



**INTEGRATED
ENVIRONMENTAL
SOLUTIONS**

A graphic consisting of three arrows: a green arrow pointing up, a blue arrow pointing left, and a blue arrow pointing right, all originating from a central point.

OPTIMISE PROJECT



Partners

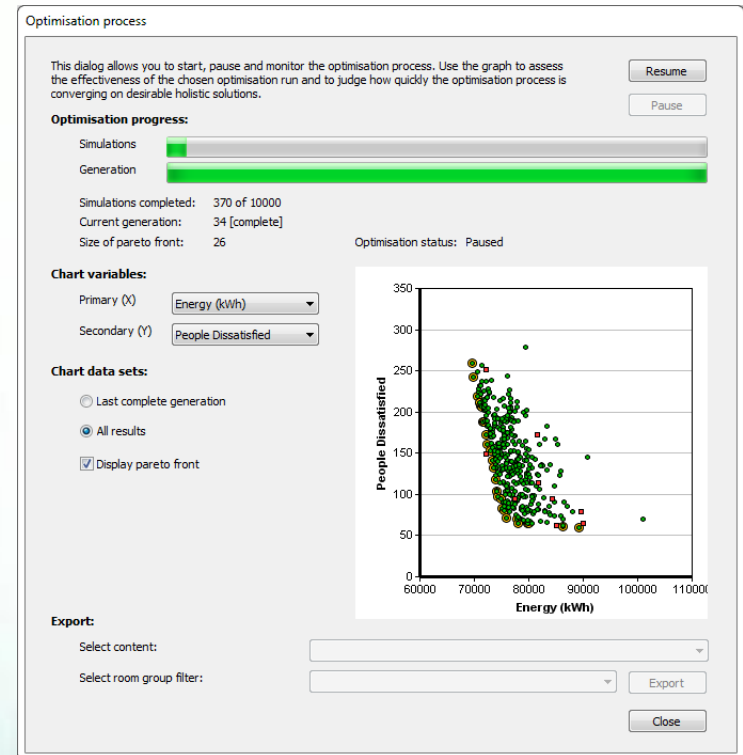


The need ...

To find alternative and optimum design solutions, but critically ...

To identify the trade-off between conflicting real world goals and the sensitivity of such goals

... and to integrate costs & compliance to inform real world decision making



Key points

The tool is a multi-objective optimiser

Objectives include cost inc. energy tariffs (lifecycle coming), energy, carbon, daylight, comfort, Part L compliance etc.

It allows multiple input variables that can be focused on specific areas

Optimisation objectives

Enter up to three optimisation objectives
Select objectives from objective group:

Performance: Energy (minimise)

Cost: Capital cost (minimise)

Daylight: Daylight (maximise)

Comfort: ---

Air quality: ---

OK Cancel

Model variables that can be adjusted must be defined for the optimisation process
Set the range, iteration step or value required. For data taken from pre-defined lists set up the valid selection lists
More variables mean an exponentially longer process; variables that apply at a room scale rapidly increase the number of simulations

List the issues that can be varied in the optimisation process ...

Model data	Scale	Iteration step	Range min.	Range max.	List
Window area (%)	Room	5.00	15.00	80.00	
External wall	Model	1	1	3	Edit list ...
Internal wall	Model	1	1	2	Edit list ...
Internal floor/ceiling	Model	1	1	3	Edit list ...
External window	Model	1	1	2	Edit list ...
Heating set point (°C)	Room	0.50	18.00	21.00	
Cooling set point (°C)	Room	0.50	21.00	28.00	

Add item Delete item

OK Cancel

Key points

Inputs include glazing area, construction materials, building orientation, HVAC systems / ventilation strategy, lighting, set-points, renewables etc.

The tool uses a genetic algorithm with constraints & is Navigator driven

The tool can be used on broad concepts and focused studies

The screenshot displays the ModellerIT software interface. The main window shows the 'Optimisation process' dialog box, which includes a progress bar, simulation statistics (370 of 10000 simulations completed, 34 complete current generation, 26 size of parent front), and a scatter plot of 'People Dissatisfied' vs 'Energy (kWh)'. The Navigator panel on the right lists various settings and options, including 'When to use', 'Model', 'Strategies', 'Energy tariffs', 'Optimisation variables', and 'Optimise'.

Example

Philips & Somfy automated blinds / day light dimming study

The Project

The main focus of this product validation project was to analyse the Somfy - Philips 'light balancing' system and to examine its potential impact on energy savings.

In order to better understand the 'light balancing' dynamic shading and lighting control system and to explore its potential benefit on the heating, cooling and lighting energy demands, a range of shading controls comprising both manual and automated blind controls and a set of lighting controls including manual, occupancy-sensing and dimming controls were explored based on an office building model created in the IES Virtual Environment for 5 different climatic locations - Abu Dhabi, Paris, Beijing, San Francisco and Singapore.

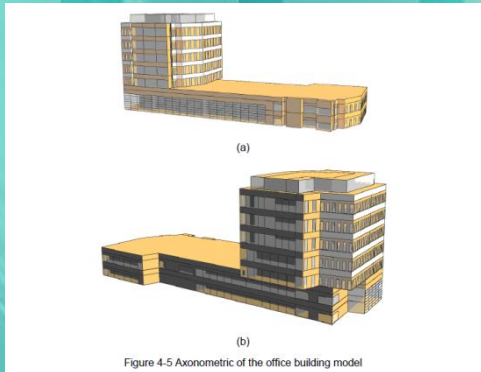
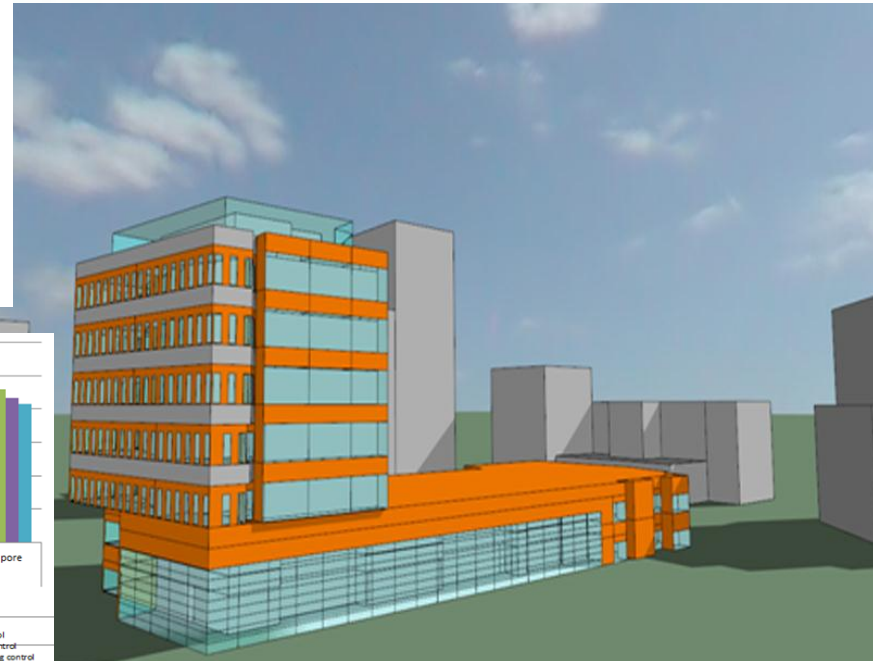
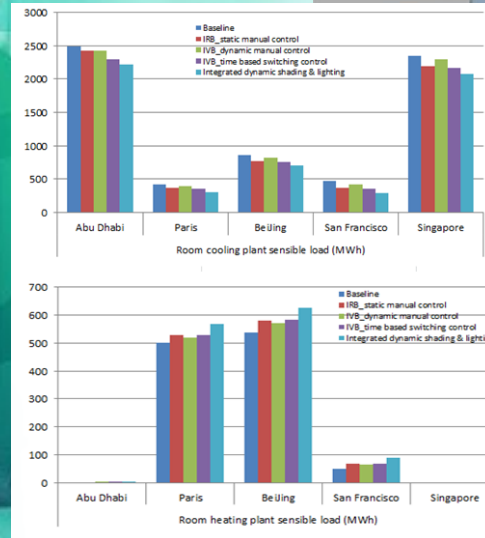


Figure 4-5 Axonometric of the office building model



Comment

The tool has been extensively tested and verified by the partners

The tool is being used on commercial projects and there is interest by large clients / projects globally (inc. China)

A smaller parametric tool has also been created using part of the technology and was released to users in June 2013



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Next Generation Design Optimisation

Rapid processing of complex building models for optimal design and strategic decision making

