

*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 of Version 1.4.0** ***
- 3 ... Ask an **EnergyPlus** Expert
 - 3 Shaded Building 6 Window Shades
 - 4 Outputs 7 Solar Radiation
 - 5 Energy Outputs 7 Flow Rate Problem
 - 5 Output—Heat Gain 8 Inside Surface Conduction
 - 6 Long Run Times 8 Chiller Coefficients
- 11 ... Position Available on the EnergyPlus Team at LBNL
- 14 ... PIER Tech Briefs, Part 3 of 3

The Buzz

November -- Training
Two 1-day workshops using DesignBuilder, to generate inputs for EnergyPlus, will be held in Sydney and Adelaide, Australia. For dates and details, please contact P.C. Thomas at pallivathukkal_thomas@yahoo.com

Recent Reports

- 10 ... From the eSim 2006 Conference held May 4-5, 2006
 - "Inter-Program Comparison of a Virtual Model of a University Building"
 - "Thermal Performance Simulation of an Atrium Building"
 - "A Case Study Demonstrating the Utility of Inter-Program Comparative Testing for Diagnosing Errors in Building Simulation Programs"



Regular Features

- 9 ... **EnergyPlus** v.1.4.0
- 9 ... Meetings – Conferences – Symposia
- 12 ... **DOE-2.1E** v.124
- 13 ... **Big List of FREE!**
- 15 ... November Educational Programs from Pacific Gas & Electric

Special Thanksgiving Treat!
Please turn to p. 16 for the attractive (and informative) ASHRAE chart of Thermal Conductivity of Meats, Fats, Gelatin Gel and Water.
Better safe than sorry.

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 1.4.0

The thirteenth major version of EnergyPlus (1.4.0) was released on October 12, 2006 and is now available in versions for both the Windows and Linux operating systems. Download at no cost from the EnergyPlus web site at <http://www.energyplus.gov>.

What's New in Version 1.4.0 ??

A few of the new features in EnergyPlus V 1.4 are listed below — for a complete list of new features added in this and previous versions please go to <http://www.energyplus.gov/features.html>

- NEW water manager to control and report water use throughout the building including HVAC components, zone-level water end-use objects that allow hot and cold water mixing at the tap, zone latent gains, drain-water heat recovery, rain-water collectors for harvesting precipitation, ground-water wells with pumping, water storage tanks for storing and reusing reclaimed water.
- New Zone thermostatic control options including operative temperature and thermal comfort control using Fanger PMV values as setpoints.
- New simple duct leakage model for VAV system with return plenum
- New reformulated version of the DOE 2.1E EIR chiller based on the PG&E Cool Tools project.
- Window and door multipliers and triangular doors are now allowed.
- Exterior window screens can now be modeled more accurately.
- New predefined reports to aid in complying with beyond-code programs such as the new commercial building tax deduction including input verification and results, climate, envelope and equipment summaries.

And many other enhancements and significant speed improvements throughout.

EnergyPlus Training Workshops

We are planning workshops on the west coast in late 2006 or early 2007. For more information, please see: <http://www.gard.com/training.htm>

EnergyPlus Support Group at YahooGroups

Join more than 1050 EnergyPlus users in an email group on YahooGroups—a place to ask your questions of and share information with other EnergyPlus users. The YahooGroup also provides a searchable archive of all 5-1/2 years of discussion—more than 7000 email messages (search there first to find an answer to your question). You can also upload files to share with other users. This group supplements but does not replace the primary support email address of EnergyPlus-Support@gard.com.

The main web page for the group is: groups.yahoo.com/group/EnergyPlus_Support

To subscribe, send an email message to: EnergyPlus_Support-subscribe@yahoogroups.com

Continued on the Next Page

Release of EnergyPlus 1.4.0 (continued)

Update on User Interfaces

EP-Quick

creates an EnergyPlus input file based on a broad range of zone templates (released April 2005).

E2AC

is an interface in Portuguese and English (available since January 2005).

DesignBuilder

a graphic user interface, was released in December 2005.

Hevacomp

uses EnergyPlus as its simulation engine (2006).

EFEN

is now available in beta version for users to test.

Green Building Studio

can take an existing CAD file and convert to an EnergyPlus input file.

Several other interfaces are under development. Watch our web site (www.energyplus.gov/ep_interfaces.html) for up-to-date information on these and other interfaces.

A number of utilities and tools for creating, editing, and running input files come with EnergyPlus, including IDF Editor, EP-Launch, and HVAC-Diagram (see www.energyplus.gov/ep_utilities.html).

Third party tools for creating, editing, and displaying EnergyPlus input files are also available, including DrawBDL, EcoTect, ESP-r, Green Building Studio, EzDrawPlus, IFCtoIDF, TSe+, and EzPlus-Parm. See www.energyplus.gov/third_party_tools.html for more information.

Ask an EnergyPlus Expert

SHADED BUILDING

When I defined neighboring buildings that shaded my building I got many warning messages. After I deleted some of the shading surfaces the number of warning messages decreased. Do I have to pay attention to these warning messages?

Answer

There are two things you can do to solve the "too many figures" problem.

1. When describing surrounding buildings, describe only the façades that will cast shadows on your building (do not describe all four sides of a neighboring building if one side is adequate to describe the shading).
2. Add "Diagnostics, DoNotMirrorDetachedShading;" to your input file. This turns off the automatic mirroring of detached shading surfaces. This must be used with caution, however, because it requires that you be careful about the facing direction of every detached shading surface. Every detached shading surface must face toward the building being modeled, because shadows are only cast in that direction (hemisphere).

Ask an EnergyPlus Expert

OUTPUTS

I need some clarification of EnergyPlus outputs.

1) Report variable: zone/system sensible cooling energy

According to the Input/Output Reference Manual, this refers to the sensible energy supplied by the system to the zone reporting the cooling delivered by the HVAC to the zone. It does not always indicate the operation of the cooling coil. The manual states that if supply air is cooled by outside air it will be reported as a cooling load even if the coils are off.

If I am using Purchased Air with no outside air (just recirculation), and I am defining a ventilation object, is it true that the zone/system cooling energy will be reported only when the coils are on? I ask the question because I do have air from the outside that might be cooling the zone (I specified a ventilation object) but this air is not influencing the supply air as it is not being mixed with the return air of the Purchased Air, it is being delivered to the zone directly. Would the zone/system cooling energy be reporting a cooling load with the coils off, even if there is a ventilation object assigned to the zone, if the Outside air is set to "NO" in the purchased air object?

2) Report variable: Zone/sys sensible load to cooling setpoint predicted

According to the documentation this variable reports the predicted sensible load required to meet the setpoint. Again will this variable refer to the loads due to the coils ("on") or all the cooling loads being delivered when I simulate using a Purchased Air object?

3) Report variable: Ventilation loads reports

There were new report variables in EnergyPlus 1.3.0 for ventilation loads. I tried to use them with the same settings, Purchased air objects, no outside air specified, but ventilation objects used instead. I got null values for all the variables referring to the ventilation reports. Do these reports only refer to ventilation loads when specified through outside air objects? If I use the ventilation object only - even with mechanical ventilation sets - these variables will report me null values - is that correct?

I would like to isolate cooling loads from coils on due to ventilation only, setting this ventilation separately from my ideal machine. Would this be possible in any way?

Answer

The zone heat balance includes the impact of VENTILATION before computing the "Zone/System sensible load to cooling setpoint predicted." The HVAC system (PURCHASED AIR) sees the net load including any increase or decrease in load due to the VENTILATION air. So, in answer to the specific questions:

- 1) For PURCHASED AIR (with zero outside air flow in the PURCHASED AIR object), zone/system cooling energy will be reported only when the coils are on.

Continued on the next page

Ask an EnergyPlus Expert

OUTPUTS (CONTINUED)

2) Zone/System sensible load to cooling setpoint predicted is the load to be delivered by the HVAC system. VENTILATION objects are not considered to be part of the HVAC system in EnergyPlus. So, for PURCHASED AIR this is the cooling coil sensible load.

3) Correct. The mechanical ventilation report variables only report outside air delivered from an HVAC system, and it only supports systems that are modeled with an AIR PRIMARY LOOP, not zone equipment.

And in order to achieve your goal of determining the load due to ventilation air, three options come to mind:

- Do two runs, one with VENTILATION and one without.
- Report the Zone/System sensible cooling load, Zone Ventilation Sensible Heat Loss, and Zone Ventilation Sensible Heat Gain on an hourly basis. Then you can analyze the hourly results to determine the benefits and penalties of the ventilation air.
- Use COMPACT HVAC and model a unitary system with outside air provided by the HVAC system. Then the mechanical ventilation report variables will sort out the load impact of the outside air (cooling load increase, cooling load decrease, etc.)

OUTPUT – HEAT GAIN

Which output variable can export the heat transferred from the outside condition to the zone through the exterior wall? And which variable can export the heat transferred from other zones?

Answer

There are no report variables that report this. These heat flows all get mixed in with solar gains and internal loads and they cannot be easily separated.

ENERGY OUTPUTS

Is it possible to get the energy (in Joules) needed for a HVAC system without introducing the HVAC type?

Answer

No. In EnergyPlus you need some kind of HVAC system to control the zones, or else the zone's thermal conditions will float. The Purchased Air HVAC system is the simplest way to get load information [J] without really describing a specific type of HVAC system. But the *energy* needed to meet loads is a different question. Try the CompactHVAC objects to facilitate adding an HVAC system.

There's a new monthly edition of the *CARB News* (Consortium for Advanced Residential Buildings) available at <http://www.carb-swa.com/>

Ask an EnergyPlus Expert

LONG RUN TIMES

I am running a simulation of a heavily glazed, three story building that has 107 zones. The simulation is taking too much time to run. I've tested the debug with two design-days only and it took approximately 10 hours to run.

My settings are:

- minimal shading (but I will need to change it to full),
- 25 warm up days (this one can be reduced)
- 6 time steps per hour
- 14 periods of shading calculation (but I'd like to have fewer days, if possible, due to the heavily glazed façade)

How do I reduce the calculation time so I can run a whole year? My next try is going to be fewer time steps and fewer warm-up days, but using full shading.

Answer

Memory might be the issue. You can check this by monitoring memory usage in the Windows task manager.

Don't change the warm-up days. Each environment "warms up" the thermal history of the building by repeating the first day of the environment until the results change within the convergence tolerances specified in the BUILDING object. The maximum number of warm-up days is just an upper limit. The simulation reports the actual number of warm-up days in the eio output file.

If the model has many detached shading surfaces (Surface:Shading:Detached:Fixed and Surface:Shading:Detached:Building), it may help to turn off the automatic mirroring of these shading surfaces:

```
DIAGNOSTICS, DoNotMirrorDetachedShading;
```

But use this with caution. If DoNotMirrorDetachedShading is specified, then these surfaces must face toward the building being simulated, because surfaces only cast shadows in the direction they face. In general, reducing the total number of surfaces helps speed up the simulation.

WINDOW SHADES

How can I model interior shades that are closed during daytime for all months and exterior blinds that are controlled using "OnIfHighSolarOnWindow" with a defined set point only for summer days. In other words, is it possible to model both interior and movable fixed exterior window shades at the same time?

Answer

The EnergyPlus window shade controls can only model one shading layer. I cannot think of a way to model what you describe.

Ask an EnergyPlus Expert

SOLAR RADIATION

What are the definitions of these solar radiation variables in the EnergyPlus IDD?

- Extraterrestrial Horizontal Radiation
- Extraterrestrial Direct Normal Radiation
- Horizontal Infrared Radiation from Sky
- Global Horizontal Radiation
- Direct Normal Radiation
- Diffuse Horizontal Radiation

Answer

These are defined in the Auxiliary programs document, page 40ff (page 52 of the pdf). However, not all of these are currently used by EnergyPlus. Climate outputs during simulations are shown in the Input/Output Reference, page 47ff, (page 82 of the PDF).

Question

How does EnergyPlus use Horizontal Infrared Radiation from Sky, Direct Normal Radiation, and Diffuse Horizontal Radiation?

Answer

Please refer to the Engineering Reference document "Sky and Surface/Shading Calculations", page 74 (page 106 of the PDF). See if that helps answer your questions.

FLOW RATE PROBLEM

I set a domestic hot water object that is parallel to a fan coil unit; both objects are served by a water heater. I set the flow rate of the domestic water object to be equal to $0.001\text{m}^3/\text{s}$. I used the autosizing feature of EnergyPlus to size the fan coil unit and found that the maximum flow rate of the plant loop is equal to the amount of the fan coil unit, rather than that of the domestic water in the EIO file. Since the flow rate of the fan coil unit is less than that of the domestic water, I wonder why EnergyPlus doesn't use the flow rate of the domestic water? During the simulation, I used a variable speed pump; the autosizing result of the pump flow rate is equal to that of the fan coil unit. When I changed the pump type to be constant speed, and set the flow rate of the pump equal to that of the domestic water, EnergyPlus showed warnings that the flow resolver is unable to calculate the flow rate correctly. The warning said that the upper limit of the flow rate is equal to the flow rate of the fan coil unit, and the flow rate of the constant speed pump is bigger than that of the fan coil unit. I want to set a bigger flow rate for the plant loop in order to increase the heating demand of the domestic water. Since the temperature difference of the water mixer is around 8C , I can't make the heating demand of the domestic water large enough, based on the flow rate of the fan coil unit. How can I fix these problems?

Answer

The autosizing routines are only looking at the thermal loads on the zone and are not quite smart enough to also factor in the added loads from domestic hot water. You'll have to manually size the pump and plant loop design flow rate. You can find the value by taking the autosizing's flow rate result (reported in the EIO) and then manually add the additional flow rate for the domestic hot water. For a constant flow pump, you will also need a third bypass that is in parallel with the coil and domestic hot water.

Ask an EnergyPlus Expert

INSIDE SURFACE CONDUCTION

I have a single zone model in which all surfaces are subject to constant temperature boundary conditions. During Winter design runs the "Inside Face Conduction" for all walls, except the floor, is Positive despite the fact that "inside wall surface temperatures" are higher than "outside surface temperatures" in all cases. During Summer design runs, "inside wall surface temperatures" are still higher than "outside surface temperatures," but this time all "Inside conduction" rates are negative. While I can make sense of the Summer design results, the Winter results are a mystery.

Answer

Carefully read the definition of this report variable in the Input/Output Reference. Because surfaces can store heat, the outside surface temperature has little to do with the current value of inside face conduction. The indoor air temperature, the inside surface temperature, and the balance of radiant and solar energy falling on the inside surface will determine the direction of inside face conduction heat flow. Try making the model as simple as possible (no sun, steady-state, no internal gains, and perhaps even set thermal absorptance to something very small to minimize radiant transfer between surfaces) to first convince yourself things are working okay. Then add each component back in one by one and see how things change.

Question

I implemented your suggestion and made the model as simple as possible by using Regular-R materials on all construction elements, no internal loads, and by setting thermal absorptance to low values. The results obtained from design day simulations using this model are very similar to what I had obtained when using regular materials. Is there anything else that I need to set to force a steady-state solution?

Answer

There is no need to switch to regular-R materials. In fact, it is better to use at least some materials which are material:regular. Make sure you shut off the sun (clearness = 0.0 in the design day objects).

CHILLER COEFFICIENTS

I want to use Chiller:Electric and need the coefficients. Are the coefficients in the EnergyPlus documentation?

Answer

These coefficients change depending on the specific chiller. The most accurate way to get these coefficients is to get performance data (capacity and power consumption) for a set of data points covering a range of entering chilled water and condenser water temperatures and then you build a spreadsheet to curve-fit the coefficients. If you just want representative data, then the file DataSets\PerfData.idf contains some curve data for CHILLER:ELECTRIC:EIR for centrifugal and reciprocating chillers.

<h2 style="margin: 0;">EnergyPlus Version 1.4.0</h2> <p style="margin: 0;">Download a free copy of the program</p> <p style="margin: 0;">http://www.energyplus.gov/</p>
<p>Support Tools</p> <p>Support software is listed on the main EnergyPlus website: www.energyplus.gov</p>
<p>Weather Data from http://www.eere.energy.gov/buildings/energyplus/cfm/weather_data.cfm</p> <p>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.</p>
<p>Ask an EnergyPlus Expert</p> <p>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</p>
<p>Are you an EnergyPlus Consultant ?</p> <p>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.</p>
<p>Join the EnergyPlus User Group</p> <p>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/</p>
<p>Testing and Validation http://www.eere.energy.gov/buildings/energyplus/testing.html.</p>
<p><i>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).</i></p>

Meetings - Conferences - Symposia

2006		
November 20-21	IBPSA Australia 2006 Conference	http://www.adelaide.edu.au/ibpsa2006
December 11-13	System Simulation in Buildings (SSB 2006)	http://www.ulg.ac.be/labothap/ann-ssb.htm
2007		
January 27-31	ASHRAE Winter Meeting	http://www.ashrae.org/
March 06	IBPSA England Symposium	http://www.ibpsa-england.org
March 22-23	Canadian Conference on Building Science + Technology	http://www.nbec2007conference.com/
May 21-25	CIB World Building Congress 2007	cdejager@saice.org.za
June 10-14	CLIMA 2007	http://www.clima2007.org/portal/
June 13-15	Roomvent 2007	http://www.roomvent2007.org
June 23-27	ASHRAE Annual Meeting (Long Beach, CA)	http://www.ashrae.org
September 03-06	Building Simulation 2007 – IBPSA China	http://www.ibpsa.org

INTER-PROGRAM COMPARISON OF A VIRTUAL MODEL OF A UNIVERSITY BUILDING

[Danielle Monfet](#)¹, Radu Zmeureanu¹, Nicolas Lemire², and Roland Charneau²

¹Centre for Building Studies, Department of Building, Civil and Environmental Engineering, Faculty of Engineering and Computer Sciences, Concordia University, Montréal, Canada

²Pageau, Morel et Associés, Montréal, Canada

ABSTRACT

This paper presents the first phase of the development of a virtual model for the new Concordia Sciences Building by using the **EnergyPlus** program. The size and complexity of the building makes the modeling process a challenge and, at the same time, an excellent way to compare and understand the predictions of different mathematical models. During this development, an inter-program comparison of thermal loads as predicted by **EnergyPlus** and EE4 programs was undertaken. [Download Paper](#)

THERMAL PERFORMANCE SIMULATION OF AN ATRIUM BUILDING

Özgür Göçer¹, Aslihan Tavil², and Ertan Özkan¹

¹Faculty of Engineering and Architecture, Beykent University, Istanbul, Turkey

²Faculty of Architecture, Istanbul Technical University, Istanbul, Turkey

ABSTRACT

In recent years highly glazed spaces and atrium buildings are seen as a sign of advanced technology. An atrium is the social center of a building where people gather for social activities and also is a significant element of passive building systems. The study aims to accomplish a thermal performance simulation of an atrium building by specifying a prototype model of an office building in Istanbul. With the help of building simulation tools (**EnergyPlus** (Version 1.2.3) and FLUENT (Version 6.2.16)) total energy consumption and air stratification of the atrium building is performed. [Download Paper](#)

A CASE STUDY DEMONSTRATING THE UTILITY OF INTER-PROGRAM COMPARATIVE TESTING FOR DIAGNOSING ERRORS IN BUILDING SIMULATION PROGRAMS

Ian Beausoleil-Morrison¹, Brent Griffith², Teemu Vesanen³, Sébastien Lerson⁴, Andreas Weber⁵

¹ CANMET Energy Technology Centre, Natural Resources Canada, Ottawa Canada

² National Renewable Energy Laboratory, Golden, CO USA

³ Technical Research Centre of Finland (VTT), Espoo Finland

⁴ Université de Liège, Liège Belgium

⁵ Swiss Federal Laboratories for Materials Testing and Research (EMPA), Dübendorf Switzerland

ABSTRACT

The validation of a building simulation program or model is a daunting task, and one that should receive as much attention as algorithm and code development. Previous research in this field has led to a well-accepted approach, composed of analytical verification, empirical validation, and inter-program comparative testing to diagnose model deficiencies, mathematical solution errors, and coding errors. Through a case study, this paper demonstrates the utility of inter-program comparative testing. It shows that by comparing program-to-program results, solution problems, coding errors, and deficiencies in mathematical model descriptions can be efficiently identified, diagnosed, and subsequently repaired. [Download Paper](#)

Position Available at Lawrence Berkeley National Laboratory

Computational Scientist Requisition No. 019491

<http://jobs.lbl.gov/LBNLCareers/details.asp?jid=19491&p=1>



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.**



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.

*Can't find a table covering large enough for the Thanksgiving groaning board?
Then consider the educational **and** highly absorbent 4-ft x 6-ft poster entitled
"Energy and Buildings in the 20th Century" – FREE from your friendly federal government.
Request one today from kllellington@lbl.gov*

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
"Best Practices" Software from the U.S. Department of Energy	http://www1.eere.energy.gov/industry/bestpractices/software.html
COMIS	http://www-epb.lbl.gov/comis
EnergyPlus 1.4.0	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/
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.eere.energy.gov/buildings/tools_directory/ -- 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

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/

Continued Next Page

The Big List of Free -- Continued

Free!!! e-Newsletters (continued)

CARB News (Consortium for Advanced Residential Buildings)	http://www.carb-swa.com/
eNews (Energy Design Resources)	http://www.energydesignresources.com/publication/en/
FSEC (Florida Solar Energy Center)	http://www.fsec.ucf.edu/bldg/resources/newsletter/
IBPSANews	http://www.ibpsa.org
Lighting Link (Calif Lighting Technology Center)	http://169.237.101.18:8080/cltc/the-lighting-link
Rocky Mountain Institute	http://www.rmi.org
SBSE (Society of Building Science Educators)	http://www.sbse.org

Free!!! Weather Data

Real Time Weather Data	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

Free!!! Stuff

Poster: "Energy and Buildings in the 20 th Century"	klcellington@lbl.gov
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PIER Tech Briefs

3 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-19 Large VAVs, Low Loads, and High Performance](#)

[PIER-TB-20 Energy Benchmarking: Does Your School Get a Passing Grade?](#)

[PIER-TB-21 Speciflow™: A Fresh Approach to Measuring Outdoor Airflow](#)

[PIER-TB-22 Design Guide: How to Make Homes Cool and Efficient](#)

[PIER-TB-23 Electronic Products: Making Power Supplies More Efficient](#)

[PIER-TB-24 Bathroom Lights Save Energy and Boost Safety](#)

[PIER-TB-25 High Hopes for Low-Glare Outdoor Luminaire](#)

[PIER-TB-26 Collaborating on Commissioning](#)

November 2006 Educational Programs

Offered by Pacific Gas & Electric Company

in San Francisco, California

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

AUDITS

Nov 07 [A Tool Day Workshop: An Overview of Applications from the Tool Lending Library](#)

BUILDING COMMISSIONING

Nov 07 [A Tool Day Workshop: An Overview of Applications from the Tool Lending Library](#)

Nov 29 [Daylighting the NY Times Headquarters: Moving Daylighting from Niche to Mainstream Markets](#)

BUILDING ENVELOPE

Nov 21 [2005 Title 24 Nonresidential Building Envelope Requirements](#)

BUILDING PERFORMANCE

Nov 07 [A Tool Day Workshop: An Overview of Applications from the Tool Lending Library](#)

Nov 29 [Daylighting the NY Times Headquarters: Moving Daylighting from Niche to Mainstream Markets](#)

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Nov 15 [HVAC Retrofits 101 for Commercial Buildings](#)

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DAYLIGHTING

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Nov 30 [Getting Started with Skylighting](#)

H V A C

Nov 15 [HVAC Retrofits 101 for Commercial Buildings](#)

LIGHTING

Nov 14 [Lighting Fundamentals](#)

Nov 29 [Daylighting the NY Times Headquarters: Moving Daylighting from Niche to Mainstream Markets](#)

MARKETING AND FINANCE

Nov 08 [Understanding Financial Analysis Methods for Photovoltaic \(PV\) Systems](#)

RENEWABLES

Nov 08 [Understanding Financial Analysis Methods for Photovoltaic \(PV\) Systems](#)

TITLE 24 (CALIFORNIA ENERGY CODE)

Nov 21 [2005 Title 24 Nonresidential Building Envelope Requirements](#)

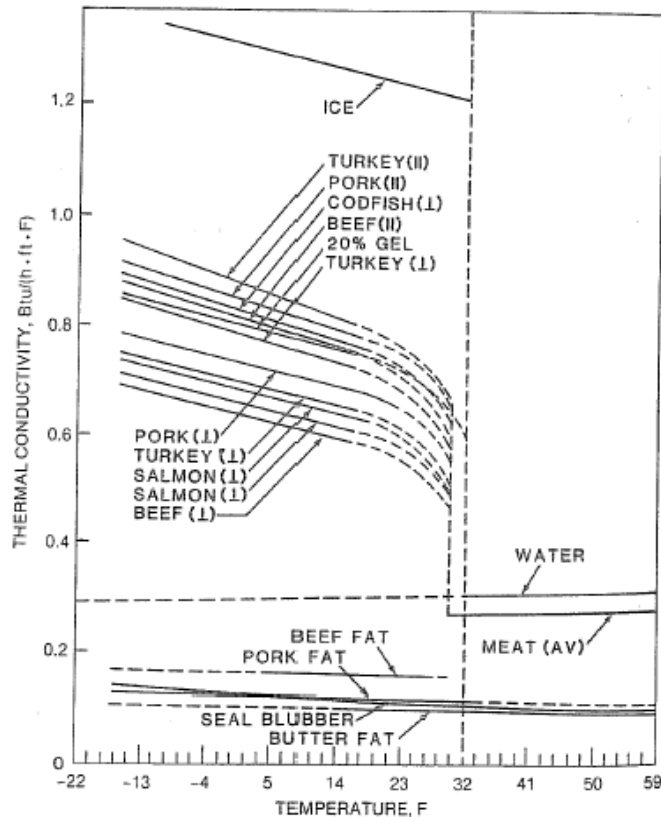
Happy Thanksgiving from the Simulation Research Group



When the frost is on the pumpkin and the autumn leaves start to fall, our thoughts here at the Berkeley Lab naturally turn to holiday cookery. However, the holiday table can be fraught with danger from improperly prepared food. So, before you tackle that Thanksgiving turkey, Christmas ham or Uncle Olaf's Codfish Surprise, it is important that you understand the thermal conductivity of the food you're cooking. We think that this attractive ASHRAE chart is an invaluable kitchen reference and suggest you paste it to your refrigerator door. Bear in mind that the simple formula of $1 \text{ Btu/hr-ft F} \approx 17.3 \text{ mW/cm-C}$ works equally well if the heat flow is parallel or perpendicular to the structure of the fiber.

Happy Holidays from the
Simulation Research Group!
Fred, Ender, Joe, and Kathy

Thermal Conductivity of Meats, Fats, Gelatin Gel and Water®



|| heat flow *parallel* to fiber structure
⊥ heat flow *perpendicular* to fiber structure

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A new issue of the IBPSA newsletter is available at
<http://www.ibpsa.org/Newsletter/IBPSANews-16-2.pdf>