Decision Support Systems for Energy Efficiency

Rui Neves-Silva

UNINOVA, Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa
Energy Efficiency in Physics

- The term Efficiency (not to be confounded with effectiveness) is only to be applied to the expected output i.e. the utility.

- An incandescent light bulb is 98% efficient in heating a room, but it’s not that efficient in lighting it.
Energy Efficiency in our Society

- Energy Efficiency is frequently ignored in the search for new sustainable power sources.

- One unit of energy that is not consumed avoids finding an additional power source to produce it.

- Energy Efficiency represents a potential of around 20 to 40% of all consumed energy.
EU's Primary energy consumption (2005)

- Transport: 19%
- Households (residential): 16%
- Commercial (tertiary): 9%
- Industry: 17%
- Transformation losses: 33%
- Non-energy uses: 6%
EU's Primary energy use (2005)

- Transport: 31%
- Buildings: 41%
- Industry: 28%
Proposed approach

Intelligent Decision Support Systems

...to help decision-makers finding and selecting...

Energy-Efficient Measures & Technologies

...with demonstrated impact on the efficiency of...

Energy Usage
Identification of Energy Efficient Opportunities from Measured Data
Intelligent Decision Support Systems

- An Intelligent Decision Support System is a software platform that helps people making decisions in complex environments with several sources of uncertainty.

- An Intelligent Decision Support System makes use of Computational Intelligence methods to enhance the decision making capabilities of the human being.
Two FP7 projects in Energy Efficiency

- **EnPROVE project**
  - Development of a platform to support a potential investor in making decisions on building retrofitting with energy efficiency in mind.
  - The focus is on the return of the investment.

- **LifeSaver project**
  - Development of a platform to support decision making in industry to find energy efficiency opportunities in operations.
  - Additionally, the platform will support companies in their participation in the new CO2 emissions market.
The EnPROVE Concept

- decision-maker criteria and restrictions
- recommendation for best available solution
- demonstrated expected benefits
- installation plans

infrastructure’s user consumption assessment

wireless sensor network

available market solutions

EnPROVE: modeling, prediction and decision support
EnPROVE – Automated measurements of the building usage

19 °C 15:15
Clear TUESDAY

Day 2
3.91 kW
86.72 kWh
15.61 €
1350 €/Y
The LifeSaver Concept

Knowledge repository → context sensitive processing

emissions calculation → prediction engine → energy models

LifeSaver Platform

decision support services

Aml data acquisition

classical monitoring → energy use monitoring

...
The LifeSaver Concept – zoom out
Main Conclusions

- Energy Efficiency is a problem of decision making in financial economics. The focus is on the return of the investment.

- The decision making process should be supported by the best knowledge on the impact of available measures and technologies on future energy consumption.

- The accurate prediction of energy consumption is one of the major challenges we have been facing in these projects.
European Partnership
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Contacts

- Projects’ Coordination:

  Rui Neves-Silva
  UNINOVA
  FCT Campus,
  Caparica - PORTUGAL
  rns@fct.unl.pt