ISES

Intelligent Services for Energy-Efficient Design and Life Cycle Simulation

SEVENTH FRAMEWORK PROGRAMME

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ISES is STREP project # 288819 funded by the EU under the 7th Framework Programme. The **objective** of the project is to develop ICT building blocks to integrate, complement and empower existing tools for design and operation management to a Virtual Energy Laboratory that will allow simulation, assessment and optimisation of the energy efficiency of built facilities and facility components in variations of real life scenarios before their realisation, acknowledging the stochastic nature of the involved information resources.

In this issue, we present the overall project idea and the performed user scenario development, state-of-the-art study and gap analysis of the aspects relevant to the realisation of the ISES Virtual Lab.

PROJECT CONCEPT

The product of ISES will be the stochastic model-based Virtual Energy Lab platform for new component product development and integrated engineering design. It will allow engineers to handle holistically the analyses regarding the energy efficient design of products and to take efficient and informed design decisions. This comprises the following three tasks: (1) Consideration of the stochastic nature of the energy performance and consumption profiles of the facility lifecycle, (2) Balanced design of involved new manufacturer building products and components, taking into account their functionality and behaviour for various possible lifecycle demands, and (3) Integration of these products / components in the facility, taking into account various alternatives with regard to location, usage, climate, costs and so on. Each of these tasks requires several iteration cycles in order to reach an optimal balanced solution.
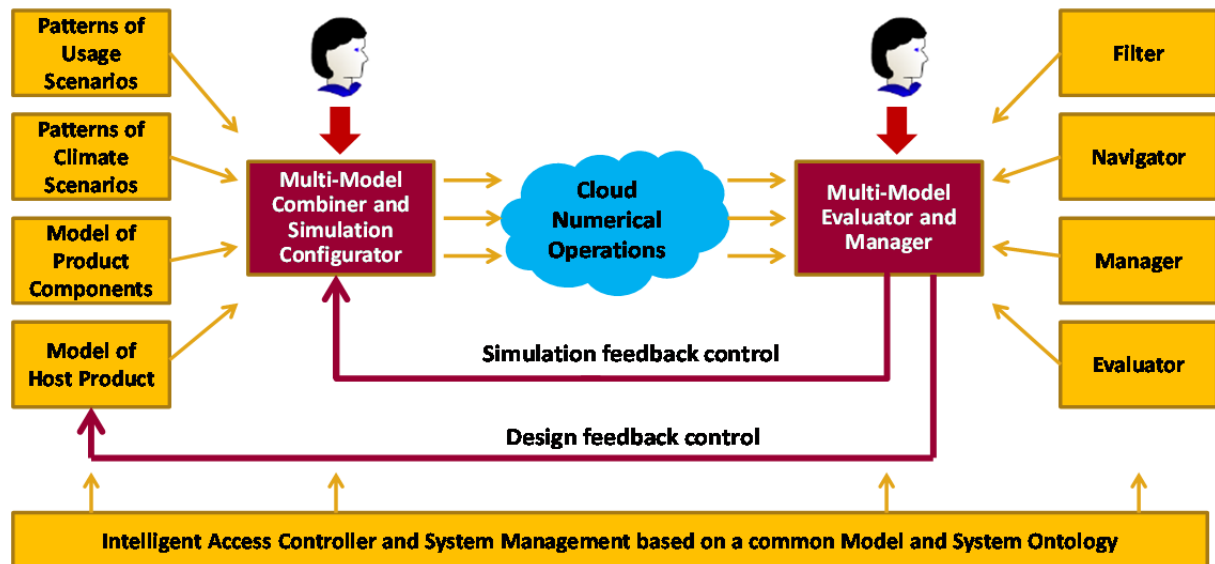
Functional structure of the ISES Virtual Energy Lab showing the needed iteration cycles

The architecture of the ISES Virtual Energy Lab will be built using the service-oriented paradigm. The information framework of the platform will be based on an integrating platform ontology binding together the model of the facility represented as a standard BIM / IFC model and the multi-model environment of related external information resources such as stochastic occupancy profiles, detailed material data and manufacturer product components provided in digital catalogues.

## USAGE SCENARIOS, STATE-OF-THE-ART AND GAP ANALYSIS

ISES defines three major usage scenarios: (1) Conceptual manufacturer product / component development, (2) Design of new buildings, and (3) Refurbishment / retrofitting of existing facilities. These scenarios span a complete lifecycle, involving a broad spectrum of actors, energy-related aspects, required information resources and models and ICT tools.

To enable efficient implementation of the envisaged ISES platform, various aspects of built facilities and their environment had to be studied and evaluated with regard to gaps at the outset.

The studied information resources comprised weather and climate data, user behaviour, user comfort, occupancy profiles, building models, systems, elements and materials, as well as libraries for digital specification of product components. Examined ICT tools and methods included an overview of building energy tools available on the market, as well as specific considerations with regard to simulation tools, CFD analysis tools and stochastic analysis methods and tools to be used in ISES.

In this way, two goals are achieved: (1) Substantiating the scope of the project, and (2) Providing guidance for the subsequent research and development.
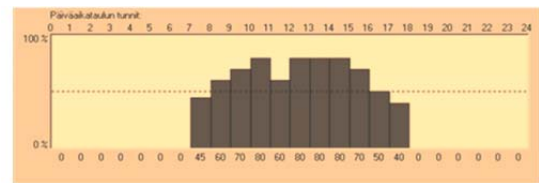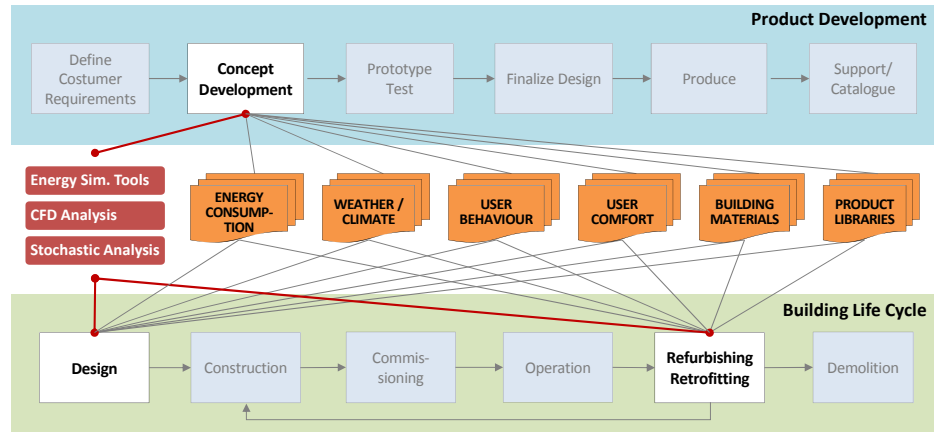
Occupancy profile for office rooms

ISES CONSORTIUM

The ISES Consortium comprises four industry partners, two research organisations and two universities.

- TECHNISCHE UNIVERSITÄT DRESDEN, Germany (Coordinator)
- GRANLUND, Finland
- UNIVERZA V LJUBLJANI, Slovenia
- NYSKOPUNARMIDSTOD ISLANDS, Iceland
- SOFISTIK HELLAS, Greece
- NATIONAL OBSERVATORY OF ATHENS, Greece
- LEONHARDT ANDRÄ UND PARTNER BERATENDE INGENIEURE, Germany
- TRIMO INZENIRING IN PROIZVODNJA MONTAZNIH OBJEKTOV, Slovenia

Second ISES Meeting, Ljubljana 24-25.04.2012