PROJECT:
ICT Platform for Holistic Energy Efficiency Simulation and Lifecycle Management Of Public Use Facilities

HESMOS Virtual Energy Lab

DELIVERABLE TITLE:
Specification of interfaces to material and climate databases

Deliverable Number:
D 5.1 (public)

WORK PLAN:

The **objective** of WP5 is to provide extended and specialist energy simulation functionality in the form of separate IT tools and/or web services so that to enhance the BIM-based kernel system to an energy simulation platform enabling third parties to contribute their expert knowledge in relevant design, refurbishment and retrofitting tasks for achievement of improved energy performance.

Four levels of modelling will be covered, namely (1) energy simulation on the functional modelling level of the facility system as a whole, (2) energy, airflow and moisture transport simulation on space/zone modelling level to evaluate comfort and behavioural aspects, (3) energy simulation on component modelling level, i.e. building elements and groups of elements, and (4) energy simulation on product level, i.e. for inclusion of alternative products and services by retrofit tasks.

Two types of services will be considered – Multizonal Building Energy Solvers (MBES) and Building Envelope Systems Solvers (BES) for durability analysis. The first are typically used in preliminary design, for rough, simplified calculations with reduced number of zones, as well as in final design and re-design, for more detailed simulations of hygrothermal performance and HVAC operation. The second are only used in detailed design and retrofitting tasks, to provide for accurately predicted reliability, durability and energy performance of the building envelope. However, these services are not well integrated with current CAD systems. They are not BIM-based and, due also to their sophisticated input/output, they are rarely used by architects and facilities managers.

Therefore, in WP5 existing tools will be adapted, extended and re-engineered to enable efficient integration within the HESMOS platform, provide for the needed interoperability with eeBIM-CAD via bidirectional mappings from the architectural model to the energy analysis model, ensure harmonised interfacing to available material and climate databases and, last but not least, provide an adequate end user platform for designers and facilities managers by “translating” energy-related parameters to architectural and FM terms and quantities.

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Deliverable Partners:

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NEMETSCHEK

EXECUTIVE SUMMARY:

WP 5 is structured into three tasks:

- T5.1 Interfaces to material and climate databases
- T5.2 Enhancement of the energy simulation tools for use with eeBIM and ICT-based sub-systems
- T5.3 User and service interfaces to the Integrated Virtual Energy Laboratory and its components

This deliverable covers especially task T5.1 of the overall work performed in WP5. The main result of the past work is a concept for providing access to climate and material data for the software components orchestrated in HESMOS framework.

The main parts of information workflow between material/climate data resources and HESMOS components are described below. The report includes the description of the existing databases for material and climate data and the interfaces to and the access of these resources via web services.

This deliverable report is structured into six parts. The first part of the report gives a short overview to the work package and the classification of material a climate data access in the main picture of HESMOS architecture including a short outline to next prospective work. The second, third and fourth part of report describes the structure and content of material data itself and the integration and access to the resources containing this information in standalone configuration and in combination with material resources provided and managed in other applications with access to IVEL. The fifth and sixth main part involves a concept for structure, availability, accessibility and linking of climate data inside HESMOS architecture. Dividing a climate data block into a set of abstract generic information and the climate data itself provides the possibility for straightforward access to this information via web service.

Two partners were involved in the reported RTD work of task 5.1 and had contributed from their own expert view point as follows:

TUD: Material and climate database description, concept for web service

NEM: Material data management in CAD application

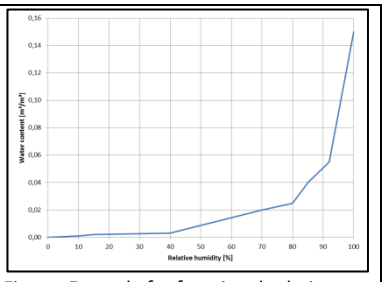

Figure: Example for functional relationship of data tuples describing a 'Sorption Isotherm' for material 'Brick'

Figure: Overview on subparts of 'Energy Computing' module outlined as streamlined puzzle pieces with focus on topic in Task 5.1

TAGS:

Energy simulation tools, eeBIM, Climate data,
Material data, databases, life-cycle, IDM, BIM, IFC, Integrated Virtual Energy Laboratory

HESMOS is a 36 month project that started in September 2010 and comprises a Consortium of one university and five industry partners.

TAGS:

Climate data, Material data, Web service

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SEVENTH FRAMEWORK PROGRAMME

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