

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

BUILDING ENERGY SIMULATION ★ USER NEWS

*EnergyPlus*SPARK*DOE-2* EnergyPlus*VisualSPARK*EnergyPlus*DOE-2*GenOpt*EnergyPlus*
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The Buzz

---REVISED---

Position Available

The Simulation Research Group at Lawrence Berkeley National Laboratory would like to hire a Scientist/Engineer to be part of the EnergyPlus Development Team at LBNL. See p. 9 for the position description.

EnergyPlus Certified for Tax Deduction

See p. 2 or follow this link to information on how to take advantage of the new IRS (§179D) tax credit for building energy efficiency: [http://SimulationResearch.l](http://SimulationResearch.lbl.gov/EP/ep_IRS06.pdf)

[bl.gov/EP/ep_IRS06.pdf](http://SimulationResearch.l). And the DOE-2 based VisualDOE version 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

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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.

EnergyPlus Certified for U.S. Tax Deduction!!

As of June 23, 2006, EnergyPlus was certified as being *Qualified Computer Software for Calculating Energy Savings for Purposes of the Energy-Efficient Commercial Building Tax Deduction under Internal Revenue Code §179D.*

For more information, see the article in [Vol. 27, No. 7](#) of the *Building Energy Simulation User News* or follow these links:

http://www.irs.gov/irb/2006-26_IRB/ar11.html

Complete text of Internal Revenue Bulletin: 2006-26, dated June 26, 2006, Notice 2006-52, *Deduction for Energy Efficient Commercial Buildings*

<http://www.irs.gov/pub/irs-drop/n-06-52.pdf>

IRS document that spells out details of the deduction (U.S. Internal Revenue Service website)

http://www.eere.energy.gov/buildings/info/tax_credit_2006.html

List of tax incentives for energy-efficient buildings and products (U.S. DOE website)

Ask an EnergyPlus Expert

"OTHERSIDECOEFFICIENTS" OBJECT FOR WINDOWS

I was trying to set up the outside surface temperature for a surface that has a window (and the same temperature for the window) and I get the following error. What am I doing wrong?

```
** Severe **  
GetHTSubSurfaceData: Other side coefficients are not allowed with  
windows. Surface=SURF-7:ROOM ** Fatal ** Fatal error discovered in  
GetSurfaceData, see previous messages
```

I'm confused because the documentation states that we are allowed to use the "OtherSideCoefficients" object for windows.

Answer

Other side coefficients can only be used on opaque surfaces. They will not work for windows, glass doors, and tubular daylighting devices. We will make this more clear in the documentation.

WEATHER, DESIGN-DAY

I ran several simulations, each time with same input file (purchased air tables) but different weather files (the weather files that come with EnergyPlus installation). The outdoor dry bulb temperatures of design-days are same in each case (each simulation run), no matter what the weather file is. Why are the design-day outdoor dry bulb temperatures the same even if I keep changing the weather file?

Answer

The answer might depend on how the RUN CONTROL object is specified in your input file.

If you have "Do the design-day simulations" = YES, and "Do the weather file simulation" = NO, then the weather file is not being used; only the design-day information/objects in the IDF would be used in that case.

For the input deck in question (PurchAirTables.idf), the Run Control object is set to run the winter and summer design-days, followed by an annual simulation (Jan 1 through Dec 31).

For design-day simulations, the weather information provided in the DesignDay object(s) will always be used, independent of the weather file being passed to the simulation (in.epw). See the "DesignDay" object in the Input/Output Reference for further discussion.

In contrast, the "weather file simulation" (annual simulation in this case), which is run after the two design-days in this particular instance, will use the information in the weather file (in.epw).

And note that the design-days are actually in the input file. Changing the weather file won't affect the design-day input. To do that you need to replace the design-day objects in your input file (because the design-days have been embedded in your input file). If you need the design-days that "go" with the weather files, you will need to download those separately. And as locations change, you would probably notice different sunrise/sunset times.

Ask an EnergyPlus Expert

STORY MULTIPLIER

I am a new user of EnergyPlus and I have defined a simple 5-zone office building level with both glazing and shading on all sides. I want to make this 1-story model into a 10-story model and I was wondering if there is a way of copying this level and multiplying the base story, rather than having to copy and paste it 10 times and replace the Z geometry for all zones manually?

Short Answer

You can use the Zone List and Zone Groups to achieve this. Typically you will need to do another floor for the top story, though. Check out the example file: MultiStory.idf

Longer Answer (from Brent Griffith)

There are few ways you can deal with this.

I use zone multipliers for buildings with 4 or more floors for faster run times. The simplest multiplier is in the Zone object, just multiply each zone by a factor of 10. In EnergyPlus, you can also group zones into a list and multiply that list - usually used as a floor multiplier. See the tips for multistory simulations in the Zone Group object description in the Input/Output Reference Manual.

If you want to see an example input file of a model for 10-story building, go to the new EnergyPlus Example File Generator and request an input deck with 10 floors. (These input files have three floors with a single ground floor, a single top floor, and a middle floor with multipliers.)

If you really want your model to have all the surfaces for 10 floors, then it is easier to use zone relative coordinates; you copy and paste the geometry without having to alter the geometric values in the vertices -- just shift the zone origins. You still have to work out unique names and the other side surfaces, but be aware that you'll end up with some pretty long simulation run times going this way.

GEOMETRY

I want to use one of the front ends for EnergyPlus to define building geometry. Which one is best?

Answer

There are a number of tools that will give you accurate geometry. It depends on whether you want a 'full' interface or something to generate input files. DesignBuilder and Hevacomp both are full interfaces and allow you to review output as well. E2AC creates simple building cases and allows you to quickly compare options. EP-Quick gives you a lot of flexibility in defining the geometry but does not include HVAC (yet). EFEN allows you to focus on windows and fenestration--defaulting much of the building description.

If you have CAD, there are two options--IFCtoIDF and Green Building Studio. Also, ESP-r and ECOTECH can export EnergyPlus input files.

There is also our web interface, which consists of rectangular buildings with defaults based on building code and building type (See the EnergyPlus Example File Generator).

More info and links to all of these are available at:

http://www.eere.energy.gov/buildings/energyplus/interfaces_tools.html

Ask an EnergyPlus Expert

VENTED PV CAVITY

I am modeling a building with integrated photovoltaic (BIPV) system for the building façade. The photovoltaic (PV) panels are attached to the exterior wall with an air cavity between them. I want the PV panels to serve as a solar heat barrier but experienced problems with heat gain on the façade. Then, by using "OtherSideConditionsModel," I applied "Vented PV Cavity" as the type of modeling used to determine boundary conditions. I used the "SURFACE:HEAT TRANSFER:EXTERIOR NATURAL VENTED CAVITY" object to describe the condition. However, there was no heat gain reduction for the underlying surface (i.e., the exterior wall), even though the required cooling energy for the corresponding zone is higher. Any advice would be appreciated.

Answer

First describe the building in more detail.

Reply

It's a 3-story building. The west-facing façades on the second and third floors are attached with vented PV panels. The surface material of the exterior wall is "glass." You can see from the files I uploaded the details, highlighted in green, in "construction_material (IDF file).doc."

Answer

I took a look at your files. I didn't succeed at running it because it is for EnergyPlus version 1.2.2. I would recommend moving to the current EnergyPlus version 1.3.

You have set up the PV modeling correctly. The basic wall construction here is un-insulated heavy concrete. Adding the PV here is increasing the wall's solar absorptivity from 0.7 to 0.97 so this could be why the cooling loads go up. This could also be one of those non-intuitive situations where adding the first bit of insulation can actually increase cooling loads. Remember that the added PV layer will also trap more heat at night and disconnect the underlying surface from cool night sky. You might try adding a different insulating layer to test expectations.

When using the external cavity model, the Construction should describe only the underlying surface and not the air gap and actual outer layer. The models will add these to the outside of the Construction. So in your file, the walls with PV actually have two layers of glass and air gap. The Material:Air object isn't really needed for the SURFACE:HEAT TRANSFER: EXTERIOR NATURAL VENTED CAVITY object (unless you really want double layers of glass and air gaps). Your value for the height scale for buoyancy looks like the one for horizontal orientation; for vertical you might increase this one-quarter or one-half of the PV module height.

Question

Thanks for your advice. And I will convert the files to EnergyPlus 1.3.0 after I solve my problem.

I have tried using other insulating materials instead of the heavy concrete. In addition, I have also tried increasing the height scale for buoyancy, effectiveness for perforations with respect to Wind (C_v) and discharge coefficient for openings with respect to buoyancy (C_d). However, the resulting annual electricity consumption was not improved. The annual cooling electricity is almost the same as the case without vented BIPV. I think attaching the exterior naturally vented BIPV can reduce the annual cooling electricity. Besides, better PV efficiency can be achieved.

Continued on the next page

Ask an EnergyPlus Expert

VENTED PV CAVITY (CONTINUED)

Will you review the file I uploaded? I am not sure I set the height scale for buoyancy, Cv and Cd correctly. You can also see my exterior wall construction. Is the "SURFACE:HEAT TRANSFER:EXTERIOR NATURAL VENTED CAVITY" object preferable for vertically mounted BIPV? I am also interested in "CONSTRUCTION WITH INTERNAL SOURCE" for PVSpandriPanel. But, will the efficiency be lower by using this model because of higher temperature behind the PV panel?

Answer

We reviewed your files and didn't see a problem.

For vertical BIPV, you have two options in EnergyPlus.

The first, construction with internal source is a more robust model but it is only for cases where there is no ventilation on the back side.

The second, external cavity model, allows modeling the effect of ventilation on the back side, but experimental research is still needed to have a better understanding of the model inputs for Cd, Cv, open area, etc.

The Sandia PV model can respond to the module temperature in both cases, but the changes in efficiency turn out to be pretty small most of the time. You could model both ways and compare to see the potential improvements from ventilation.

And it is difficult to confirm your observation that "resulting annual electricity consumption is not improved." I would need to examine complete input files for both cases (after macro processing please). Just guessing, I would say the vertical walls are not a big part of the cooling load compared to the windows, roof, and internal gains and anything you do to them won't make much difference. I would compare the two runs by plotting the inside face surface temperatures for the wall for at least 24 hours.

PLANT: SEQUENTIAL VS OPTIMAL

For cooling plant equipment, I am using purchased chilled water with a constant COP chiller. When the cooling load is less than 10kW, I want the purchased chilled water; when the demand is larger than 10kW, I want the constant COP chiller to supply additional chilled water (with the purchased chilled water still working). I set the purchased chilled water as the primary equipment in the plant equipment list, with the chiller as secondary. However, the chiller supplied much more chilled water (during the yearly simulation) when the load was larger than 10kW. In most cases, the chiller was working at its rated capacity. Because the flow rate of the chiller is variable, and the load distribution scheme is optimal, I don't know how to control the chiller now.

Answer

If I understand the question correctly, you should set the load distribution option to be SEQUENTIAL, not OPTIMAL. SEQUENTIAL runs the first piece of equipment until it is fully loaded, then activates the next piece of equipment and so on.

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).

ENERGYPLUS Example File Generator

There is a new (beta version) Web-based interface for EnergyPlus called the [EnergyPlus Example File Generator](#). It quickly creates, runs, and emails user-defined simple models of commercial buildings with only a few inputs. This is an easy way to create and review EnergyPlus input and output results, and should greatly simplify learning how to use EnergyPlus. Using web-based forms, input files use defaults based on ASHRAE Standard 90.1, CBECS and other data sources. To try out the EnergyPlus Example File Generator, go to http://www.eere.energy.gov/buildings/energyplus/interfaces_tools.html (note that pop-ups must be enabled).

QuickLink to EnergyPlus Documentation

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

Recent Reports

Click on the link to download these (pdf) reports.
If you run into problems, contact klellington@lbl.gov.

[LBNL-60204](#) download paper

*Proc. ACEEE Summer Study on Energy Efficiency in Buildings,
Pacific Grove, CA, August 13-18, 2006.*

Distributed energy resources (DER) refers to technologies which can be used to provide energy close to the energy consumer (load). These technologies include small power generators, energy storage units, interconnection and power control technologies, and combined heat and power systems.

The [DER group](#) at Lawrence Berkeley National Laboratory is developing ways to study customer adoption patterns of the technology. Please explore the DER site (http://der.lbl.gov/new_site/DER.htm) as a resource for your research.

On-Site Generation Simulation with EnergyPlus for Commercial Buildings

by

[Michael Stadler](#), Ryan Firestone, Dimitri Curtil, and Chris Marnay
Lawrence Berkeley National Laboratory

May 2006

ABSTRACT

Building energy simulation software (e.g. [EnergyPlus](#)) is a powerful tool used widely by designers and researchers. However, current software is limited in modeling distributed generation (DG), including DG with heat recovery applied to building end-use, i.e. combined heat and power (CHP). Concurrently, DG investment and dispatch optimization software has been developed, yet has not been linked to a building energy simulation program for accurate assessment of DG designs, particularly under uncertainty in future end-use loads and equipment availability. CHP is a proven approach to cost effective reductions in primary fuel consumption and CO₂ emissions. Integrating DG system design and controls into building energy simulation is an important step towards popular DG acceptance. We propose to extend the existing building energy simulation program, EnergyPlus, to enable the simulation of various DG modules and associated control strategies in order to achieve more accurate and holistic analysis of DG technologies. Extension of EnergyPlus is conveniently facilitated by [SPARK](#), a program capable of modeling building equipment and controls as individual modules. These modules can be automatically integrated with EnergyPlus building models. Candidate DG systems can be selected from the DG investment optimization program, Distributed Energy Resources Customer Adoption Model (DER-CAM). The dispatch of the modeled DG system can be determined by a novel dispatch optimization algorithm, the Energy Manager, that accounts for uncertainty in future load and DG availability, as well as curtailment options. DG equipment and controls can modeled in SPARK and integrated into EnergyPlus building models. The way to this holistic approach will be described in this paper.

http://der.lbl.gov/new_site/pubs/LBNL-60204_Final_17May2006.pdf

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

Revised

Scientist/Engineer

Position Available at Lawrence Berkeley National Laboratory



Uncle Fred Wants You!

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

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.

Building Simulation 2007

September 3-6, 2007

To be held at Tsinghua University in Beijing, China

For all information, go to <http://www.bs2007.org.cn/>

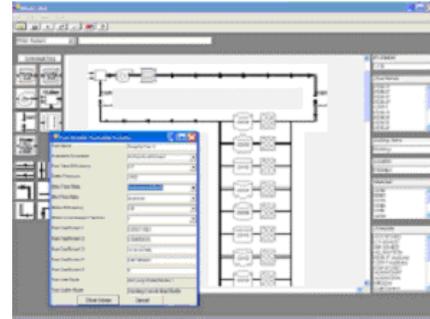
Submit Abstracts by September 15, 2006

The 10th International Building Performance Simulation Association Conference and Exhibition will be held in Beijing in September 2007. Architects, designers, researchers, environmental engineers, city planners, simulation software producers, and all academics, professionals and practitioners involved in the wide of disciplines associated with building performance simulation from all over the world will attend this conference to exchange the latest knowledge and experience.



IHIT: New Interoperable HVAC Input Tool

The Interoperable HVAC Input Tool ([IHIT](#)) is one of many interoperable software tools being developed by the [IRUSE](#) research group at the National University of Ireland Cork. IHIT is a HVAC system design tool that allows a building design engineer to create HVAC system information for energy simulation in a context-sensitive format. The building designer creates the energy simulation HVAC model using ISO standard HVAC symbols/icons. IHIT continuously validates the underlying model and automatically outputs the model configuration in EnergyPlus IDF format and IFC neutral file format.



The on-screen schematic will be developed through the use of the drag-and-drop interface greatly reducing the time needed to create a complete HVAC system. This will also work in the alteration of existing files, which can be altered while being viewed through the interface as shown in the provisional screenshot above. The IHIT program will support the existing EnergyPlus autosizing and default values and the output of the tool will be in IDF and IFC with a view to storage in an integrated IFC Building Information Model. A beta version is expected by late 2006.

Developer: Barry O'Sullivan
email: b.osullivan@mars.ucc.ie

IRUSE, Department of Civil & Environmental Engineering,
National University of Ireland, Cork, Ireland

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.](#)**

September 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 COMMISSIONING

Sep 12 [Commissioning \(Cx\) Lighting Systems](#)

BUILDING ENVELOPE

Sep 19 [2005 Title 24 Glass and Fenestration Requirements](#)

LIGHTING

Sep 12 [Commissioning \(Cx\) Lighting Systems](#)

Sep 20 [Lighting Fundamentals](#)

Sep 26 [New Technologies for Retail Lighting](#)

MARKETING AND FINANCE

Sep 26 [Overcoming Objections to Energy Efficiency Investments](#)

MATERIAL SELECTION

Sep 21 [Smart Structures - Materials and Engineering for Ecological Design](#) (evening lecture)

RENEWABLES

Sep 13 [Basics of Photovoltaic \(PV\) Systems for Grid-Tied Applications](#)

SOFTWARE

Sep 14 [Multifamily Energy Efficiency Program - Design Basics](#)

TITLE 24 (CALIFORNIA ENERGY CODE)

Sep 14 [Multifamily Energy Efficiency Program - Design Basics](#)

Sep 19 [2005 Title 24 Glass and Fenestration Requirements](#)

Sep 21 [Smart Structures - Materials and Engineering for Ecological Design](#)



IBPSA-England Launch Event -- 13 September 2006

<http://www.ibpsa-England.org/>



The Summer 2006 issue of ***Buildings Research Post***, the newsletter of the Florida Solar Energy Center (FSEC), is ready for download at <http://fsec.ucf.edu/bldg/resources/newsletter/summer2006/index.htm>.



The current issue listed these links to recent FSEC publications:

Cooling Performance Assessment of Building America Homes

Energy performance in many Building America homes has been documented with measured data collected over several years to verify savings projections. An evaluation of measured cooling performance is presented with data from nine homes in three climate regions.

<http://www.fsec.ucf.edu/bldg/baihp/pubs/cooling/index.htm>

Energy Performance Aspects of a Florida Green Roof

This monitored study evaluates summer and winter energy performance aspects of a green roof on a central Florida university building addition that was completed in 2005.

http://www.fsec.ucf.edu/bldg/pubs/green_roof/index.htm

Measured Crawlspace Conditions in a HUD-Code Home

FSEC conducted research utilizing two unconditioned, old, singlewide side-by-side manufactured homes, one with a ground cover and one with exposed dirt under it.

<http://www.fsec.ucf.edu/bldg/baihp/pubs/crawlspace/index.htm>

School Conditions Will Continue to Earn Failing Grades

This study addresses indoor air quality and general condition problems in schools throughout the United States. Tools used include a nationwide web-based survey, characterization of actual operating conditions, diagnostic tests, and retrofits in problem schools.

<http://www.fsec.ucf.edu/bldg/pubs/schoolconditions/index.htm>

The Energy Policy Pyramid[®]: A Hierarchal Tool For Decision Makers

Decision makers often jump first to fuel substitution to either lower emissions or counter fuel price escalation. When it comes to both return on short-term economic investment and long-term sustainability for the economy and environment, there is a clear hierarchy.

<http://www.fsec.ucf.edu/bldg/pubs/energypolicypyramid/index.htm>

To Subscribe, go to <http://fsec.ucf.edu/bldg/resources/newsletter/index.htm>

More on IFCs

In the web edition of *Architecture Week*, author Elizabeth Bollinger wrote an article entitled "IFCs Connect," which gives a nice overview of where Industry Foundation Classes are today.

An important milestone in software development for the building industry over the past decade has been the establishment of Industry Foundation Classes (IFCs) — freely available, nonproprietary data model specifications. Now the IFCs are being applied toward automating code checking and other kinds of complex analysis.

Follow this link to the complete article:

http://www.architectureweek.com/2006/0809/tools_2-1.html



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 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

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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

Free!!! Stuff

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

Part 1 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-1 Classroom Lighting](#)

[PIER-TB-2 Small HVAC Savings](#)

[PIER-TB-3 Modular Skylight Well Design](#)

[PIER-TB-4 NightBreeze Cuts Peak](#)

[Demand](#)

[PIER-TB-5 Up with CFL Downlights](#)

[PIER-TB-6 Residential Commissioning Guide](#)

[PIER-TB-7 Heat-Pump Water Heaters:](#)

[Reliable, Efficient](#)

[PIER-TB-8 Commissioning of Air Handling](#)

[Systems](#)

[PIER-TB-9 Hybrid Lighting Fixtures](#)