

*EnergyPlus*SPARK*DOE-2* EnergyPlus*VisualSPARK*EnergyPlus*DOE-2*GenOpt*EnergyPlus*
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BUILDING ENERGY SIMULATION USER NEWS

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

- 2 ... **EnergyPlus** -- Release 1.3.0
- 2 ... PIER Tech Briefs, Part 2 of 3
- 3 ... Ask an **EnergyPlus** Expert
 - 3 Plant Demand Error 4 Atrium Simulation
 - 4 Reports 5 Surface Geometry,
 - 5 Thermal Comfort and Natural Ventilation
 - 6 Basement Inputs 6 Condensing Temperature Control
 - 7 Moisture Transfer 7 Modeling Attic Space
 - 8 Electric vs Hot-Gas Reheat 8 Report Variables
- 9 ... New **EnergyPlus** Consultants
- 10 ... Position Available on the **EnergyPlus** Team
- 10 ... U.S. DOE's "Best Practices" Software Tools
- 11 ... October 2006 Seminars from Pacific Gas & Electric
- 13 ... **DOE-2** Question: *Output Files*
- 13 ... New **DOE-2** Consultants
- 15 ... Square One Software Launches Their (*Dazzling*) New Web Site
- 16 ... More on the Energy Policy Act of 2005
- 16 ... New Issue of *Setting the Standard* Newsletter

Regular Features

- 7 ... Meetings, Conferences, Symposia
- 9 ... **EnergyPlus** v.1.3.0
- 12 ... **DOE-2.1E** v.124
- 14 ... **Big List of FREE!**

The Buzz

---REVISED--- Position Available

*The Simulation Research Group at Lawrence Berkeley National Laboratory would like to hire a **Computational Scientist** to be a member of the EnergyPlus Development Team at LBNL. See p. 10 for the position description.*

EnergyPlus Certified for Tax Deduction

All the details are at: http://SimulationResearch.lbl.gov/EP/ep_IRS06.pdf.

And note that VisualDOE (v.4.1, build 0002) was recently approved as an energy analysis tool for the IRS Tax Credit for commercial buildings.

http://www.eere.energy.gov/buildings/info/qualified_software/ Find VisualDOE at www.visualdoe.com

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

Release of EnergyPlus 1.3.0

The tenth major version of EnergyPlus (1.3.0) was released on April 25, 2006 and is now available in versions for both the Windows and Linux operating systems. Download this newest release at no cost from the EnergyPlus web site: www.energyplus.gov.

Features

- UFAD (Under Floor Air Distribution) room air model for exterior zones is now available.
- Completely reworked airflow modeling -- the new AirflowNetwork model replaces both COMIS and ADS and has the combined capabilities. Calculation of infiltration, ventilation, mixing and cross mixing moved to system time step for future feature development of hybrid (mixed mode) ventilation control. Differences in results are usually minor.
- Outside air temperature is now varied as a function of zone or surface height above ground. Wind profile options can be set separately for the weather station and the building site. Includes new zone and surface report variables for height dependent properties. There will be differences in results, particularly in files with Ventilation or Infiltration.
- Simple earth tube model for preconditioning (heating/cooling) outside air.
- Tempering valve (3-way valve emulation) for effective and safe use of stored thermal energy.
- Variable and constant speed headered pumps.
- Detailed ice storage.
- New Compact HVAC models for fan powered VAV, fan coil, night cycle controls, outside air heat recovery, supply air temperature reset, chilled/hot water temperature reset, VAV supply fan part-load options, VAV fan blow through or draw through option, and zone supply and return plenums.
- Energy end-use subcategories are now user-definable.
- New report variable for Zone Operative Temperature (Operative Temperature Control planned for V 1.4 in October).

And many other enhancements and significant speed improvements throughout.

PIER Tech Briefs

Part 2 of 3

The California Energy Commission's Public Interest Energy Research (PIER) Program supports energy research, development and demonstration (RD&D) projects. Their technical briefs, on a variety of energy-related issues, are available free for the download.

http://www.esource.com/public/products/cec_form_send.asp

[PIER-TB-10 Automatic Diagnosis for Ailing Rooftop Air Conditioners](#)

[PIER-TB-11 Demand-Controlled Ventilation](#)

[PIER-TB-12 Next Stage in Evaporative Cooling](#)

[PIER-TB-13 Estimating Energy Use Early and Often](#)

[PIER-TB-14 Guide to Optimizing Commercial Kitchen Ventilation](#)

[PIER-TB-15 At Home with Cool-Colored Roofs](#)

[PIER-TB-16 Radiant Heating and Cooling Made Easy and Inexpensive](#)

[PIER-TB-17 Duct Leakage: If You Can Measure It, You Can Cut It](#)

[PIER-TB-18 Sweet SPOT™ for Daylighting](#)

Ask an EnergyPlus Expert

PLANT DEMAND ERROR

I am using two fan coil units to serve two zones; they are supplied by purchased chilled water and a constant COP. The output of the design day simulation shows that the cooling demand of the two fan coil units is less than 25kW, but the plant cooling demand is around 35kW. There are only two fan coil units in the cooling water loop. Are these results correct?

Answer

We reviewed the file you uploaded. In the input file, the only report variable at the zone level is "Zone/Sys Sensible Cooling Rate." This does not include latent cooling load, and it is the net cooling provided to the space. The chilled water coil in the fan coil unit must offset the fan heat and the chillers/purchased cooling must offset pump heat in addition to that. To follow this, you also need to report the cooling coil total load, pump heat that is added to the fluid.

Also, note that "Plant Loop Cooling Demand" represents the cooling required to bring the plant loop to its setpoint. If for any reason, the loop is not holding setpoint, this value will not match the current loads on the loop. It is best to compare the coil load plus pump heat with the chiller evaporative heat transfer rate plus purchased cooling rate.

Question

I checked the coil total cooling load. The sum of the two coils is less than 27kW; however, the plant cooling demand is still 35kW. In the csv file, the sum of the flow rate through the two coils was equal to that of the chiller. And the temperature difference of the coil inlet and outlet node is almost the same of the chiller. I used the formula $Q=Cp*\dot{M}*\Delta T$ to calculate the heat transferred. The heat transferred from the chiller corresponded to the plant cooling demand; however, the heat transferred in the two coils corresponded to the zone cooling demand. And it is 10kW bigger than the sum of the coil total cooling load from the csv file. It's hard to believe that the pump and fan can add 10kW cooling demand to the loop. Can I just increase the setpoint of the cooling loop to fix this problem? The coil cooling demand and the loop cooling demand was matched before the domestic water object was added; did it influence the loop cooling demand? The domestic water is operating when the coil are supplying chilled air to the zones.

Answer

Well, not exactly. The sum of "Fan Coil Total Cooling Rate[W](Hourly)" is approximately 27kW. But the sum of "Total Water Cooling Coil Rate[W](Hourly)" is approximately 35kW, and it exactly matches the plant loop cooling demand each hour.

What's the difference? See the definition of "Fan Coil Total Cooling Rate" in the Input/Output Reference. It is the cooling delivered to the zone.

"Total Water Cooling Coil Rate" is the coil load. The difference is the outside air load.

And domestic hot water can certainly impact the plant loop. When hot water is "used" it is replaced by "new" water that can be colder. You can set the temperature of this new mains water in different ways.

Ask an EnergyPlus Expert

ATRIUM SIMULATION

I am simulating a building with a huge glass-roofed atrium. On the two opposite sides of the atrium are floors for offices; I need to model the office and atrium zones that are adjacent to each other.

Do I have to define the inter-zone wall and its associated windows twice for two adjacent zones? If I understand EnergyPlus correctly, each zone needs to be defined with a complete set of surfaces (say, 6) surrounding it. True?

Answer

Zones do not necessarily require a complete enclosure. If you want sunlight and heat to be transferred between the atrium zone and the office zones, then you will need inter-zone walls and windows to model that transfer. And yes, the inter-zone walls and windows are each described twice, once for each zone, facing in opposite directions. It is critical to get the facing directions correct, or the window will not see sunlight.

Question

Also, other than CFD, are any modeling tools capable of simulating the temperature stratification effect of the atrium, which is approximately 50 meter high?

Answer

Stratification is a tough problem, but the implications can be modeled in EnergyPlus using user-defined room air models - see the Input/Output Reference Manual for the ROOMAIR TEMPERATURE PATTERN objects. However, these models require that you already know something about the stratification. CFD is probably needed to do a good job of determining the vertical distribution of air temperatures, but a simple way to model atria in EnergyPlus is to assume a vertical gradient (for a 50 meter high space maybe 0.1°C per meter?) and use the ROOMAIR TEMPERATURE PATTERN:CONSTANT GRADIENT object.

Note from Andy Tindale, developer of the DesignBuilder software

You may be interested to know that the ROOMAIR TEMPERATURE PATTERN:CONSTANT GRADIENT object mentioned above has been implemented in the DesignBuilder user interface to EnergyPlus. This allows you to easily model vertical distribution of air temperatures by modulating the temperature gradient during the simulation based on a range of different variables. In DesignBuilder, this data is accessed on the HVAC tab under the Air Temperature Distribution header. For details, go to <http://www.designbuilder.co.uk/>

REPORTS

Is there a standard output file where I can view calculated surface areas and zone volumes? Alternatively, what report variables can I select to display these parameters in the "eplusout.eso" file?

Answer

For surface areas, you need to specify: **Report, Surfaces, Details;**
The zone volumes are automatically reported. Both will appear in the .eio file, which is a comma separated variable file.

Ask an EnergyPlus Expert

SURFACE GEOMETRY

On my building model, all roofs/floors with more than four sides don't appear in the graphical representation. Is this because information was lost when data was translated from EnergyPlus to CAD?

Answer

By default, they are there. If you use DXF reporting, they appear as thick lines; if you ask for triangulation they will appear as "faces."

Question

I am modeling the floors of a "Plenum Zone" as the respective ceilings of the zones below. In other words, I am using the same vertice coordinates for both surfaces but I am designating their surface types as Ceiling and Floor. EnergyPlus calculates the Tilt angle of the floors as 0.0 instead of 180. On pg 129 of the Input Output Reference, it is stated that any vertex can be chosen as the starting position for horizontal surfaces, as long as the VertexEntry convention is followed. Are there other parameters beside "surface type" and "vertice coordinates" used in coming up with the tilt angle of a surface? Don't quite understand why the floors have tilt angles of 0.0.

Answer

Is it possible that you are inputting them counter-clockwise rather than clockwise or vice versa? EnergyPlus uses the coordinates and calculates the "outward facing normal" angle to determine the tilt angle -- it does not depend on surface type for this calculation. So, be sure to flip the order of the vertices between the "floor" and "ceiling" versions of each surface. Setting the surface type won't do anything to the geometry.

THERMAL COMFORT AND NATURAL VENTILATION

I am modeling a space with Natural Ventilation using Airflow Networks and I would like to look at thermal comfort in the spaces. I believe that the thermal comfort model is specified under the PEOPLE command. I selected the Fanger model, but then I am required to input an air velocity schedule that the model uses for its calculations. I want thermal comfort calculated based on the natural ventilation that occurs in the space. I can't schedule the air velocity, because that's what I'm trying to model.

Answer

The EnergyPlus Airflownetwork model only calculates the bulk flows in and out of each zone. It does not calculate local air velocities. For your purpose, it will be necessary to obtain hourly (or time-step if you prefer) output from the airflownetwork simulation, then make your own calculation of local air velocities for each PEOPLE object based on the flow rates, opening sizes and zone volumes. The air velocities can then be fed back into the PEOPLE object using SCHEDULE:FILE:COMMA.

Ask an EnergyPlus Expert

BASEMENT INPUT

Please explain the following input fields for me.

1. "Gravel fill above the floor slab"

Is this gravel fill above the basement floor and alongside the walls? Or, does this refer to gravel fill above the slab covering a totally underground building?

2. "Aspect Ratio"

Should the aspect ratio be based on the entire heat transfer surface of the underground structure or on a single wall? And is the 3-D grid generated for the entire basement including the enclosed space? Or, does the program generate 3-D grids for each wall and floor slab?

Answer

1. Alongside the walls. These three fields go together:

Field N3: This specifies the width of the gravel fill bed beside the basement wall.

Field N4: This specifies the depth of the gravel fill above the floor slab.

Field N5: This specifies the depth of the gravel fill below the floor slab.

2. There is an "A/P ratio" in the EquivSlab object. This is the area-to-perimeter ratio of the floor slab only. I do not know if the 3-D grid subdivides the interior space, but this would expect this to have little impact on the results.

CONDENSING TEMPERATURE CONTROL

I'm new in the field of building energy simulation. I need to investigate how the condensing temperature serves to accurately determine the energy efficiency or COP of air-cooled chillers under part load conditions. How can I model variable lower condenser temperature in EnergyPlus/DesignBuilder? Can anyone point the way?

Answer

I am not sure I understand the question, but here goes: the chiller models use curve-fits to establish efficiency (COP or EIR) as a function of chilled water and condenser temperatures. The equations are explained in the Input/Output Reference and/or the Engineering Reference Manuals, depending on the particular chiller model.

If you want to see this effect in EnergyPlus output results, you could set up a simulation that is similar to the PlantLoadProfile.idf example file using an air-cooled chiller and a fixed plant load. Then model it with a weather file or a series of design days and compare efficiency vs. outdoor dry bulb.

Ask an EnergyPlus Expert

MOISTURE TRANSFER

I would like to simulate transfer of moisture from the outside surfaces of a basement into the conditioned space. Should the MTF method be used for this application and not the EMPD algorithm?

Answer

EMPD only models moisture storage and release, so it will not model your example. MTF is intended to model moisture transfer, however the current implementation is rather limited due to a single set of linear coefficients when in reality the moisture properties are very nonlinear as conditions change. See the cautions in the Input/Output Reference and Engineering Reference Manuals in the sections regarding moisture material properties. I do not think that MTF can deal with soil as the outside environment. So, you probably need to find another tool to model this moisture transport.

Question

Can I use "Othersidecoeff" boundary conditions when the MTF solution method is selected?

Answer

No. Othersidecoeff has no provision for establishing moisture conditions.

Question

Is there a sample file containing moisture properties data for typical construction materials?

Answer

Please refer to EnergyPlusV1-3-0\DataSets\MoistureMaterials.idf

MODELING ATTIC SPACE

I am simulating a simple residential building. How do I define the attic space, which has a pitched roof? The attic space is not used but it is naturally ventilated. Does the attic space have to be modeled as a different zone or is there another way to model it?

Answer

It would be best to model it as a different space. Check out the example files: AirflowNetwork_Simple_House.idf and AirflowNetwork_Multizone_House.idf. See the geometry (heat transfer surface) portion of the example file AirFlowNetwork_Simple_House.idf.

Meetings - Conferences - Symposia

2006

November 15-17	Greenbuild 2006 (usgbc)	greenbuild@conferon.com
November 20-21	ClimaMed 2006	http://www.climamed2006.org
December 11-13	System Simulation in Buildings (SSB 2006)	http://www.ulg.ac.be/labothap/ann-ssb.htm

Ask an EnergyPlus Expert

ELECTRIC VS HOT-GAS REHEAT

I am modeling a unitary system (type:Furnace:BlowThru:HeatCool) with the high humidity control activated. First, I ran the model with a Hot Gas Reheat Coil, then with an electric reheat coil. The rest of the model remained unchanged. The results from the simulation using the electric reheat coil show that zone temperature and humidity are tightly controlled. On the other hand, the Hot Gas reheat simulation resulted in significant zone temperature deviations from the cooling setpoint (zone is cooled as much as 7F lower than setpoint temperature, to maintain desired max humidity). This, in turn, required a much high system cooling capacity.

Answer

As explained in the documentation, the maximum amount of heat reclaim for the COIL:Desuperheater:Heating is 30% of the total heat rejection. For your simulation, this must not be sufficient (particularly at part-load conditions).

Question

Are there any other aspects of the model that need to be modified depending on which reheat coil type is used?

Answer

Did you compare the maximum heating capacity of your electric reheat coil to the maximum heat provided by your COIL:Desuperheater:Heating object? And, no, there are no other aspects of the model that need to be modified.

Question

Also, are there any Unitary System Objects in EnergyPlus that support a draw-through configuration for cooling and blow-through for heating?

Answer

UNITARYSYSTEM:HEATPUMP:AIRTOAIR and UnitarySystem:HeatPump:WaterToAir currently allow the user to specify both blow-through or draw-through fan arrangements. We intend to add drawthrough configuration to the Unitary HeatCool systems in a future release (Oct 2006 or April 2007 depending on scheduling).

REPORT VARIABLES

In example file "5ZoneAutoDXVAV" I added report variable "System Node Temp" and set all reporting frequencies to one-hour; however, I was unable to see the corresponding fields in the Excel Output file. The ".RDD" file didn't contain the subject variable name. Also, I'm not able to get the usual warning that the report variable is not being reported due to spelling error, etc. Any hints on how to fix this?

Answer

Do you also have a 5zoneAutoDXVAV.rvi file? If so, it will only report the variables that are in that file (if you're using the example file out of the example files folder). If you remove the .rvi file you will get everything reported (up to 255 variables); alternatively, you could add the System Node Temp to the .rvi file. Also, check the .eso file (5ZoneAutoDXVAV.eso) because the first lines show what report variables will be shown in the file along with their "report id" numbers.

EnergyPlus Version 1.3.0

Download a free copy of the program

<http://www.energyplus.gov/>

Support Tools

Support software is listed on the main EnergyPlus website: www.energyplus.gov

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 Meteorom 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 (details below). 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](#), Q and A for [2005](#)

Are you an EnergyPlus Consultant ?

If you are an EnergyPlus consultant and would like to be listed in this newsletter and on our website, 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. To join, 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).

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QuickLink to EnergyPlus Documentation

<http://www.eere.energy.gov/buildings/energyplus/documentation.html>

Please visit our website at <http://SimulationResearch.lbl.gov>

Revised

Position Available at Lawrence Berkeley National Laboratory

Computational Scientist—Req. 019491

Apply here → <http://jobs.lbl.gov/LBNLCareers/>
then search the Environmental Energy Technologies Division



Uncle Fred Wants You!

Environmental Energy Technologies Division, Building Technologies Department

POSITION SUMMARY: This person will be a key participant in the research and development activities of the Simulation Research Group (SRG) within the Building Technologies Department (BTD) of the Environmental Energy Technologies Division (EETD). This building science modeling group is the developer or co-developer of several widely-used building energy analysis tools including EnergyPlus, DOE-2, Spark, and GenOpt. This is an opportunity to help design and implement the next generation of advanced energy simulation tools designed to improve the design and operation of energy efficient buildings

DUTIES: *Essential* - As a member of the EnergyPlus team, develop new and enhance existing computational capabilities in EnergyPlus. This includes engineering model development, coding, validation and documentation tasks. Assist the DOE EnergyPlus development team and the DOE Program Manager in guiding current EnergyPlus development and in defining and prioritizing future modeling capabilities. Contribute to the design and operation of the Building Controls Virtual Test Bed and to the development of model-based diagnostic tools for buildings. Act as a project leader. Work with other groups in EETD to coordinate tool development activity, to identify new cross-cutting simulation-based initiatives and to jointly seek funding for new projects. Play an active role in key technical, scientific and professional societies involved with Building Simulation; e.g., ASHRAE and the International Building Performance Simulation Association. Publish technical results in peer reviewed journals. Participate in the development of the annual operating plan (AOP) and in DOE and LBNL peer review processes.

Marginal - become familiar with and assist in group financial management.

QUALIFICATIONS: *Essential* - Advanced degree or equivalent experience in computational science, engineering, architectural engineering related building science field. Two or more years of experience in developing mathematical models for state of the art building energy simulation models, preferably in the HVAC area, and implementing these models in computer code. Strong working knowledge of one or more programming languages, preferably Fortran90, C/C++, or Java. Demonstrated ability in using either whole building energy analysis programs (such as EnergyPlus, DOE-2, ESP, eQuest) or general nonlinear differential/algebraic solvers (Spark, TRNSYS, EES, HVACSIM+, DASSL). Excellent verbal and written communications and presentation skills. Demonstrated ability to lead projects and coordinate development with diverse technical partners.

Marginal - Experience in one or more areas of architectural and/or engineering practice, building design process, building controls, facilities operations and management.

IF you have problems uploading your resume on the LBNL website, please contact Kathy Ellington at (510) 486-4931 or klellington@lbl.gov.

**USDOE's Industrial Technologies Program
Best Practices Software Tools**

<http://www1.eere.energy.gov/industry/bestpractices/software.html>

QuickPEP – Quick Plant Energy Profiler (added May 2006)

Online software tool gives a quick overview of how energy is being used in a plant. After the tool identifies areas for potential savings, the customer is provided with a list of potential next steps to begin realizing energy and cost savings. Read the fact sheet ([PDF 502 KB](#)), **learn more about Quick PEP, and try the BETA release.**

October 2006 Educational Programs

Pacific Gas & Electric Company

San Francisco, California

For a complete listing of classes and to register go to www.pge.com/pec

BUILDING ENVELOPE

Oct 17 [Home Energy Efficient Design \(HEED\)](#)

BUILDING PERFORMANCE

Oct 17 [Commissioning \(Cx\) with Data Loggers](#)
Oct 26 [Case Studies of HVAC Retrofits for High Tech Facilities](#)

COMMISSIONING

Oct 17 [Commissioning \(Cx\) with Data Loggers](#)

CONTROLS

Oct 26 [Case Studies of HVAC Retrofits for High Tech Facilities](#)
Oct 31 [Managing Baseloads with Energy Feedback Devices](#)

HVAC

Oct 26 [Case Studies of HVAC Retrofits for High Tech Facilities](#)

LIGHTING

Oct 18 [Lighting Fundamentals](#)
Oct 24 [Light & Health](#)

SOFTWARE

Oct 17 [Home Energy Efficient Design \(HEED\)](#)
Oct 17 [Commissioning \(Cx\) with Data Loggers](#)
Oct 18 [EnergyPro Nonresidential Software for Beginners](#)

TITLE 24

Oct 18 [EnergyPro Nonresidential Software for Beginners](#)



DOE-2.1E



DOE-2.1E (version 124) 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) 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
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 2005](#) [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.

Study Hard to Become a Scientist! Grow Your Hair! Get Famous!

<http://www.improbable.com/projects/hair/hair-club-top.html>

Yes, it's the "Luxuriant Flowing Hair Club for Scientists" !! (no lie)

The DOE-2 "Doctor" Answers Your Questions



by
Joe Huang

DOE-2 OUTPUT FILES

I am trying to get the ground temperatures from DOE-2.1E. The DOE-2 manual on "Libraries and Reports" states that the ground temperature is GLOBAL variable with a variable list number 2. From some examples I have noticed that we need to add 4 to the stated list number for GLOBAL outputs. When I specify 8 as the Variable list I get the expected dry bulb temperature as the output. I am assuming that I should specify 6 for the ground temperatures. However I get the current hour as the output instead. Please let me know how I could get the ground temperatures.

Also, I am trying to output the BUILDING-LOADS variable list no 10 (building lighting heating loads). When I specify the Variable-Type = BUILDING or even BUILDING-LOADS. I get an error "symbol previously undefined." Please let me know what is to be specified as the VARIABLE-TYPE to get the building loads.

Answer

You have to be careful in distinguishing Hourly-Reports for LOADS versus SYSTEMS or PLANT. From your description, you are extracting the GLOBAL variables in SYSTEMS, where variable 6 (ISCHR) is the current hour of simulation, and 8 (DBT) is the dry bulb temperature (see DOE-2.1E Supplement, p. A.16). Ground-temperatures in Rankine are available as GLOBAL variable 2 (TGNDR Ground temperature, Rankine) in the LOADS hourly-report (see DOE-2.1E Supplement, p. A.2). Therefore, you should try moving your HOURLY-REPORT commands from SYSTEMS to LOADS.

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The Big List of Free

Free!!! Books

2005 Buildings Energy Data Book	http://buildingsdatabook.eere.energy.gov/
Daylight in Buildings (book on CD)	klellington@lbl.gov
Residential Lighting Design Guide (California)	http://www.cltc.ucdavis.edu/

Free!!! Building Energy Software *

BDA 3.1	http://gaia.lbl.gov/BDA
COMIS	http://www-epb.lbl.gov/comis
EnergyPlus 1.3.0	http://www.energyplus.gov/
GenOpt 2.0	http://SimulationResearch.lbl.gov
Optics 5.2	http://windows.lbl.gov/materials/optics5/
HEED, SOLAR 5.7, OPAQUE, etc.	http://www.aud.ucla.edu/energy-design-tools
HOMER (off-grid and grid-connected power systems)	http://www.nrel.gov/homer/
Industrial Technologies Software from the U.S. Department of Energy	http://www1.eere.energy.gov/industry/bestpractices/software.html
RADIANCE 3.5	http://radsite.lbl.gov/radiance/
RESFEN 3.1	http://windows.lbl.gov/software/resfen/resfen.html
THERM 5.2	http://windows.lbl.gov/software/therm/therm.html
VisualSPARK 2.0	http://SimulationResearch.lbl.gov
WINDOW 5.2 (window thermal analysis)	http://windows.lbl.gov/software/window/window.html

* See also the "big daddy" of building energy software lists, compiled by Dru Crawley of USDOE, at http://www.eren.doe.gov/buildings/tools_directory -- note that some software on the USDOE list is not free ☺

Free!!! Memberships

IBPSA-Australasia	veronica.soebarto@adelaide.edu.au
IBPSA-USA	peter_ellis@nrel.gov

Free!!! Newsgroups (Mailing Lists)

BLDG-SIM	BLDG-SIM-SUBSCRIBE@GARD.COM
EnergyPlus User/Support Group	http://groups.yahoo.com/group/EnergyPlus_Support/
GARD Analytics (http://www.gard.com/) for:	
ASHRAE 4.7 Energy Simulation	tc47-l-subscribe@gard.com
ASHRAE 2.8 Building Environmental Impacts/Sustainability	tc28-l-subscribe@gard.com
Standards Project - Test for Building Energy Analysis Software	spc140-l-subscribe@gard.com

Continued on the Next Page

Please visit our website at <http://SimulationResearch.lbl.gov>

The Big List of Free -- Continued

Free!!! e-Newsletters

Architecture Week	http://www.architectureweek.com
ASHRAE	http://www.ashrae.org/template/enewsletterlanding
BLUEPRINT (State of California)	http://www.energy.ca.gov/efficiency/blueprint/
FSEC (Florida Solar Energy Center)	http://www.fsec.ucf.edu/bldg/resources/newsletter/
Rocky Mountain Institute	http://www.rmi.org
SBSE (Society of Building Science Educators)	http://www.sbse.org

Free!!! Weather Data

Real Time Weather Data (on demand)	http://www.eere.energy.gov/buildings/energyplus/cfm/weatherdata/weather_request.cfm
California Climate Zones on GoogleEarth™ Download, install and launch GoogleEarth then download and open the Climate Zones CA-CZ.kmz 120 kb file.	http://earth.google.com/

Free!!! Web Tools

Home Energy Saver (home energy use)	http://hes.lbl.gov
Mechanical Engineering – world wide virtual library	http://dart.stanford.edu/vlme/
ORNL Building Envelope Calculators	http://www.ornl.gov/sci/roofs+walls/index.html

Be There or Be Square!

Square One Research

The developers of *Ecotect* spent over one year revamping their web site -- and it's a beauty!! Here's the link: <http://www.squ1.com>

Of special interest is their new, electronic journal, "Natural Frequency," (<http://naturalfrequency.com/>) for articles on the environmental design of buildings and the application of analysis and simulation in architecture.



And don't miss the Square One Wiki (<http://squ1.org/wiki/Home>), a free resource of educational material on the environmental design of buildings. The Wiki is a public area where Square One is in the process of putting all their online course notes and user documentation projects. Making it a Wiki will allow users to add pages and make changes to any part of the documentation.

[HTTP://BLEER.LBL.GOV](http://bleer.lbl.gov)

ALL BUILDING TECHNOLOGY ALL THE TIME

U.S. Tax Deductions for Energy Efficient Commercial Buildings



**More on the Energy Policy Act of 2005
and
The Commercial Building Tax Deduction Coalition**

On August 8, 2005, the President signed H.R. 6, the Energy Policy Act of 2005. The legislation set a precedent by containing a market transformation incentive in the form of a tax deduction for owner investments in commercial building energy efficiency. The Energy Policy Act of 2005 established a new deduction for expenses incurred for energy-efficient commercial building property.

This site (http://www.efficientbuildings.org/about_the_provision.html) has good information plus a big list of frequently asked questions with links to expanded answers.

Sample of the Frequently Asked Questions:

- [What types of buildings will qualify? What types of expenditures will qualify?](#)
- [What is the tax deduction amount?](#)
- [Are there certification requirements and if so, what are they?](#)
- [How will calculation design methods impact various technologies?](#)
- [Will there be inspections of buildings to determine compliance? Who will do them?](#)
- [Do public buildings qualify for this tax deduction?](#)

Related rules and links: http://www.efficientbuildings.org/related_rules.html

Also, the National Electrical Manufacturers Association (NEMA) has issued guidance on how to satisfy the project certification requirements of the Energy Policy Act of 2005. Follow this link to the NEMA website for sample language and examples of the required certification letter: <http://www.nema.org/gov/efficientbuildings/upload/Guidance-EPACT-Tax-Incentive-Certification-Letters.pdf>)

**October 2006 Issue of the *Setting the Standard* Newsletter Available!
(http://www.energycodes.gov/news/sts/pdfs/standard_october06.pdf)**

In this issue,

- Selecting Appropriate Building Energy Simulation Software
- Can Energy Code Compliance Tools Be Used To Determine EPACT 2005 Tax Incentives?
- U.S. DOE Provides Technical Assistance for States Considering New Codes
- 2006/2007 ICC Code Development Hearings
- New This Year -- Online Self-paced Training Tools
- Upcoming Software Updates Reflect User Preferences
- First Annual Jeffrey A. Johnson Award Winner Announced
- Building Energy Codes Training Progresses at an Astounding Pace

The *Setting the Standard* newsletter encourages the exchange of information among building professionals and organizations, state and local code officials, and researchers. Its goal is to facilitate timely development and early adoption of the building energy conservation standards.