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

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### PAS 1192 STAGE

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<th>STRATEGY</th>
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<th>CONCEPT</th>
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<th>BUILD &amp; COMMISSION</th>
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<tr>
<td>INFORMATION MODEL</td>
<td>Design (Federated) Model</td>
<td>Services, Philosophy, Outline planning, Prelim P&amp;L, BREEAM/CTSH.</td>
<td>Services, layout &amp; zoning Energy, carbon &amp; cost Interim P&amp;L Update BREEAM/CTSH</td>
<td>Coordinated design, site layouts, GAS, Services &amp; controls strategies, cost plan schedules</td>
<td>Pre-handover</td>
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<td>PRINCIPAL S ACTIONS</td>
<td>Strategies for Electricity, Gas, Water &amp; District Heating and Cooling</td>
<td>Oriented model to minimise energy, maintenance and replacement costs. Review existing resources</td>
<td>Briefing</td>
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Ref: Department for Business Innovation and Skills (BIS) & Local Government Model BIM Process Map Cabinet Office
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 2013 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.y, 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.

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.
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.

CBG were tasked with bringing the Architects Revit model into the IESVE to carry out analysis on the performance of the building.

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.

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’.

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

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.
- Corrected room volumes.
- Linked models caused issues.
- Balconies didn’t export.
- Provides IES rooms with ‘inner volumes’.

Learning
- 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
CONTACT
To find out more about how our BIM4Analysis workflow can benefit you, email sales@iesve.com or visit www.iesve.com/bim-4-analysis