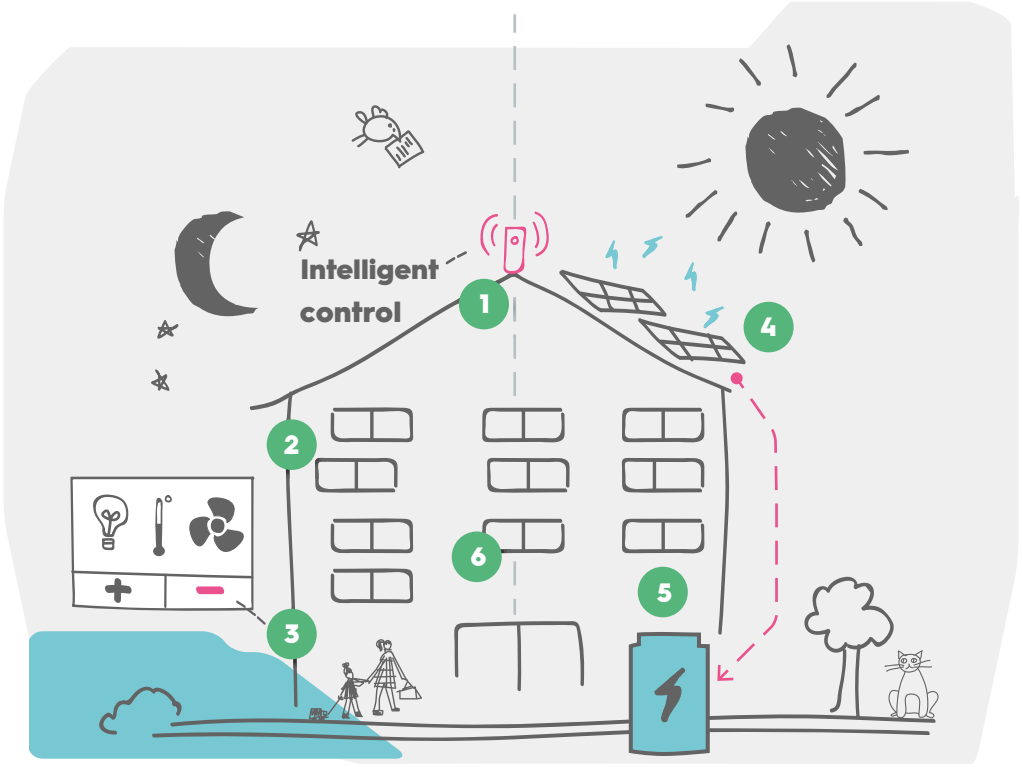
FACTSHEET U4

RUGGEDISED

Intelligent building control and Gamification for end user behavioural change in energy consumption

Umeå | **Energy management and ICT**



1. Intelligent system control 2. The control optimizes energy usage 3. Unnecessary usage is reduced (lights, heat, ventilation)
4. Solar panels charge an in-house battery 5. Energy is stored for later use 6. Tenants using gamification to reduce their climate impact

The goal is also to reduce CO2 emissions in the city of Umeå by involving students, personnel and other people in the university area. These actions will also lead to energy savings, improved indoor climate and customer satisfactions. The idea is to create a system that will learn about the routines in the premises and customize the energy usage. Solutions for ventilation, heating, cooling and lighting are being tested. By finding improved technical solutions, the result should provide smarter buildings with reduced energy consumption.

By deploying Gamification methods for a residential building, the project will also be able to study whether the energy consumption may be lowered by making tenants involved in different quests, games and challenges.

Main partners involved:

UMEÅ ENERGI

AKADEMISKA HUS

Västerbottens läns landsting

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How does it work?

In the implementation area, a VAV cooling baffle with automatic control for ventilation, heating, cooling and lighting are installed in 130 offices. In each office, presence, temperature and carbon dioxide content is measured through a multi sensor located on the actual cooling baffle. The rooms are flexible and can be furnished for between 1-4 people. The energy usage and climate of the room can be optimally controlled, depending on: human presence, solar radiation, internal load, outdoor temperature, weather forecast and other parameters.

Occupancy
By measuring the carbon dioxide content in the rooms, it is possible to calculate how many people are present in the building and in each room. This provides valuable information as to how well we use the premises.

Lighting controls and sockets in the rooms
The lighting will switch on with the help of switches on the wall and if no presence has been registered in the room after 10 minutes, the lighting will be dimmed down. If no presence is registered again within 5 more minutes, the lighting will switch off. However, if presence has been registered within 5 minutes, the lighting returns to normal capacity.
The presence-controlled jacks function similarly, after 15 minutes of absence, the power is switched to special sockets where, for example, computer monitors, speakers, and mobile chargers are plugged in.

Energy use in the rooms
By measuring the energy consumption of heating, cooling and fans in the building, it is possible to calculate and report approximately how much energy each room and space uses. This creates great opportunities to sort out the rooms that differ in order to troubleshoot any errors in the system.

Estimated impacts

- An energy efficient building
- Reduced CO2 emissions in the city of Umeå.
- Influencing the energy usage
- User involvement (tenants)

Replication potential

A solution similar to this requires some basic conditions for the building, such as mechanical supply and exhaust ventilation, pressure-controlled ventilation units with heat recovery, heating and cooling system, lighting luminaires with daylight harvesting system and energy media measurement on heat, cooling and electricity.

As these solutions contain a lot of technological knowledge, trained operating personnel and local expertise about the system are required. Given the amount of data handled in these systems, an IT organization with expertise in network, servers and data communication is also needed.

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