






<p>PROJECT: ICT Platform for Holistic Energy Efficiency Simulation and Lifecycle Management Of Public Use Facilities</p>	
<p>DELIVERABLE TITLE: Requirements Synthesis and Energy-Related Key Performance Indicators</p>	<p>Deliverable Number: D 9.1 (Confidential, only for members of the consortium (including the Commission Services))</p>
<p>WORK PLAN:</p> <p>For the achievement of holistic energy efficiency simulation and lifecycle management of the targeted public use facilities it is not only important to provide an integrated interoperability platform and modelling framework but also to validate the operation of the facilities, comparing current practice and anticipated new capabilities enabled by HESMOS.</p> <p>The objective of D9.1 is to synthesize the requirements identified in WP1 to practical rules and parameters that can be objectively monitored in the facilities and to define relevant energy-related Key Performance Indicators (eKPIs) by analysing energy/emissions issues and inter-relating these with investment and operational costs.</p>	<p>Deliverable Main Authors:</p> <p>Bastian Bort, BAM DE Tiziana Caruana, BAM NL Marie-Christine Geißler, BAM DE</p> <p>Co-Authors:</p> <p>John Grunewald, Romy Guruz, Friedrich Jonas, Jens Kaiser, Tuomas Laine, Erja Reinikainen, Wilfred van Woudenberg</p>
<p>EXECUTIVE SUMMARY:</p> <p>This Deliverable Report describes a systematic approach to identify eKPIs for the evaluation of the design of Public Private Partnership (PPP) projects as well as the efficiency of the operation of such projects.</p> <p>This report is structured in three parts to synthesize the requirements, derive appropriate energy-related Key Performance Indicators (eKPI) and analyse the selected types of facilities:</p> <ul style="list-style-type: none"> In the first part, the authors synthesize the requirements of Deliverable D1.1: Gap Analysis, Use Case Scenarios and Requirements Specification (Bort et al., 2011) regarding energy efficiency, comfort as well as investment and operational costs. In this process, every phase of the whole life cycle of a building "Design & Tendering", "Commissioning & Operation" as well as "Retrofitting & Refurbishment", the goals of the main stakeholders and the aims for HESMOS had to be taken into account. Out of these considerations, the relevance of energy-related Key Performance Indicators for decision-making and monitoring within the HESMOS Integrated Virtual Energy Laboratory were derived. 	<p>Deliverable Partners:</p>    

- The **second part** focuses on the development of appropriate energy-related key performance indicators (eKPIs) for the comparison of design alternatives as well as monitoring of existing buildings. For this purpose, the meaning of the term “Key Performance Indicators (KPIs)” was defined and for HESMOS especially the term “energy-related Key Performance Indicators (eKPIs)”. On the basis of the preceding preliminary considerations and definitions, a decision making framework was developed. Beside evaluating and monitoring energy and CO₂-emission, other factors like the thermal comfort, air quality, visual comfort as well as the costs through the whole life cycle are important eKPIs. The methodology adopted for the development of efficient eKPIs comprises the following steps:

- Review earlier defined exchange requirements from WP1
- Select the most relevant indicators (eKPIs) for a certain purpose
- Group these indicators regarding the main identified categories
 - ecologic
 - socio-cultural
 - economic.

- The **third part** gives an overview of building specific characteristics for selected types of facilities, in HESMOS a school complex and an office building. Therefore examples for user profiles (start time – end time), degrees of occupancy (m²/person) as well as internal loads (W/m²) are shown. And based on a benchmark report the identification of the most influencing operational costs for the different types of facilities.

The definition of appropriate eKPIs and the analysis of these indicators in the selected types of facilities will provide feedback to other work packages e.g. the model-based ICT system integration (WP 04), the development of energy-related tools for lifecycle facility management (WP 06) and most important the development of the nD Navigator (WP 07).

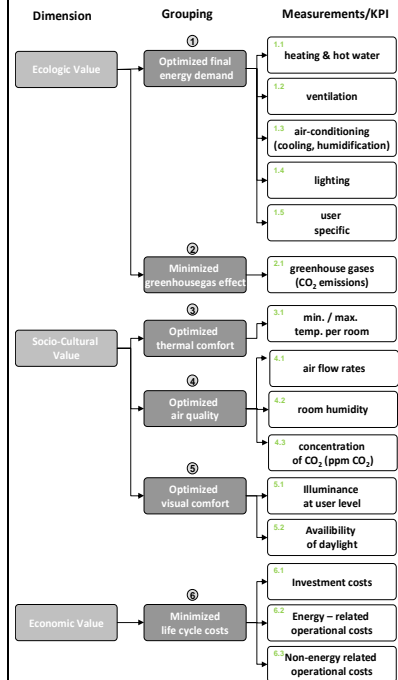


Figure 1: eKPI framework

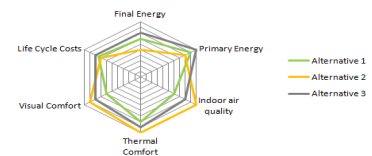


Figure 2: Alternative Comparison

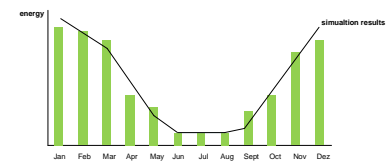


Figure 3: Monitoring

TAGS:

Alternative comparison, decision-making, dashboards, energy-related Key Performance Indicators (eKPIs), life cycle management, monitoring, sustainability dimensions: ecologic, economic and socio-cultural value.

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

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