OPTIMUS: Optimising the energy use in cities with smart decision support system

The goal of OPTIMUS is to provide a series of tools that enable local administrations:

- to assess the level of compliance of the city with regard to the energy performance targets at the city level
- to set up specific targets to achieve by improving the performance of buildings
- to adopt measures to improve the building performance over time
Multiscale evaluation

Current Status
- How “OPTIMUS” is a city or a building in terms of energy optimization?
  - Energy & Environmental Profile
  - Political Field of Action
  - Related Infrastructures - Energy & ICT

Potential
- Municipal Building Sector
- Selection of Suitable Action Plans
- Calculation of DSS Indicators
- Theoretical Potential of the DSS

Installation & Configuration of the DSS

Application of Action Plans in different Domains within the Municipal Building Sector
- Sustainable Districts & Built Environment
- Integrated Infrastructures & Processes across Energy and ICT

Results
- Effective evaluation of the DSS application

Objectives
- Application of advanced ICT systems
- Optimization of the energy use and increase of RES production
- Significant reduction of energy cost and CO₂ emissions

OPTIMUS DSS
- Plug-in single buildings and/or buildings connected to energy production and other energy systems

OPTIMUS SCEAF Tool (ex-ante)
- OPTIMUS Tracker
- Customization & Engagement

OPTIMUS SCEAF Tool (ex-post)
- Targets

WWW. OPTIMUS- SMART CITY. EU
OPTIMUS DSS

CITY level

BUILDING level

DSS

- Energy market
- Renewable energy production
- Occupancy
- Social feedback
- Climate
- Environment
- Monitoring
- Building
- Energy production
- Energy costs
- People

A systemic approach to energy efficiency

Target indicators (SCEAF+Tracker)

To calculate predicted data

Derived from inference rules

PREDICTIVE MODELS

RECOMMENDED ACTIONS
CURRENT SCENARIO
Nowadays, all rooms in a building are heated without taking into consideration climatic conditions of each room and their occupancy.

Some energy is wasted to heat spaces that are empty.

OPTIMIZED SCENARIO
Knowing the occupancy of the rooms and the climate it would be possible to adapt the consumption level to the forecasted conditions.

1. ADAPTING OCCUPANCY OF ROOMS TO CONSUMPTION

- Energy consumption
- Monitoring
- Climate
- Renewable energy production
- Energy market
Some energy is wasted to heat spaces that are empty.

CURRENT SCENARIO
Nowadays, all rooms in a building are heated without taking into consideration climatic conditions of each room and their occupancy.

OPTIMIZED SCENARIO
Knowing the occupancy of the rooms and the climate it would be possible to adapt the consumption level to the forecasted conditions.

There is an energy reduction as a result of not heating the empty rooms.

1. ADAPTING OCCUPANCY OF ROOMS TO CONSUMPTION
CURRENT SCENARIO
Nowadays, the set-point is established for a fix time every day independently from the temperature and the thermal sensation of occupants.

OPTIMIZED SCENARIO
Knowing the thermal sensation of occupants and the climate conditions we could change the set point temperature.

Some energy is wasted because the external conditions are not taken into account.

2. ADAPTING SET-POINT TEMPERATURE TO THERMAL COMFORT
CURRENT SCENARIO
Nowadays, the set-point is established for a fix time every day independently from the temperature and the thermal sensation of occupants.

OPTIMIZED SCENARIO
Knowing the thermal sensation of occupants and the climate conditions we could change the set point temperature.

2. ADAPTING SET-POINT TEMPERATURE TO THERMAL COMFORT
Nowadays, we might be selling all the produced renewable energy to the grid whereas it could be used by the system. Knowing the prices of the energy in the market (selling and buying) and the consumption load it can make sense to shift some loads to use renewable energy instead of selling it.

**CURRENT SCENARIO**

We are selling energy which could we use to the market.
OPTIMUS DSS

CURRENT SCENARIO
Nowadays, we might be selling all the produced renewable energy to the grid whereas it could be used by the system.

OPTIMIZED SCENARIO
Knowing the prices of the energy in the market (selling and buying) and the consumption it might make sense to shift some loads to use renewable energy instead of selling it.

3. LOAD SHIFTING BASED ON RENEWABLE ENERGY PRODUCTION