Tax Deduction Qualified Software for buildings placed in service on or after January 1, 2016.

EnergyPlus 9.0.1


Date Documentation Received by DOE: November 13, 2018

Statements and information in the right hand column of this table are from the software developer.

| 1 | The name, address, and (if applicable) web site of the software developer; | Amir Roth  
Technology Manager, Building Energy Modeling  
Office of Building Technologies, EE-2J  
U.S. Department of Energy  
1000 Independence Avenue, SW  
Washington, CD  20585-0121  
http://energyplus.net |
|---|---|---|
| 2 | The name, email address, and telephone number of the person to contact for further information regarding the software; | Amir Roth  
Amir.roth@ee.doe.gov  
202-287-1694 |
| 3 | The name, version, or other identifier of the software as it will appear on the list; | EnergyPlus, Version 9.0.1 |
| 4 | All test results, input files, output files, weather data, modeler reports, and the executable version of the software with which the tests were conducted; and | Provided to DOE |
| 5 | A declaration by the manager in charge of software development, made under penalties of perjury, that all statements and information in the right hand column of this table are true and correct. | On behalf of the EnergyPlus software development team I certify the following: |

(a) The software has been tested according to ANSI/ASHRAE Standard 140-2014 Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs (except for sections 5.2.4, 7, and 8);  
The software has been tested according to the American National Standards Institute/American Society of Heating, Refrigerating and Air-Conditioning Engineers (ANSI/ASHRAE) Standard 140-2014 Standard Method of Test for Evaluation of Building Energy Analysis Computer Programs.

(b) The software can model explicitly(1)—  
The EnergyPlus software is fully compliant with ASHRAE 90.1-2007 and meets all of the below requirements.

(i) 8,760 hours per year;  
The EnergyPlus software complies.
(ii) Calculation methodologies for the building components being modeled;  
The *EnergyPlus software* complies.

(iii) Hourly variations in occupancy, lighting power, miscellaneous equipment power, thermostat setpoints, and HVAC system operation, defined separately for each day of the week and holidays;  
The *EnergyPlus software* complies.

(iv) Thermal mass effects;  
The *EnergyPlus software* complies.

(v) Ten or more thermal zones;  
The *EnergyPlus software* complies.

(vi) Part-load performance curves for mechanical equipment;  
The *EnergyPlus software* complies.

(vii) Capacity and efficiency correction curves for mechanical heating and cooling equipment; and  
The *EnergyPlus software* complies.

(viii) Air-side and water-side economizers with integrated control.  
The *EnergyPlus software* complies.

(c)(2) The software can explicitly model each of the following HVAC systems listed in Appendix G of Standard 90.1-2007(1):

<table>
<thead>
<tr>
<th>System Description</th>
<th>The <em>EnergyPlus software</em> models this system.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Packaged Terminal Air Conditioner (PTAC), constant volume (CV) fan, DX coil cooling, hot-water fossil fuel boiler.</td>
<td></td>
</tr>
<tr>
<td>(ii) Packaged Terminal Heat Pump (PTHP), CV fan, DX coil cooling, electric heat pump heating.</td>
<td></td>
</tr>
<tr>
<td>(iii) Packaged Rooftop Air Conditioner (PSZ-AC), CV fan, DX coil cooling, fossil fuel furnace heating.</td>
<td></td>
</tr>
<tr>
<td>(iv) Packaged Rooftop Heat Pump (PSZ-HP), CV fan, DX coil cooling, electric heat pump heating.</td>
<td></td>
</tr>
<tr>
<td>(v) Packaged Rooftop Variable-Air-Volume (PVAV) with reheat, Variable-Air-Volume (VAV) fans, DX coil cooling, hot-water fossil fuel boiler.</td>
<td></td>
</tr>
<tr>
<td>(vi) Packaged VAV with parallel fan-powered boxes (PVAV with PFP boxes) with reheat, VAV fans, DX coil cooling, electric resistance heating.</td>
<td></td>
</tr>
</tbody>
</table>
(vii) Packaged Rooftop VAV with reheat, VAV fans, chilled water cooling, hot-water fossil fuel boiler. | The *EnergyPlus* software models this system.
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(viii) VAV with PFP boxes with reheat, VAV fans, chilled water cooling, electric resistance heating. | The *EnergyPlus* software models this system.

(d) The software can—

(i) Either directly determine energy and power costs or produce hourly reports of energy use by energy source suitable for determining energy and power costs separately; and | The *EnergyPlus* software complies.
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(ii) Design load calculations to determine required HVAC equipment capacities and air and water flow rates. | The *EnergyPlus* software complies.

(e)(2) The software can explicitly model:

(i) Natural ventilation. | The *EnergyPlus* software models natural ventilation.
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(ii) Mixed mode (natural and mechanical) ventilation. | The *EnergyPlus* software models mixed mode ventilation.
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(iii) Earth tempering of outdoor air. | The *EnergyPlus* software models earth tempering of outdoor air.
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(iv) Displacement ventilation. | The *EnergyPlus* software models displacement ventilation.
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(v) Evaporative cooling. | The *EnergyPlus* software models evaporative cooling.
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(vi) Water use by occupants for cooking, cleaning or other domestic uses. | The *EnergyPlus* software models water use by occupants.
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(vii) Water use by heating, cooling, or other equipment, or for on-site landscaping. | The *EnergyPlus* software models water use by heating, cooling, and other equipment as well as for on-site landscaping.
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(viii) Automatic interior or exterior lighting controls (such as occupancy, photocells, or time-clocks). | The *EnergyPlus* software models automatic interior and exterior lighting controls.
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(ix) Daylighting (sidelighting, skylights, or tubular daylight devices). | The *EnergyPlus* software models sidelighting, skylights, and tubular daylighting devices.
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(x) Improved fan system efficiency through static pressure reset. | The *EnergyPlus* software models improved fan system efficiency through static pressure reset.
Radiant heating or cooling (low or high temperature).

The EnergyPlus software models low and high temperature radiant heating and cooling.

Multiple or variable-speed control for fans, cooling equipment, or cooling towers.

The EnergyPlus software models multiple and variable-speed control for fans, cooling equipment, and cooling towers.

On-site energy systems (such as combined heat and power systems, fuel cells, solar photovoltaic, solar thermal, or wind).

The EnergyPlus software models on-site energy systems including combined heat and power, photovoltaic systems, and solar water and air systems.

Date Posted: 11/13/18

1) 90.1-2007 is defined by the PATH Act of 2015 as "Standard 90.1–2007 of ASHRAE and IESNA (as in effect on the day before the date of the adoption of Standard 90.1–2010 of such Societies)." This definition includes 90.1-2007 and the addenda supplement package (Addenda a, b, c, g, h, i, j, k, l, m, n, p, q, s, t, u, w, y, ad, and aw) and addendum r, plus all published errata.

2) Software that cannot explicitly model one or more of the HVAC systems or features in sections 5.c and 5.e of the table can still be listed as qualified software. It cannot, however, be used for 179D analyses of projects that need to model such systems or features. When this is the case, the statement used for the particular requirements shall be as follows: The EnergyPlus software cannot model system or feature X and shall not be used for projects with this technology.


Signature of Manager of Software Development

Amir Roth

Technology Manager, Building Energy Modeling