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

## Highlights

## Technical Reports

## Regular Features

### *The 🐝 Buzz*

**EnergyPlus Certified for Tax Deduction**
*See p. 8 or follow this link to information on how to take advantage of the new IRS (§179D) tax credit for building energy efficiency:*
*http://SimulationResearch.lbl.gov/EP/ep_IRS06.pdf*

*The latest edition of the State of California's Energy Codes newsletter, **Blueprint**, is available for download at http://www.energy.ca.gov/efficiency/blueprint/*
*It's all about energy code training on-line. A schedule of training sessions is at http://www.bect.ws*

# 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.

### New 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 <u>significant speed improvements</u> throughout.**

## NEW ENERGYPLUS TESTING AND VALIDATION RESULTS

## HVAC COMPONENT TESTING

A new set of test results for HVAC Components is now available near the bottom of this web page on the EnergyPlus web site:

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

This new EnergyPlus HVAC Components Test checks the accuracy of EnergyPlus component simulation results compared to manufacturer catalog data, when available. The test procedure makes use of ANSI/ASHRAE Standard 140 procedures for generating hourly equipment loads and ASHRAE Standard 140 weather files. The test suites described within this report are for testing of the EnergyPlus electric chiller referred to within EnergyPlus by the object name CHILLER:ELECTRIC:EIR and the EnergyPlus hot water boiler referred to within EnergyPlus by the object name BOILER:SIMPLE.

## Ask an EnergyPlus Expert

### ADD UPSTREAM COMPONENT TO MIXER

I want to recool/reheat the outside air (OA) to the specified setpoint temperature (usually dewpoint temperature for dehumidification in summer). I added a cooling coil and a heating coil upstream from the outside air mixer. The outside air flow is as follows: Outside Air → Cooling Coil → Heating Coil → OA mixers.  For OA temperature control (inlet node of the OA mixer), I added two simple controllers to control the cooling/heating coil. After the simulation ran I got no severe errors but I was left with an orphaned branch. I checked the values and found that the outside air VolFlowRate was 0, the OA reheat/reheat coil were not sized in the eio file, and the water inlet MassFlowRate was 0.1.  According to the Input/Output Reference, adding an upstream component for the mixer is allowed.  Is my setup incorrect?

**Answer**
Sorry, but at the present time EnergyPlus cannot do what you ask. The Controller:Simple will only function in the main air loop; it does not work in the outside air system. Components in the outside air stream must have their own built-in controllers in order to control to a setpoint. Chilled and hot water coils do not have built-in control.

**Question**
Thanks for the clarification. So which components may be added upstream of the mixer for reheat/recool?

**Answer**
Right now, the only ones available to you in the outside air system are:

    COIL:Gas:Heating
    COIL:Electric:Heating
    DXSystem:AirLoop

You'll have to check the Input/Output Reference for input details. In each case you need to specify the setpoint node.

### WATER HEATER:MIXED

I am using a water heater to recover the heat from an IC engine. In the winter, the water heater will supply hot water to the fan coil unit for heating. But I want the heater to supply domestic water during the summer rather than supply hot water to the fan coil unit. How can set up the water heater for the purpose?  And how can I make the heater use the exhausted heat from the engine?

**Answer**
For this system you'll have to set up two PLANT LOOPS connected together by the Water Heater:Mixed object. One loop, for heat recovery, will add heat to the Water Heater on its source side; the other loop, for hot water, will serve the coil and domestic water. It might help you to study the plant-related input objects in the example file SolarCollectorFlatPlateWater.idf, then swap out your IC engine for the solar panels. On the demand side of the hot water plant loop, use a splitter/mixer to put the hot water coil and the Domestic Hot Water on parallel branches . The water heater object can be used to simulate domestic hot water usage by adding a DOMESTIC HOT WATER object to your plant loop. Make sure to put the DOMESTIC HOT WATER object in a branch that is parallel to your hot water fan coils, not in series.

## Ask an EnergyPlus Expert

### AIRFLOW VENTILATION OBJECTS

I'm running an idf file with no AirFlow ventilation objects. In the same file I have a ventilation object set to 0 m$^3$/s (no ventilation).  Yet, I get different results, does that make sense?

**Answer**
If you have any "simple" airflow objects in the original input file, such as INFILTRATION, VENTILATION, MIXING and CROSS MIXING, they may be turned off by the "AirflowNetwork Control" field in the AIRFLOWNETWORK SIMULATION object.

**Question**
In the original idf there is a "simple" ventilation. And I understand that you are giving me a way to stop the ventilation. But does that means that an idf file with no ventilation object is incorrect or is not equivalent to a building with no ventilation?

**Answer**
No. The reason that the AIRFLOWNETWORK SIMULATION object has a switch to turn off simple VENTILATION and INFILTRATION is to make it convenient for a user to compare "simple" against AirflowNetwork.

### INITIAL CONDITIONS

What are the initial conditions assumed in each EnergyPlus simulation? Can the user define some or all initial conditions?  For example, recovery from a temporary loss of HVAC equipment?  My search for information on the subject, in both the user documentation and support database, was not successful.

**Answer**
There is no direct user control over initial conditions. Here is a summary of the initializations which are performed at the beginning of each environment  (an environment is RunPeriod or a DesignDay):

1.  All building heat transfer related temperatures are initialized to 23C.

2.  All HVAC system nodes are initialized to 20C and the outdoor humidity ratio of the first time step of weather data.

3.  The first day of the environment is repeated until the changes in zone loads and zone and surface temperatures are less than the tolerances specified  in the BUILDING object. If convergence is not reached within the "Maximum  Number of Warmup Days" (which defaults to 25 days, see the BUILDING object), then a warning is issued "Loads Initialization did not Converge."

The only way for the user to control initialization would be to customize a weather data file with an initial time period long enough to establish the desired initial conditions and then have the weather data proceed into the period of interest.
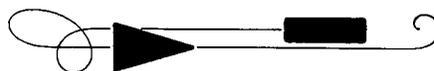
## Ask an EnergyPlus Expert

### SURFACE OUTSIDE TEMPERATURE (ROOF)

I'm modeling a building where the surface outside temperature of the roof reaches 73C at noon. However, I'm not sure if this temperature is reasonable. The direct solar at noon (10:00-14:00) is about 760-860 W/m$^2$. Listed below are the settings of the outside layers of the roof in the simulation.

```
MATERIAL:REGULAR,
R006-1, !- Name
Rough, !- Roughness
0.1, !- Thickness {m}
0.17, !- Conductivity {W/m-K}
600, !- Density {kg/m3}
1600, !- Specific Heat {J/kg-K}
0.9, !- Absorptance:Thermal
0.8, !- Absorptance:Solar
0.7; !- Absorptance:Visible
```

I know that two main factors, conductivity and absorptance solar, will affect the surface outside temperature. Are there any other factors I should take into consideration?

**Answer**
Two other significant factors are thermal absorptance (emissivity) and the exterior convection coefficient (which is driven primarily by wind speed). And, of course, the thermal conductivity of the other layers in the roof construction, the outdoor air temperature and the temperature of the thermal zone on the inside of the roof. Note that 73C is not unreasonable on a hot sunny day.

### BLOWTHRU:HEATCOOL

What is difference between these:
FURNACE:BLOWTHRU:HEATCOOL and UNITARYSYS:BLOWTHRU:HEATCOOL?

**Answer**
To quote Edwin Starr, from his classic song War* **. . .** *Absolutely Nothing*! Of course, you could also refer to the Input/Output Reference, p. 732 under UnitarySystem: BlowThru:HeatCool, where it states:

*The UnitarySystem:BlowThru:HeatCool is the identical model to the Furnace: BlowThru: HeatCool object.*

* *http://www.oldielyrics.com/lyrics/edwin_starr/war.html*

### FURNITURE MODELING

How do I model the percentage of floor covered by furniture in a zone? I know I can use internal mass, but is there a way to account for the surface of the floor being reduced?

**Answer**
There isn't a requirement that the floor surface(s) cover the entire area of the zone, so if you want you can just shrink the floor surface to remove area. The entire floor can be broken up into different surface objects and different Constructions used for different portions. If the furniture is in very close thermal contact with the floor (no gaps or air flow underneath), then you could model the presence of furniture by adding additional material layer(s) to the Construction.

## Ask an EnergyPlus Expert

### HEAT PUMP EQUATIONS, "EquationFit"

What numerical formulas use Capacity Coefficient1-5 and Power Consumption Coefficient1-5? I could not find the equations in Input/Output Reference.

**Answer**
You need to look in the Engineering Reference, not the Input/Output Reference. The equations for the EquationFit model for water-to-water Heat Pump are explained in Engineering Reference (p 530, search for "water-to-water heat pump").

### AUTOSIZING ERRORS

In order to serve one room, I set up a fan coil unit accompanied by a direct air object that is, in turn, served by an air-to-air heat pump.   Since I lack of the performance data on both units, I chose to autosize these two objects at one time. I set the fan coil as the highest priority for air conditioning, and the direct air as an assist.  The node-branch connection passed the test; however, the design load for heating coil became 0, and the leaving humidity of the cooling coil was larger than the entering humidity.  For the heat pump, the air volume flow rate per watt of rated total heating capacity is out of range.  How, can I fix them?  Should I set up the parameters for the fan coil unit, and then autosize the  heat pump alone?  And does the configuration of the zone equipment list set the priorities of the equipment?

**Answer**
EnergyPlus autosizing is not able to split the load among multiple units serving the same zone. It will attempt to size both units to meet the entire heating and cooling load. The zone equipment list controls the sequence in which multiple units are simulated to meet the current zone load. As a starting point, you should be able to autosize both units to meet the full  load. Then you can decide what portion of the loads should be met by each unit  and then specify hard sizes for everything based upon the sizing outputs in the  eio file.  If the design load for the heating coil is zero, then there is something wrong  in one of the sizing objects. Check the thermostat, zone sizing, system sizing, and plant sizing inputs.

### STRATIFICATION, DISPLACEMENT VENTILATION

I am attempting to compare various indirect evaporative cooling systems in a large production hall with displacement ventilation.  In some configurations, the secondary air flow is extracted near the ceiling and I assume that the effects of stratification would be significant. So far I have considered coupling air flow with multiple zones (stacked) or defining the plenum space or multiple nodes into a single zone.  Each possibility seems feasible, but I lack the experience to know which assumptions are necessary to obtain realistic results. The simulation should be on an hourly basis (at least). Can you give me some pointers on how to define such a space?

**Answer**
If you are able to characterize the stratification in the hall by some other means, you could model the implications of that temperature distribution in EnergyPlus using User Defined Room Air models. Various temperature patterns can be entered.  EnergyPlus also has a displacement ventilation room air model but it may not be applicable to your space.

## Ask an EnergyPlus Expert

### STANDARD BUILDING MODELS

I'm trying to find standard/generic building models that can be used for retrofit evaluations. I am working on a project where we are testing various new ventilation technologies in several climate zones. The technologies are to be evaluated in several generic buildings – a hotel, school, hospital and office building – to see the effect of the different climates. Has anyone constructed hypothetical models that fall into these categories?

**Answer (**from Drury Crawley, USDOE)
You can get simulation inputs for different building types by using the EnergyPlus Example File Generator. It is tied to a version of ASHRAE 90.1 (you input the size). Follow this link

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

USDOE is creating prototypes based on the 2003 CBECS (Joe Huang is updating work he did based on 1995 CBECS). We hope to make those available for use this Fall or early Winter. (We will announce their availability on the various email lists.)

### STANDARD VS. DAYLIGHT SAVINGS TIME

I created a weather file with daylight saving time. However, Energy Plus calculated the solar altitude angle for standard time. That doesn't match the weather parameters with solar altitude and irradiation. How do I make EnergyPlus calculate the simulation using daylight saving time?

**Answer**
The reported times in the csv output files are always in standard time. Daylight savings shifts schedule values by 1 hour when daylight savings is active. Add REPORT VARIABLE "Daylight Saving Time Indicator" to your output to confirm operation of daylight savings. If it is always zero, then check that the daylight savings option in the RunPeriod object is set and that the specifications in the weather file are correct. When the daylight saving time indicator is 1, you should see a shift in scheduled values such as internal loads profiles and thermostat settings.

## 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).

# 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 Meteonorm files for EnergyPlus.

Ask an EnergyPlus Expert

Questions from EnergyPlus users are answered promptly via email by program developers.
To submit questions, join the EnergyPlus User Group (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 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)

# Recent Reports

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

## PARAMETRIC ANALYSIS OF A SOLAR DESSICANT COOLING SYSTEM USING THE SIMSPARK ENVIRONMENT

Etienne Wurtz, Chadi Maalouf, Laurent Mora, Francis Allard
LEPTAB, University of La Rochelle, Av. M. Crepeau, 17042, La Rochelle, France

**ABSTRACT**

A desiccant cooling unit powered by 14.8 $m^2$ of solar liquid collectors is implemented in a training room in Chambery in Eastern France. The system uses a Lithium Chloride sorption wheel and is optimized to work without auxiliary heat regeneration source. Several parameters are studied in order to decrease primary energy consumption and increase system performance. The models are implemented in SimSPARK a simulation environment linked with energy+ and able to solve complex problems. Simulations show that humidifiers efficiencies and rotating heat exchanger efficiency have major influences on the system performance. Besides it was shown that airflow rate during inoccupation period is a key component in the operation of the system. Our results suggest that an airflow rate of 2.8 AC/H during inoccupation decreases required regeneration hours by about 40 percent, decreases room required cooling factor about 62 percent while electricity consumption increases only about 8 percent.

## NATURAL VENTILATION ANALYSES OF AN OFFICE BUILDING WITH OPEN ATRIUM

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Elements / BNIM Architects
106 W 14th Street, Suite 200
Kansas City, MO 64105

**ABSTRACT**

This paper is part of a larger research to 'theoretically' review the application of natural ventilation to commercial buildings, the potential advantages these systems offer, and some pitfalls that must be considered. Physical design strategies and the analytical methods developed to support them have been reviewed, and then a modeling study of a representative naturally ventilated building recently constructed in the Netherlands is presented. A multizone coupled thermal (EnergyPlus)/airflow (COMIS 3.0) simulation tool is tested while being used to investigate the performance of this building in a North American climate. This paper describes the process I have followed to explore the practicality/effectiveness of the tool as well as the building and my related findings. In the hope that this tool be used more often for whole-building analysis, with greater ease and quickness than the more complicated, expensive and difficult to master CFD tools. Such a study is a step that would enable designers and clients to select the passive ventilation strategy in suitable North American climates.

**Building Simulation 2007** – To be held at Tsinghua University in Beijing, China, September 3-6, 2007
For all information, go to http://www.bs2007.org.cn/ -- Submit Abstracts by September 15, 2006

## FREE!  Building Design Tools

### Department of Architecture and Urban Design  --  University of California at Los Angeles

**HEED: Home Energy Efficient Design --** This program determines how much energy and money you can save by making various Design or Remodeling changes to your home. You can easily draw in the floorplan of your own house, then click and drag your windows to their correct location. You can select from lists of standard wall and roof construction. This version adds a number of new features including allowing changes to electric and gas utility rates, adding rates for oil and propane, allowing pollution data to be revised, allowing attic radiant barriers to be added or removed, offering operable shading, improving the thermal mass algorithm (admittance factor), and solving a problem with windows. Includes climate data for over 500 locations.
http://www.aud.ucla.edu/heed

**SOLAR-5.7 (Now replaced by HEED) --** Displays 3-D plots of hourly energy performance for the whole building or for any of 16 different components. It also plots heat flow into/out of thermal mass, and indoor air temperature, output of the HVAC system, cost of electricity and heating fuel, and the corresponding amount of air pollution.

**OPAQUE (originally called SOLAR-3)  --** Draws a detail of wall or roof sections, calculates U-value, Time Lag, and Decrement Factor. It plots temperature drop through the section. Draws 2-D daily and 3-D annual plots of Outdoor and Sol-Air Temperatures, Normal and Total Surface Radiation, and Heat Flow through the envelope.

**SOLAR-2 --** Plots sunlight penetrating through a window with any combination of rectangular fins and overhangs. Also plots hour-by-hour 3-D suns-eye view movie of the building. Prints annual tables of percent of window in full sun, radiation on glass, etc.

**CLIMATE CONSULTANT --** Graphically displays climate data in dozens of ways useful to architects including temperatures, wind velocity, sky cover, percent sunshine, psychometric chart, timetable of bioclimatic needs, sun charts and sun dials showing hours when solar heating is needed and when shading is required.

**Download tools from  http://www.aud.ucla.edu/energy-design-tools**

## Meetings – Conferences – Symposia

| 2006 | | |
|---|---|---|
| September 13-14 | World Energy Engineering Congress | http://www.energycongress.com |
| September 13-15 | Energie 2006 | gcelery@etai.fr |
| September 19-22 | Rethinking Sustainable Construction 2006 | http://www.treeo.ufl.edu/rsc06/ |
| October 17-19 | Labs21 Annual Conference | http://www.labs21century.gov/conf/ |
| 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 |
| **2007** | | |
| January 27-31 | ASHRAE Winter Meeting | http://www.ashrae.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 | http://www.bs2007.org.cn |
| October 28-31 | International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings | yoshino@sabine.pln.archi.tohoku.ac.jp. |

# DOE-2.1E

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

Cost is as follows:
- $  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.

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**Access the World Wide Web Virtual Library for Mechanical Engineering at**
**http://dart.stanford.edu/vlme/**

NIST Virtual Library (NVT)  http://ts.nist.gov/nvl/   Access a variety of scientific and technical information.

MatWeb  http://www.matweb.com/  -- Free online materials information resource - search for properties, find specific materials, find material by constituent elements.

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**Change of Address for DOE-2 Consultants**

| P. C. Thomas, Director | Peter Lyons | Marco Rapella |
|---|---|---|
| Team Catalyst | Peter Lyons & Associates | SMART FM |
| 67 Heig Street | 24 Bellinger Crescent | Viale delle Rimembranze di |
| Matoubra NSW 2035, Australia | Kaleen, ACT 2617, Australia | Lambrate 9/A |
| pcthomas@teamcatalyst.com.au | peterlyons@gmail.com | 20134 Milano - Italy |
| +0417 405 478 | +61 408 808 556 | marco.rapella@smart-fm.it |
| | | Phone: +39 347 4756858 |

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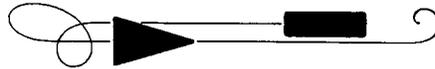
### Sacramento Municipal Utility District (SMUD)

Workshops and Seminars September-November 2006

*https://usage.smud.org/yourAccount/ETCstudent/classlist.asp*

| | |
|---|---|
| Sep 16 Hot Attics, Cool Pools for Homeowners | Oct 28 Windows & Weatherization for Homeowners |
| Sep 19 Daylighting Update: Toplighting | Oct 30  Efficient Chilled Water Systems |
| Oct 07 Heating, Cooling, and Fans for Homeowners | Nov 02 HVAC Static Pressure and Air Flow |
| Oct 12 LEED & Lighting Controls: A `Green Opportunity` | Nov 09 Lighting: Best Practice Report |
| Oct 19 Nonresidential Fenestration | |

### Southern California Gas Company

Educational Programs for September 2006

*http://www.socalgas.com/business/resource_center/erc_seminar_info.shtml*

| | |
|---|---|
| Thursday -- September 14 | Boiler Basics-Energy Resource Center |
| Thursday -- September 28 | Title 24: Compliance and Beyond |

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### 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.

# *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 ASHRAE 2.8 Building Environmental Impacts/Sustainability Standards Project - Test for Building Energy Analysis Software | tc47-l-subscribe@gard.com tc28-l-subscribe@gard.com 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)

| | |
|---|---|
| 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™ <br> 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 20th Century" | klellington@lbl.gov |

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**ASHRAE Online Seminar Series – Fall 2006**
http://www.ashrae.org/

Introduction to Green Buildings and Sustainable Construction
     Wednesday, September 13, 2006  -- 1:00 p.m. to 4:00 p.m. ET

Introduction to Green Buildings and Sustainable Construction
     Wednesday, September 13, 2006  -- 1:00 p.m. to 4:00 p.m. ET

Complying with ASHRAE Standard 90.1-2004 HVAC/Mechanical
     Wednesday, September 20, 2006  -- 1:00 p.m. to 4:00 p.m. ET

Leadership Skills for Engineering Leaders-Situational Leadership®
     Wednesday, September 27, 2006  -- 1:00 p.m. to 4:00 p.m. ET

Designing Residential Ventilation Systems to Meet ASHRAE Standard 62.2
     Wednesday, October 4, 2006  -- 1:00 p.m. to 4:00 p.m. ET

Complying with Requirements of ASHRAE Standard 62.1-2004
     Wednesday, October 11, 2006  -- 1:00 p.m. to 4:00 p.m. ET

Understanding and Designing Dedicated Outdoor Air Systems (DOAS)
     Wednesday, October 18, 2006 -- 1:00 p.m. to 4:00 p.m. ET

*Position Available at Lawrence Berkeley National Laboratory*

## Senior Research Associate

## Requisition No. 019314

Apply here ➔   http://jobs.lbl.gov/LBNLCareers/details.asp?jid=19314&p=1

*Uncle Fred Wants You!*

### Environmental Energy Technologies Division, Building Technologies Department

POSITION SUMMARY: The Simulation Research Group develops simulation tools to analyze building energy performance. Tools developed include DOE-2, Spark, and Genopt with a current focus on the EnergyPlus program. The successful applicant will join the Simulation Research Group to help develop future versions of EnergyPlus and related software. As part of the EnergyPlus development team this is an opportunity to actively develop new software that will enable the design, analysis, and operation of very low energy buildings. The applicant will be expected to become a skilled EnergyPlus and Spark modeler in support of performance analysis of innovative, low energy building designs and related control strategies. The applicant will be expected to modify, enhance, expand LBNL?s current hardware-in-the-loop virtual building simulation setup and develop models for use in model-based fault detection and diagnosis.

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. Support LBNL project staff and outside industry partners in simulating innovative building designs using EnergyPlus and EnergyPlus/Spark. Provide EnergyPlus users with expert advice and support. Contribute to the design and operation of the Building Controls Virtual Test Bed and to the development of model-based diagnostic tools for buildings. Interact with other EnergyPlus team members and with DOE headquarters staff in assessing current work on EnergyPlus and in planning future simulation tools development. Work with Building Technologies Department staff in planning and coordinating among all department energy-related software development projects.

Marginal - 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 (IBPSA). Help in the development of the Annual Operating Plan and aid in preparation of monthly progress reports. Work with other group members on EnergyPlus deployment activities.

QUALIFICATIONS: *Essential -* Advanced degree or equivalent experience in computational science, engineering, architectural engineering or 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 and/or C/C++. 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. Good working knowledge of at least one of the following: HVAC system design and operation; building controls; building operations.

Marginal - Hands-on experience with thermal/energy measurements, data collection in buildings, and/or calibration of simulation models to measured performance, Experience in modeling building envelopes in particular fenestration systems and complex building facades.

http://jobs.lbl.gov/LBNLCareers/details.asp?jid=19314&p=1