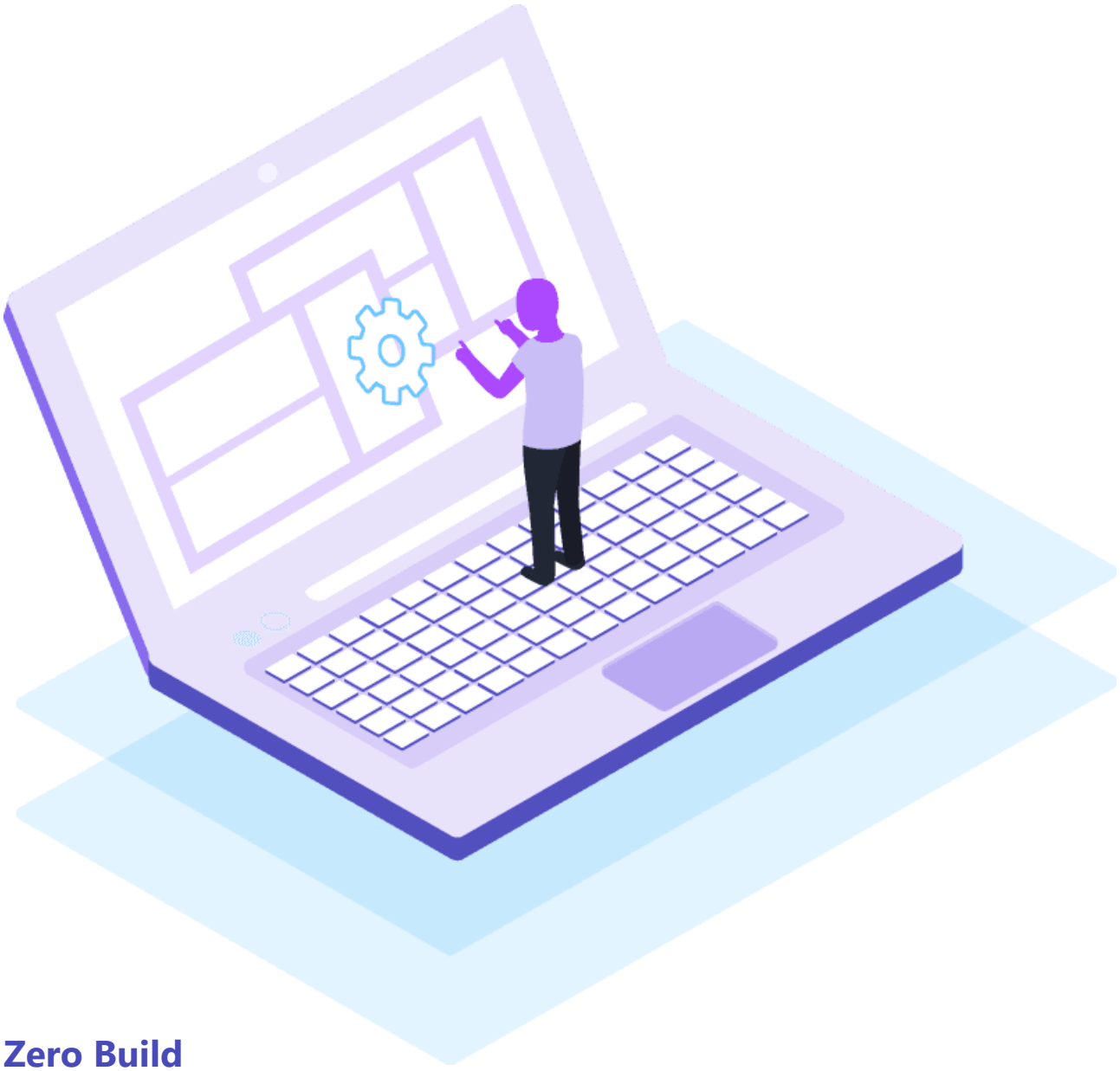
User guide for Heat Balance Quality Assurance VE Python tool



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Version 2.1

Document control

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Date	Version	Comments
22/05/2024	1.3	Initial version
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Document protection

Arising IP

Description	Owner	Category
Data analysis tool	Deepak Sadhwani	VE Python script package

Contents

1. Introduction

1.1 Purpose of the script

The Heat Balance Quality Assurance VE Python tool is designed to process heat gains and losses from Apace simulation file to analyse and visualise peak heating and cooling demand within the building.

Central to the tool's output is a dynamic visualisation reflecting heat losses and gains, breaking them down into solar gains, internal gains, and fabric losses. The visualisation helps identify peak heating and cooling demand, supporting decisions related to thermal comfort and energy efficiency improvements.

The extracted data is stored in an MS Excel worksheet in the same folder as the APS file, facilitating further analysis, reporting, and collaboration.

1.2 Scope of this guide

This user guide covers the installation, configuration, and usage of the VE Python tool. It aims to assist sustainability leaders and their teams in efficiently utilising the tool for streamlined sense checks and quality assurance of dynamic simulation models.

2. Getting Started

2.1 Installing the script

Please **follow the instructions** to install the tool by clicking on the link.

2.2 Apache simulation settings

This VE Python tool is designed to extract results from **ApaceSim** dynamic simulation files with hourly output. Ensure that **Simulation Time Step** is set to 30 minutes and **Reporting interval** is set to 60 minutes. Verify that all necessary model links are checked before running the simulation. This tool requires the selection of **Conduction gains breakdown and all the rooms** in the **Output Options** to visualise the results appropriately. Refer to Figure 1 for ideal Apache Simulation settings to run the VE Python tool.

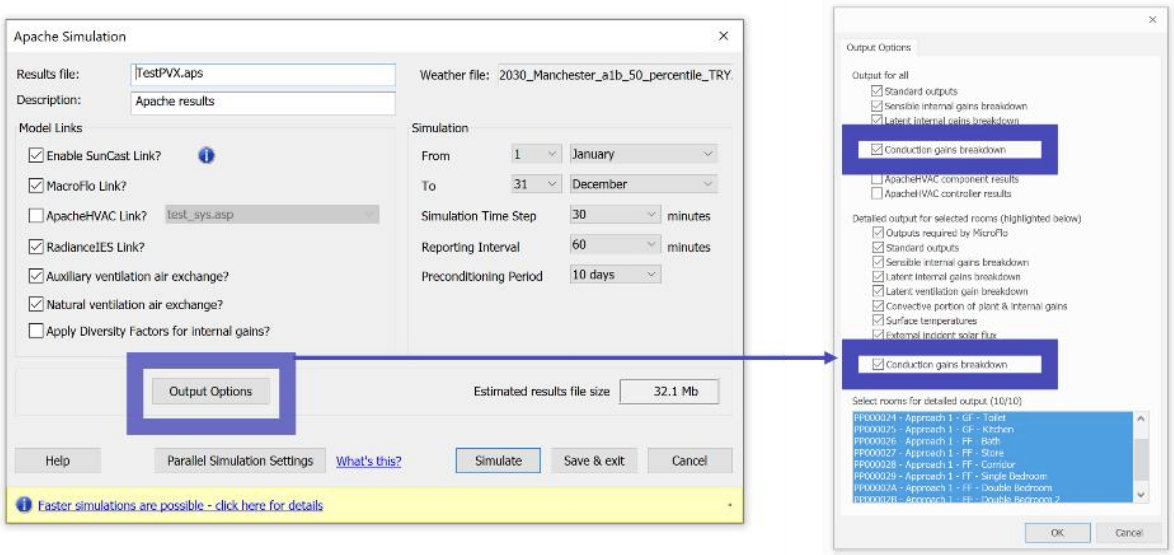

Figure 1. Ideal Apache simulation settings

2.3 Running the VE Python tool

This VE Python tool requires only the APS file from the Windows Explorer pop-up window. In some cases, you may need to navigate to the **vista** folder of your project file.

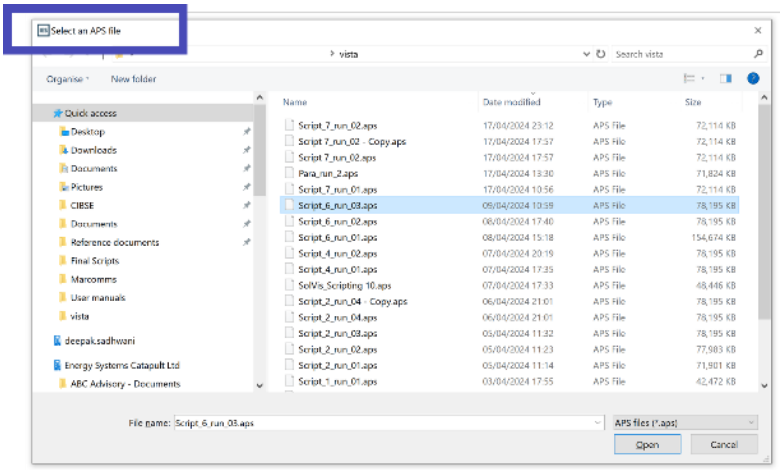

Figure 2. Select an APS file

3. Output

The tool performs a detailed heat balance analysis for a building by evaluating various heat gains and losses at the room level during the hottest and coldest hours of the year. This analysis supports in investigating the thermal performance of the building and for designing efficient HVAC systems.

Figure 3. Example of output worksheet

It breaks the gains and losses into external wall, ground floor, roof, windows, rooflights, doors, solar and internal gains in separate graphs for hottest and coldest hours. Heat balance calculations are then carried out to estimate peak heating and/or cooling demand of the building.

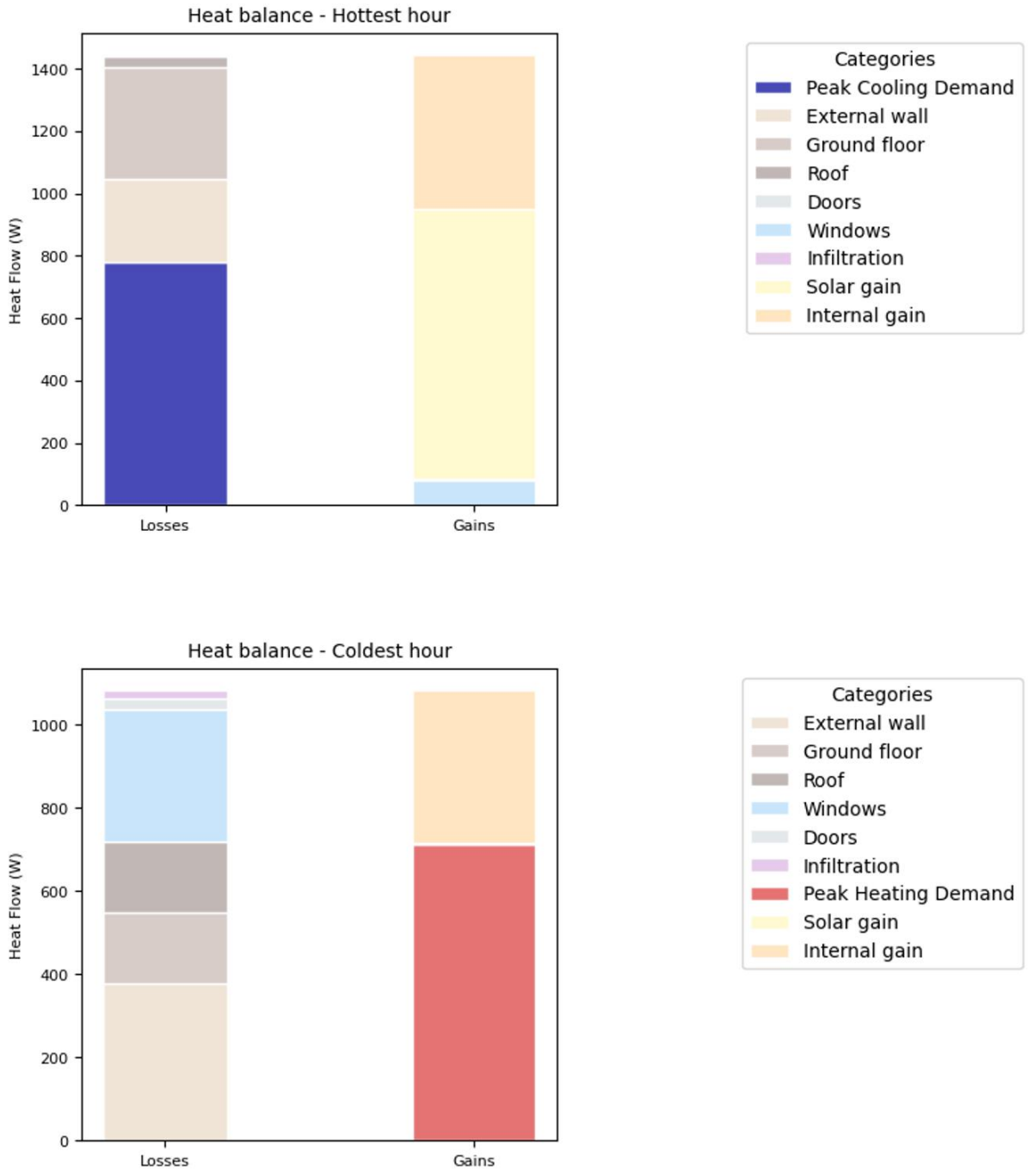

Figure 4. Peak heating and cooling demand

If the external conduction categories are not identified, then verify that Conduction gains breakdown and all the rooms are selected in the Output Options before running the simulation.

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