Life Cycle Data Analysis in Buildings

Matthew Horrigan[1] (matthew.horrigan@ucdconnect.ie), **James O'Donnell**[2] (james.odonnell@ucd.ie),

[1,2]*UCD School of Mechanical and Materials Engineering*

INTRODUCTION

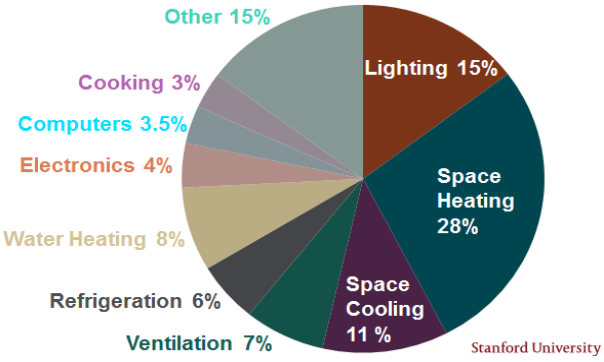

Fig.1 Breakdown of US Commercial Building Energy Consumption

- Nine end uses of commercial energy can be identified
- With space heating, lighting and space cooling, representing close to half of commercial energy consumption
- Therefore, optimum building operation requires analysis of a relatively large number of data sets throughout a buildings Life Cycle

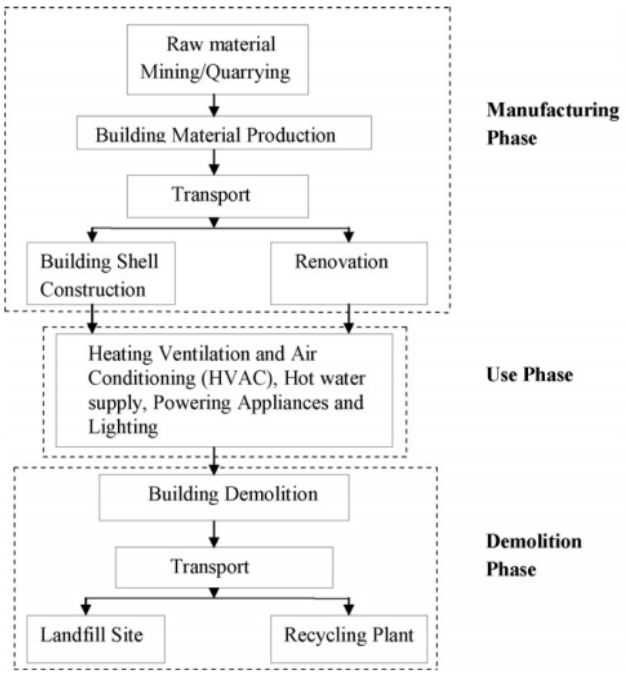

Fig. 2 System boundaries for life cycle energy analysis

Objectives:

- **To develop new life-cycle analytical techniques to process and mine "Big Data" in buildings**
- **Determine the most appropriate technique for handling large volumes of predicted and measured building performance data over the entire life-cycle of a building**

RESEARCH QUESTIONS

1. What are the key stages of data when analysing a buildings life cycle?
2. What data analysis actions are necessary to provide context based information for numerous stakeholders?
3. What is the appropriate ontology to represent context specific data for numerous stakeholders?

Methodology

- Combination of data mining, statistical and physics based techniques
- Examine the effectiveness of the proposed analytical solutions from a technical and economic perspective

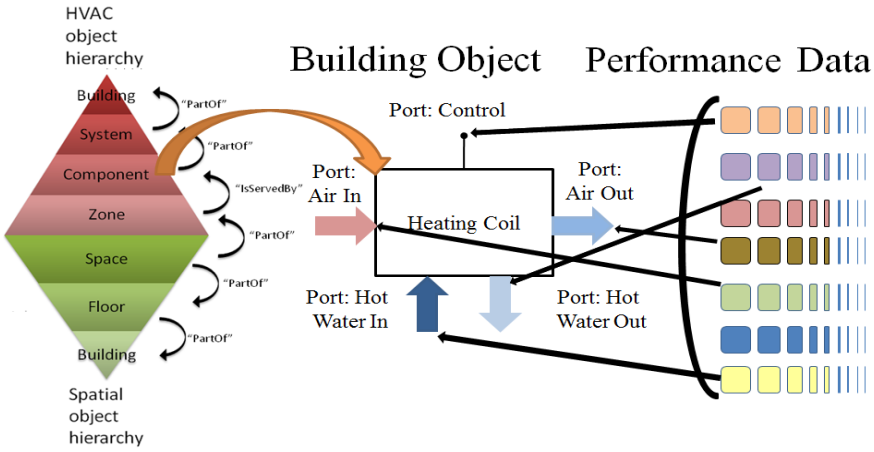

Fig. 3 A meta-data rich model-ontology enables knowledge capture for performance evaluations

- Each analysis action should focus on one or more contexts that are important to the stakeholder in question

Future Work

- Extensive Literature Review
- Development of a methodology to assess the environmental and energy performance of a building over its Life Cycle
- Data Collection from suitable buildings
- Implementation of new methodology in suitable buildings

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