

Abstract

Lowering the world energy consumption is one of the major challenges of present day and future generations. The combined energy amount used for buildings (residential and services) in kilo tonnes of oil equivalent (ktoe) comprises over 40% of Ireland's total energy consumption. This amounts to a monetary value of €3.5 billion for the year 2004.

It should be also noted that this 40% energy consumption by buildings also translates into over of 30% of Ireland's total CO₂ emissions which may have a

direct monetary value in the context of an emerging carbon tax-scheme under consideration by government at present.

Recent European Legislation (Directive 2006/32/EC) requires present and future Facility and/or Building Managers to reduce building energy consumption and operational costs. Therefore, conducting performance based assessments of building operation is of outmost importance.

Objective

The objective of this project is to specify, design, and validate a data management technology platform that supports integrated energy and environmental mgmt. in buildings utilising a combination of wireless sensor network technologies, an integrated data model and data mining methods and technologies.

Principally targeted at the operational life cycle of large public and private buildings, it is envisaged that the Build-Wise platform will provide a dramatic improvement over existing disparate hardware and software technologies currently utilised in the management of energy in buildings, leading to increased energy efficiencies in buildings in the range of 15-20%.

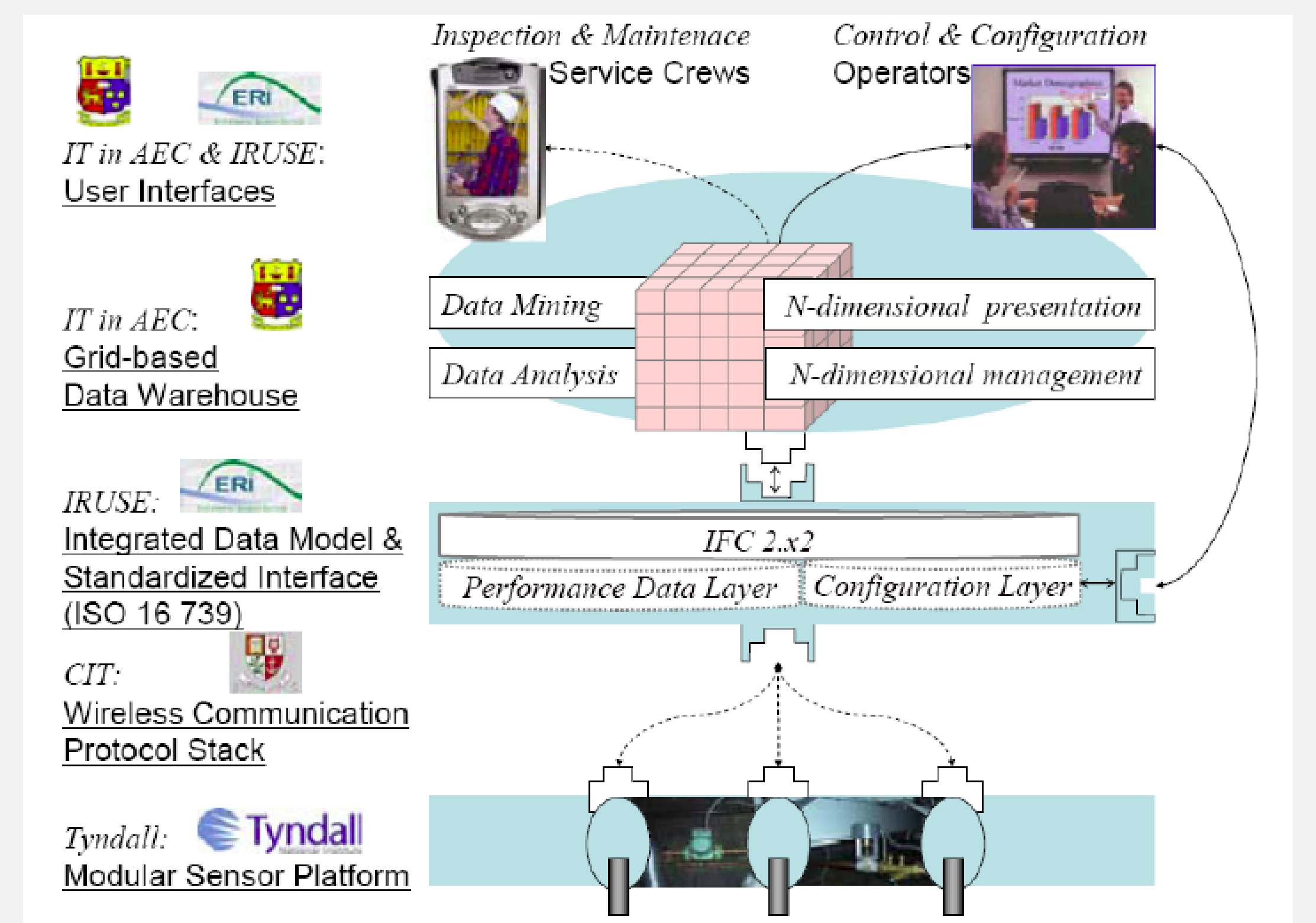


Figure 1: buildWISE-Platform

Approach

In addressing these objectives, the project developed a wireless sensor platform using a backend mgmt. and control system based on standards compliant to suitable Building Information Models. This technology platform, is based on the combination of:

- A Performance Framework Tool (PFT) to support the documentation and specification of building performance requirements (cf. figure 1);
- A Performance Monitoring Platform to provide access to classified and categorised Building Performance Data through context-sensitive web-based user interfaces (cf. figures 4,5).
- A Wireless Systems Network Design tool to allow the design of power efficient and reliable indoor wireless sensor networks for use in Building Management Systems. This tool also simplifies the installation of such networks determining the optimum positions of sensor nodes (cf. figure 3).

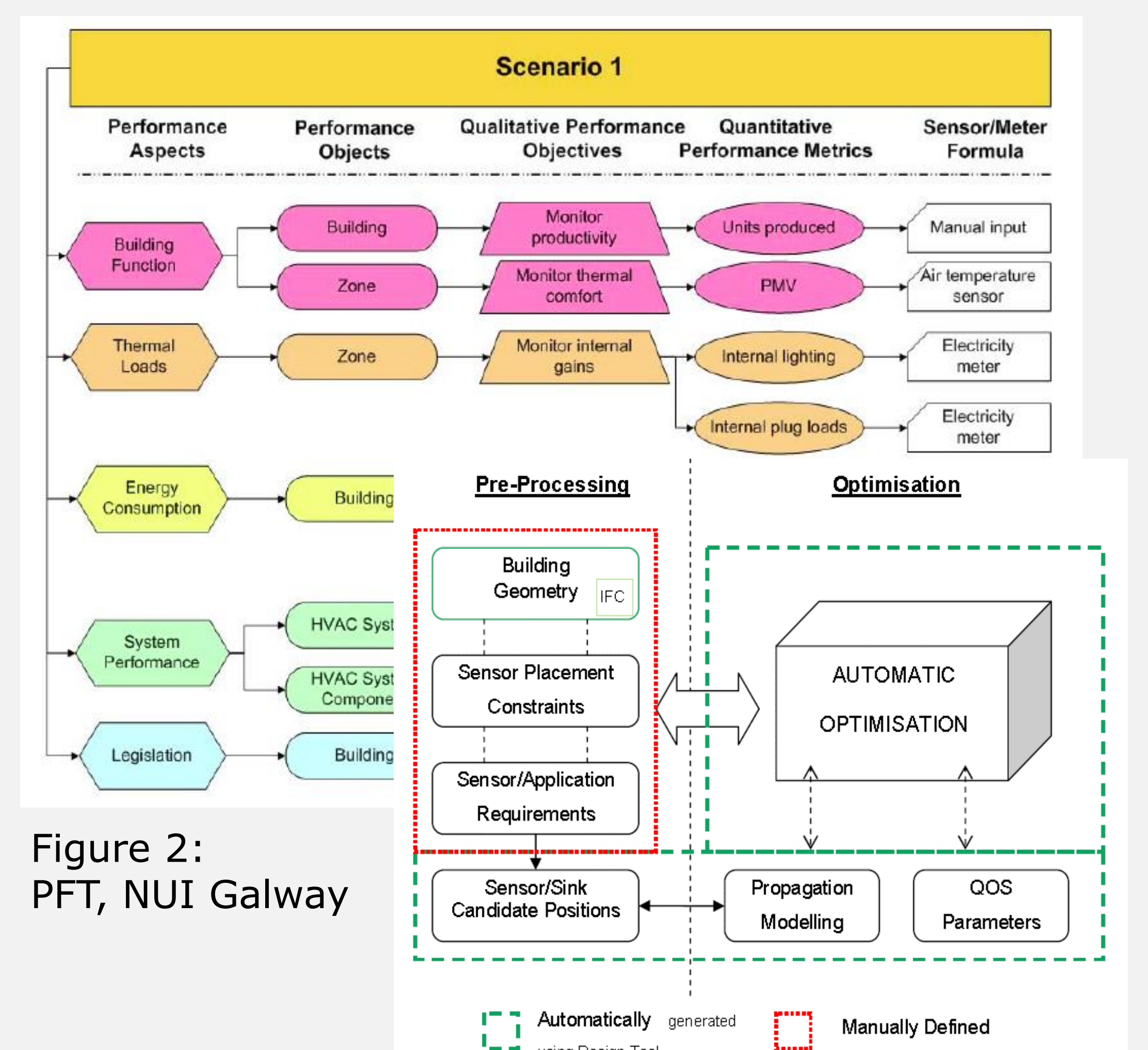


Figure 2: PFT, NUI Galway

Figure 3: WSN Design Process, CIT

Achievements

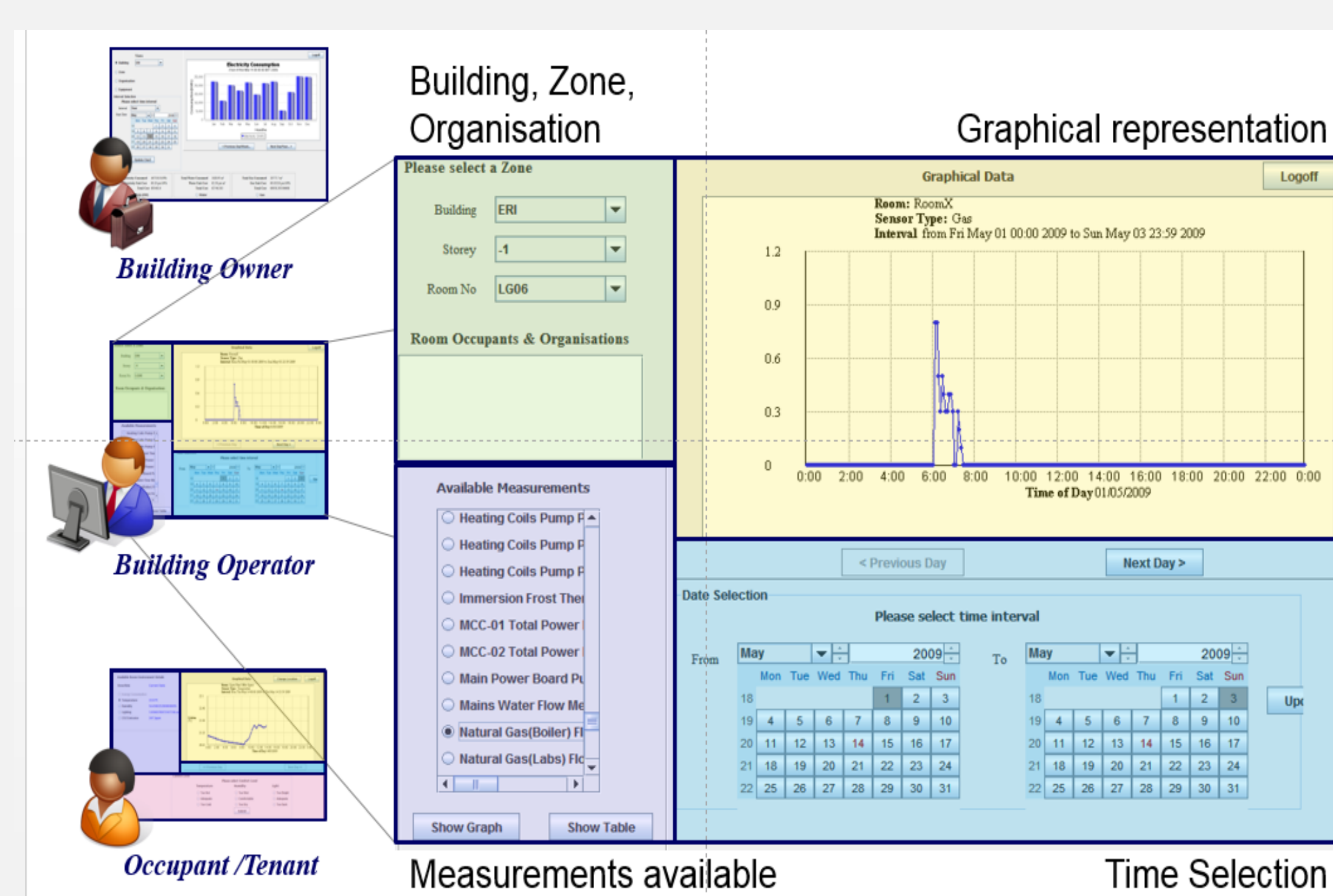


Figure 4: Web-based User Interface (IRUSE)

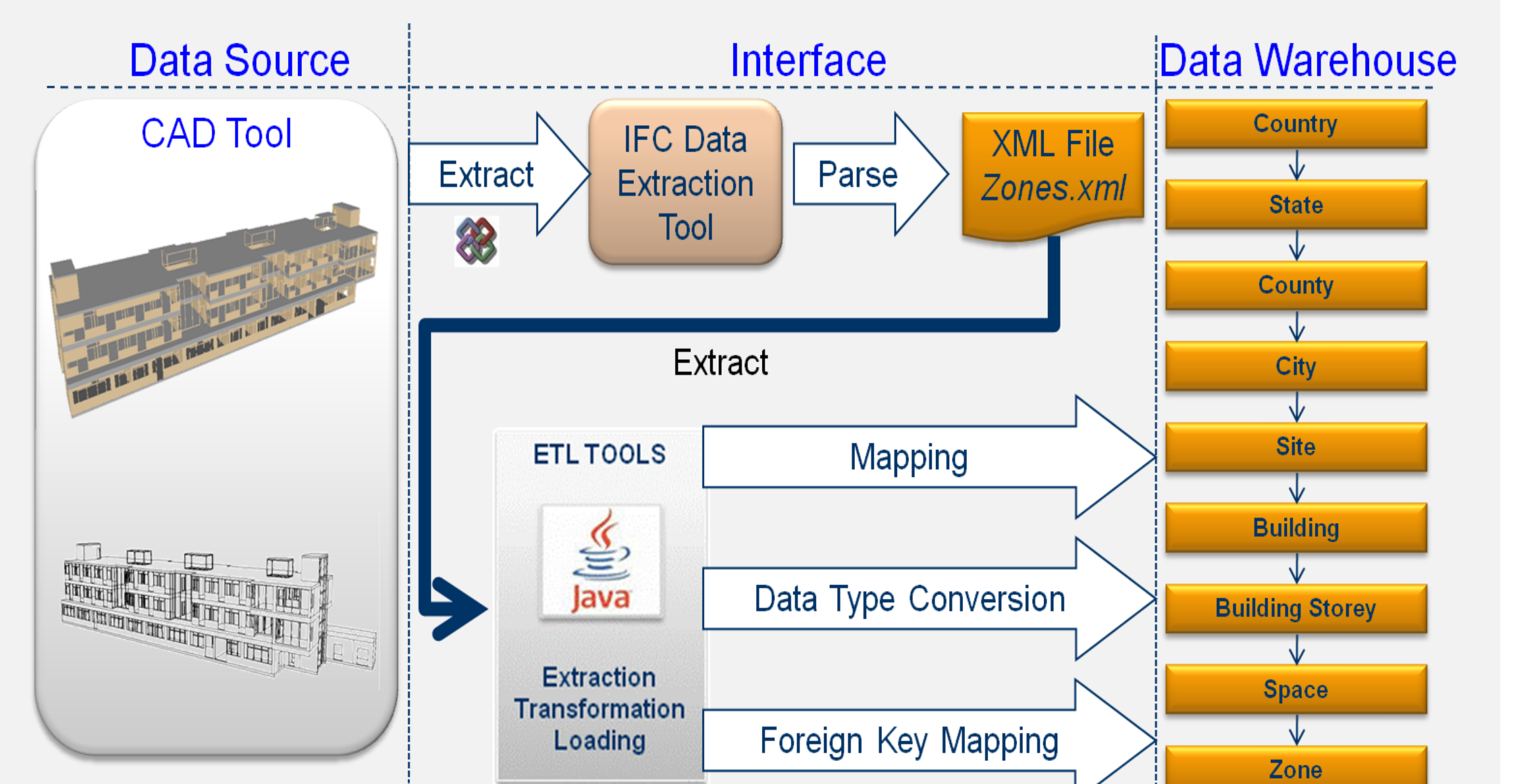


Figure 5: Data Categorisation (IRUSE)

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