



Find the gap: Project MOEEBIUS, a Holistic Energy Performance Optimization Framework

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Modelling Optimization of Energy Efficiency in Buildings for Urban Sustainability

Project duration: November 2015 – February 2019

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AGENDA

- **Project overview**
- **Problem observed**
- **Need**
- **Solution**
- **Objectives**
- **Implementation approach**
- **Project pilots**
- **Expected impacts**

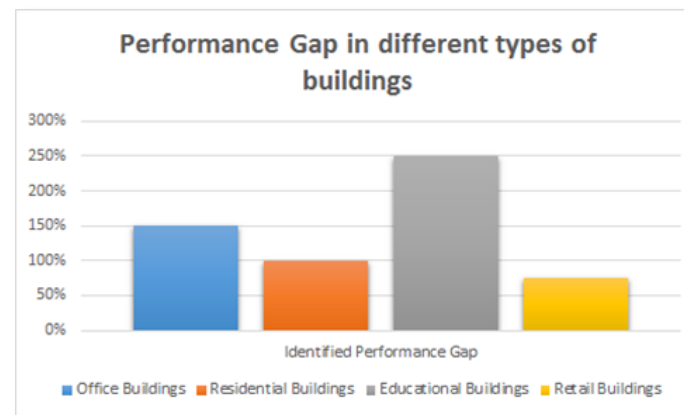
PROJECT OVERVIEW

Project Full Title	Modelling Optimization of Energy Efficiency in Buildings for Urban Sustainability
Project acronym	MOEEBIUS
Topic	EeB-07-2015 - New tools and methodologies to reduce the gap between predicted and actual energy performances at the level of buildings and blocks of buildings
Call	H2020-EeB-2015
Duration	42 months
Starting date	01-11-2015
Partnership	15 partners from 8 countries



PROBLEM OBSERVED

- Huge gaps between predicted and actual energy consumption
- Inability of current modelling techniques to present realistic use and operation of buildings
- Impact of occupants behaviour on the energy performance buildings
- Prohibit the scaled deployment of energy efficient projects



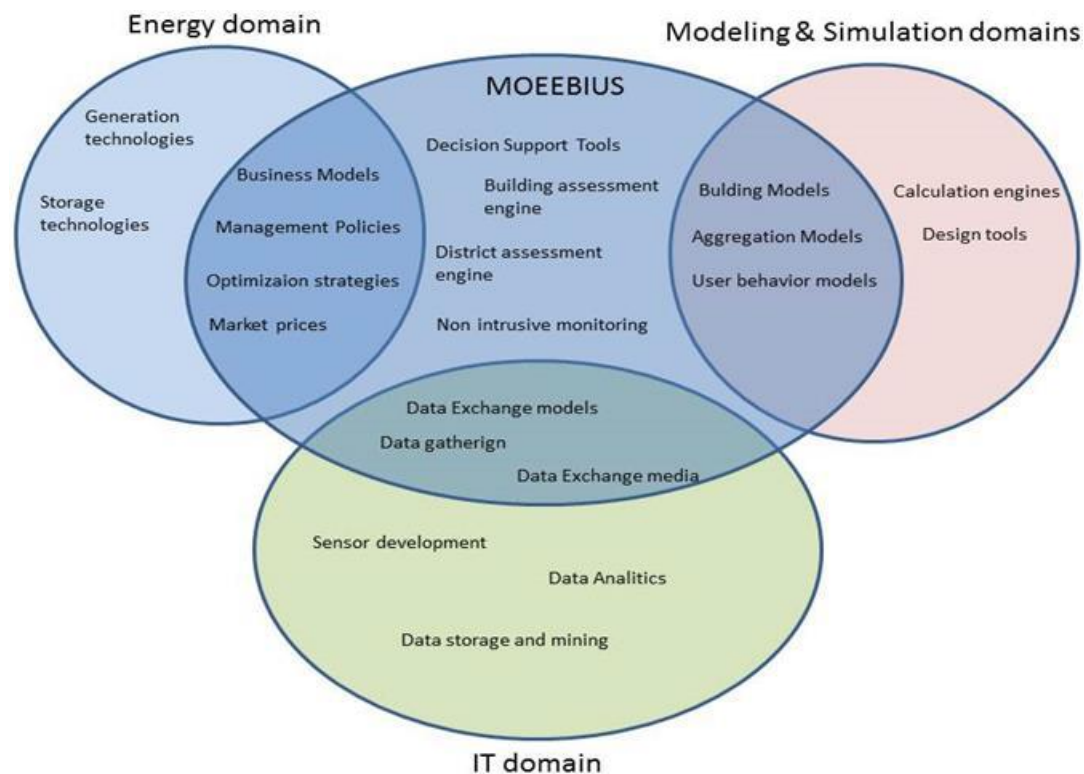
NEED

Reduction of the gap between real and predicted energy performance of buildings and block of buildings narrowed down to values consistent with EPC

- Develop methodologies and tools to monitor and assess actual building energy performance
- Include energy performance diagnostics to support decision making during the different stages in the life of the buildings
- Real time optimization of energy demand and supply using intelligent energy management systems

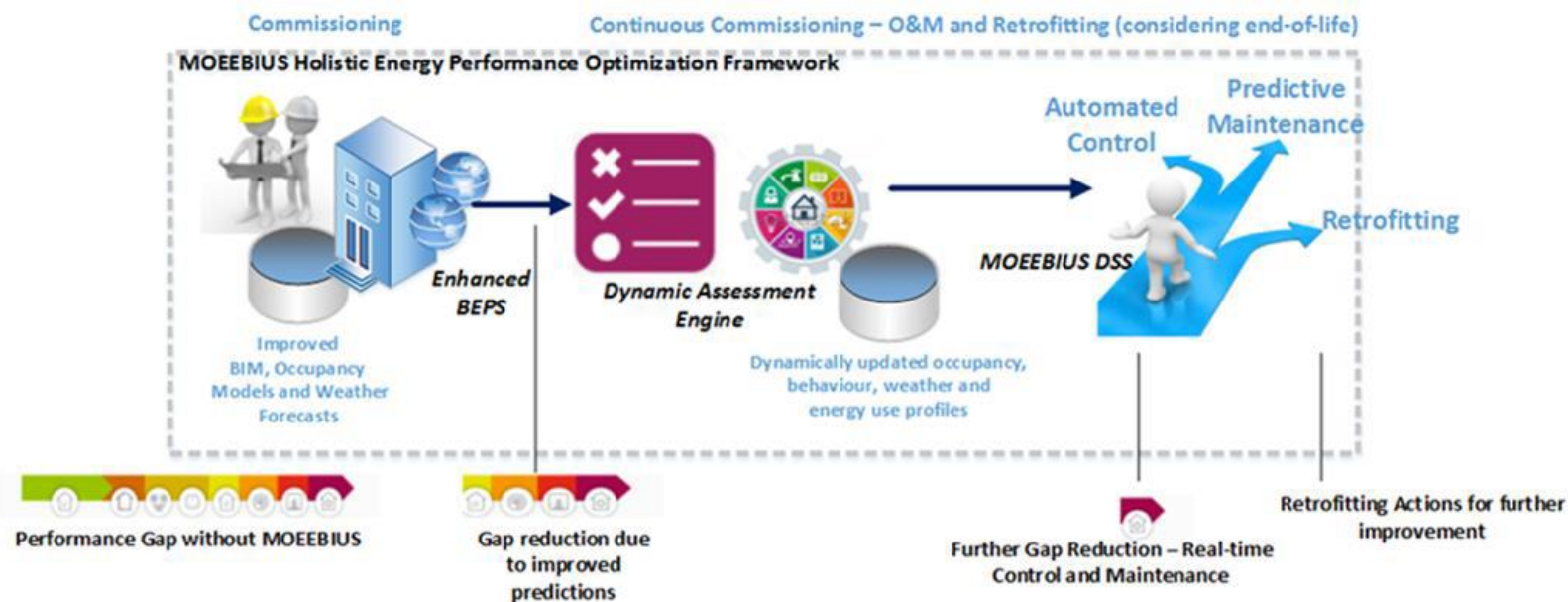
Holistic energy performance optimization framework is needed

- Improved Building Energy Performance Assessment
- Precise allocation of critical building components
- Real time building performance optimization
- Optimizes retrofiting decision making
- Real-time peak-load managements optimization

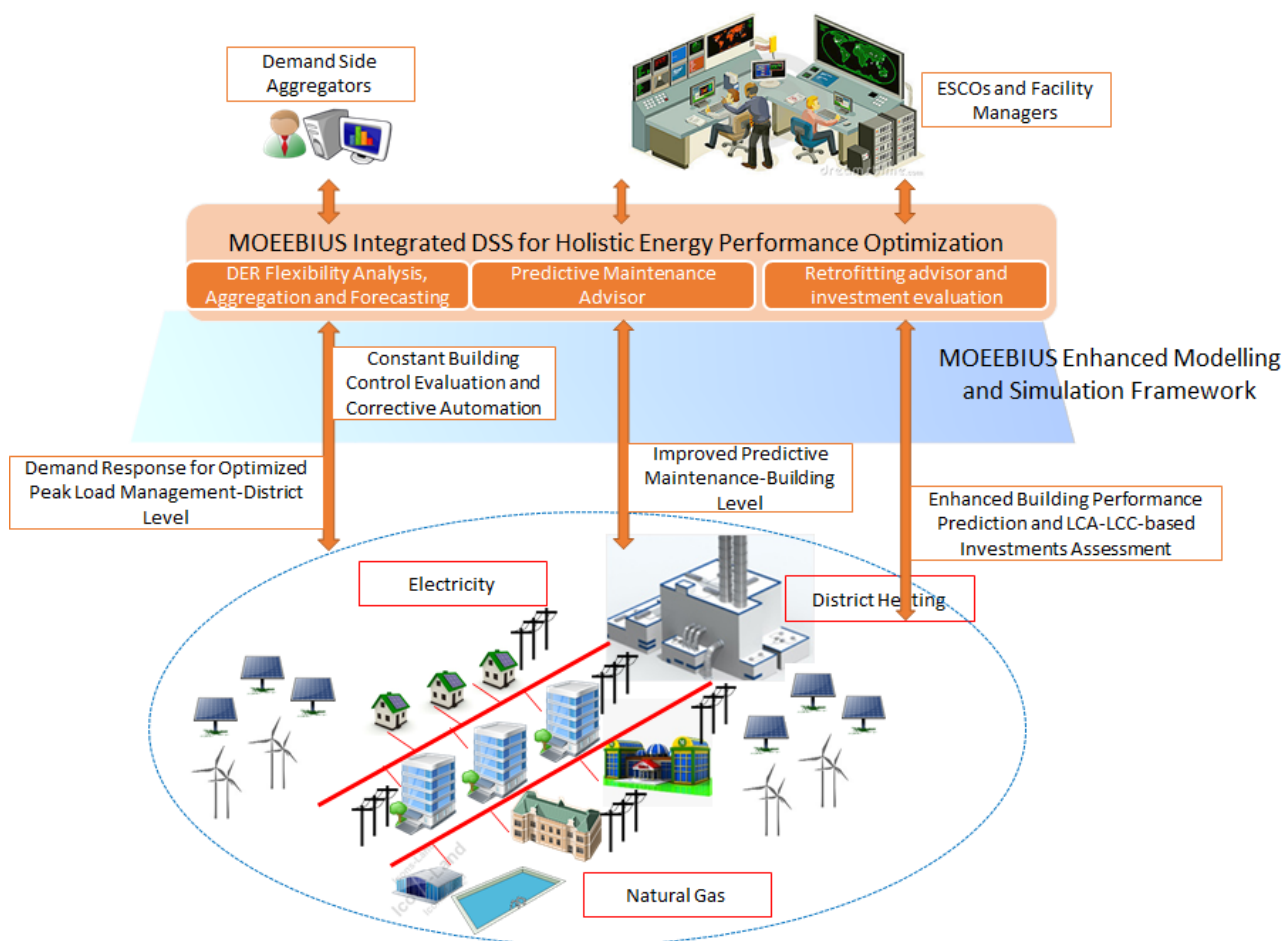


SOLUTION

Holistic Energy Performance Optimization Framework that enhances current (passive and active building elements) modeling approaches and delivers innovative simulation tools which



SOLUTION



End Users

Building Managers & ESCO-s

Real Time Management

Optimized automation & peak demand reduction

Scheduled Management

Predictive maintenance Advisor for buildings and district energy management

Future Management

Retrofitting Advisor

OBJECTIVES

- **Advancing the capabilities of current building energy performance systems (BEPS)**
- **Further optimizing the performance gap**
- **Enabling the efficient integration of distributed and intermittent energy resources**
- **Facilitate Energy Performance Contracting penetration in EU Energy Services Markets**
- **Introducing New ESCO Business Models and New Energy Market Roles**

IMPLEMENTATION APPROACH

1. Diagnostic & Analysis

- Identification of user and business requirements
- Define use-case scenarios and stakeholders roles
- Definition of new business models

2. Design - Modelling

- Technological and functional specifications
- Detailed architectural framework
- Models: information, distributed energy resources, occupation profiles and comfort, IAQ, local and global energy performance

3. Development

- Data acquisition and management
- Simulation-based dynamic assessment environment
- Decision Support System for holistic energy performance optimization

4. Deployment

- Ex-ante surveys and evaluations of the pilot areas
- Simulation model calibration and training
- Validation and marketability tests
- Evaluation of the entire project and its achievements

IMPLEMENTATION APPROACH



TECNALIA's KUBIK test facility

- User-Driven Innovation Approach to be followed aims at involving end-users and buildings occupants throughout all stages of the project life-cycle, as key enablers of the MOEEBIUS innovation process
- Based on the establishment of the MOEEBIUS Living Lab:
 - Widely disseminate
 - Create opportunities for exploitation / replication
 - Obtain feedback
- Early Validation and Verification protocols (ensure the reliability of the final outcomes)

PROJECT PILOTS

- Evaluation holds a significant position in MOEEBIUS, since it comprises the means towards validating cost-effectiveness, techno-economic feasibility and the impact generated by the project.
- MOEEBIUS solutions will be validated in real-life in three dispersed geographical areas addressing the needs of different system stakeholders.

UK - London

Serbia - Belgrade

Portugal - Mafra



PROJECT PILOTS

Location	No of buildings	Types of buildings	Total Surface of Buildings	Total Annual Consumption	No of Occupants	Shared Infrastructure
UK – London	4	Residential, Hotels, Retail	22.500 m ²	E: 3.100 MWh NG: 80 MWh	1.200	RES (PV), Back-up Generators
Portugal - Mafra	5	Educational, Sports, Office	8.100 m ²	E: 535 MWh NG: 760 MWh	800	HVAC (Natural Gas Boilers)
Serbia - Belgrade	48	Educational, Office, Residential, Retail	434.000 m ²	E: 12.400 MWh	11.700	District Heating

E – Electricity; NG – Natural gas

EXPECTED IMPACTS

Environmental

- Deviations between forecasted and measured consumption below 10%.
- Reduction of peak demand at levels of ~50%.
- Reduced energy consumption through real-time optimization 35%.

Economic/social

- Regulated comfort and health in built environments at levels above 80%.
- Strong industrial participation (3 Large companies + 7 SMEs).
- Validate Energy Efficiency Services Agreement business models for ESCOs in the 3 project pilot sites (with the participation of 3 ESCOs).

ACKNOWLEDGEMENTS

FCT

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THANK YOU



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MOEEBIUS

MOEEBIUS Partners



SUSTAINABLE
PLACES

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