IES

BIM4ANALYSIS
END TO END
SOLUTION

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BIM4ANALYSIS

BIM is moving the construction industry from analogue to digital. A 'business as usual' approach will not succeed in maintaining competitive advantage in a changing world.

The policy and business drivers are building to create a compelling case. BIM Level 2 will be mandated on all centrally funded public projects from April 2016 (England) and 2017 in Scotland. The mandate requires projects to be set up so the information can be shared. The right information accessible at the right time to the right people.

BIM4Analysis is a strategy to integrate analysis within the BIM process, enabling VE users to take advantage of valuable information during design, commissioning and operation. The strategy is concerned with implementing BIM as a mechanism to deliver Value, Cost and Carbon Improvement on all projects.

BIM4ANALYSIS BENEFITS

Our Virtual Environment (VE) suite provides a single platform that integrates with the BIM workflow to create and capture performance information during design, commissioning and operation of a building.
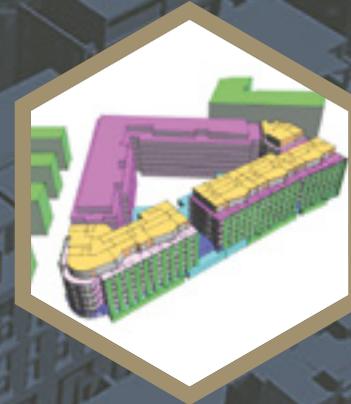
– Import any Revit® or other gbXML or IFC model into the VE for analysis

– Quantify, Optimise and Verify building performance including energy, cost, carbon, LCA, LCC, BREEAM/LEED, Building Regulations compliance

– Use one VE model throughout the entire building lifecycle to inform decisions

– Reduce costs associated with maintaining multiple software applications

– Integration with BIM workflow – take information out, put information back in at each stage

– Increase workflow efficiency

PA5 1192 STAGE	STRATEGY	BRIEF	CONCEPT	DEFINITION	DESIGN	BUILD & COMMISSION	HANDOVER	O&M
INFORMATION MODEL		Design (Federated) Model					Construction Model	O&M Model
PRINCIPAL S.L ACTIONS		Briefing		Design Dev		Pre-handover	Initial Aftercare	1-3 Year Aftercare
OUTPUT	Strategies for Electricity, Gas, Water & District Heating and Cooling.	Oriented model to minimise energy, maintenance and replacement costs. Review existing resources	Services, Philosophy, Outline planning, Prelim P&L, BREEAM/CfSH.	Services, layout & zoning Energy, carbon & cost Interim P&L Update BREEAM/CfSH	Coordinated design, site layouts, GA's, Services & controls strategies, cost plan schedules.	As built model, Soft landings, Performance metrics.		Ongoing performance review and feedback.
HOW THE VE FITS	Masterplanning	VE for Architects – Climate – Bioclimate – Water – Renewables (natural resources) – Initial energy & carbon optioneering – Feasibility Studies	VE for Engineers – Compliance – Daylighting – Orientation – Glazing – Shading – Water – LZCT – IMPACT: materials, LCC/ LCA – FAQ – Comfort	VE for Engineers – Energy, carbon, cost – Compliance – Daylighting etc – ApacheHVAC: Autosize main plant components	VE for Engineers – Detailed – Final design – Final P&L & EPC – Final BREEAM – Final LCA/LCC – BREEAM/ CfSH	ERGON & VE for Engineers Enhanced commissioning & soft landings performance feedback (energy, carbon, cost, visual & thermal comfort controls etc.)		ERGON & VE for Engineers Feedback loop: capture metered data, compare with the design scenario, feed into subsequent designs.

Ref: Department for Business Innovation and Skills (BIS) & Local Government Model BIM Process Map Cabinet Office

CASE STUDY – HLM
350 UNITS RESIDENTIAL DEVELOPMENT IN LONDON
FEBRUARY 2015, UK

To meet stringent performance target of 35% reduction on Part L 2013 Carbon Emissions, HLM used IESVE as part of an Integrated BIM enabled process.

HLM were tasked with using BIM Archicad software and IESVE to assess the ability of its design to meet performance targets set out in The London Plan for a large residential development. These included achieving a 35% reduction on Part L Carbon Emissions, without having to rely on renewable energy sources or carbon offset payments. To achieve this target the firm had to develop a robust integrated design strategy.

Using the IESVE IFC export function HLM were able to export their design model seamlessly from Graphisoft Archicad into the IESVE to perform the required calculations. Using the Tabular Room Edit function they were able to set up a robust link between different design packages, ensuring they wouldn't have to double up on effort by re inputting geometry data etc.

HLM focussed on Passive Building Fabric Efficiency and Low/Zero Carbon Systems. To do this it compared the use of the Standard Assessment Procedure (SAP) versus the use of Dynamic Simulation Modelling. The DSM method proved to be the most efficient and the most effective way to drive and verify integrated solutions and meet compliance with the London Plan targets. Also, in a direct comparison, DSM calculation showed an averaged space heating requirement of 6.5 kWh/m².yr, corresponding to 80% less than what calculated with SAP. Having this more detailed understanding of the energy patterns allowed HLM to work with its Building Services Design Consultants MTT to design significantly more efficient and appropriate environmental control systems.

HLM's integrated design strategies included the following elements:

1. Passive design
2. Whole house MechVent w/ Heat Recovery
3. Integrated Winter Gardens
4. Indoor Environmental Quality/Controls
5. Community System – CHP

Using IESVE to perform DSM gave HLM a much more comprehensive picture of the integration of different design solutions. It also provided an exact understanding of the local conditions and performance allowing for responsive design and efficient allocation of resources e.g. adding insulation or solar control only where necessary and effective. The key consideration is that this methodology demonstrates that the performance of the whole system is considerably higher than the cumulative performances of the single parts.

KEY FACTS

– 35% reduction on Part L 2013 Carbon Emissions required under the London Plan

– Using a DSM enhanced analysis process, the results demonstrate an 80% reduction in Carbon Emissions relative to Space Heating (circa 12% reduction on the total CE)

HLM

CASE STUDY – CBG CONSULTANTS

THRAYLE HOUSE, LONDON & THOMAS GAINSBOROUGH SCHOOL, SUFFOLK

MARCH 2015, UK

CBG Consultants recently introduced the IES Revit plug-in into their working practice. Using the plug-in, CBG have discovered the time saving benefits of a BIM enabled workflow.
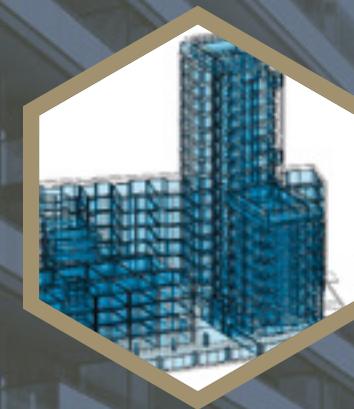
THRAYLE HOUSE, LONDON

Thrayle House is a large apartment block in London Brixton. CBG were tasked with bringing the Architects Revit model into the IESVE to carry out analysis on the performance of the building.

Challenges

− Revit model was actually a series of linked models; one for the shell of the building and then separate ones for each apartment.
− Exporting this model along with the balconies from Revit.
− Finding the correct room volumes; In the Architectural model some of the walls only went to ceiling height and ideally for the analysis model they were required to go to slab height.

Learning

− Corrected room volumes.
− Closed gaps in model.
− Linked models caused issues.
− Balconies didn't export.
− Provides IES rooms with 'inner volumes'.

CBG were able to overcome most of these challenges and discover the benefits of a BIM enabled workflow. The biggest gain came from being able to successfully export the entire building shell. Using ModelIT the team were able to easily divide the model and add all the correct geometry and windows and openings.

THOMAS GAINSBOROUGH, SUFFOLK

Again this project involved importing the model from Revit to IESVE.

Challenges

− Import or export error.
− Segmented rooms, diagonal lines over the face and not clean geometry for analysis.
− Distinguishing between windows and louvers. Vision was to have a structured opening with a fixed glazed panel next to a louver and the louver would provide the ventilation.

Learning

− Import error due to building being set up in phases: not considered in the architect's model.

− Deleting Room Separators resolved segmentation issue and returned nice clean, simple geometry.
− Discovered issues caused by elements being set up as room bounding that shouldn't have been. This created holes going through the entire building where columns were incorrectly set out. This, however was easily fixed.

On the whole CBG were able to overcome most of the challenges and discover the benefits of a BIM enabled workflow.

"Overall the integration between Revit and IESVE made modelling run a lot quicker and smoother. We have separate teams of Revit Engineers and IESVE Engineers so it really helped us to work together better, sharing our knowledge on both platforms. Features like the ability to transfer data and the IES solar analysis tools were particularly useful for these projects.The whole process really opened our eyes to the benefits of a BIM enabled workflow."

Ross Thompson
Senior Sustainability
and Energy Engineer

INTEROPERABILITY

Integrating Performance Analysis into the heart of the design process, IES offers an unrivalled interoperability with other CAD design and analysis tools.

NEMETSCHEK Vectorworks | Autodesk Revit | Gaia Geothermal | DXF | gbXML

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BIM4Analysis workflow can benefit you
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