ENERGYPLUS

NEXT-GENERATION ENERGY SIMULATION SOFTWARE FOR BUILDING DESIGN

EnergyPlus is an energy simulation program designed to model energy flows in buildings, including heating, cooling, lighting, and ventilation. EnergyPlus builds on the most popular features and capabilities of BLAST and DOE-2, but includes many innovative simulation capabilities. The capabilities include time steps of less than one hour, modular systems and plant integrated with heat balance-based zone simulation, multizone air flow, thermal comfort, and photovoltaic systems.

www.energyplus.gov

EnergyPlus is being developed by researchers at the University of Illinois, the U.S. Army Construction Engineering Research Laboratory (CERL), and the Department of Energy's Lawrence Berkeley National Laboratory, with the assistance of the Florida Solar Energy Center, GARD Analytics, the University of Wisconsin, and Oklahoma State University.

The development of EnergyPlus is supported by the U.S. Department of Energy.

Q: What do the version numbers mean?

We are using an internal/external numbering scheme. The initial release version of EnergyPlus was 1.0.0.011—Major Version 1, Minor Version 0, Sub-Minor Version 0, Build 11. The current release (July 2002) is 1.0.2 with the build number to be determined. Build numbers are code changes in the release process. We use a "build details" spreadsheet to track changes. The final release will have a build number designation.

The next official public release, scheduled for Spring 2003, will be 1.1. However, we are planning a sub-minor release version schedule with the following target dates:

1.0.3: Fall 2002

1.0.4: Winter 2002/Spring 2003

1.1: Spring 2003

Q: Has EnergyPlus been tested with all versions of Windows?

Extensive testing has been done with Windows 95, 98, NT, 2000, and XP. The user should achieve the same results on all platforms.

Q: Does the new version of EnergyPlus run on Macintosh, Linux, and other platforms?

We are limiting the standard release to a simple "console" application that will run under Windows operating systems. EnergyPlus is and will remain an "engine." Other developers may produce interfaces (both pre-and post-process) for several platforms. The EnergyPlus team may not be the sole "release mechanism" for EnergyPlus—members of the extensive interface developer network may put EnergyPlus on several platforms.

A Linux version is available for Version 1.0.2. Users must first register and download the standard version; the documentation is a PDF file. Most of the other files are in plain ASCII text.

Users will then need to download the Linux "engine" and run script.

Q: There is no apparent utility rate object/ economic module. Will it be included in a later version?

The utility rate, or economics module, is not currently built into the EnergyPlus simulation program. This feature is viewed as a post-processing procedure, based on the necessary time step data or compiled meter data from the simulation results. We do plan to include a file capable of being read into an LCC program (such as BLCC5) to assist users in determining costs.

The meter data available from EnergyPlus (eplusout.mtr), including meters such as facility electricity or building electricity, can be produced at several resolutions (timestep/minutes, hourly, daily, monthly, etc.). EnergyPlus should be able to read in programs that can access utility rate structures/databases for producing these types of calculations and costs.

Q: Can input units and ranges be found in the Input Data Dictionary (IDD)?

As noted in the Interface Developers document, we have set up conventions, including minimum, maximum, defaults, units, and other information. EnergyPlus processes the minimum/maximum information for numeric fields and flags items that are outside of the range. Defaults are used for blank fields.

Q: Does the Input Data File (IDF) require a particular order?

Objects in the IDF may be in any order. EnergyPlus input routines process the information as it is needed by the simulation and reorder if the internals of EnergyPlus require a particular order.

Q: Is there a limit to the number of statements that EnergyPlus can process?

Technically speaking, there is no limit to the number of Zones, Surfaces, Lighting, and other

statements that EnergyPlus can process. The input routines allocate according to how many of these the user enters. Practically speaking, your simulation may take longer if greater numbers of more complex statements are entered.

Q: Is the RunPeriod command optional or required?

RunPeriod is not required if design days are defined, but it is required to access data from a weather file. There can be more than one RunPeriod.

Q: How many run periods can an IDF contain?

EnergyPlus does not limit the number of run periods specified in an IDF. All run periods entered, however, will be executed. This will likely result in increasingly large output files. The shortest run period is one day. The longest is one year. There is no way at the present time to specify a run period of more than one year.

Q: A .dxf file is produced as one of the optional outputs. What is the purpose of this file?

Data Exchange Format (DXF) is a generally recognized exchange format in the CADD world. Many programs can read a .dxf file and produce an image that can be viewed (in this case, a building). The following programs are capable of reading the .dxf file produced by EnergyPlus: QuickView Plus, Microstation™, Visio™, and Autodesk™ products. Autodesk was the originator of the DXF format and has produced a free viewer called VoloView Express™. The viewer can be downloaded from **http://www.autodesk.com** (choose Products and Support links).

Send your EnergyPlus support questions to EnergyPlus-Support@gard.com.

About EnergyPlus

A Statement from the EnergyPlus Development Team

EnergyPlus is a stand-alone simulation engine without a user-friendly graphical interface. EnergyPlus reads input and writes output as text files. Interfaces are under development in the private sector—the first one should be available by late summer 2002. More than five private sector companies have indicated that they intend to develop EnergyPlus interfaces.

Because public funds (primarily from the U.S. Department of Energy) were used to develop EnergyPlus, we chose to develop the engine and not try to be all things to all users. Developing good user interfaces requires resources, attention to problem domains, and backing from specific user communities. The team members feel that those interests are better served through private considerations in which domain-specific funding may help quantify the requirements.

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