Centre for Digital Built Britain

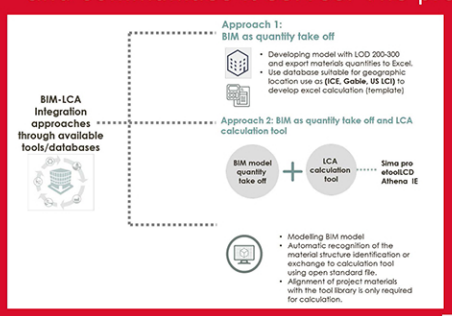
Digital Energy Estimation Tool (DEET)

Benefits to developers, architecture firms, designers, housing associations, facilities managers

"Collaborated with leading regional architecture firm with the aim of developing a parametric BIM ready tool that address is CDBB research topics of Sustainbility , exploiting of exiting tools and techniques and leverage data and information"

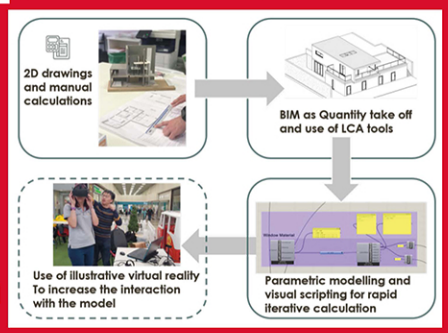
Summary

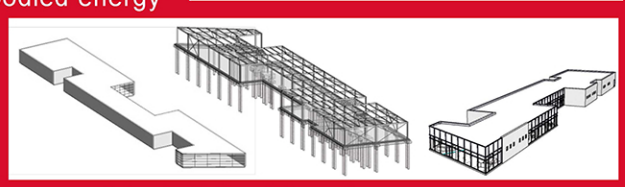
In this research project the research team has developed a unique parametric design-based methodology for estimating total energy use in a building utilising BIM (Building Information Modelling) frameworks and protocols. Results from the work have indicated that embodied energy can be much more significant in the first few phases of the buildings life cycle, and material selection can be addressed within a parametric model. In addition the project had a unique multidisciplinary research approach to show how technologies such as BIM and virtual reality can be used to communicate the message of addressing the overall aims of CDBB in enhancing the performance of the built environment and the cities and communities it serves. The project achieved the development of data rich 3D construction templates that addressed more efficiently the decision making potential of BIM processes. A final outcome of the work was the realization of how such aspects such as energy and carbon in the built environment assets can be visualized with virtual reality to give it greater acceptance.



Key Findings

- Widening understating of embodied energy and its impact on the Built Environment within a building can vary in their contribution to embodied energy, and certain material can be classified as energy hotspots
- A framework has to be developed for measuring embodied energy impact as not all components can be measured
- Embodied energy contribution can play an important role in the first few years of the building lifecycle
- Established and adopted a framework to identify the parameters that can actually be measured
- Within a single parametric model whole energy - both operational and embodied - can be analysed and can potentially be analysed in VR environments





Impact and Value

- Using carbon data of assets to make future cities and BIM a possibility
- Development of datacentric approaches for material selection in construction based on energy and carbon
- Key tool to deliver carbon reduction objectives of 50% as part of construction 2025 strategy

Long-term Vision

- Development of Digital Carbon Twin of Built Environment assets
- New approaches to material selection using BIM and dashboards for smart buildings
- Develop long term benchmarks for Embodied energy and Carbon for built environment
- Applying Virtual Reality principles
- Development of the parametric model so it enables real time Carbon as well as energy capture
- Develop the DEET as a synergy between Information management framework to deliver the governments targets of zero carbon by 2050.

Next Steps/Further Work

- Development of a full systems that uses VR linked to devices which enables energy and carbon estimation in real time
- Development of the parametric model so it enables real time Carbon as well as energy capture
- Develop the DEET as a synergy between Information management framework to deliver the governments targets of zero carbon by 2050.

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