Manuals+ — User Manuals Simplified.

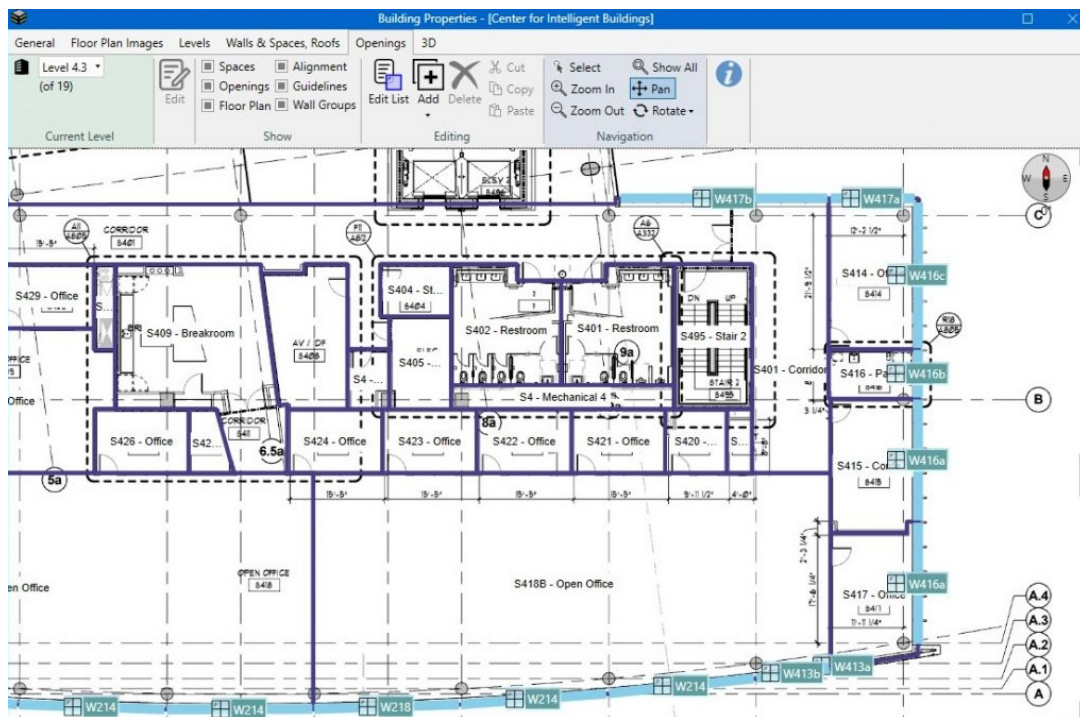# Carrier v6.2 Hourly Analysis Program Software User Guide

Contents

Carrier v6.2 Hourly Analysis Program Software

Specifications

- Product Name: HOURLY ANALYSIS PROGRAM v6.2
- Manufacturer: Carrier Software Systems, Carrier Corporation
- Location: Syracuse, New York
- Revision: April 2024

gbXML Import

The gbXML Import feature allows for seamless integration between HAP and CAD or BIM tools. Follow these steps to import gbXML] data:

1. Export building plans from CAD or BIM tool to a gbXML-format] file.
2. In HAP, use the Import gbXML option in the Project Menu to load data from the gbXML file.
3. HAP imports 3-dimensional building geometry data to create a new building model within the project.
4. Review the model, make necessary corrections or adjustments.

LEED v4.0

HAP v6.2 includes features for calculating and generating a LEED

v4.0 Summary Report. Follow these steps for LEED v4.0 analysis:

1. Select the LEED rating system in project preferences.
2. Fully define the Proposed alternative for analysis.

FAQ
Q: How can I access additional information about gbXML workflow] in HAP?
A: Further information about gbXML workflow, troubleshooting models, and data scope can be found in section 1.5.1 of the HAP help system, accessible by pressing F1 or clicking the Help button in the main window toolbar.

HOURLY ANALYSIS PROGRAM v6.2 NEW FEATURES GUIDE

Overview

This New Features Guide summarizes enhancements in HAP v6.2 which include:

1. Building Modeling
   - Added an "Import gbXML" option to facilitate integration between HAP and BIM or CAD tools.
2. LEED v4.0
   - Added features for conducting a Standard 90.1 Appendix G performance rating analysis and then generating a LEED v4.0 Summary report.
3. Calculation Engine
   - Updated the calculation engine to EnergyPlus version 23.2 which resolves certain calculation problems, updates calculations, and in some cases delivers a calculation speed increase.
4. Other Enhancements and Problem Fixes
   - Made other enhancements involving project data management, building modeling, space models, air systems, plants, utility prices, and documentation
   - Corrected problems identified in HAP v6.1

The remainder of this Guide explains these enhancements in more detail. Additional information is found in the HAP help system in section 1.2
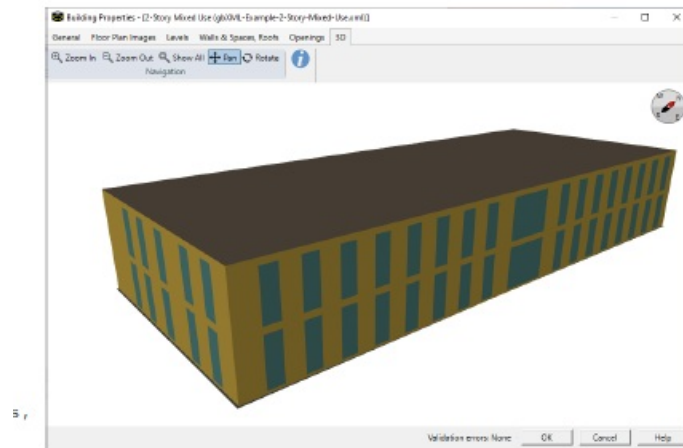
gbXML Import

Added an "Import gbXML" option to the Project Menu. This option facilitates integration between HAP and CAD or Building Information Modeling (BIM) tools. It can greatly reduce time and labor to create the building model. The workflow for using gbXML is as follows:

1. The BIM or CAD tool is used to export the building plans into a gbXML-format file.
2. In HAP data from the gbXML file is loaded using the "Import gbXML" option on the Project Menu.
3. HAP imports the 3-dimensional building geometry data from the file and uses it to create a new building model in the project. This produces complete building geometry including levels and spaces, with all wall, floor, ceiling, and roof surfaces defined, and with window, door and skylight openings positioned in the envelope.
4. The model is then reviewed by the user and any needed corrections or adjustments are made.
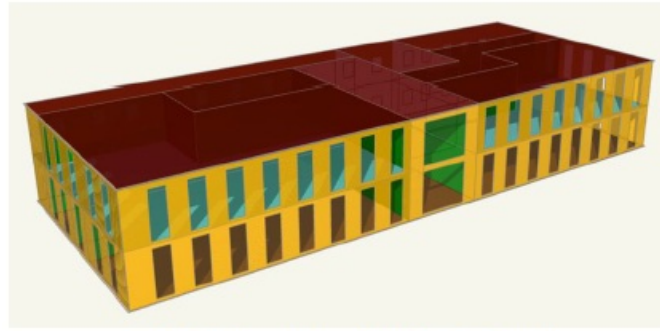
BEFORE: Rendering of gbXML Contents for
2-Story, Multi-use Example Building
using Spider gbXML File Viewer

AFTER: Rendering of building model in HAP
after being imported

Successful creation of a building model in HAP requires the original BIM or CAD building drawing to be of sufficient quality and a gbXML file that is compliant with the gbXML data schema. Drawing quality involves complete geometry with closed volumes for all spaces (surfaces connected), and all surfaces associated with spaces.

The example at right shows a sample building rendering of gbXML data using external software before the file was imported, and the equivalent rendering after data was imported to HAP.

The HAP help system provides further information about gbXML workflow, troubleshooting models, replacing models when architectural plans change, and data scope. See section 1.5.1 in the help system. The help system is accessed by pressing F1 or pressing the Help button on the main window toolbar.

LEED v4.0

Added features for calculating and generating a LEED v4.0 Summary Report.

The procedure for performing a LEED v4.0 analysis with HAP v6 is explained in the Using HAP v6 for LEED v4 guide document which can be displayed from the Documentation Menu.

The procedure for running a LEED v4.0 analysis in HAP 6.2 has some similarities but also key differences versus the procedure in earlier versions like HAP v5. A key difference is HAP 6.2 automatically generates the 90-, 180-, and 270-degree rotations of the baseline alternative. Procedure details:

Sample LEED v4 Performance Summary Report

1. Make sure you select the LEED rating system in project preferences when you create the project.
2. Fully define the Proposed alternative
3. Use the "Duplicate Alternative (with spaces and HVAC eqpt)" option to make a copy of the entire Proposed alternative with its building, space model, air systems, plants, and related data as the starting point for the Baseline (0 degree) alternative.
4. Modify the elements of the Baseline (0 degree) alternative to comply with baseline building and HVAC requirements defined in ASHRAE Standard 90.1 Appendix G. Note that it is no longer necessary to create input data for the 90-, 180-, and 270-degree rotations of the baseline. HAP will do this automatically later.

Energy Modeling Report Options window.
Performance Rating Summary report inputs for LEED v4
analysis

5. Request energy modeling reports.
   - Choose both the Proposed and Baseline alternatives and request energy modeling reports.
   - On the report selection window select the Performance Rating Summary Report (image at right).
   - Assign the alternatives to their Proposed and Baseline roles.
   - Specify that HAP should automatically perform the baseline rotations to generate the 90-, 180-, and 270-degree baseline cases.

- Specify the report is being generated for a LEED application.

6. After completing energy modeling calculations, HAP will generate the Performance Rating Summary report which, along with the standard contents of the report from v6.1, now contains:
    - Data for all four baseline alternatives plus the proposed alternative.
    - A tabulation of Baseline and Proposed envelope areas by exposure.
    - A LEED v4 credit points table.

Further information about these features can be found in the HAP help system in sections 16.1 and 16.2. To display help, press F1 or press the Help button on the main window tool bar.

Calculation Engine Update

Upgraded the calculation engine to use EnergyPlus version 23.2, released in October 2023. This upgrade brings with it corrections to a number of calculation problems and an important change to how loads for HVAC zones containing multiple spaces are calculated.

HVAC Zones with Multiple Spaces – In the EnergyPlus version used in HAP 6.1, load calculations for system sizing and for energy modeling for an HVAC zone containing multiple spaces required first merging all the spaces into one large enclosed volume representing the zone. That process resulted in an enclosed volume comprised of many individual floor, wall, and ceiling surfaces. The greater the number of surfaces, the slower the calculation. Frequently users performed preliminary load estimates by sketching over floor plans in detail to define all individual spaces and then placing all the spaces on each level into an HVAC zone. That could result in extremely long calculation times. In EnergyPlus version 23.2, that space merging process is no longer necessary. EnergyPlus calculates loads for individual spaces within a zone for system sizing and energy modeling applications rather than on a whole zone basis. Even though it is calculating more enclosed volumes (spaces), the overall calculation can run faster. This has several important consequences:

- Calculation Time Reduction. For any project containing multiple-space zones, calculation times should decrease. For projects with only a few multiple-space zones, or zones containing only a few spaces, the improvement in calculation time may be relatively small. However, for projects where each zone contains dozens or even hundreds of spaces, calculation time improvements can be very significant. In extreme cases we have seen calculation time reductions on the order of 10x.
- Differences between Zone Load and Zone Conditioning. This calculation change also eliminates the differences between total zone load and zone conditioning seen on the Air System Heat Balance Summary report for projects having zones containing very large numbers of spaces.
- Automatic Daylighting Calculations. The change also allows automatic daylighting control calculations to be performed on a space by space basis rather than on the basis of HVAC zones, for increased granularity and better accuracy.

Other Enhancements

Program Operation

1. Work-In-Progress Project Data Storage Location – Changed the storage location used for data files while a project is open and work is in progress. The location was changed from the configured Windows TEMP folder to a sub folder under C:\Users\userid.

Importance: While the Windows TEMP folder is the Microsoft-recommended location for work-in-progress files, some customers encountered situations where Windows Storage Sense or anti-malware software were performing file cleanup very aggressively and were erasing project data while a project was in use. In some

cases, the erased project data could not be recovered. Field testing of the new work-in-progress storage location indicates such problems have been eliminated.

2. Running Multiple Instances of HAP – Modified HAP to allow multiple instances of the program to be run at the same time. This can be useful if you want to work on two or more projects at the same time. For example, inputting data in one project while waiting for calculations in another project to finish

Building Model

1. Resetting Wall Group – Added a Reset button to the Edit Wall Groups window. This button resets all wall segments assigned to a selected wall group to the Default wall group. It can also be used to reset all Air Walls to the Default wall group.
2. Area Display – The display of building area on the main window was revised to show only floor area of modeled spaces. Previously the total also included the area of spaces designated as unmodeled. In addition, if the building model has validation errors, the floor area will be shown as zero since validation errors prevent accurate calculation of building floor area. Floor area display will reappear when validation errors are corrected.
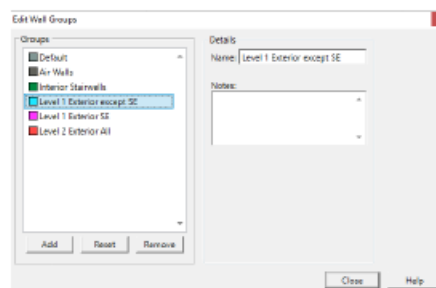
Wall Group Reset Feature

Space Model

1. Window to Wall Ratio – Added building window-to-wall ratio information at the end of the Windows and Doors section of the Space Model input report.
2. Grid Sort I – Enhanced the space grid sort feature to perform multi-level sort for level and space name. When you sort on the Level column, the software will automatically perform a two-level sort with Level as the primary sort and space name as the secondary sort. This results in space names being alphanumerically sorted on each level.
3. Grid Sort II – Improved the space grid sort feature for data columns using option list selections and schedules. Previously columns containing option lists like lighting space usage type, lighting fixture type, and others as well as schedules sorted in an index order. Sorting now arranges the rows alphanumerically according to the item or schedule name.

Air Systems and Plants

Air Systems and Plants

1. Split or DX Fan Coils Modified the equipment performance model to account for the effects of defrost cycles when the equipment uses air source heat pump heating.
2. .Simulation Reports When exporting hourly simulation results to a CSV file, the simulation results now report data to three decimal digits instead of one. For example, electrical power data now has a resolution of 0.001
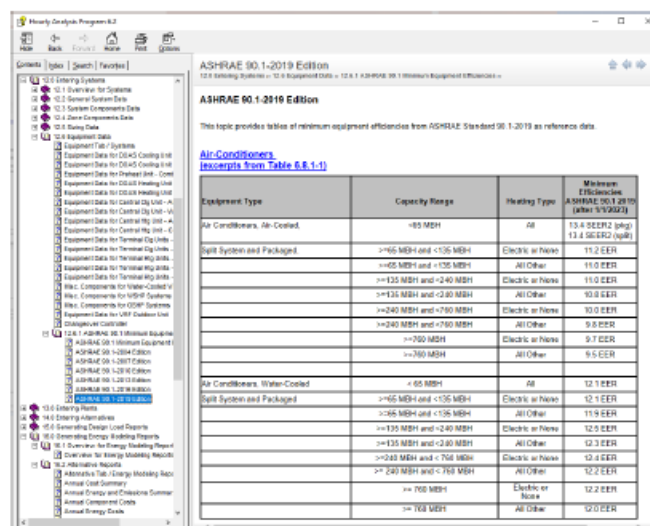
kW or 1 W rather than 100 W.

Utility Rates

1. Updated EIA Prices Updated the default US state average prices for electricity and natural gas which appear in the Utility Rate Wizard to use the most recently published data from the US Energy Information Administration (EIA). Data represents averages for calen dar year 2022.

Program Documentation

1. ASHRAE 90.1 Minimum Efficiencies – Added reference documentation listing ASHRAE Standard 90.1 minimum equipment efficiency requirements for Standard 90.1 editions 2004 thru 2019. These efficiencies are defaulted by HAP when selecting the "ASHRAE Minimum Efficiency" options for DX cooling and heating equipment and warm air furnace heating equipment. See section 12.6.1 in the Help system.

2. Space Type Defaults – Added documentation explaining the source of HAP-supplied space type defaults. This new information is found in Chapter 17 in the topic "About Space Type Default Data".


ASHRAE 90.1 Minimum Efficiency Documentation

Problems Fixes

1. Corrected problems identified in HAP v6.1. A list of problem fixes is found in section 1.2 of the HAP help system in the "What's New in HAP" topic. To display program help, press F1 or press the Help button on the main window toolbar.

About Automatic Data Conversion

1. When you open a project created by v6.1 or v6.0 it will be converted to 6.2 format automatically. An informational message appears to make you aware this is happening.
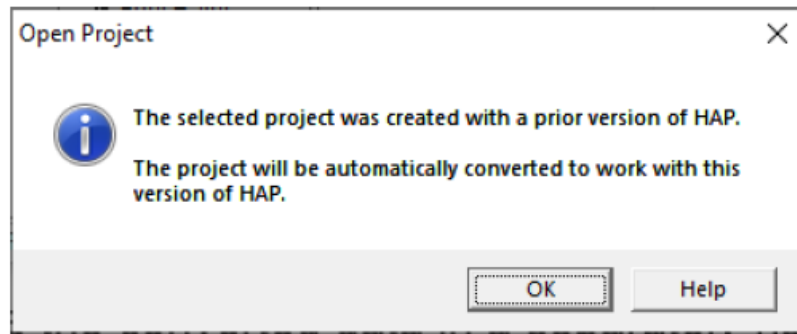
2. **Conversion Process** – The process inserts the word "(converted)" into the project name. This is done so you don't inadvertently overwrite the original project file. When you save the project for the first time you can choose to save it as a separate file with a different name, or you can choose to overwrite the original project with the original file name.

   Note that once you convert a project to 6.2 format, it cannot be opened thereafter in 6.1. Therefore, if you will need to inspect the original project in 6.1, its best to save the converted data in a separately-named file.

3. Will calculation results in 6.2 be different than 6.1 for a converted project? Typically, yes, due to the following:

   - The calculation engine upgrade described on page 7 affects how space loads are calculated in HVAC zones containing multiple spaces. That can alter results by a small amount for zones with a few spaces, and by larger amounts for zones with larger numbers of spaces.
   - Further, if your 6.1 project contained one of the issues that was corrected in 6.2, that correction could also cause changes in results. In the help system, the "What's New in HAP" topic in section 1.2 summarizes the problem fixes. The help system can be displayed by pressing F1 or pressing the Help button on the main window tool bar.

QUESTIONS?
Please contact Carrier Software Systems at **software.systems@carrier.com**

Documents / Resources

	Carrier v6.2 Hourly Analysis Program Software [pdf] User Guide v6.2 Hourly Analysis Program Software, v6.2, Hourly Analysis Program Software, Analysis Program Software, Program Software, Software

References

- **User Manual**