



## EnergyPlus Version 1.2.3

To download a free copy of the program, go to <http://www.energyplus.gov/>

### New Features of v. 1.2.3

#### Datasets

- Updated all design conditions to match new 2005 ASHRAE Fundamentals data in the weather files and associated design day data
- Extensive set of new example summary report templates for:
  - Space Gains/Envelope/Daylight/Comfort
  - Peak Demand and Consumption
  - Unglazed Transpired Solar Collector
  - HVAC/Electrical Systems/Loops/Components
  - Outdoor Conditions

#### Geometry/Windows/Walls/Shading

- User-definable radiation view factors

#### Input

- Example input files for all new features (more than 200 example files available)
- All example input files have been updated and new documentation of features added
- New weather data for 100 international weather locations including India, Portugal, Brazil, China, Ethiopia, Ghana, Kenya, and Nepal in the EnergyPlus/ESP-r weather format (975 locations available worldwide)
- Revised design days to accommodate "enthalpy" and "humidity ratio" as potential humidity indicating types based on 2005 ASHRAE Fundamentals

#### Electrical Power

- Demand limiting controls

#### HVAC

- Simple Water to Water GSHP
- Packaged Terminal Heat Pump
- Return air bypass
- Heat Pump Water Heater
- Desuperheater Water Heating Coil
- Steam loop, steam coil, steam boiler
- Restructured plant loop modeling to support branch pumps and future headered pumps and extensions of controls simulation
- Branch supply pumps for supply side equipment such as chillers, boilers, heat pumps, and water heaters
- Simple ice storage tank

## EnergyPlus Version 1.2.3

To download a free copy of the program, go to <http://www.energyplus.gov/>

### New Features of v. 1.2.3 (continued)

#### Zone Model

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

#### On-Site Energy Supply

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

#### Output

- DXF:Wireframe
- New report variables including power and breakout of separate object-level variables for all internal gains objects.
- New report variables to monitor zone temperature when heating and cooling setpoints are not met and when they are not met during occupancy, when zone temperatures oscillate due to poor simulation, and when zone conditions are outside the ASHRAE Standard 55-2004 comfort region.
- Output reporting enhancements including optional unit conversion for J into kWh, MJ or GJ in tabular output; new schedule support for TimeBins report; and table of contents for HTML tabular output files.

#### Utilities

- New features in EP-Launch including new quick open panel for opening output files, composite error file for group simulations, and integration with the Transition utility to automatically update files to the latest version.
- Many IDF Editor improvements including resizable window regions, opening DDY files, and pulldown list of report variable names from RDD output file.
- New unit conversion utility produces output in user-definable units
- Many new HVAC Diagram capabilities including draws "dangling" pieces that fit together that were not drawn as part of loop, draws lines to represent the loop coming back to the start, long names now wrap to two lines within boxes, and faintly drawn lines connect items that appear in multiple loops such as coils.

#### Documentation and Guides

- Input/Output Reference and Engineering Reference have been updated and extended for all new features and updates, bringing total documentation to more than 2500 pages.

**And many other enhancements and speed improvements throughout.**

**EnergyPlus Training in Atlanta, GA, December 1-2, 2005!**

**Go to <http://www.gard.com/training.htm> for details.**



A Brazilian interface for EnergyPlus

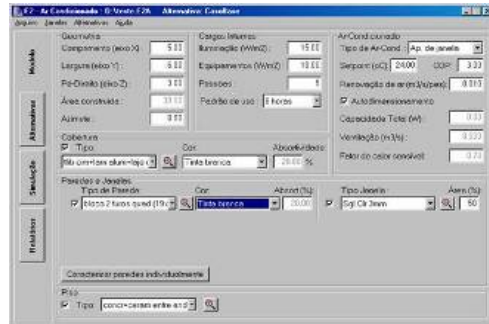
## E2AC (E2-ArCondicionado) v 2.1

E2AC is a simplified interface for EnergyPlus that allows the simulation of 'shoe box' models with or without air conditioning systems.

Download from <http://www.labeee.ufsc.br/edois/e2ac.html>

Improvements in version 2.1 include screens for visualizing monthly energy consumption of alternatives and options for either Portuguese or English (other languages are under development).

E2AC has a library with typical Brazilian constructions and materials, and a template of a direct expansion air conditioner system (window mounted system). It currently comes with hourly weather files and design days for 14 Brazilian cities. Through E2AC, the user can both simulate — in a few minutes — a single zone model and test the effect of alternatives for envelope, internal loads density, schedules, set-point temperatures, and system capacities and efficiencies.

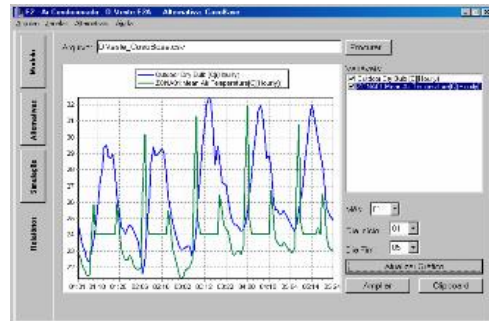


E2AC allows the user to save several alternatives of a model in a single data file. Each alternative can be simulated directly from the interface. E2AC generates the EnergyPlus input data file (IDF) and executes EnergyPlus. NOTE: In order to run the simulation from the interface, it is necessary to have the current version of EnergyPlus installed.

Output reports can be visualized through graphs plotted by the program.

Important characteristics of E2AC are:

- Simplified interface
- Database with materials and constructions
- Calls EnergyPlus directly from the interface
- Window mounted air conditioner model embedded
- Allows multi alternatives in a single data file
- Weather data and design days for 14 Brazilian cities.



**E2AC is under development by the LabEEE team (Energy Efficiency in Buildings Laboratory) at Federal University of Santa Catarina, Brazil.**

Recent Reports  
Recent Reports  
**Recent Reports**  
Recent Reports  
Recent Reports  
Recent Reports  
Recent Reports  
Recent Reports

[Dru Crawley](#) (U. S. Department of Energy), Jon Hand (University of Strathclyde, UK), Michael Kummert (University of Wisconsin Solar Energy Laboratory) and Brent Griffith (National Renewable Energy Laboratory) have released the report ("[Comparison of Capabilities of 20 Building Simulation Programs](#)") comparing the features and capabilities of 20 simulation programs. It is hoped that the report will be a resource for the simulation community and the intent is for it to become a living document.

Suggestions (email [Dru.Crawley](mailto:Dru.Crawley)) for its improvement are definitely welcomed!

[Download Document Here](#)



## Ask An EnergyPlus Expert



### AIR TO AIR HEAT EXCHANGER

Is the air-to-air heat exchanger model in EnergyPlus able to simulate the total heat exchange?  
And was the module developed for a sensible heat exchanger?

#### Answer

There are two air-to-air heat exchanger models in EnergyPlus:

object HEAT\_EXCHANGER:AIR\_TO\_AIR:FLAT\_PLATE or sensible-only heat exchange

object HEAT\_EXCHANGER:AIR\_TO\_AIR:GENERIC for sensible and latent (total) heat exchange

See the I/O Reference and Engineering documents (doc links on p. 9) for more details.

### CONDENSER LOOP WITH GLYCOL

I need to simulate a building with a glycol-condenser loop. The loop feeds a chiller (supply side condenser loop). For the demand side, glycol passes through tubes into a cooling tower, and so is chilled by water. Is it possible to change the type of fluid in the condenser loop?

#### Answer

Yes, it is possible to change fluid types, but it's not necessary for most types of equipment. In EnergyPlus 1.2.2, only water-source heat pumps and the ground loop heat exchanger honor different fluid properties. Most other equipment (including chillers and towers) assumes water properties. In general, the primary energy impact of using glycol instead of water is a change in required flow rates due to different specific heats. This modification can be made by adjusting the pump head accordingly.

### ZONE VOLUME CALCULATION

How is the zone volume is calculated in EnergyPlus?

#### Answer

Basic Algorithm:

Given:

A 3D Polyhedron P described as a set of faces where each face is described by its 3D vertex point list

- P can be subdivided into a set of pyramids, each defined by one face and a common "tip" point somewhere in P
- The volume of each pyramid is given by: (pyramid base area)\*(tip height above base plane) / 3
- The total polygon volume is then the sum of the pyramid volumes.

See W. R. Franklin, "Volume of a Polyhedron"

[http://www.ecse.rpi.edu/Homepages/wrf/misc\\_notes/volume.html](http://www.ecse.rpi.edu/Homepages/wrf/misc_notes/volume.html)

Very accurate for enclosed spaces but not so good if many surfaces are missing. Therefore, we allow users to calculate their own and enter it in the Zone Object.



## Ask An EnergyPlus Expert



### SOLAR HEAT GAIN ON A FAÇADE

I need to model a large convention center but I'm only interested on the effects that a large louver system would make on the solar heat gain in an adjacent interior space. I'm using Autocad, which doesn't use enclosed zones but uses zones corresponding to different parts of the model, like one for the roof, louvers etc. Can I find the  $w/m^2$  incident on the façade by using EnergyPlus (and not have to worry about having the enclosed zones)?

#### Answer

Yes. To have EnergyPlus calculate the incident solar flux with shading effects, define the surfaces of interest as one or more exterior Surface:HeatTransfer objects which are connected to a single zone. Also define any exterior shading features. The zone does not need any other surfaces. If the simulation fails due to high temperatures, it may be necessary to add PURCHASED AIR or INFILTRATION to remove excess heat from the zone.

### MODELING SHADED FAÇADES

I'm trying to model a shaded façade. It's a south facing façade with external shading that consists of a mesh of 6 x 6cm squares that have a 4cm depth, one meter apart from the outer façade surface.

#### Answer (from Andy Tindale of DesignBuilder) ([www.designbuilder.co.uk](http://www.designbuilder.co.uk))

You can achieve 'Grid shading' by placing 10 x 6cm wide X 60cm high windows side-by-side, each window having 2 sidefins (1 vertical shading device each side of each window) and 10 louvers (horizontal blades evenly spaced).

This is very simple to set up using DesignBuilder - just draw one window of the correct size, clone it nine times and set up the appropriate external shading device.

I have put together a simple example grid shading DesignBuilder file – if you're interested in seeing it please let me know and I will send it to you.

### MODELING CURVED FAÇADES

How can I use EnergyPlus to simulate an office building with a large number of curved façades?

#### Answer (from Andy Tindale of DesignBuilder) ([www.designbuilder.co.uk](http://www.designbuilder.co.uk))

It is possible to represent curvature in EnergyPlus; the key word is **represent**. You need to break the curves up into equivalent planar surfaces, 3 or more vertices; breaking a circular building into 8 or so equivalent surfaces is probably enough. DesignBuilder ([www.designbuilder.co.uk](http://www.designbuilder.co.uk)) allows you to easily create arcs for curved façades and, thus, complete the EnergyPlus simulations.



Visit the Environmental Energy Technologies Division (LBNL) blog at

<http://bleer.lbl.gov>



## Ask An EnergyPlus Expert



### GLASS ELEVATOR WITHIN A GLASS ELEVATOR SHAFT

I need help with a tricky modeling problem. I have a glass elevator "cabin" within a 15m high glass elevator shaft which is exposed to sunlight on three sides. I can easily simulate the elevator shaft without the elevator but I don't know how to calculate the shaft with the cabin inside. Also, there might be cooling provided by the air between the outside walls of the cabin and the inside walls of the shaft.

#### Answer

EnergyPlus does allow interior windows, but they are not considered "Sunexposed" because they do not see outdoor solar radiation directly. If we assume that the gap between the elevator cabin and the glass walls of the shaft is fairly narrow, then there are two approaches that may be applicable:

1. Define two zones, one for the empty portion of the shaft, and another for the elevator cabin including a portion of the surrounding shaft. Define the combined shaft glass and cabin glass as double-pane airflow windows (because you mentioned that the air in the shaft might provide cooling).
2. Define the shaft as a zone with exterior windows, and define the cabin as a second zone. The walls of the cabin would be interzone surfaces with windows (these surfaces and windows are defined in both the shaft and cabin zones, with exterior environment of OtherZoneSurface, referencing the companion surface as an Outside face environment object). Windows on interior walls receive both direct and diffuse sunlight from the exterior zone and transmit it to the interior zone. Note, however that the solar gain entering the second zone is treated as all-diffuse and directionality is lost at that point.

In both of these options, we would recommend setting the Solar Distribution field in the Building object to FullInteriorAndExterior or FullInteriorAndExteriorWithReflections.

This is a very complex problem, and the simulation results will have some uncertainty. We would recommend doing some sensitivity studies, varying uncertain parameters, in order to get a range of results. Also, if you use the thermal comfort reporting, they may not account for the impact of solar radiation incident directly on the person, which could be a significant effect in this situation.

### NODES AND BRANCHES

Are all of the nodes declared in "node list" or can they be declared along the way, for example, while we do the branches? And do I fill in the branch list or is it automatic?

#### Answer

Nodes only need to be declared in the objects in which they are used. In some instances, this may require the use of a node list to connect more than one node to an object. For example, a SET POINT MANAGER object, which applies the same setpoint to more than one node, would require a NODE LIST. Also, outside air inlet node must be listed in an OUTSIDE AIR INLET NODE LIST object. Branch lists are very specific groups of branches associated with particular sub-loops. The user must create branch lists.



## Ask An EnergyPlus Expert



### CONNECTED ZONES

I am attempting to model zones without partitions separating them; however, the zones are kept at different conditions. To do this I have modeled them with partitions and also have attached windows to the partitions. The partitions are nearly completely transparent to solar, visible and long wave radiation and have a high conductivity. Is this the best way to model this situation or should I approach the problem differently?

#### Answer

This is a good start. You should also add some cross mixing to transfer air between the two zones; however, it's difficult to say what flow rate to use.

Note that windows in EnergyPlus are opaque to infrared (long-wave) radiation (see Engineering Reference p. 171, pdf p. 199), so there is no direct radiant exchange between surfaces in different zones even when there is an interior window. This should be a small effect if the windowglass is given a high emissivity so that it will simply exchange with Zone A on one side and conduct through and exchange with Zone B on the other side.

Also, be sure to use FullInteriorAndExterior solar distribution (in the BUILDING object) so that beam solar can be transmitted through the partition windows into the adjacent zone.

### SURFACE HEAT BALANCE OF DECOUPLED PV

For the case of decoupled PV, does the surface heat balance consider the shading effect by the PV panels? If a PV is input as decoupled, do we need to include it in the construction of the base surface?

#### Answer

Yes, shading effects are considered. The incident solar will be reduced if other surfaces in the model will shade the PV panels.

If by "decoupled" you mean you are using the object "Surface:HeatTransfer:ExteriorNaturalVentedCavity" then the model assumes that none of the solar will make it to the underlying surface, it is all incident on the decoupled surface (baffle) that has the panels. And no, you do not include the PV panel in the construction of the base surface. (But if you model the PV as "integrated," then you would include it in the construction, but you would use a "Construction With Internal Source" object.)



#### E-Update from NFRC

The latest newsletter from the National Fenestration Rating Council (NFRC) is packed with information. Go to <http://www.nfrc.org/press/NFRCupdate/index.html> and read about code updates, bilingual labels, and the continuing progress on non-residential certification.





## Ask An EnergyPlus Expert



### MACROS IN ENERGYPLUS

Is it possible to write macros or scripts to run EnergyPlus? And if so, where can I find the documentation?

#### Answer

Go to the EPlusMainMenu.pdf, search for Macros. The EnergyPlus Auxiliary Programs documentation describes the macros in details. Also, try the GettingStarted manual. EnergyPlus also comes with two "batch" files, one accompanies the EP-Launch and one is a stand-alone (RunEPlus.bat). Both get installed in the "root" folder.

### MINIMUM SYSTEM AIR FLOW RATE

The Input/Output reference states that

*"If the zone VAV dampers are reverse action and can open to full flow to meet heating demand, the ratio should be set to 1."*

However, in the example file 5ZoneAutoDXVAV this value set to 0.3. Is this a different case than what the manual describes? If yes, then when should the ratio be set to 1 and what other fields need to be changed?

#### Answer

For "reverse-action" damper control, the ratio should be set to 1. The change will affect the sizing of the terminal unit heating coils and the central heating coil. It might affect the overall design flow rates of the zones. Basically putting in 1 allows the sizing algorithms to do a better job of sizing your system when you are using reverse action dampers. The documentation is correct; if the example files are incorrect, we will change them.

### QuickLinks to EnergyPlus Documents

[Input/Output Reference \(PDF 4.2 MB\)](#)  
[Output Details and Examples \(PDF 493 KB\)](#)  
[Engineering Document \(PDF 4.5 MB\)](#)

[Module Developer's Guide \(PDF 539 KB\)](#)  
[Interface Developer's Guide \(PDF 200 KB\)](#)  
[Programming Standard \(PDF 168 KB\)](#)

### "One Man's Ceiling is Another Man's Floor"

If you are interested in MultiFamily Housing, you should take a look at **Party Walls**, a free e-newsletter from [Steven Winter Associates, Inc.](#) **Party Walls** joins the other excellent e-newsletters from Steven Winter: **WinterGreen** (sustainable design and construction), **RUSH** (HUD-related), **CARBNews** (Consortium for Advanced Residential Buildings) and **Inside&Out** (SBIC).

## New EnergyPlus Consultant

Hank Jackson, PE  
ETech Solutions  
P.O. Box 2355  
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(828) 691-0785  
HZJackson@juno.com

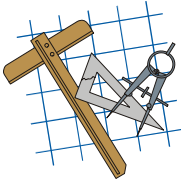


## Update to the WINDOW 5.2 Program

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

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

## Building Energy Software Tools Directory



This directory provides information on over 300 building software tools for evaluating energy efficiency, renewable energy, and sustainability in buildings. The energy tools listed in this directory include databases, spreadsheets, component and systems analyses, and whole-building energy performance simulation programs. A short description is provided for each tool along with other information including expertise required, users, audience, input, output, computer platforms, programming language, strengths, weaknesses, technical contact, and availability.

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

## EP-Quick

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

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

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

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

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

Contact Jason Glazer, Glazer Software, at [jglazer@gard.com](mailto:jglazer@gard.com)



PG&E Educational Programs for November and December 2005

**PG&E Pacific Gas and Electric Company**  
**WE DELIVER ENERGY.**

For a complete listing of classes or to register call 415.973.7268 or go to [www.pge.com/pec](http://www.pge.com/pec)

### H V A C

Wed, Nov 16	Optimization of Chilled Water Plants
Wed, Nov 30	EnergyPro Nonresidential Software Training - HVAC
Tue, Dec 13	Innovations in Evaporative Cooling and Water Treatment

### ARCHITECTURE

Wed, Nov 2	Solar Hot Water Systems
Tue, Nov 8	Residential Envelope Performance
Tue, Nov 29	EnergyPro Nonresidential Software Training - Building Envelope
Wed, Dec 7	Lighting Fundamentals
Thu, Dec 8	2005 Title 24 Glazing and Fenestration Requirements

### LIGHTING

Tue, Nov 29	EnergyPro Nonresidential Software Training - Lighting
Wed, Dec 7	Lighting Fundamentals

### RENEWABLES

Wed, Nov 2	Solar Hot Water Systems
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### RESIDENTIAL and WHOLE HOUSE

Tue, Nov 1	House as a System (3-day class)
Fri, Nov 4	House as a System Overview
Tue, Nov 8	Residential Envelope Performance

### TITLE 24 (CALIFORNIA ENERGY CODE)

Thu, Nov 10	MICROPAS Residential Energy Compliance
Tue, Nov 29	EnergyPro Nonresidential Software Training - Building Envelope
Tue, Nov 29	EnergyPro Nonresidential Software Training - Lighting
Wed, Nov 30	EnergyPro Nonresidential Software Training - HVAC
Thu, Dec 8	2005 Title 24 Glazing and Fenestration Requirements

*The Forecast Looks Favorable for ...*

## **(Free!) Weather Data on Demand**

Access archived weather data from around the world through this U.S. DOE web interface:

[www.eere.energy.gov/buildings/energyplus/cfm/weatherdata/weather\\_request.cfm](http://www.eere.energy.gov/buildings/energyplus/cfm/weatherdata/weather_request.cfm)

Hourly weather data is continuously collected and stored into a local database, available through this web interface. Most stations have information for dry bulb temperature, wet bulb temperature, wind speed/direction, atmospheric pressure, visibility, cloud conditions, and precipitation type.

## EnergyPlus Version 1.2.3

To download a free copy of the program

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



EnergyPlus is an R&D 100 Award Winner, named one of the 100 most technologically significant new products of the year.

### EnergyPlus Support Tools

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

### EnergyPlus Weather Data from [http://www.eere.energy.gov/buildings/energyplus/cfm/weather\\_data.cfm](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 Meteoronorm files for EnergyPlus](#).

### Ask an EnergyPlus Expert

Questions from EnergyPlus users are answered promptly via email by program developers. To submit questions, join the EnergyPlus User Group at [http://groups.yahoo.com/group/EnergyPlus\\_Support/](http://groups.yahoo.com/group/EnergyPlus_Support/). A selection of questions/answers are compiled (yearly) into a downloadable PDF document: Q and A for [2002](#), Q and A for [2003](#), Q and A for [2004](#).

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

#### Are you an EnergyPlus Consultant ?

If you are engaged in EnergyPlus consulting, and would like to be listed in the *Building Energy Simulation User News* and on our website (<http://SimulationResearch.lbl.gov>), please send details to [kl Wellington@lbl.gov](mailto:kl Wellington@lbl.gov).

#### Join the EnergyPlus User Group

The developers of EnergyPlus have formed a support group to foster discussion and maintain an archive of information for program Users. We invite questions about program usage and suggestions for improvement to the code. Go to [http://groups.yahoo.com/group/EnergyPlus\\_Support/](http://groups.yahoo.com/group/EnergyPlus_Support/)

#### Translate EnergyPlus Web Pages

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

*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).*

# BLASTnews

[www.bso.uiuc.edu](http://www.bso.uiuc.edu)

Building Systems Laboratory  
University of Illinois, 30 Mechanical Engineering Building,  
1206 West Green Street, Urbana, IL 61801  
Tel: (217) 333-3977 - Fax: (217) 244-6534  
[support@blast.bso.uiuc.edu](mailto:support@blast.bso.uiuc.edu)

The Building Loads Analysis and System Thermodynamics (BLAST) program predicts energy consumption, energy system performance and cost for new or existing buildings.

BLAST contains three major sub-programs:  
**Space Load Prediction** computes hourly space loads based on weather data and user inputs detailing the building construction and operation.  
**Air Distribution System Simulation** uses the computed space loads, weather data, and user inputs.  
**Central Plant Simulation** computes monthly and annual fuel and electrical power consumption.

**Heat Balance Loads Calculator (HBLC)**  
Graphical interface for producing BLAST input files.

**WINLCCID 98**  
LCCID (Life Cycle Cost in Design) performs Life Cycle Cost Analyses.

Program Name and Description	Order Number	Price
<b>PC BLAST</b> Includes: BLAST, HBLC, BTEXT, WIFE, CHILLER, Report Writer, Report Writer File Generator, Comfort Report program, Weather File Reporting Program, Control Profile Macros for Lotus or Symphony, and the Design Week Program. The single CD-ROM includes s the BLAST Manual, technical articles and theses, nearly 400 processed weather files, browsing engine, and source code.	3B486E3-0898	\$1500
<b>PC BLAST Package</b> Upgrade from level 295+	4B486E3-0898	\$450
<b>WINLCCID 98:</b> executable version for 386/486/Pentium	3LCC3-0898	\$295
<b>WINLCCID 98:</b> update from WINLCCID 97	4LCC3-0898	\$195

*The last four digits of the catalog number indicate the month and year the item was released or published.*

## International Websites for Energy-Efficient Buildings

### Australia

- <http://www.airah.org.au/>  
Australian Institute of Refrigeration, Air-Conditioning and Heating
- <http://www.fbe.unsw.edu.au/>  
Faculty of the Built Environment at the University of New South Wales

### Canada

- [http://buildingsgroup.nrcan.gc.ca/home/home\\_e.asp](http://buildingsgroup.nrcan.gc.ca/home/home_e.asp)  
The Buildings Group is one of 10 energy technology R&D groups that make up the CANMET Energy Technology Centre (CETC) [www.cetc.nrcan.gc.ca](http://www.cetc.nrcan.gc.ca)
- <http://greenbuilding.ca>  
Green Building Information Council

### Norway

- <http://www.ntnu.no/indexe.php>  
University of Science & Technology at Trondheim
- <http://www.byggforsk.no/default.aspx?spraak=en>  
Norwegian Building Research Institute

### Sweden

- [http://www.hvac.chalmers.se/home\\_e.htm](http://www.hvac.chalmers.se/home_e.htm)  
Building Services Engineering Department at the Chalmers University of Technology

### United Kingdom

- <http://www.bre.co.uk/what.jsp>  
Building Research Establishment

[From the EETD Blog:](#)

## A LEED-Gold Building in China

A new energy-efficient building in Beijing, designed with the help of Berkeley Lab EETD experts, has just received a LEED Gold rating from the U.S. Green Building Council—the first in Beijing. The LEED (Leadership in Energy and Environmental Design) Green Building Rating System is a voluntary, consensus-based standard developed in the US for rating high-performance, sustainable buildings.

The Agenda 21 Demonstration Energy-Efficient Office Building is a joint effort of the Chinese Ministry of Science and Technology and the U.S. Department of Energy. EETD's Joe Huang was the principal technical adviser in the schematic design of the building. He completed a feasibility study in late 2000 that identified 20 energy-efficiency measures through the use of computer simulations.

Starting in 2000, Rob Watson of the Natural Resource Defense Council spearheaded a voluntary effort to get U.S. companies to parti-



cipate in the demonstration building by supplying their technologies or equipment at no incremental cost to the Chinese partner.

Ground-breaking took place in February 2002. Joe and Rob continued to work with the U.S. manufacturers and suppliers, and with the architectural team and the owner, throughout a lengthy process of contract and construction.

They were interrupted at one point by the SARS epidemic in Beijing in mid-2003. The building, completed in Spring 2004, has now been occupied for more than a year. According to the building manager the actual energy consumption of the building has fully validated the computer simulations done three years ago, with measured energy use less than half that of a typical office building in Beijing.

Joe Huang and Xu Peng, also of EETD, are now implementing a monitoring plan with the goal of fully documenting the building's energy and thermal performance.

Also of interest . . . from the newsletter [Science @ Berkeley Lab](#)

## "Taking the Measure of China's Energy Strategies"

China quadrupled its economy in 20 years while only doubling its energy consumption. Now China wants to double its economy again, but its energy consumption is growing faster than ever.

A [new report](#) shows that to get back on track, conservation is crucial.

Read or download the report [Evaluation of China's Energy Strategy Options](#) as a pdf file

Visit the Berkeley Lab's [China Energy Group website](#)

More about the China Energy Group's [work in China](#)

**GenOpt 2.0**  
Generic Optimization Program

*GenOpt is an optimization program for the minimization of a cost function, such as annual energy use, that is evaluated by an external simulation program. GenOpt can be used with any simulation program -- such as EnergyPlus, SPARK or DOE-2 -- that has text-based input and output. It also offers an interface for adding custom optimization algorithms to its library.*

**GenOpt 2.0 (with documentation) may be downloaded free of charge from**

<http://SimulationResearch.lbl.gov>



# DOE-2



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

Cost is as follows:

- \$ 300 U.S. Government/Non-Profits/Education
- \$ 575 U.S. Public, Mexico, Canada
- \$1129 to \$1268 Other Foreign

DOE-2 [Documentation on a CD from ESTSC](#) - Cost US\$100

**What is included on the CD?**

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

### Order Software and ESTSC Documentation

Ed Kidd or Kim Buckner  
NCI Information Systems, Inc.  
Energy Science and Technology Software Center (ESTSC)  
P.O. Box 1020  
Oak Ridge, TN 37831

Phone: 865/576-1037  
Fax: 865/576-6436  
Email: [estsc@adonis.osti.gov](mailto:estsc@adonis.osti.gov)

### Purchase DOE-2 Documentation

DOE-2 Sample Run Book (2.1E) -- The Sample Run book is the only remaining DOE-2 manual not available electronically. It must be purchased separately from NTIS; ordering information may be found at <http://SimulationResearch.lbl.gov> > DOE-2 > Documentation

### Free DOE-2 Documentation (<http://simulationresearch.lbl.gov/>> DOE-2 > Documentation)

[DOE-2 Basics Manual \(2.1E\)](#)

**Update Packages:** Update Packages are **not** cumulative; each one contains different information. Download all four packages then print and insert the pages into your existing DOE-2 manuals.

- [Update Package #1:](#) DOE-2.1E Basics, the Supplement and BDL Summary
- [Update Package #2:](#) BDL Summary and Supplement.
- [Update Package #3:](#) Appendix A of the Supplement.
- [Update Package #4:](#) (1000-zone DOE-2.1E) BDL Summary.

[DOE-2 Modeling Tips \(pdf files\) for 2004 for 2003 for 2002](#)

A compilation of all the "how to" and "DOE-2 Puzzler" articles from the newsletter.

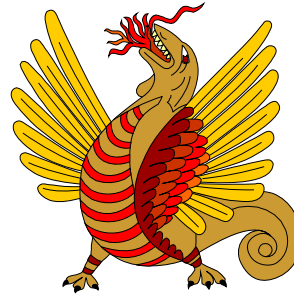
[Changes and Bug Fixes to DOE-2.1E \(txt file\)](#)

Description of all changes and bug fixes in a text document.

## New DOE-2 Consultant

[tweber@weberconsultants.com](mailto:tweber@weberconsultants.com)

Thomas Weber, P.E.  
Weber Consultants, Ltd.  
116 West Illinois Street, Suite 6W  
Chicago, IL 60610  
phone 312-644-6180  
fax 312-644-6179  
cell 773-443-8682



*Run for safety, foolish pedestrians!*



### The DOE-2 Puzzler

### Modeling a Domed Roof with DOE-2

#### Question:

I am developing a DOE-2 model for a building with a large domed roof. Do you have any suggestions for approximating roof geometry – i.e. how many facets should I use for reasonable solar gain and conduction results?

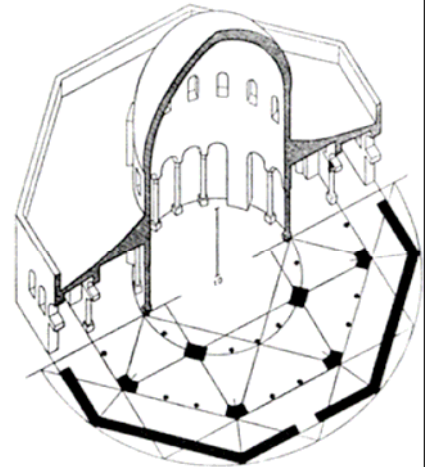
#### Joe Huang Answers:

A few years ago, I wrote an AWK script that generated DOE-2.1E input based on the input dome diameter and the specified number of arc segments (horizontal rows) desired. The generated script produces a series of polygons to model the dome in any detail. However, here are some caveats:

- (1) the dome is hemispherical,
- (2) the model, of course, does nothing about air stratification or other thermal effects,
- (3) one can easily be entranced by the representational accuracy of the script and transform the dome to hundreds of polygons - clearly geometrical overkill - but it looks good in drawings.

The description of the procedure is described in the Sept/Oct 2002 issue of the USER NEWS. Here's a link to "[Adapting DOE-2 to meet the needs of the Egyptian Housing and Building Research Center](#)" and "[Modeling Domes with DOE-2.](#)"

The article includes the AWK script and a sample input.



*Example of a Domed Building:  
The Ancient Dome of the Rock*

Please email your "DOE-2 Puzzler" questions to [klington@lbl.gov](mailto:klington@lbl.gov)

### Chinese language version of [VisualDOE 4.0](#)

Architectural Energy Corporation (AEC) has developed a Chinese language version of VisualDOE 4.0, in collaboration with Taiwan's Industrial Technology Research Institute. Those interested in this product may contact Dr. Hong ([thong@archenergy.com](mailto:thong@archenergy.com)) or Mr. Lee ([haochuan\\_lee@itri.org.tw](mailto:haochuan_lee@itri.org.tw)) for more information.



## Building Energy Software

Environmental Energy Technologies Division of Lawrence Berkeley Laboratory

### Free Downloads

**BDA 3.1 (Building Design Advisor)** [gaia.lbl.gov/BDA](http://gaia.lbl.gov/BDA)

(building decision-making from design through completion)

**COMIS** [www-epb.lbl.gov/comis](http://www-epb.lbl.gov/comis) (multi-zone air flow and contaminant transport model)

**EnergyPlus 1.2.2** [www.energyplus.gov/](http://www.energyplus.gov/)

(next-generation whole-building energy analysis program, based on BLAST and DOE-2)

**GenOpt<sup>®</sup> 2.0** [SimulationResearch.lbl.gov](http://SimulationResearch.lbl.gov) (generic optimization program)

**Optics 5.2** [windows.lbl.gov/materials/optics5/](http://windows.lbl.gov/materials/optics5/) (for analyzing optical properties of glazing systems)

**RADIANCE 3.5** [radsite.lbl.gov/radiance/](http://radsite.lbl.gov/radiance/) (analysis and visualization of lighting in design)

**Desktop Radiance 2.0 $\beta$**  [radsite.lbl.gov/deskrad/](http://radsite.lbl.gov/deskrad/)

(integrates the Radiance Synthetic Imaging System with AutoCAD Release 14)

**Radiance Control Panel** [www.squ1.com/site.html](http://www.squ1.com/site.html)

(automates some Radiance tasks once the model has been created)

**THERM 5.2** [windows.lbl.gov/software/therm/therm.html](http://windows.lbl.gov/software/therm/therm.html) (models two-dimensional heat-transfer effects in building components where thermal bridges are of concern)

**VisualSPARK 2.0** [SimulationResearch.lbl.gov](http://SimulationResearch.lbl.gov) (*Simulation Problem Analysis and Research Kernel*)

(connect component models to simulate innovative building envelope and HVAC systems)

**WINDOW 5.2** [windows.lbl.gov/software/window/window.html](http://windows.lbl.gov/software/window/window.html) (thermal analysis of window products)

### Free Software / Request by Fax from 510.486.4089

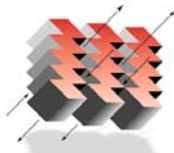
**RESFEN 3.1** [windows.lbl.gov/software/resfen/resfen.html](http://windows.lbl.gov/software/resfen/resfen.html)

(choose energy-efficient, cost-effective windows for a given residential application)

### Web Based (free)

**Home Energy Saver** [hes.lbl.gov](http://hes.lbl.gov) (quickly computes home energy use)

## VisualDOE and LEED Training ☘ October 19-21, 2005



**ARCHITECTURAL ENERGY**  
CORPORATION  
*Integrated Engineered Solutions*

Architectural Energy Corporation is pleased to announce a VisualDOE 4.0 and LEED energy savings calculation training session on October 19-21, 2005 in Chicago.

The seminar includes two days focused on DOE-2.1E, the VisualDOE interface, VisualDOE 4.0 new features, and general energy simulation skills. The third day covers LEED energy savings calculations for green buildings. The LEED module covers LEED-NC 2.1 as well as proposed calculation methods for LEED-NC 2.2.

No prior energy modeling experience is required.

VisualDOE 4.0 is available at a discount to training attendees. However a free one-month license for VisualDOE 4.0 is included with the training.

For questions, please email [vdotraining@archenergy.com](mailto:vdotraining@archenergy.com) or phone (415) 957-1977 ext 111.

To register or get more training information, please go to <http://www.archenergy.com/products/visualdoe/training/>

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

## DrawBDL+3.1

The DrawBDL program can now read and display EnergyPlus IDF files, as well as convert the building surface descriptions from DOE-2 BDL to EnergyPlus IDF. In addition to a different "look and feel" from earlier versions, 3.1 has the following improvements:

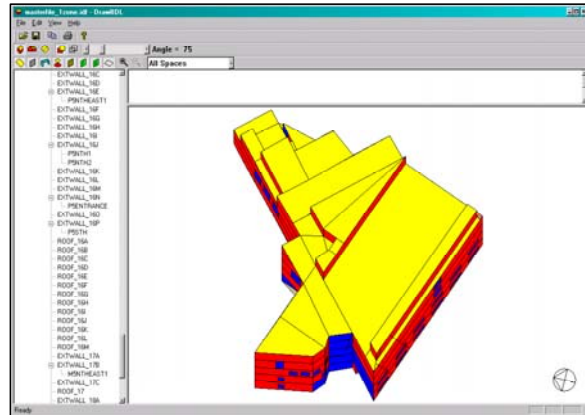
1. New user interface with a hierarchical tree showing all building surfaces.
2. No limit on the number of building surfaces.
3. For building surfaces, the expanded data window shows not only the input values, but also their locations in the global coordinate system; for spaces, the data window shows the gross and net areas of walls, windows, doors, roofs, and skylights.
4. Displays surfaces as 2-D or 3-D polygons.
5. Ability to change the sort order of building surfaces used in the display; this allows users to "touch up" the shaded drawings for use in presentations.
6. Interprets both EnergyPlus IDF files as well as DOE-2.1 BDL files.
7. Surface data is output as an EnergyPlus IDF file. This allows DrawBDL+ users to convert their DOE-2 building descriptions to EnergyPlus with a single mouseclick. However, since DrawBDL+ processes only building geometry data, the converted IDF file is a partial file containing only the inputs for building surfaces.

The price for DrawBDL+3.1 remains \$125 plus shipping (shipping charge only applies to mailed diskettes). Updates from previous DrawBDL Versions 1.X or 2.X cost \$62.50 plus shipping. Shipping costs are \$5 US, \$10 international.

For more information about DrawBDL+ or to order, please contact

### Joe Huang and Associates

31 Sarah Lane  
Moraga CA 94556-2563  
Phone 925-247-9180  
mail to: [joe@drawbdl.com](mailto:joe@drawbdl.com)



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



Night view of the completed building

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

◆ [www.drawbdl.com](http://www.drawbdl.com) ◆ [www.drawbdl.com](http://www.drawbdl.com) ◆ [www.drawbdl.com](http://www.drawbdl.com) ◆



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

ENERGY STAR is a government-backed program helping businesses and individuals protect the environment through superior energy efficiency.

Results are already adding up. Last year alone, Americans, with the help of ENERGY STAR, saved enough energy to power 20 million homes and avoid greenhouse gas emissions equivalent to those from 18 million cars - all while saving \$8 billion.

#### **For Business**

Because a strategic approach to energy management can produce twice the savings - for the bottom line and the environment - as typical approaches, EPA's ENERGY STAR partnership offers a proven energy management strategy that helps in measuring current energy performance, setting goals, tracking savings, and rewarding improvements.

EPA provides an innovative energy performance rating system which businesses have already used for more than 19,000 buildings across the country. EPA also recognizes top performing buildings with the ENERGY STAR.

#### **For Homes**

##### Home Energy Yardstick

If you have 5 minutes and your energy bills are handy, find out if your energy use is above average. You will need to enter some common information about your home such as age, square footage, number of occupants and energy bill totals for a consecutive 12-month period (one year). If you don't keep your bills, contact your utility for a 12-month summary.

##### Home Energy Advisor

If you have more time (15 minutes) you'll be asked to enter additional information about your home, but you'll get a list of customized energy improvements and the estimated savings.

### **Recent gems from e-News, the newsletter from Energy Design Resources:**



#### **New VAV System Design Guide**

Too often, the central or built-up HVAC systems installed in large commercial buildings use significantly more energy than necessary. To address this problem, a major new study completed last year evaluated the performance of airside variable-air-volume (VAV) systems with chilled water plants. The research resulted in a comprehensive publication, the Advanced VAV System Design Guide, that includes dozens of recommended design strategies for systems in new and existing buildings.

Find out more in the [October issue of e-News from Energy Design Resources](#).

<http://www.energydesignresources.com/resource/205/>

And click this link to download the [Advanced VAV System Design Guide](#).

[http://www.energy.ca.gov/pier/buildings/projects/400-99-013-1-3-3\\_3.html](http://www.energy.ca.gov/pier/buildings/projects/400-99-013-1-3-3_3.html)



#### **Underfloor Air Distribution Systems**

If you are interested in Underfloor Air Distribution Systems (UFADs) check out the latest eNews newsletter. UFADs are gaining ground in commercial new construction across North America. Compared to conventional overhead air distribution systems, underfloor systems have the potential to provide better indoor air quality, improved thermal comfort, and reduced energy use. Download the eNews Issue #49 [here](#).

<http://energydesignresources.com/docs/end-49.pdf>

Lonely??? Bored??? Why not lose yourself in the Visual Dictionary of Famous Plane Curves!!

[http://xahlee.org/SpecialPlaneCurves\\_dir/specialPlaneCurves.html](http://xahlee.org/SpecialPlaneCurves_dir/specialPlaneCurves.html)