

Part 1.5 Examples of smart buildings

HEP-ESCO
May 2025
Online in Blackboard



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EXAMPLES OF SMART BUILDINGS

What follows are four real life examples of smart buildings across Europe that are presented through:

- Short technical description for each building
- Potential for improvement of the building in the direction of smartness

The last slide leads you to two links on another two smart buildings where you can explore further by clicking on the links.



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Case study n°1

THE BUILDING:



Building type Non-residential (office building)

Location Bettembourg, Luxembourg

Surface area 2200 m²

Construction year 2014

Specificities The NeoBuild building is a pilot project for environmental performance and renewable energy production. It allows testing novel technologies, materials and building components



MAIN TECHNICAL CHARACTERISTICS:

EPC*
class A

Heat pumps
(ground to water &
air to air)

Solar panels (thermal
& PV) on the roof and
on several sides

Energy
storage on
site

No active
cooling

Case study n°1



IMPROVEMENT POTENTIAL:

DECISIONS

Smart grid
implementation:
building systems
responding to electric
grid signal

Intelligent charging stations
on at least 10% of parking
spaces (user indication of
charge and control at vehicle
level)

Predictive management & occupant
feedback for blinds, heating, DHW,
ventilation and battery charging.
Smart control depending on occupancy
and weather conditions

ACTIONS

Involvement of the
DSO and configuration
of systems

Installation of a sufficient
number of adequate EV
charging stations

Data analysis and prediction models to
develop and deploy

IMPACTS

Increased energy
flexibility and storage

Better convenience,
improved information to
occupants, increased energy
flexibility and storage

All SRI impact criteria improved by such
a broad action

Case study n°2

THE BUILDING:



Building type Residential (semi-detached houses)

Location Olm, Luxembourg

Surface area 200 m²

Construction year 2020

Specificities The Elmen social housing project, developed by [SNHBM](#), is expected to become a model of sustainable construction in Luxembourg. The case study concerns the demo house of the project.



Demo house of the Elmen project. © Sébastien Thomas

MAIN TECHNICAL CHARACTERISTICS:

EPC*
class B

4-in-1 heat pump
providing heating, cooling,
ventilation and domestic
hot water

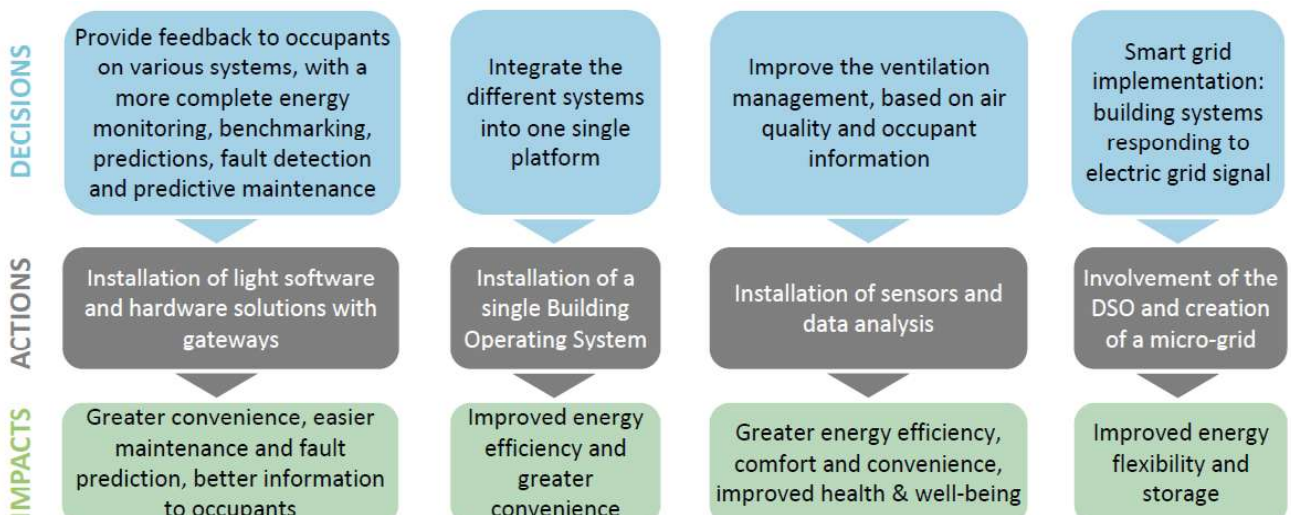
Heating mainly via
ventilation +
electric floor
heating system

Electric
vehicle
charging

PV solar
panels and
Li-Ion
batteries

Case study n°2

IMPROVEMENT POTENTIAL:



Case study n°3

THE BUILDING:



Building type	Non-residential (office building)		
Location	Aix-en-Provence, South of France		
Surface area	13,772 m ²	Construction year	1970's
Specificities	This research center is a group of several buildings supplied by a collective boiler room.		



MAIN TECHNICAL CHARACTERISTICS:

EPC*
class: E

Heating by gas
boiler with
remote controlled
device

Cooling by
air/water
heat pump

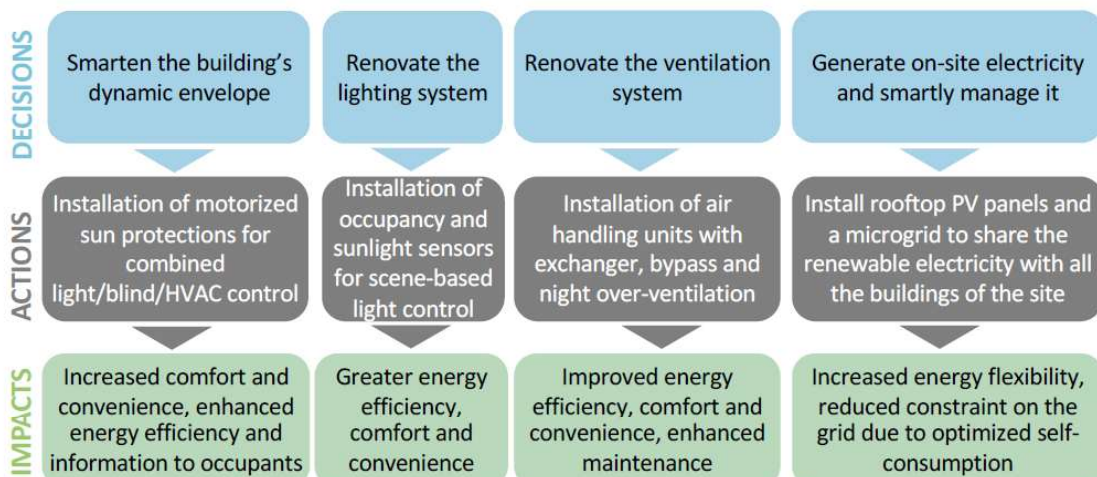
Single flow
ventilation for 90%
of the floor area and
double flow on 10%

Some EV
charging
points

Case study n°3



IMPROVEMENT POTENTIAL:



Case study n°4

THE BUILDING:



Building type Non-residential (health sector)

Location Western Slovenia

Surface area 3,630 m²

Construction year 1980

Specificities All technical domains addressed by the SRI are present, with the exception of electric vehicle charging. The building underwent a comprehensive energy renovation in 2019.



MAIN TECHNICAL CHARACTERISTICS:

Electricity consumption:
73 kWh/m²/yr
District heating:
77 kWh/m²/yr

Connected to
the local
district heating
network

Modern energy
management
system
installed

Several split-
system units
across the
building

Heat pump
for DHW
production

Case study n°4

IMPROVEMENT POTENTIAL:



DECISIONS

Upgrade the installed energy management system with demand-response functionalities and feedback to occupants

Generate on-site electricity

Renovate the lighting system and advanced control systems

Install a battery system for the peak load management, emergency supply and optimisation of the PV electricity generation

ACTIONS

Installation of smart sensors and implementation of control for non-essential HVAC* and lighting systems

Installation of photovoltaic panels

Installation of dimmable LEDs and occupancy/daylight sensors

Sizing the battery system, installation of storage batteries, connection of battery management system to EMS*

IMPACTS

Reduction of electricity and heat consumption, enhanced information to occupants

Reduced electricity consumption from the grid, increased energy flexibility

Greater energy efficiency, comfort and convenience

Improved self-consumption, increased energy flexibility

EXAMPLES OF SMART BUILDINGS

You can also see examples of smart buildings in the following links:

- **The Edge - Amsterdam, Netherlands**(<https://edge.tech/buildings/the-edge>).
- **Bloomberg HQ - London, UK**
(<https://www.bloomberg.com/company/press/bloomberg-most-sustainable-office-building/>).



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