor slab for the reasons given above. Bear in mind that QUGF is a LOADS variable, which is the heat flow calculated at the constant LOADS temperature (input as TEMPERATURE=(XX) in the SPACE-CONDITIONS command), rather than at the actual zone temperature calculated in SYSTEMS.

Please email your "DOE-2 Puzzler" questions to **klellington@lbl.gov**

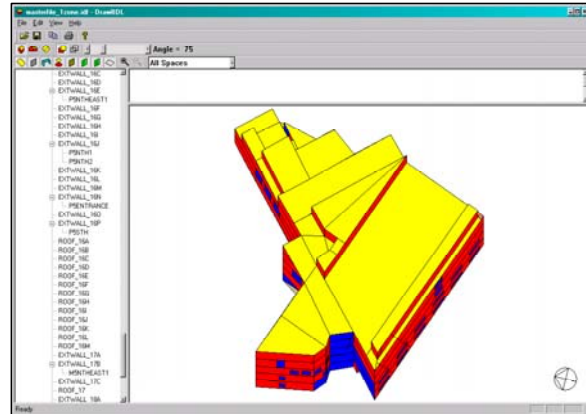*The "Plus" in DrawBDL+ 3.1 refers to EnergyPlus . . .*

DrawBDL✛3.1

The *DrawBDL* program can now read and display EnergyPlus IDF files, as well as convert 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.

Example of the EnergyPlus input file for the Te Papa Tongarewa Museum (New Zealand)*

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
31 Sarah Lane
Moraga CA   94556-2563
Phone 925-247-9180
mail to: _joe@drawbdl.com_

Night view of the completed building

*DrawBDL+ example was kindly provided by Sam Roose of Energy Solutions, Ltd., New Zealand
(http://www.energysolutions.co.nz/)

◆ **www.drawbdl.com** ◆ **www.drawbdl.com** ◆ **www.drawbdl.com** ◆