

Newsletter

31. May 2011 | Issue Nr. 1



Welcome to the first issue of the **HESMOS-Project Newsletter**. HESMOS is a so called STREP-Project funded by the EU under the 7th framework Programme. During the runtime of the project several newsletters will be published. For further information and downloads please visit our website. There you can also register if you want to receive this newsletter automatically. **In this issue**, HESMOS presents the **main objectives** and the first outcome of the analysis phase. In each issue there will be introductions of the consortium partners. Today we start with partners playing the role of end-users, because their input is very important in the analysis phase.



HESMOS – PROJECT OBJECTIVES

HESMOS - Holistic Energy Efficiency Simulation and Life Cycle Management Of Public Use Facilities. The overall objective of HESMOS is to develop an **Integrated Virtual Energy Laboratory (IVEL)** which allows decision makers to design and compare several energy and life cycle cost optimised alternatives as well as to optimize the operation of Public Private Partnership Projects (PPP). To achieve this objective **HESMOS IVEL** enhances existing Computer-Aided Design (CAD) and Facility Management (FM) tools with information from energy simulation and cost calculation as well as up-to-date data from the Building Automation Systems (BAS). To evaluate the functionality of the HESMOS IVEL, an extensive 30-month validation program will be **realized at two PPP projects**.

HESMOS – PARTNERS



IN THIS ISSUE

The HESMOS-Project	page 1
HESMOS Project Objectives	page 1
Analysis of User Requirements	page 2
Use Case Scenarios	page 2 - 4
Partner Profiles – BAM	page 4 - 5
Partner Profiles – OBERMEYER	page 6
Partner Profiles – TU Dresden CIB	page 6

ANALYSIS OF USER REQUIREMENTS

In the first phase (WP 01) of the HESMOS project the research team, led by Royal BAM Group nv, analysed the processes involved in the design, construction and operation phase of PPP projects. This analysis shows that there is a strong request for integrated design, simulation and facility management tools to further optimize the processes and support the involved disciplines.

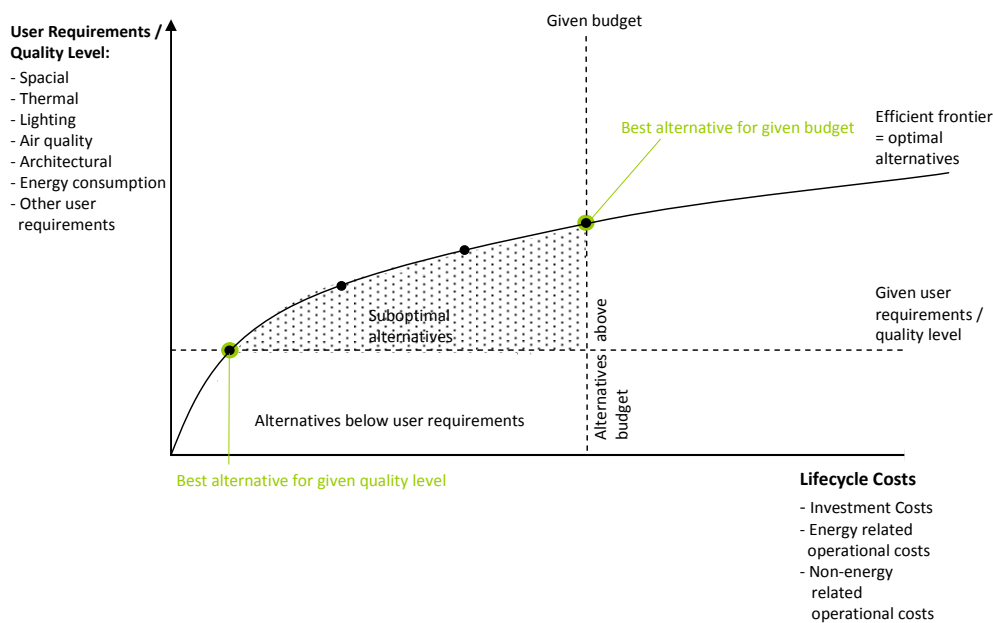


Figure 1: Decision making during the Life Cycle of PPP Projects

The graph illustrates how decisions are made during the lifecycle of a Public Private Partnership (PPP) project. In an iterative process, the design team constantly strives to increase the quality of the building and to decrease life cycle costs. Alternatives with the highest quality level for a given budget or the lowest cost for a given quality level are considered to be optimal since there is no alternative with a better cost/quality ratio. These alternatives are on the “efficient frontier” of all possible alternatives.

Based on the results of the analysis, the research team developed the HESMOS TO BE Process. This process describes the development of a PPP project focusing on possible use case scenarios of the HESMOS IVEL during the design and tendering phase, the operational phase and the refurbishment/retrofitting phase.

USE CASE SCENARIO 1 – PLANNING AND TENDERING

Based on the user requirements, which comprise especially, spatial, thermal, lighting, air quality, design, energy consumption and other requirements, an interdisciplinary team of architects, planners, consultants, construction, facility management and life cycle cost specialists develop and optimise complex projects for a contract period of 20-30 years. The planning and tendering phase in the “To Be Process” involves a number of iterations, whereby simulations and cost calculations are carried out for all iterations in the HESMOS Integrated Virtual Energy Laboratory (IVEL) in order to reach the best cost / quality ratio.

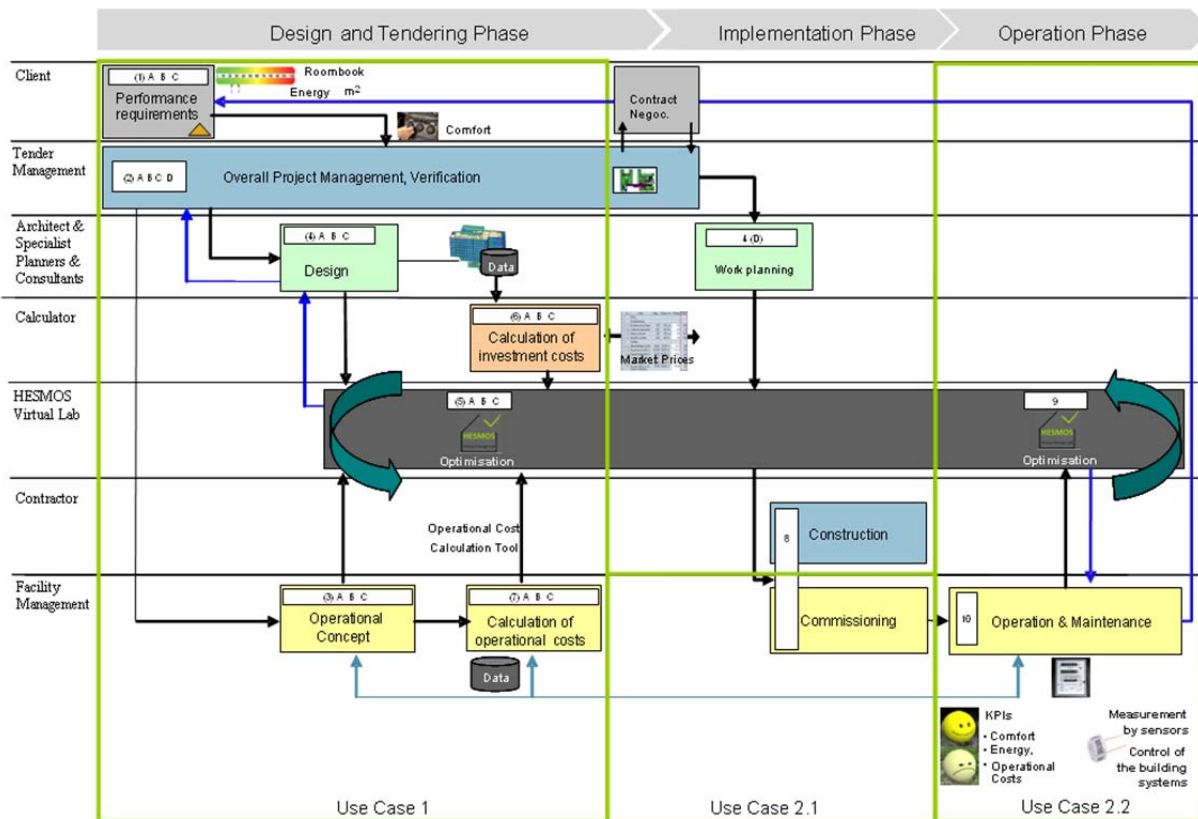


Figure 2: HESMOS TO BE Process - Design and Tendering as well as Commissioning and Operational Phase

USE CASE SCENARIOS 2.1 and 2.2 – COMMISSIONING & OPERATION PHASE

During the commissioning & operation phase the project team analyses and evaluates sensor data from the Building Automation System (BAS) of a current PPP Project. The sensor data will be logged and visualised to detect indoor conditions, to identify possible areas of improvement of Heating, Ventilation and Air-Conditioning (HVAC) systems and to report changes in user behaviour. This information gained from evaluating operation data concerning energy consumption, emissions and Life Cycle Costs is the basis for optimizing the operating strategy of existing PPP projects and for improving the design and operating concept of future projects.

USE CASE SCENARIO 3 – RETROFITTING AND REFURBISHMENT PHASE

The HESMOS IVEL also covers the retrofitting & refurbishment phase. Similar to the design and tendering phase, the HESMOS IVEL can be used to simulate and decide among different alternatives for retrofitting or refurbishment to improve the performance of the building. The HESMOS IVEL can be used to either further optimize the design for given user requirements (i.e. to further decrease energy consumption) or to find the optimal design for increased or changed user requirements (i.e. increased thermal comfort).

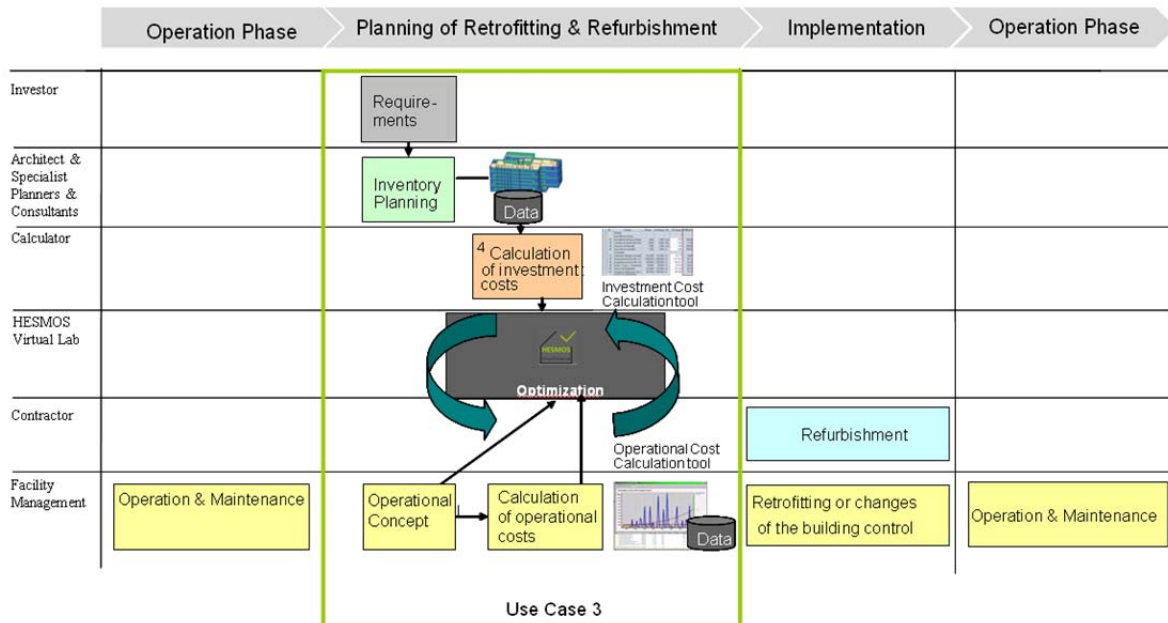


Figure 3: HESMOS TO BE Process - Refurbishment and Retrofitting Phase

PARTNER PROFILES IN THIS NEWSLETTER: BAM, OPB and TUD-CIB

Royal BAM Group nv – End User Group



Royal BAM Group nv is a successful European construction group and unites operating companies in five home markets with the administrative centre in the Netherlands. BAM is active in the sectors construction, property, civil engineering, public private partnerships, mechanical and electrical contracting, consultancy & engineering as well as facilities management and ranks among the largest companies in Europe. Projects all over the world reflect BAM's broad experience and expertise in construction and property for example the O2 World Multifunktionsarena (Berlin), the University Biometrical Research Center (Dundee), the Hospital for Sick Children (London), the Eau Rouge Viaduct (Francorchamps), the Financietoren (Brussels), the Harare International Airport (Zimbabwe), the Telecommunications Tower (Kuala Lumpur), the Conference Palace Hotel (Abu Dhabi), the Park Place building (Dubai), the Carrefour Supermarkets (Indonesia) as well as the Woodside Phase I, II, V (Australia).

Important topics on the strategic agenda of the Royal BAM Group are sustainability, life cycle costing as well as virtual construction. BAM seeks to work together with its clients and other interested parties on sustainability as early as possible in the process. Various tools have been developed e.g. the project carbon calculator to determine the possibilities for reducing CO2 emissions, the sustainable stadium construction toolkit for a sustainable design and construction of sports stadiums, the green-up tool to

offer a customized service to the client and the existing buildings toolkit with well-considered measures for renovating older buildings. New development projects as well as renovation projects focus on sustainability for example the BBI Steigenberger Hotel and the City Group Data Center in Germany, the Monarch' in the Netherlands, the Lateral, the Latitude, Chiswick Green and Co-op HQ in the UK. Within Royal BAM Group, the benefits of virtual construction are acknowledged and all group companies are implementing various aspects in primary processes. BAM is further active in the European Network of Construction Companies for Research and Development (Encord) and the 5D Initiative to define common requirements of the European construction industry for the development of new innovative tools. Various projects have been developed with VC for example the Arena in Leeds, the Unterrichtscarré in Enschede as well as the FNB stadium in Johannesburg.

BAM Deutschland AG, a German operating company of Royal BAM Group nv, has extensive experience in coordination, design optimization, realisation, as well as operation of lifecycle optimized construction projects. Consequently, BAM Deutschland contributes its experience with such projects to HESMOS especially for the specification of the end user requirements and use case scenarios. BAM Deutschland designed, built and operates several Public Private Partnership (PPP) projects. To validate the results of HESMOS IVEL, BAM provides two of its PPP projects as real world demonstrators.



Figure 4: Pilot Project by BAM Deutschland AG

BAM Utiliteitsbouw bv operates on the Dutch non-residential construction market, with about 1,800 employees, eight regional offices and the Major Projects business unit, which operates at a national level. In addition to building premises for companies and institutions, BAM Utiliteitsbouw focuses on project development, technical development and preparatory work as well as operation and maintenance. Clients can also call on the services of BAM's own consulting and engineering agency - BAM Advies & Engineering - whose input includes architectural, structural, project management and BIM expertise.

OBERMEYER PLANEN + BERATEN – End User Group



Obermeyer Planen + Beraten (OPB) is an engineering and architectural design and consulting company, well known for its innovative design solution in energy efficient buildings. OPB currently employs around 800 people at its headquarters and about 400 in associated companies. The variety of products covers almost every area of engineering, for example, the new main high speed railway traffic line between Berlin and Munich, the overall design concept of a new terminal for the Novosibirsk Airport, the overall planning of the new trade fair centre in Munich together with several external partners, the design of the testing ground for Volkswagen Shanghai, design consulting related to the planned 4th Runway of the Frankfurt airport etc. Recent projects with special emphasis on energy efficient are: Berlin Brandenburg International Airport, Kaiserslautern Fraunhofer Centre, University of Pisa, Faliro Athens Station, Beijing Van Palace, Beijing Super Shine, Huanggang Shenzhen / Hongkong Border crossing, Guangzhou City Underground, Shenyang International Airport, Beijing CLD Forum.

Technische Universität Dresden (TUD) is one of the oldest and largest technical universities in Germany. It is member of the group of the nine leading Technical Universities in Germany (“T9 Board”). It is a full-scale university with 14 faculties, 36,000 students, over 4,500 employees and about 600 professors. TUD is represented in HESMOS by three institutes, namely the **Institute of Construction Informatics (CIB)**, the **Institute for Building Climatology (IBK)** and the **Chair for Technical Information Systems (TIS)** of the Institute of Applied Computed Science.

INSTITUTE OF CONSTRUCTION INFORMATICS – Project Coordinator



Research at the Institute is in two directions: Applied Informatics and Applied Uncertainty and Fuzzy Methods. The institute strongly promotes ICT in research and industry. **Prof. Scherer**, head of the institute, is also the chairman of the European Association of Product and Process Modelling.

Know-how transfer to the industry has a high priority for the institute to facilitate practical exploitation of developed innovative ICT solutions. For the industry CiB is a National Information Point in construction ICT. CiB is active in international and national standardization bodies in the domains of ICT-related product, process, and document modelling and holds chair and vice-chairman positions there.

Current research topics are: (1) building information models, (2) intelligent engineering structures and construction methods, (3) virtual organizations, (4) project risk and simulation management, (5) dynamic process modelling, (6) structural uncertainty, (7) earthquake engineering and (8) e-learning. Major methods applied are object-oriented modelling and management, engineering and business ontologies, description logic, service-oriented architectures, grid computing, fuzzy logic, stochastic and information mining.

Contributors to this Newsletter:

Royal BAM Group

(BAM Deutschland AG / BAM Utiliteitsbouw BV)

Obermeyer Planen und Beraten GmbH

Technische Universität Dresden

Your Contact to HESMOS:

Chief Coordinator: *Prof. Dr. Raimar J. Scherer (TUD-CIB)*

Deputy: *Dr.-Ing. Peter Katranuschkov (TUD-CIB)*

coordinator@hesmos.eu

Exploitation Manager and Newsletter Editor:

Prof. Rasso Steinmann (NEMETSCHKE)

publicrel@hesmos.eu

Design: *Dipl.-Ing. (Arch.) Romy Guruz (TUD-CIB)*

Website:

www.hesmos.eu

www.hesmos.org