

The Sustainable Building Technology (SBT) ontology is a structured (semantics) vocabulary that describes emerging green technologies currently being incorporated into housing developments. One major use of a structured vocabulary such as the SBT ontology is for it to be processed by both humans and machines. Like in any ontology knowledge base, the machine-processing of the SBT ontology facilitates the capture and dissemination of green technology information between construction project partners and database boundaries.

## Current challenges in the housing sector

Climate change, profit margins, demand versus supply, energy efficiency, etc



Recommendation for uptake of SBT

## An overview of SBT

- Too much information about SBT
- End-users are overwhelmed by too much information and are unable to make informed decision in their housing projects



### Reluctance in the uptake of SBT into housing projects

## Challenges of information representation in the construction industry

- Limited understanding of the best ways to foster knowledge creation and knowledge capture
- Major difficulty: How to ensure knowledge is readily available to individuals, project partners and companies
- Limitation of the present web in rendering information available



Semantic web technology (SWT)  
with ontology engineering  
as back-bone

### Aim

“Investigate the extent to which SWT can be used as a decision support tool for practitioners in making appropriate SBT choices for housing projects”.

## Objectives

- 1) Establish the state-of-the-art of both SBT and SWT
- 2) Elicit, model and represent SBT knowledge using AI techniques; and
- 3) Develop and test a prototype decision support tool for SBT selection.

## Methodology

## Knowledge Engineering methodology

### I-Knowledge Identification

- Domain familiarisation
  - Information sources
- Potential re-usable components
  - Existing ontologies

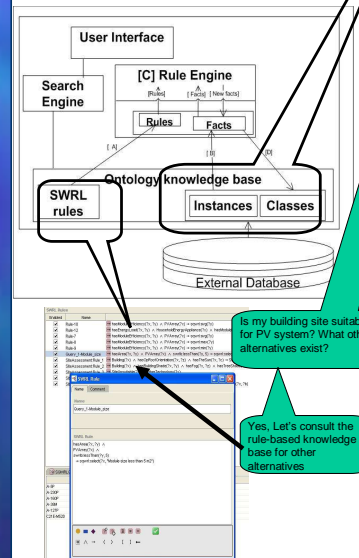
## II-Knowledge Specification

- Initial domain conceptualisation
  - Semi-formal concepts
- Complete specification of the knowledge model
  - Instances, relationships, attributes

### C-Knowledge Refinement

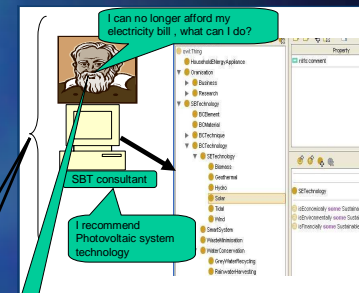
- Validation of the knowledge model
- Refinement of the knowledge base

Using the above methodology, a prototype system is under development to demonstrate the strengths of SWT. To ensure maximum efficiency, the system include both the ontology and a rule knowledge base [see the system architecture below]



Is my building site suitable for PV system? What other alternatives exist?

Yes, Let's consult the rule-based knowledge base for other alternatives



## Achievements

Based on literature review and informal interviews with SBT experts the state-of-the-art of SBT and SWT was established (objective 1).

Using knowledge representation techniques, intelligent models about the SBT have been developed (objective 2)

For the implementation, a prototype system is currently being developed to demonstrate the strengths of the SWT (objective 3)

## Conclusion

The use of ontologies in encoding knowledge and semantics about SBT can greatly enhance interoperability over machines. By exploiting the capabilities of the SWT, information about SBT is well-structured and easily rendered available for interested end-users hopefully stimulating an uptake of SBT.