SUPPORTING SIMULATION WITH BIM

BUROHAPPOLD ENGINEERING

Loughborough University

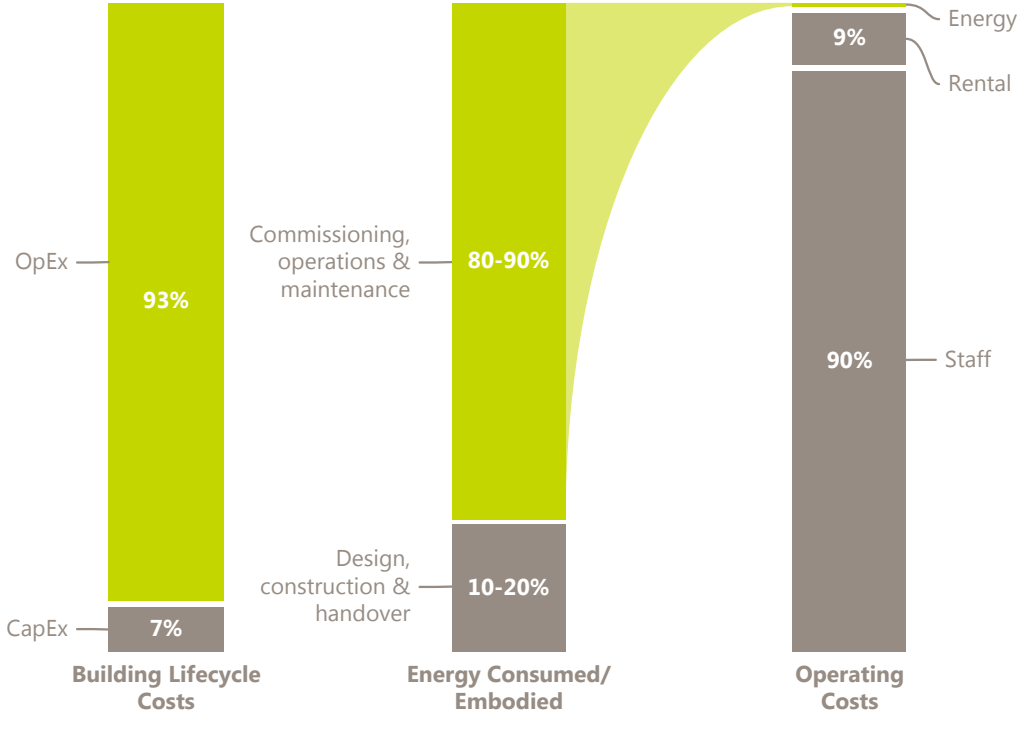
Thursday, 14 May 2015

How can BIM be used to improve the design process, let alone improving operational performance?

LOTS OF DATA … LOTS AND LOTS OF DATA

- Data developed during design +
- Data generated throughout use
- Lots of data…but no real benefit

- What's more important;
  - …the energy used by the building and its occupants?
  - …the wellbeing of those occupants?
  - …and who is this important to?



*Hughes, W.P., Ancell, D., Gruneberg, S., Hirst, L., 2004. Exposing the myth of the 1:5:200 ratio relating initial cost, maintenance and staffing costs of office buildings, in: Proceedings of the 20th Annual ARCOM Conference. University of Reading, HeriotWatt University, Edinburgh, pp. 373–381.
*Pisello, A., Bobker, M., Cotana, F., 2012. A Building Energy Efficiency Optimization Method by Evaluating the Effective Thermal Zones Occupancy. Energies 5, 5257–5278.
*Terrapin Bright Green, 2012. The economics of biophilia - Why designing with nature in mind makes financial sense. Terrapin Bright Green, New York, USA.

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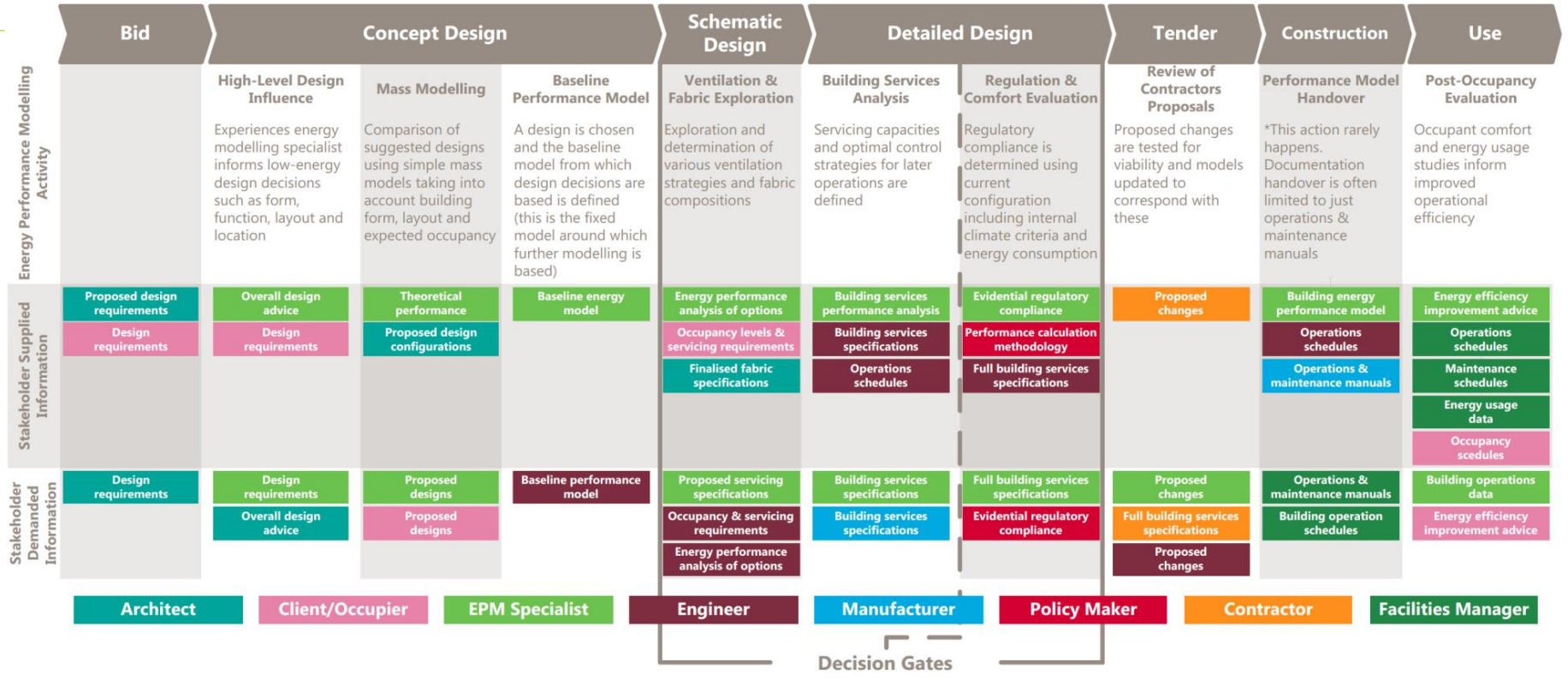
BIM AS A REFERENCE LIBRARY

THE DATA DEVELOPMENT PROCESS



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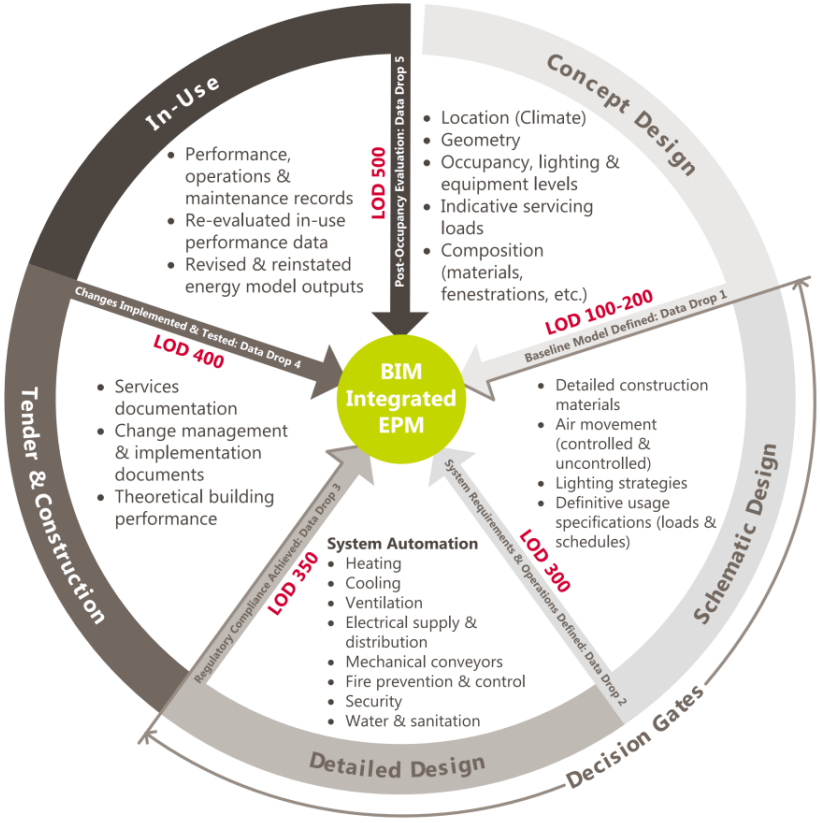
THE DATA DEVELOPMENT PROCESS



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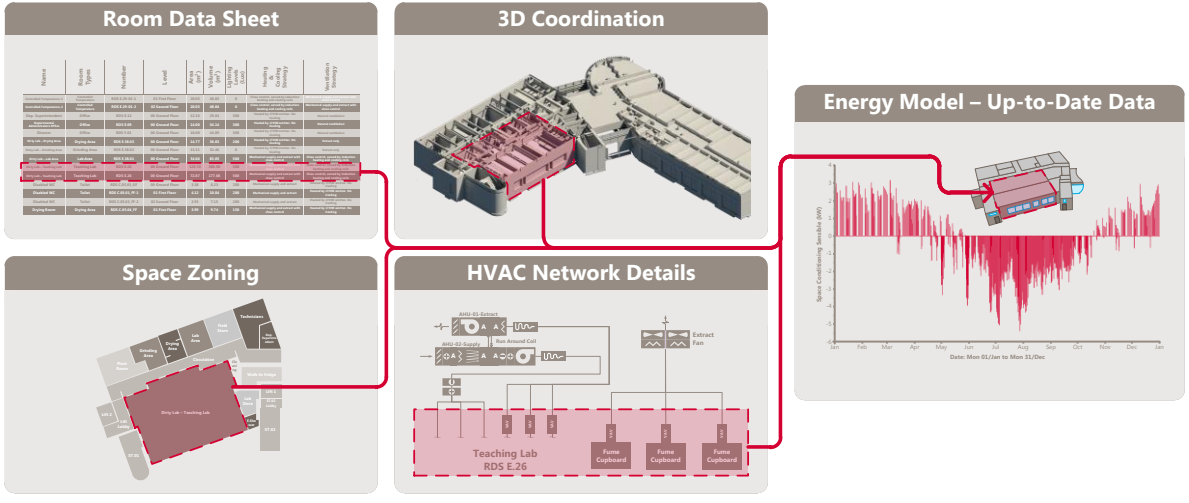
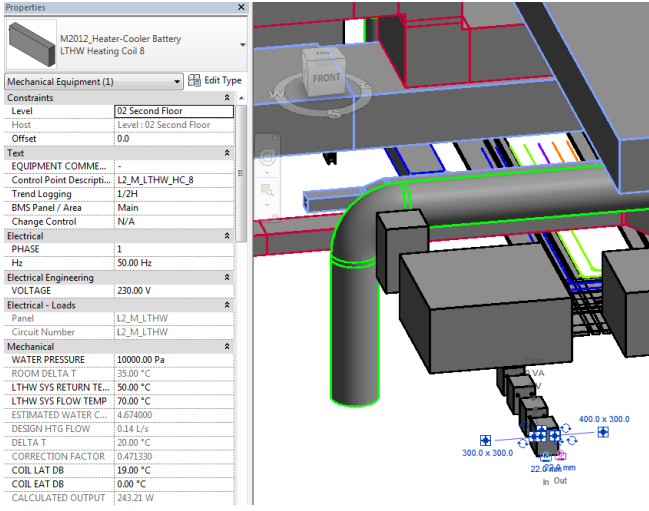
CASE STUDY – YORK UNIVERSITY



Data contributing towards the up to date energy performance model



Extensible parameter attribution within Revit

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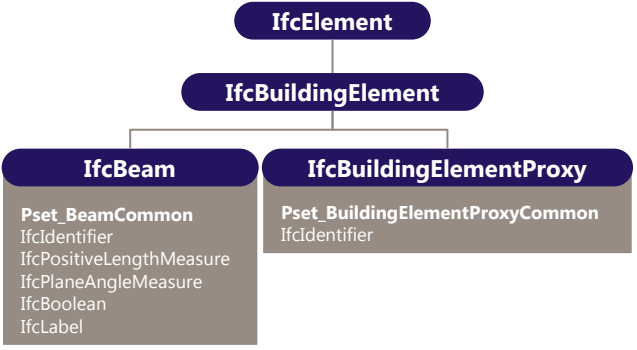
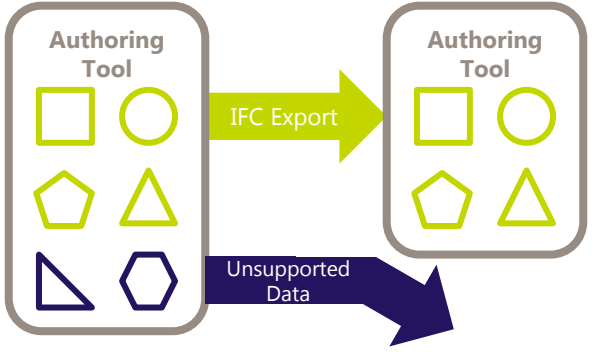
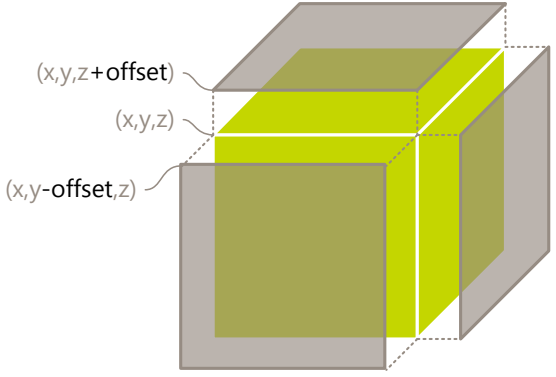
PITFALLS AND OBSTACLES



Data loss through proprietary attribute storage methods



Data loss through export to other platforms



Geometry misrepresentation through offset coordinate assignment

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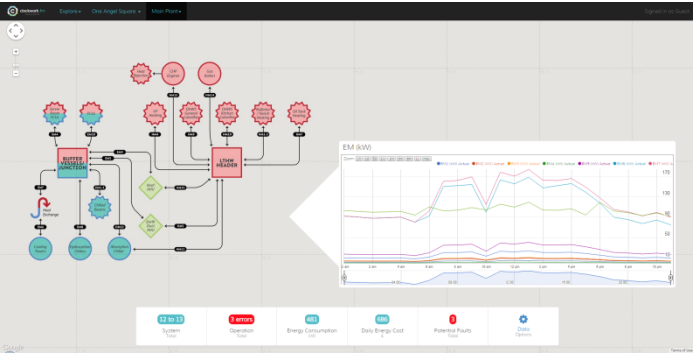
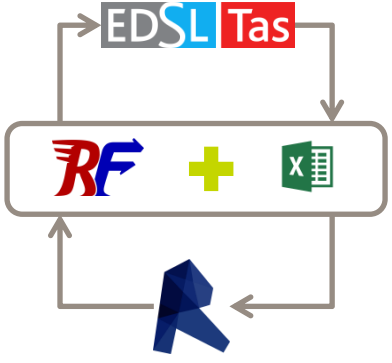
WHERE NEXT

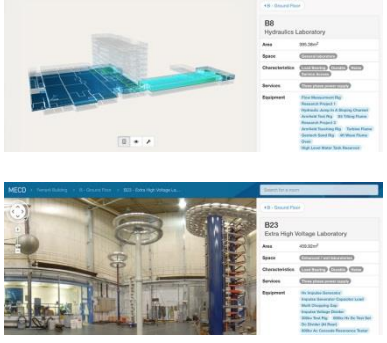
- Ad-hoc tools manipulating ad-hoc data



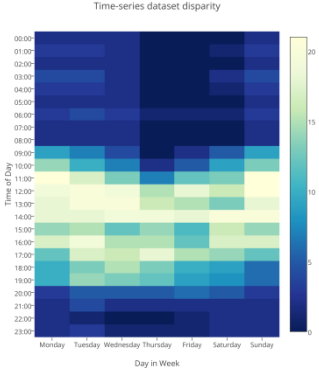
Clockwork FM



Systems and geometry export/import between tools



Space usage and movement planning



Data management and visualisation

CALL FOR PAPERS – SPECIAL ISSUE OF SCIENCE AND TECHNOLOGY FOR THE BUILT ENVIRONMENT

- "***BIM Applications for HVAC&R Engineering and Operations***"
- Manuscript submission June 12th
- Topics of interest:
  - HVAC&R performance modeling and simulation
  - Modeling of HVAC equipment
  - Fault detection and diagnosis
  - Building in-use management
  - BIM tools and performance simulation
  - BIM and energy system dynamics, controls and optimization
  - BIM applications for Facilities Management
- Contact t.gerrish@lboro.ac.uk for further details and the invitation containing instructions

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