IES Virtual Environment
New Features
Version: 2013 Feature Pack 1
New Features

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</table>
1 General

1.1 Check for updates

The Virtual Environment can now tell you if there is a newer version available.

On start-up the VE will check the iesve.com website to determine whether an update is available and if there is, a dialog will be displayed to let you know and take you to the download area.

The user has the option to remove the notification on start-up by choosing “Don’t automatically check for updates on startup” This can be reset in the Start-Up tab of the User Preferences.

The check can be performed manually at any time by using the “Check for Update...” entry in the Help menu.

Released VE2013
1.2 Master Templates wizard

The master templates wizard adds the ability to import and assign data to the current model. The options provided allow you to import templates and associated databases (profiles, systems... etc.).
Master templates are in essence the strategy of a design embodied in a model made simply transferrable to a new model i.e. all data & assignment, but no geometry.
1.3 Model Imports Improved; XML & IFC New in 2013 Feature Pack 1

The VE import functions have been analysed and further improved to give a more robust geometry import from gbXML, IFC and veXML (IESVE plug-in for SketchUp). This results in a far higher success rate for models imported from 3rd party software allowing full simulation and analysis with the VE suite of applications including solar analysis, thermal and energy simulation and lighting studies.

The Preferences dialog (access via Tools menu) now includes a Shell Import Settings tab. This gives the option to allow VE to attempt to correct any low quality geometry that is detected in the file being imported and also gives options to control how the software identifies rooms during the import process including:

- option to disregard columns,
- minimum surface boundary area to consider for import,
- limit for the maximum number of surfaces to allow in a space boundary (so that the user has control in extreme circumstances over how far the tidy algorithm goes before reverting to the source geometry)
New Features

The room healing algorithms are improved to correct and enhance any models imported with imperfections in the analytical model geometry. As such missing surfaces can be replaced, extra surfaces removed and other adjacency problems corrected to give a high quality model for us in VE. Rooms are always imported regardless of whether they require further improvement* and a new report is automatically generated giving full feedback on the success of the import and highlighting any areas for review in ModelIT.

*rooms will not be imported if they have fewer than 4 space boundaries.

Released VE2013 Feature Pack 1

1.4 SketchUp

SketchUp plug-in now supports SketchUp 2013.

Released VE2013

1.5 Revit

Revit plug-in now supports the Revit Architecture, Revit MEP & Revit Suites 2014 x86 & x64

Released VE2013
### 1.6 Building template manager interface tidy

Some mild cosmetic changes to the traditional BTM window.

![Building Template Manager](image)

**Released** VE2013

### 1.7 German Language Navigators New in 2013 Feature Pack 1

German language translations of the VE Navigators are available. When VE is installed on a German language machine this will be detected and the Navigators are automatically displayed in German.

![Navigators](image)

German is the only language currently available but more will be added in the future, if you have a request please contact IES.

**Released** VE2013 Feature Pack 1
2 VE-Gaia

2.1 Solar navigator upgrade

VE-Gaia solar navigator now uses the power of Model Viewer II to generate image reports and AVI video.

Solar shading analysis A free form analysis of building using Model Viewer II
Solar shading video Generates a video on either the equinox or solstice at a view position set by the user.
Solar shading report A report is generated with images for:
- Each month @ 09:00
- Each month @ 12:00
- Each month @ 15:00
- Every hour on summer solstice
- Every hour on winter solstice
- Every hour on equinox

Solar exposure analysis An annual exposure calculation is performed and the results are viewed graphically in Model Viewer II.
Solar exposure report An annual exposure calculation is performed and the results are displayed in 6 set views in a single page report.
**Annual Solar Exposure**

**Hint:** When generating a video use the “Get Position” button to determine the azimuth and altitude of the viewpoint as this will allow you to place the camera using the viewer.

Click OK once you are happy with the view and the video will be generated then displayed using your default viewer.

**Released VE2013**
3 ModelIT

3.1 Tabular Edit for ModelIT variables

Ability to view and edit model level variables by tabular edit. Sort rooms by area, room group, number of windows... any variable in the list!

To view the tabular edit window use Ctrl + Shift + T or select from the menu shown here:

A small selection of variables that you can now edit/export/import are:

- Room name
- Room type
- Visible state
- Colour
- Inner volumes (toggle on/off)
- Circulation area
- Lettable area
- Layer

These fields are also accessible in other views that use Tabular Edit.
4 SunCast

4.1 SunCast Parallel Processing New in 2013 Feature Pack 1

SunCast solar shading calculations are optimized to run at maximum efficiency and can run multiple processes (at present up to four).

Options can be found in the VE Preferences dialog (via Tools menu) or on the SunCast shading calculation settings dialog prior to starting the calculations.

- **Off**: Runs the version of SunCast available prior to VE 2013 Feature Pack 1 (single core)
- **On**: Runs the new optimized version of SunCast (single core)
- **Max**: Runs the new optimized version of SunCast with parallel processing on multiple cores

**Released** VE2013 Feature Pack 1
4.2 SunCast Tree Components Support New in 2013 Feature Pack 1

SunCast recognizes tree components in models and treats these as shading objects when calculating solar shading and generating images.

Tree Components are placed in ModelIT using the Place Landscaping Object feature.
5 APlocate

APlocate is the VE module which we use to set the site location, design weather data for sizing, simulation hourly weather data and the simulation calendar for defining holidays.

5.1 Mapping functionality

The ability to view and select site locations and weather files on a graphical map.

Released VE2013
### 6 Apache

#### 6.1 Input data visualisation

Apache can now visualize many of the room variables in Model Viewer II.

<table>
<thead>
<tr>
<th>General</th>
<th>Room Volume</th>
<th>Lettable Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>• General Template</td>
<td>• Room Volume</td>
<td>• Lettable Area</td>
</tr>
<tr>
<td>• Thermal Template</td>
<td>• Floor Area</td>
<td>• Circulation Area</td>
</tr>
<tr>
<td>• Room Volume</td>
<td>• Lettable Area</td>
<td>• Included in Building Floor Area?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Room Conditions</th>
<th>Aux Energy Profile</th>
<th>Max Humidification</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Heating Profile</td>
<td>• Solar Reflected Fraction</td>
<td>• Max Dehumidification</td>
</tr>
<tr>
<td>• Heating Setpoint</td>
<td>• Furniture Mass Factor</td>
<td>• Max Heating + Humidification</td>
</tr>
<tr>
<td>• Cooling Profile</td>
<td>• Humidity Control Min</td>
<td>• Max Cooling + Dehumidification</td>
</tr>
<tr>
<td>• Cooling Setpoint</td>
<td>• Humidity Control Max</td>
<td></td>
</tr>
<tr>
<td>• DHW Profile</td>
<td>• Cooling Unit Capacity?</td>
<td></td>
</tr>
<tr>
<td>• DHW Consumption*</td>
<td>• Cooling Unit Fixed Capacity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cooling Plant Radiant Fraction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• System Air Supply Flow Rate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• System Air Supply Free</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cooling Flow Capacity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• System Air Supply Variation Profile</td>
<td></td>
</tr>
</tbody>
</table>

* - only rooms with the consumption value entered in the units you have chosen to display will be coloured up.

<table>
<thead>
<tr>
<th>Apache System</th>
<th>Max Humidification</th>
</tr>
</thead>
<tbody>
<tr>
<td>• HVAC System</td>
<td>• Has Mechanical Supply?</td>
</tr>
<tr>
<td>• Aux Vent System</td>
<td>• Mechanical Supply Specific Fan Power</td>
</tr>
<tr>
<td>• DHW System</td>
<td>• Has Mechanical Exhaust?</td>
</tr>
<tr>
<td>• Heating Unit Size</td>
<td>• Extract Flow Rate</td>
</tr>
<tr>
<td>• Heating Unit Unlimited Capacity?</td>
<td>• Mechanical Exhaust Specific Fan Power</td>
</tr>
<tr>
<td>• Heating Unit Fixed Capacity</td>
<td>• Is Remote Extract Fan?</td>
</tr>
<tr>
<td>• Heating Plant Radiant Fraction</td>
<td></td>
</tr>
<tr>
<td>• Cooling Unit Size</td>
<td>• Cooling Unit Unlimited Capacity?</td>
</tr>
<tr>
<td>• Cooling Unit Fixed Capacity</td>
<td>• Cooling Plant Radiant Fraction</td>
</tr>
<tr>
<td>• Cooling Plant Radiant Fraction</td>
<td>• System Air Supply Flow Rate</td>
</tr>
<tr>
<td>• System Air Supply Free</td>
<td>• System Air Supply Free</td>
</tr>
<tr>
<td>• Cooling Flow Capacity</td>
<td>• System Air Supply Variation Profile</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internal Gains</th>
<th>Maximum Heating and Cooling Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Lighting Max Sensible Gain</td>
<td>• Computing Max Sensible Gain</td>
</tr>
<tr>
<td>• Lighting Max Power Consumption</td>
<td>• Computing Max Latent Gain</td>
</tr>
<tr>
<td>• Lighting Max illuminance</td>
<td>• Computing Max Power Consumption</td>
</tr>
<tr>
<td>• Lighting Installed Power Density</td>
<td>• Computing Radiant Fraction</td>
</tr>
<tr>
<td>• Lighting Radiant Fraction</td>
<td>• Cooking Fuel</td>
</tr>
<tr>
<td>• Lighting Fuel</td>
<td>• Computing Fuel</td>
</tr>
<tr>
<td>• Lighting Variation Profile</td>
<td>• Cooking Variation Profile</td>
</tr>
<tr>
<td>• Lighting Dimming Profile</td>
<td>• Computing Diversity Factor</td>
</tr>
<tr>
<td>• Lighting Diversity Factor</td>
<td>• Machinery Max Sensible Gain</td>
</tr>
<tr>
<td>• People Max Sensible Gain</td>
<td>• Machinery Max Latent Gain</td>
</tr>
<tr>
<td>• People Max Latent Gain</td>
<td>• Machinery Max Power Consumption</td>
</tr>
<tr>
<td>• People Occupancy</td>
<td>• Machinery Radiant Fraction</td>
</tr>
<tr>
<td>• People Variation Profile</td>
<td>• Machinery Fuel</td>
</tr>
<tr>
<td>• People Diversity Factor</td>
<td>• Machinery Variation Profile</td>
</tr>
<tr>
<td>• People Diversity Factor</td>
<td>• Machinery Diversity Factor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Air exchanges</th>
<th>Auxiliary Max Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Infiltration Max Flow</td>
<td>• Auxiliary Max Flow</td>
</tr>
<tr>
<td>• Infiltration Variation Profile</td>
<td>• Auxiliary Variation Profile</td>
</tr>
<tr>
<td>• Infiltration Adjacent Condition</td>
<td>• Auxiliary Adjacent Condition</td>
</tr>
<tr>
<td>• Infiltration Adjacent Room</td>
<td>• Auxiliary Adjacent Condition</td>
</tr>
<tr>
<td>• Infiltration Adjacent Room</td>
<td>• Auxiliary Adjacent Room</td>
</tr>
<tr>
<td>• Infiltration Temp. Profile</td>
<td>• Auxiliary Temperature Profile</td>
</tr>
<tr>
<td>• Infiltration Temp. Offset</td>
<td>• Auxiliary Temperature Offset</td>
</tr>
<tr>
<td>• Natural Max Flow</td>
<td>• Natural Variation Profile</td>
</tr>
<tr>
<td>• Natural Adjacent Condition</td>
<td>• Natural Adjacent Condition</td>
</tr>
<tr>
<td>• Natural Adjacent Room</td>
<td>• Natural Adjacent Room</td>
</tr>
<tr>
<td>• Natural Temperature Profile</td>
<td>• Natural Temperature Profile</td>
</tr>
<tr>
<td>• Natural Temperature Offset</td>
<td>• Natural Temperature Offset</td>
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</tbody>
</table>
New Features

<table>
<thead>
<tr>
<th>Constructions</th>
<th>Opaque Construction</th>
<th>Glazed Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Opaque U-value (EN-ISO)</td>
<td>Glazed U-value (EN-ISO)</td>
</tr>
<tr>
<td>Construction U-value (EN-ISO)</td>
<td>Opaque Net R-value (EN-ISO)</td>
<td>Glazed Glass U-value (EN-ISO)</td>
</tr>
<tr>
<td>Construction Net R-value (EN-ISO)</td>
<td>Opaque Total R-value</td>
<td>Glazed Frame U-value (EN-ISO)</td>
</tr>
<tr>
<td>Construction Total R-value</td>
<td>Opaque Thermal mass Cm</td>
<td>Glazed Net R-value (EN-ISO)</td>
</tr>
<tr>
<td></td>
<td>Opaque Thermal mass class</td>
<td>Glazed Total R-value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Glazed g-value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Glazed Transmittance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Glazed Shading Devices</td>
</tr>
</tbody>
</table>

**Note:** Any variables that can have multiple values will be combined into one item. Numeric values will be summated, and discrete values will be shown as ‘Multiple <Item>s’. For example: A room with two People gains specified, with Maximum Sensible Gain values of 90 W/P and 120 W/P will show up as the one value of 210 W/P, and the Variation Profile values will show up as one item - ‘Multiple Profiles’.

To open Model Viewer II in visualization mode select the following button from the main toolbar in Apache.
6.1.1 Cross Hatch Colouring New in 2013 Feature Pack 1

Where the selected variable has more than 12 discrete values in the selection cross-hatch colouring is used to distinguish between colours.
6.2 Parametric batch processor

The Parametric batch processor tool enables users to create and batch-run a series of Apache simulations. In addition to providing a simple batch queue mode, the tool allows a single parameter to be changed before running the Apache simulation. This extra mechanism enables the user to perform simple parametric studies on the same base model.

Currently available variables:

<table>
<thead>
<tr>
<th>Building Form</th>
<th>Orientation</th>
<th>Opaque constructions</th>
<th>Glazed constructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventilation</td>
<td>Infiltration rate</td>
<td>External floor</td>
<td>External window</td>
</tr>
<tr>
<td></td>
<td>Aux vent rate</td>
<td>External wall</td>
<td>Roof light</td>
</tr>
<tr>
<td></td>
<td>Nat vent rate</td>
<td>Internal floor/ceiling</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Internal wall</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Roof</td>
<td></td>
</tr>
<tr>
<td>Renewables</td>
<td>Photovoltaics</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wind turbine</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This should be considered the very first version of the tool and the intention is to expand on the capability and number of variables available in upcoming releases.

Released VE2013
6.3 APpro: simple filters for project profiles

Finding individual profiles within the APpro project profiles list can be frustrating as the database becomes larger. With the addition of this simple filtering ability the frustration should be avoided.

A dedicated NCM toggle button has been added to hide all NCM profiles at a single click.

Released VE2013
6.4 Apache Systems dialog tidy

Cosmetic change to the Apache Systems dialog window with the intention of being able to display more systems in the list before having to scroll.

Filters expected to be added in an update later in 2013.

Released VE2013
6.5 Assign Construction Templates New in 2013 Feature Pack 1

Construction Templates can be assigned to rooms using the Assign Template tool.

This works in a similar way to assigning Thermal Templates to the selected rooms but please note that further edits made to the Construction template will not be applied to the room without reassigning the template.
7 ApacheHVAC

7.1 HVAC Controller dialogs upgrade

Completely revised layout for network controllers and room unit controller dialogs, with addition of graphs for all profiles, graphical representations of both of Set point (on/off) and Proportional control regimes and new options for setting control parameters with absolute profiles.

The proportional ramp is presently displayed only when the midband value is fixed. For midband values that vary with time (or otherwise according to a profile), IES will eventually provide a means of determining which midband value the user wishes to see represented in the graph. For now, switching to Constant and setting an appropriate fixed value provides a means of viewing the graph; however, the dialog must be exited via the Cancel button or the midband set back to Timed if that option is to be retained.

Released VE2013
7.2 Find Node

A facility to zoom in to [bring it into view] any given node number in ApacheHVAC.

This will make it easier to navigate large networks, and in particular to debug Apache error messages.

Released VE2013

7.3 Drop objects onto connectors

The ability to replace a connector on the canvas with another object without first deleting the connector.

This was identified as a necessary add-on to the pencil drawing functionality introduced in VE2012.

Released VE2013
7.4 Component output expansion

Addition of HVAC component results (in VistaPro) for three plant equipment types:

- Water-to-air heat pumps (WAHP)
- Direct expansion cooling (DX Cooling)
- Air-to-air heat pumps (AAHP)

DX Cooling coils connected now have their component output variables associated and listed with the DX Cooling unit to which the coil is connected, so that both are displayed with a single component selection.

Simulation output options in ApacheSim now include a check box for ApacheHVAC component results (un-ticked by default), separate from the ApacheHVAC system results for airside nodes, to give users better control over the results file size.
7.5 Room units auto-sizing

Radiators and chilled ceilings may now be autosized. Using specified room temperatures and loads (either manually entered or generated by a System Loads analysis), users can elect to autosize the number of units of a chosen type and the required water flow.

Released VE2013
7.6 Fans upgrade

The parameter set and autosizing capabilities for ApacheHVAC fans have been revised and extended. The fan parameters (below) now allow design fan and motor efficiencies to be specified separately, and the power/flow characteristic is expressed in terms of flow fraction, motor efficiency and fractional fan power (fan power in kW also being displayed). A check-box gives a choice between constant and variable volume fans, and a selector allows typical characteristic curves to be chosen from a list.

The autosizing of fan components via System Loads analyses now adjusts only the single value for fan design flow rate, with power parameters calculated from that and special provisions for requirements specific to fan applications in ASHRAE 90.1 Appendix G PRM Baseline systems.
New Features

![Fan Characteristics](image)

**Released** VE2013

**EDR Good SP Reset VSD Fan**

- **Fan power**
- **Motor efficiency**

**Flow fraction**

**Flow rate (cfm)**

- 0.00 2000.00 4000.00 6000.00 8000.00 10000.00
- 0% 20% 40% 60% 80% 100%

- Fan power (kW)
- Motor efficiency
8 MacroFlo

8.1 Input Data Visualisation New in 2013 Feature Pack 1

Model Input Data Visualisation is added to the MacroFlo application allowing the model to be displayed in ModelViewer II coloured by assigned MacroFlo Opening Type data.

<table>
<thead>
<tr>
<th>MacroFlo Openings</th>
<th>Duct Type</th>
<th>Opening Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient of Discharge</td>
<td>Equivalent Orifice Area</td>
<td></td>
</tr>
<tr>
<td>Crack Flow Coefficient</td>
<td>Exposure Type</td>
<td></td>
</tr>
<tr>
<td>Crack Length</td>
<td>Max Angle Open</td>
<td></td>
</tr>
<tr>
<td>Degree of Opening Profile</td>
<td>Openable Area</td>
<td></td>
</tr>
<tr>
<td>Duct Length</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Released VE2013 Feature Pack 1
9 VistaPro

9.1 MacroFlo arrows in Model Viewer II

The ability to visualize MacroFlo airflow results in the newer Model Viewer II module.
New Features

Released VE2013
9.2 Variable browser filter

The ability to display only variables that we are interested in by defining some criteria has been added to the variable browser.

Example:

“boiler + load” shows all variables that contain boiler or load.

“boiler & load” shows all variables that contain boiler and load.

The filter is accumulative until it is reset. An example would be:

Type “boiler & load” to show only the variables that contain boiler and load. Now type “-HVAC” to remove any variables that contain HVAC. We can see this in action here:
9.3 Adaptive Thermal Comfort (CIBSE TM52) Beta New in 2013 Feature Pack 1

New tools are provided in VistaPro to allow easy assessment of the overheating criteria specified in CIBSE Technical Memorandum TM52. The Adaptive Comfort analysis tool is accessed in VistaPro via the Comfort Settings dialog.

When the additional parameters for Air Speed and Building Type have been applied the report can be generated for the selected results file showing the rooms that are occupied/unoccupied and pass as well as details of those rooms that fail based on Criteria 1, 2 and 3.

When assessing TM52 Adaptive Comfort additional variables are available in VistaPro:

<table>
<thead>
<tr>
<th>Weather Variables</th>
<th>Room Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily running mean temperature</td>
<td>Operative Temperature</td>
</tr>
<tr>
<td>Max adaptive temperature</td>
<td>Degrees &gt; Max adaptive temperature</td>
</tr>
<tr>
<td></td>
<td>Daily weighted exceedance</td>
</tr>
</tbody>
</table>
New Features

Note: this feature is currently in public beta form, if you have any comments, suggestions or problems then please report these to the feedback team.

Released VE2013 Feature Pack 1
10 ASHRAE 90.1 PRM

10.1 Rule based determination of baseline HVAC system

Utility to provide guidance / advice for the user to assist in choosing the correct baseline system.

This was introduced in response to user feedback to help with the selection of the correct baseline system.

Released VE2013
10.2 Internal heat gains (rework)

Enables users to set LPD values for lighting within matched space types. Changes address user feedback regarding confusion associated with inputs that were applied as an adjustment to the previous value. Before the revisions, this was in essence an alternative “Edit group attributes” for lighting power. In the revised VE 2013 dialog, the displayed LPD values represent the actual room lighting values within room data and edits made here will directly replace to these values, rather than applying a factor to them. The dialog now displays and retains the values entered by the user and highlights when a value has been otherwise changed on an individual room basis—i.e., when not all spaces assigned to a particular space type share the same LPD value that is displayed in the PRM Navigator dialog for LPD.

Also, things such as the dialog title was “Reduce Lighting” which in itself was very confusing as only one part of the dialog reduced, the main UI was a SET lighting not reduce, hence the dialog title update.

Note: The same changes were made to the PRM Navigator dialogs for People and Equipment gains.

Released VE2013
10.3 Proposed building constructions

Allow the importing of all necessary baseline constructions for climate zone, regardless type.

<table>
<thead>
<tr>
<th>Fenestration</th>
<th>Assembly Max. U</th>
<th>Assembly Max. SHGC</th>
<th>Assembly Max. U</th>
<th>Assembly Max. SHGC</th>
<th>Assembly Max. U</th>
<th>Assembly Max. SHGC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Glazing, 0%-40% of Wall</td>
<td>U-0.40</td>
<td>U-0.40</td>
<td>U-1.20</td>
<td>SHGC-0.40 all</td>
<td>SHGC-0.40 all</td>
<td>SHGC-0.40 all</td>
</tr>
<tr>
<td>Nonmetal framing (all)</td>
<td>U-0.50</td>
<td>SHGC-0.40 all</td>
<td>U-0.50</td>
<td>SHGC-0.40 all</td>
<td>U-1.20</td>
<td>SHGC-0.40 all</td>
</tr>
<tr>
<td>Metal framing (curtain wall/door)</td>
<td>U-0.85</td>
<td>U-0.85</td>
<td>U-1.20</td>
<td>U-1.20</td>
<td>U-1.20</td>
<td>U-1.20</td>
</tr>
<tr>
<td>Metal framing (all other)</td>
<td>U-0.55</td>
<td>U-0.55</td>
<td>U-1.20</td>
<td>U-1.20</td>
<td>U-1.20</td>
<td>U-1.20</td>
</tr>
<tr>
<td>Skylight with Curb, Glass, % of Roof</td>
<td>0%</td>
<td>U'all-1.17</td>
<td>SHGC'all-0.40</td>
<td>U'all-0.98</td>
<td>SHGC'all-0.34</td>
<td>U'all-1.98</td>
</tr>
<tr>
<td>2.1%-5.0%</td>
<td>U'all-1.17</td>
<td>SHGC'all-0.39</td>
<td>U'all-0.98</td>
<td>SHGC'all-0.39</td>
<td>U'all-1.98</td>
<td>SHGC'all-0.98</td>
</tr>
<tr>
<td>Skylight with Curb, Plastic, % of Roof</td>
<td>0%</td>
<td>U'all-1.30</td>
<td>SHGC'all-0.65</td>
<td>U'all-1.30</td>
<td>SHGC'all-0.62</td>
<td>U'all-1.90</td>
</tr>
<tr>
<td>2.1%-5.0%</td>
<td>U'all-1.30</td>
<td>SHGC'all-0.34</td>
<td>U'all-1.30</td>
<td>SHGC'all-0.27</td>
<td>U'all-1.90</td>
<td>SHGC'all-0.90</td>
</tr>
<tr>
<td>Skylight without Curb, All, % of Roof</td>
<td>0%</td>
<td>U'all-0.69</td>
<td>SHGC'all-0.40</td>
<td>U'all-0.58</td>
<td>SHGC'all-0.36</td>
<td>U'all-1.36</td>
</tr>
<tr>
<td>2.1%-5.0%</td>
<td>U'all-0.69</td>
<td>SHGC'all-0.39</td>
<td>U'all-0.58</td>
<td>SHGC'all-0.39</td>
<td>U'all-1.36</td>
<td>SHGC'all-0.36</td>
</tr>
</tbody>
</table>

Excerpt from ASHRAE 90.1-2007

10.4 Single baseline model

The previous version held all 4 baseline models (0°, 90°, 180° and 270°). This change removes these to store only one baseline model (“the baseline”). This single model is then rotated at run time.

Note: the project .MIT file should be smaller in size now as the number of variant models stored within it has been reduced.
10.5 Increased calculation flexibility

The ability for the user to choose the combination of models they wish to simulate for either loads or simulation.

Very often it is desirable to run the single baseline model or single proposed model etc. but it was not possible to do so in the previous versions of the VE. Now a single navigator action presents the user with the options shown (relative to the run) below.
**10.6 AHU default grouping scheme change**

Additional AHU schemes added (function of the prototype model).

Previously, the Prototype model data provided a single group called “Air Handling Units.” This was revised to facilitate two groups: one for the proposed case and one for the baseline case. This will allow for different grouping of zones for systems, as the baseline must often differ from the proposed case. For example, this is needed as a result of ASHRAE 90.1-2007 requirements for one AHU per floor and for the use of packaged single-zone systems serving spaces with code-driven primary air-changes.
10.7 Baseline fan power adjustment

The Baseline Fan Pressure Drop Adjustment for PRM Baseline fans has been revised to more readily support separate calculations of this adjustment for numerous packaged single-zone systems.

For projects including code-driven primary air-changes, ASHRAE 90.1 Appendix G requires the Baseline model to use numerous single-zone systems in place of what would normally be a much smaller number of larger multi-zone systems. Therefore, the pressure drop adjustment to the Baseline system, which is straightforward when there is a 1:1 correspondence of systems in the Proposed and Baseline, becomes much more tedious and potentially confusing.

Where users previously entered the value for ‘A’ and that was read directly into the spreadsheet for calculation of the baseline fan power; the new approach allows the user to enter the sum of pressure drop allowances (the value of ‘PD’) for each system through the System Parameters UI.

The ‘A’ value for each system is then calculated using the ‘PD’ adjustment permitted with respect to components in the proposed systems (90.1 Table 6.5.3.1.1B) and the flow rate of the baseline system using the following equation:

\[ A = \frac{\text{Sum of all System Pressure Drops (PD)}}{4131} \times \text{Baseline Flow rate} \]

This new value for PD will be feed into a new cell within the sizing spreadsheet for each applicable system

i.e. Y24: for systems 3,4,5,6,7 and 8.

Using the previous equation this figure is used to calculate ‘A’.
10.8 HVAC system reports: Equipment load and energy usage

These are two new detailed HVAC documents that allow us to visualise the central plant performance of the HVAC system and are used to support PRM submissions.

The two new reports are:

1. Equipment Loads and Energy Use
2. Detailed Equipment Loads and Energy Usage
11 VE Compliance

11.1 Section 6 (2010) Scotland Regenerate EPC New in 2013 Feature Pack 1

The option to regenerate an EPC using existing results files from a previous simulation is provided for ApacheSim (DSM) EPCs.

When the simulation has been run and simulation results files already exist for the Actual and Notional Buildings it is possible to edit details in Building and System Data and when the Generate EPC button is clicked the user is presented with the option to regenerate the Energy Performance Certificate using the up to date Building Data without re-running the simulations.
12 Navigator for Monodraught Cool-Phase New in 2013
Feature Pack 1

Monodraught Cool-Phase systems are available within VE. Using the VE Navigator for Monodraught Cool-Phase components are imported to rooms and the pre-configured Cool-Phase system is automatically created in ApacheHVAC with the room assigned.

Three types of Cool-Phase components are provided; Facia, Suspended Ceiling and Exposed Void installations. Full details are available from the User Guide which is linked from the Navigator.
12.1 Import Component

Select the required Cool-Phase unit from the Component Library

Information on each unit is provided to assist with the selection.

12.2 Operating Parameters

When the component is in the model the properties can be modified if necessary
12.3 Assign Rooms to Cool-Phase Groups

A Cool-Phase Room Groupingcheme is created with appropriate Room Groups for the Cool-Phase systems in the model.

Assign rooms to the Room Groups using the assign tool.

When rooms are assigned Cool-Phase components an icon is shown in the VE workspace to indicate this assignment and how many units are assigned to the room.
At Room level when viewing components the full component geometry is displayed

12.4 Apply Cool-Phase to ApacheHVAC System Files

After assigning components this step allows the correct associated Cool-Phase HVAC networks to be imported to the project.
12.5 Analysis

With the model now complete and Cool-Phase systems assigned to rooms the analysis can be completed by running Room Loads calculations, System Loads calculations to determine system sizes and peak loads and finally full dynamic simulation with Apache linked to the Cool-Phase ApacheHVAC network to produce full results analysis in VistaPro including options to query the system components and nodes directly.

Released VE2013 Feature Pack 1
13 RadianceIES

13.1 Daylight Autonomy Beta New in 2013 Feature Pack 1

New dynamic analysis options are provided in RadianceIES allowing climate based daylight modelling to be assessed. The features can be found on two new tabs available in RadianceIES; Dynamic Simulation and WP Grid.

13.1.1 Dynamic Simulation

The Run Simulation runs a dynamic calculation for the selected zone. When complete there are options to Display and Process (WP Grid tab) Results.

13.1.2 WP Grid

After simulating the data files for the selected room, results are displayed on the WP Grid tab.
Selecting the results set and then Display Thresholds allows the results for a particular room to be displayed graphically (this is done at room level).

A new VE-Navigator for the assessment of LEED® 2009 (with 2012 revisions) credits.

**Credits covered:**

<table>
<thead>
<tr>
<th>Category</th>
<th>Credit</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS</td>
<td>4.1</td>
<td>Alt transport</td>
</tr>
<tr>
<td>SS</td>
<td>4.4</td>
<td>Transport parking</td>
</tr>
<tr>
<td>SS</td>
<td>5.2</td>
<td>Open space</td>
</tr>
<tr>
<td>SS</td>
<td>6.1</td>
<td>Storm water</td>
</tr>
<tr>
<td>SS</td>
<td>7.1</td>
<td>Heat island</td>
</tr>
<tr>
<td>SS</td>
<td>7.2</td>
<td>Heat island roof</td>
</tr>
<tr>
<td>WE</td>
<td>Preq.1</td>
<td>Water use reduction</td>
</tr>
<tr>
<td>WE</td>
<td>1</td>
<td>Water efficient landscaping</td>
</tr>
<tr>
<td>WE</td>
<td>2</td>
<td>Innovative wastewater technologies</td>
</tr>
<tr>
<td>WE</td>
<td>3</td>
<td>Water use reduction</td>
</tr>
<tr>
<td>EA</td>
<td>Preq.2</td>
<td>Minimum energy performance</td>
</tr>
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<td>Optimise energy performance</td>
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<td>On-site renewable energy</td>
</tr>
<tr>
<td>EA</td>
<td>6</td>
<td>Green power</td>
</tr>
<tr>
<td>IEQ</td>
<td>6.2</td>
<td>Controllability - Thermal comfort</td>
</tr>
<tr>
<td>IEQ</td>
<td>7.1</td>
<td>Thermal comfort</td>
</tr>
<tr>
<td>IEQ</td>
<td>8.1</td>
<td>Day light</td>
</tr>
<tr>
<td>IEQ</td>
<td>8.2</td>
<td>Quality views</td>
</tr>
</tbody>
</table>
14.1 IES TaP integration

The LEED navigator can link with IES’ secure online collaborative portal for LEED. This provides the ability to upload supporting documentation directly to the appropriate credit.

NOTE: An IES TaP account is required for integration to TaP LEED projects.

For more information on IES TaP for LEED: http://www.iesve.com/software/tap/leed

Released VE2013
14.2 Transport SS4.1

Place alternative transportation features on our interactive map in order to assess the Alternative Transportation credit.

Features:

- Zoom/Pan/Zoom-to-Site
- Scale indicator for assessing distances
- Search
- Two Radius Circles
- Multiple pedometer routes
- Place features by simple click
- Control the Map image used for report
14.3 Parking Capacity SS4.4

Using ModelIT the user can draw car parking spaces available on-site and these will be identified in the generated report. Parking bays must be drawn using the 2D plane object drawing tool and with selected object type set to Parking Bay.
14.4 Maximize Open Space SS5.2

This credit simply checks the proportion of site open space to building footprint. Thus this is a straightforward check of model object areas, namely:

- Thermal objects rooms that constitute building “footprint”;
- Non-thermal planar objects that constitute the development.
In most cases users will have drawn only the development plus any adjacent building or topographical shades that impact the development; in this case the non-thermal planar objects are all those in the model. It is possible that the user draws an urban model – in this case the user will need to use layers and turn off non-thermal planar objects that are outside the development for this credit.
14.5 Storm Water SS6.1

This credit will follow Option 1: design storms only. Option 1; path 1 involves calculating a before and after peak runoff rate and a total runoff quantity calculation for 1, 2 year and 24 hour design storms. This involves site surface data and storm data for the location.

LEED indicates that the modified rational method to determine peak run-off rates WQF is an acceptable approach.
14.6 Heat island non-roof SS7.1

This credit will carry-out options 1 or 2; it is essentially a collation of SRI data (top surface & area weighted if multiple roof surfaces & constructions per object) for hard landscaping plus a shading (solar exposure) analysis.

The shading analysis is based on the summer solstice; this means it is quick and trees are simply solid objects.

Released VE2013
14.7 Heat island roof SS7.2

This credit will carry-out options 1, 2 or 3; it is essentially a collation of SRI data and/or vegetated roof data for the project building’s roof surfaces. data (top surface & area weighted if multiple roof surfaces & constructions per object).
14.8 Water use – WE prerequisite, WE 2, WE 3

Includes: Water use reduction and Innovative Wastewater Technologies

- WC: 38%
- Blackwater: 25%
- Urinals: 19%
- Greywater: 14%
- Showers: 3%

Released: VE2013
14.9 Water eff. Landscaping WE1

This credit involves calculating an irrigation demand for non-thermal objects using the data defined in ApCDB (plant water use variables ks, kd, kmc and Irrigation variable IE). LEED requires a mid-summer calculation to be carried out.

The irrigation demand can be reduced by rain or waste water recycling; thus there is an interaction with the general WE 2 calculation in order to avoid double counting of rain/grey/black-water reuse volumes if this is also used for appliance flushing in the project.
14.10 **Energy performance EA 1, 2, 6, preq 2**

Comprises the following sections:

- EA 1 – Optimise energy performance
- EA 2 – On site Renewable energy
- EA 6 – Green power
- EA prerequisite 2 – Minimum energy performance
14.11 Controllability of Systems IEQ6.2

This credit requires the provision of individual comfort controls for 50% of occupants or in perimeter zones (6m inside & 3m to either side of a window) operable windows of a size compliant with ASHRAE 62.1 5.1 (4%):

5.1 Natural Ventilation. Use of natural ventilation systems designed in accordance with this section shall be permitted in lieu of or in conjunction with mechanical ventilation systems.

Exception: An engineered natural ventilation system when approved by the authority having jurisdiction need not meet the requirements of Sections 5.1.1 and 5.1.2.

5.1.1 Location and Size of Openings. Naturally ventilated spaces shall be permanently open to and within 8 m (25 ft) of operable wall or roof openings to the outdoors, the openable area of which is a minimum of 4% of the net occupiable floor area. Where openings are covered with louver or otherwise obstructed, openable area shall be based on the free unobstructed area through the opening. Where interior spaces without direct openings to the outdoors are ventilated through adjoining rooms, the opening between rooms shall be permanently unobstructed and have a free area of not less than 8% of the area of the interior room or less than 25 ft² (2.3 m²).

5.1.2 Control and Accessibility. The means to open required operable openings shall be readily accessible to building occupants whenever the space is occupied.
14.12 Thermal Comfort IEQ7.1

This credit requires that ASHRAE 55 – 2004 (with errata without addenda 37) is met.

For natatoriums compliance for ASHRAE HVAC 2011 chapter 5 places of assembly needs to be met (reference required).

For CS the base systems must allow tenant fit out systems to meet ASHRAE 55 – 2010; in practice I assume this means the user will need to assume default conditions in spaces and carry out the analysis as per other full fit-out types.

For Warehouse building types only office spaces need be assessed; for regularly occupied storage, sorting & distribution spaces the user must include a suitable design: radiant flooring, circulating fans, passive systems, local active cooling or local fans. This is confirmed by narrative so does not require simulation assessment.

The credit also requires suitable comfort controls; this is confirmed by narrative so does not require simulation assessment.

Released VE2013
14.13 Daylight IEQ8.1

This credit will use option 1 simulation with a target range of 10 to 500 fc, clear sky condition on September 21 at 9am & 3pm

Achieve an exemplary credit by providing daylighting for 95% (instead of 75%) of occupied areas.

Released VE2013
14.14 Views IEQ8.2

This credit requires a direct line of sight to the outdoors via “vision glazing” (i.e. valid glazing defined by height above floor level) for x% of occupied areas. The line of sight may pass through internal glazing.

Please note that this credit is not supported in VE for Healthcare (new or major renovation) as the requirements are too complex.
## New Features

<table>
<thead>
<tr>
<th>Selected space</th>
<th>Floor</th>
<th>Space type</th>
<th>Floor Area m²</th>
<th>Internal room?</th>
<th>Components (facilities) used in room?</th>
<th>Horiz. view at 45°</th>
<th>(1) At least 2 views &gt;90° apart</th>
<th>(3) View path &lt;&lt; 3X window head h.h.</th>
<th>Area of room with view %</th>
<th>Area of room with view m²</th>
<th>LEED Pass/Fail?</th>
</tr>
</thead>
<tbody>
<tr>
<td>office</td>
<td>Ground Floor</td>
<td>Reg offic.</td>
<td>136.00</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
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<td>136.00</td>
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</tr>
<tr>
<td>office</td>
<td>Ground Floor</td>
<td>Reg offic.</td>
<td>134.00</td>
<td>N</td>
<td>N</td>
<td>Y</td>
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<td>16.00</td>
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<td>N</td>
<td>100.00</td>
<td>16.00</td>
<td>Pass</td>
</tr>
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<td>16.00</td>
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<td>N</td>
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</tr>
<tr>
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<td>43.30%</td>
<td>603.00</td>
<td>106.00%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Credits:**
90% of selected spaces
Exemplary credit - (1) & (2) must each >= 90%
15 GM-Pro

Compliance navigator for the Green mark rating scheme in Singapore.

15.1 Appendix D – HVAC simulation output

Enhancement to the current output report to include the Appendix D requirements for the HVAC systems.
16 Cost & Value

New cost and value modules based on IMPACT grant development.

16.1 CostPlan

Capital cost analysis based on UK industry standard NRM code reporting. The capital cost dataset is a recommended optional add on for this module.

Released VE2012 FP2HF1
16.2 LifeCycle

Life cycle cost analysis based on UK industry standard NRM code reporting. The life cycle cost dataset is a recommended optional add on for this module.

Released VE2012 FP2HF1
16.3 EnvirolImpact

Life cycle assessment based on BRE ecopoint methodology. Output can be configured to display either ecopoint or characterised results. The life cycle assessment dataset is essential for this module.

Released VE2012 FP2HF1