Fact sheet MED_LR_1

SOLUTION SET 1

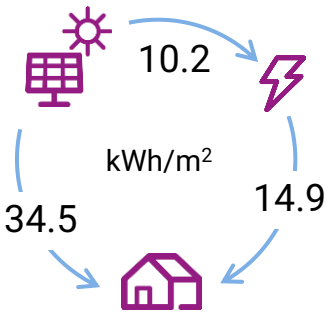
- Mechanical ventilation through a decentralized ventilation system
- Space heating and cooling through a centralized heat pump with water storage
- Air movement through ceiling fan

LOW-RISE BUILDING

3 floors, 7 dwellings of 80-110m^2 each

MEDITERRANEAN GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



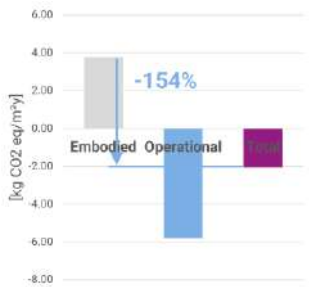
Self-generation
Self-consumption

Primary energy

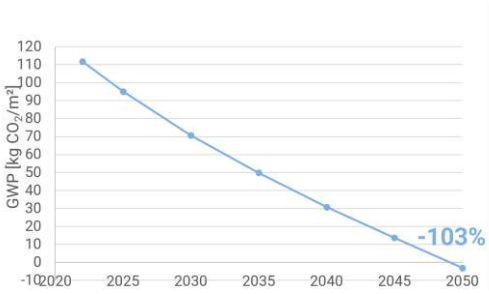
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

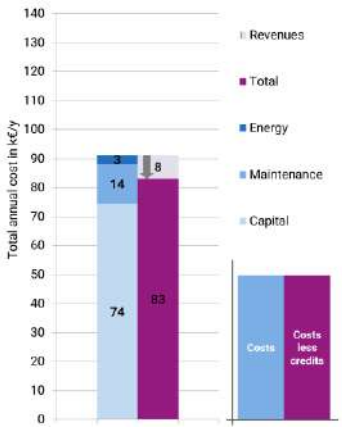


INDOOR COMFORT

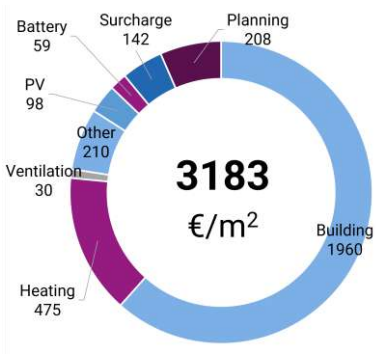
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED

Ventilating and being in contact with the outdoor space

RESPONSE

Opening windows. Very little use of the ventilation system

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

A1

Fact sheet MED_HR_1

SOLUTION SET 1

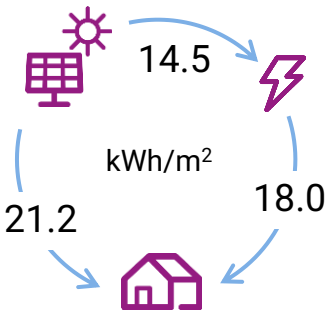
- Mechanical ventilation through a decentralized ventilation system
- Space heating and cooling through a centralized heat pump with water storage
- Air movement through ceiling fan

HIGH-RISE BUILDING

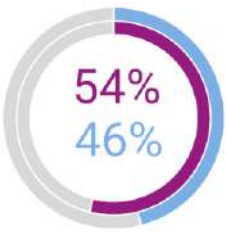
8 floors, 20 dwellings of 50-75m^2 each

MEDITERRANEAN GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



Self-generation
Self-consumption

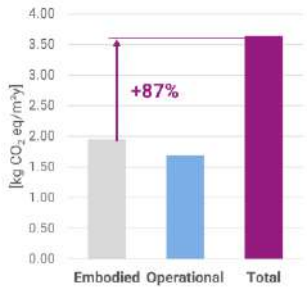


Primary energy

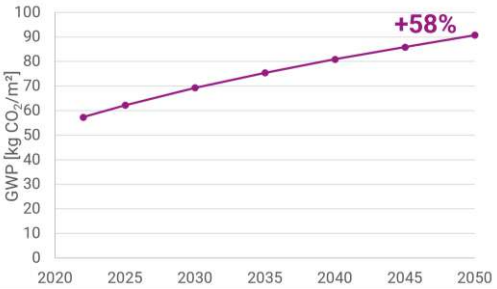
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

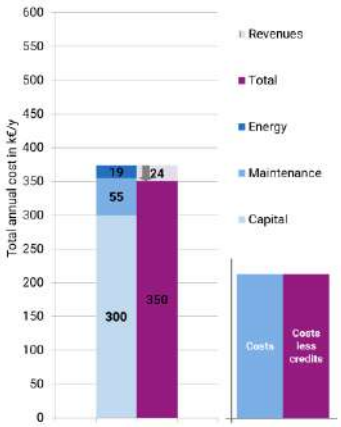


INDOOR COMFORT

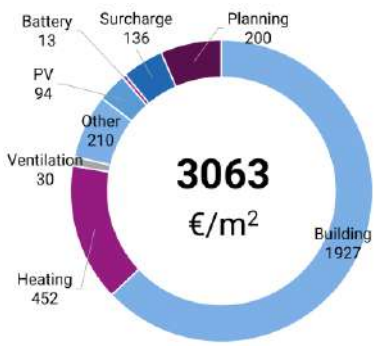
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Sleeping comfortably with an adequate temperature

RESPONSE
Turning off the heating system and opening windows

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

A2

Fact sheet CON_LR_1

SOLUTION SET 1

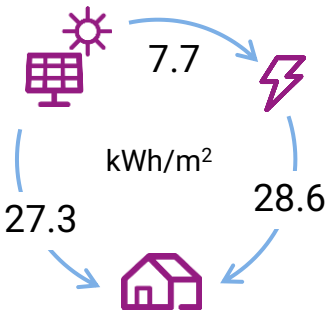
- Mechanical ventilation through a decentralized ventilation system
- Space heating and cooling through a centralized heat pump with water storage
- Air movement through ceiling fan

LOW-RISE BUILDING

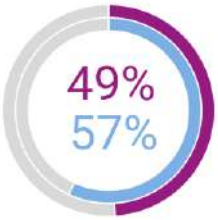
3 floors, 7 dwellings of 80-110m^2 each

CONTINENTAL GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



Self-generation
Self-consumption

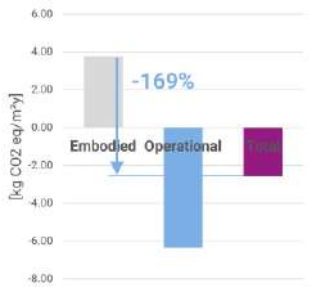


Primary energy

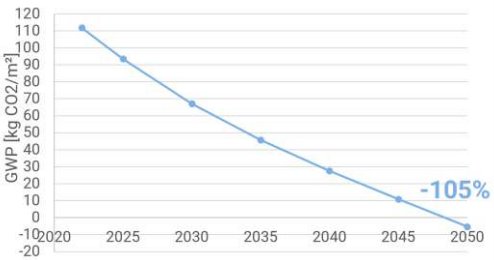
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

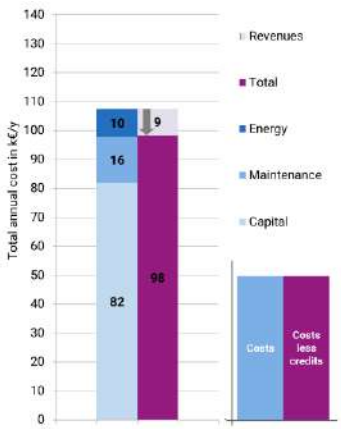


INDOOR COMFORT

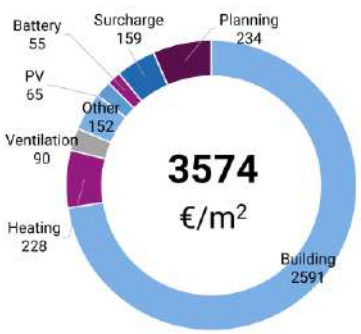
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED

Relaxing in the outdoor balcony (all year round) and being in contact with outdoor space

RESPONSE

Using an electric heater on the balcony

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

C1

Fact sheet CON_HR_1

SOLUTION SET 1

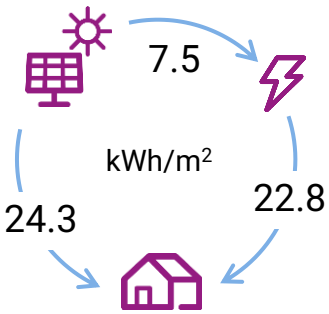
- Mechanical ventilation through a decentralized ventilation system
- Space heating and cooling through a centralized heat pump with water storage
- Air movement through ceiling fan

HIGH-RISE BUILDING

8 floors, 20 dwellings of 50-75m^2 each

CONTINENTAL GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



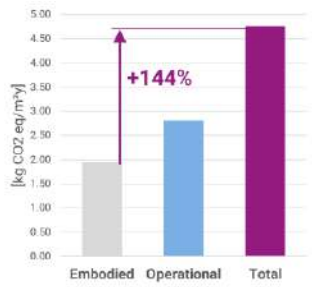
Self-generation
Self-consumption

Primary energy

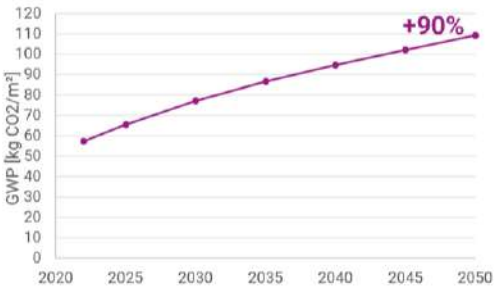
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

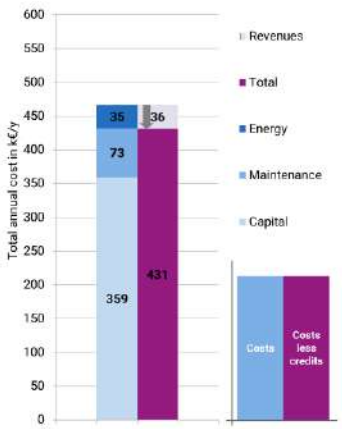


INDOOR COMFORT

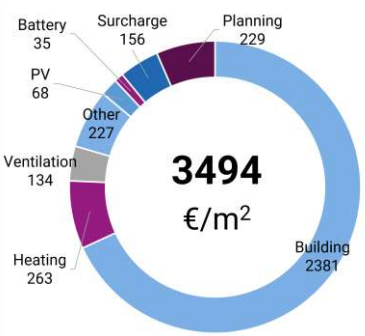
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Sleeping comfortably with an adequate temperature

RESPONSE
Turning off the heating, opening windows, changing dressing habits

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

C2

Fact sheet OCE_LR_1

SOLUTION SET 1

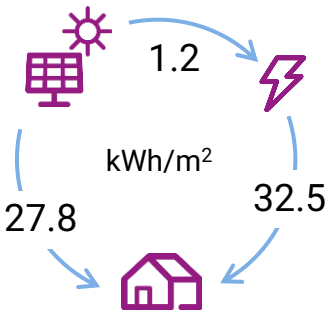
- Mechanical ventilation through a decentralized ventilation system
- Space heating and cooling through a centralized heat pump with water storage
- Air movement through ceiling fan

LOW-RISE BUILDING

3 floors, 7 dwellings of 80-110m^2 each

OCEANIC GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



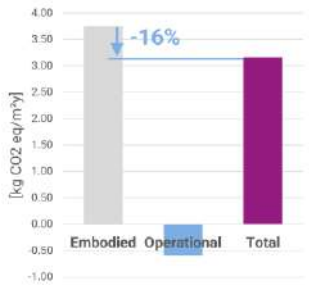
Self-generation
Self-consumption

Primary energy

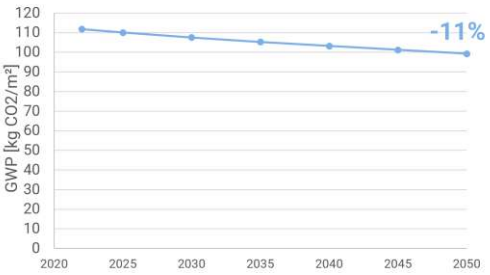
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

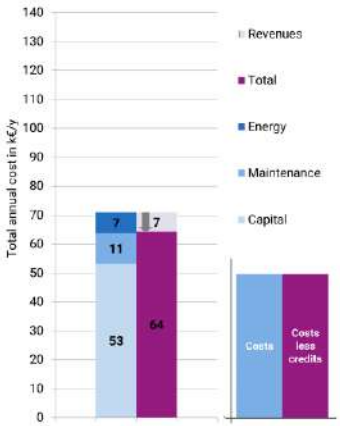


INDOOR COMFORT

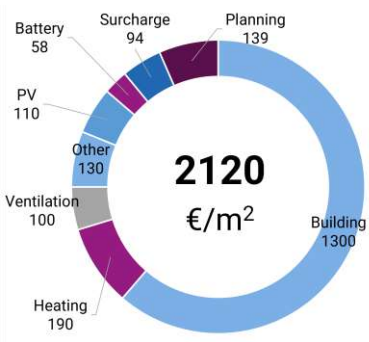
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Ventilating and being in contact with the outdoor space

RESPONSE
Opening windows

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

Fact sheet OCE_HR_1

SOLUTION SET 1

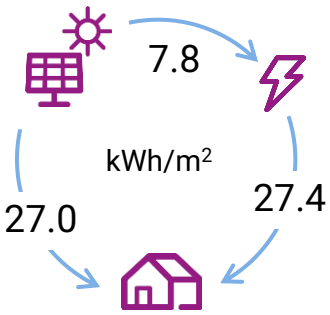
- Mechanical ventilation through a decentralized ventilation system
- Space heating and cooling through a centralized heat pump with water storage
- Air movement through ceiling fan

HIGH-RISE BUILDING

8 floors, 20 dwellings of 50-75m^2 each

OCEANIC GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



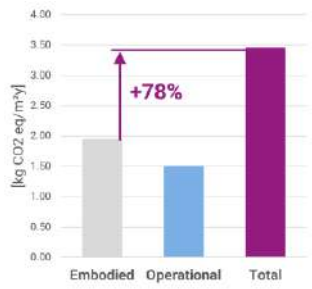
Self-generation
Self-consumption

Primary energy

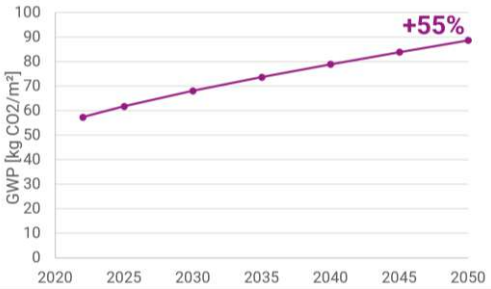
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

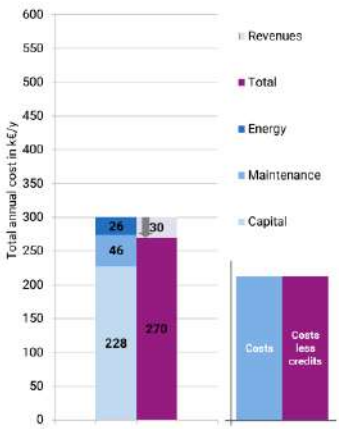


INDOOR COMFORT

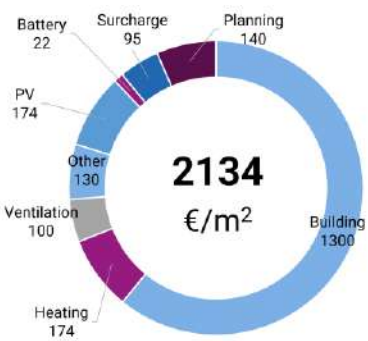
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Sleeping comfortably with an adequate temperature

RESPONSE
Cooling - having a fan always on to feel good

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

Fact sheet ARC_LR_1

SOLUTION SET 1

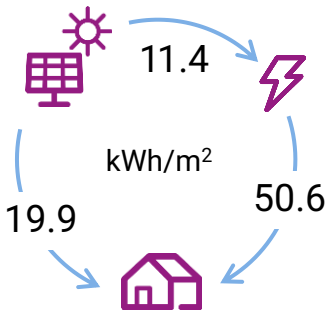
- Mechanical ventilation through a decentralized ventilation system
- Space heating and cooling through a centralized heat pump with water storage
- Air movement through ceiling fan

LOW-RISE BUILDING

3 floors, 7 dwellings of 80-110m^2 each

SUB-ARCTIC GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



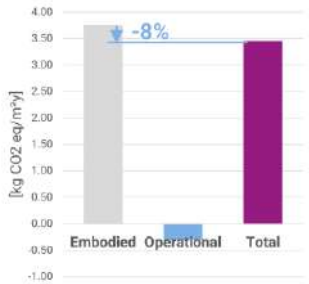
Self-generation
Self-consumption

Primary energy

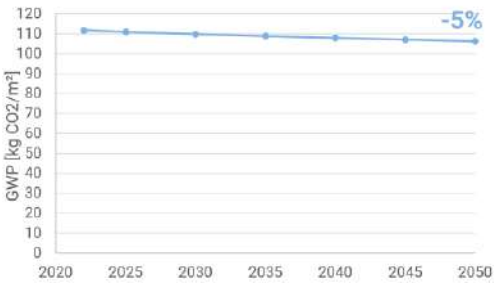
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

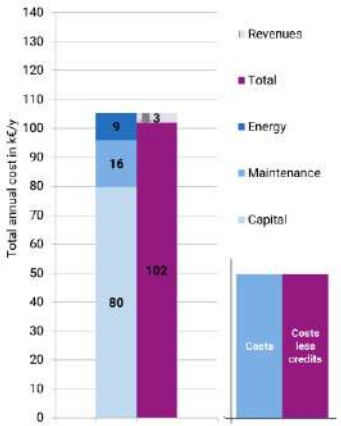


INDOOR COMFORT

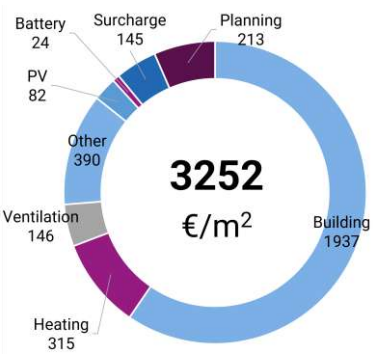
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Feeling cold/Missing a direct warmth source (fireplace)

RESPONSE
Adding an extra electric radiator

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

D1

Fact sheet ARC_HR_1

SOLUTION SET 1

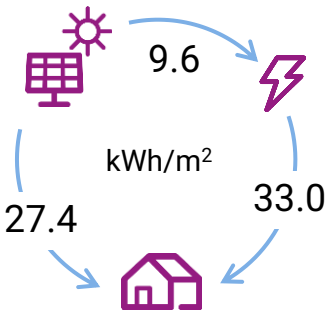
- Mechanical ventilation through a decentralized ventilation system
- Space heating and cooling through a centralized heat pump with water storage
- Air movement through ceiling fan

HIGH-RISE BUILDING

8 floors, 20 dwellings of 50-75m^2 each

SUB-ARCTIC GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



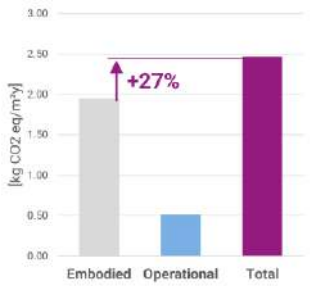
Self-generation
Self-consumption

Primary energy

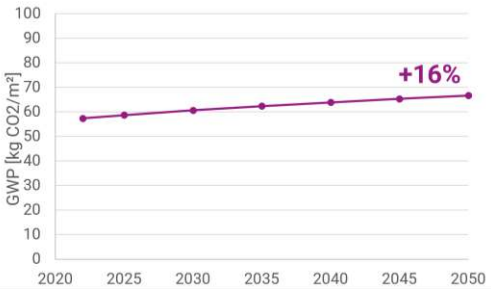
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

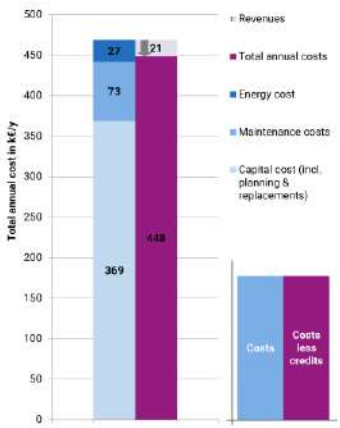


INDOOR COMFORT

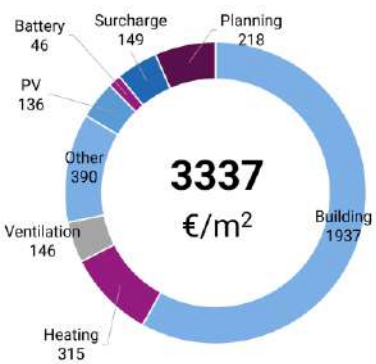
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Being in contact with outdoor space

RESPONSE
Opening windows, which interferes with the heating system and mechanical ventilation

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

D2

Fact sheet MED_LR_2

SOLUTION SET 2

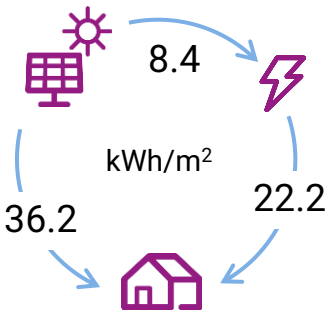
- Mechanical ventilation through a decentralized system
- Space heating, cooling and DHW through a decentralized PHP
- Air movement through ceiling fan

LOW-RISE BUILDING

3 floors, 7 dwellings of 80-110m^2 each

MEDITERRANEAN GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



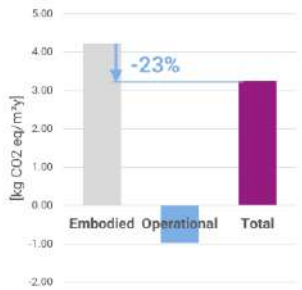
Self-generation
Self-consumption

Primary energy

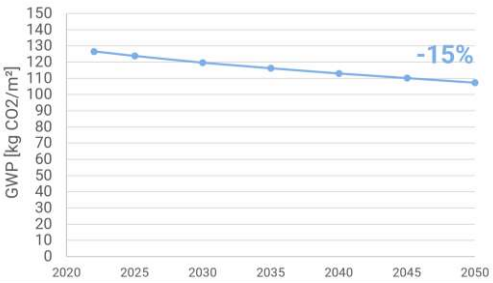
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

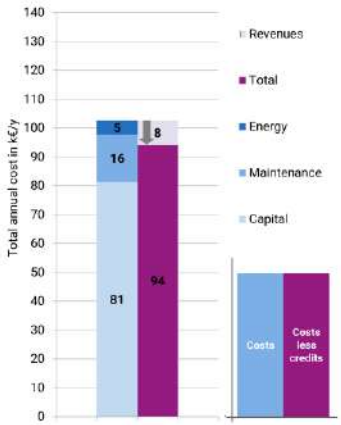


INDOOR COMFORT

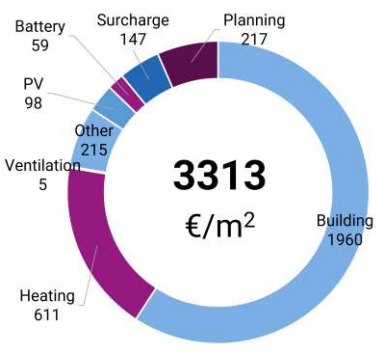
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Taking care of a loved one

RESPONSE
Extra heating by raising the temperature setpoint or adding an electric heater

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

A3

Fact sheet MED_HR_2

SOLUTION SET 2

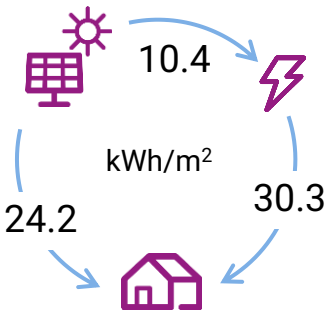
- Mechanical ventilation through a decentralized system
- Space heating, cooling and DHW through a decentralized PHP
- Air movement through ceiling fan

HIGH-RISE BUILDING

8 floors, 20 dwellings of 50-75m^2 each

MEDITERRANEAN GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



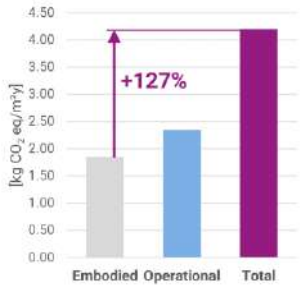
Self-generation
Self-consumption

Primary energy

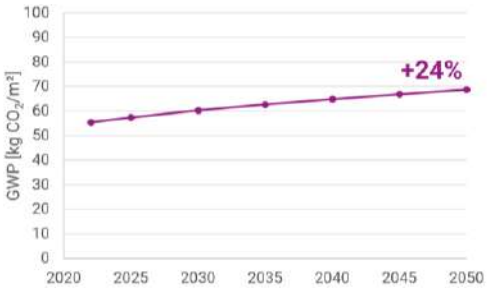
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

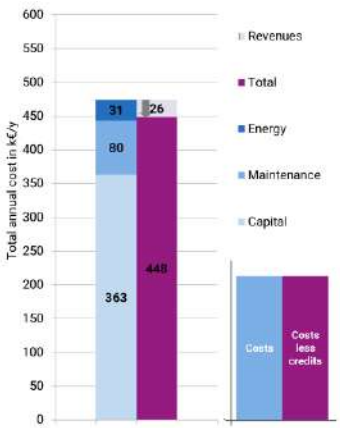


INDOOR COMFORT

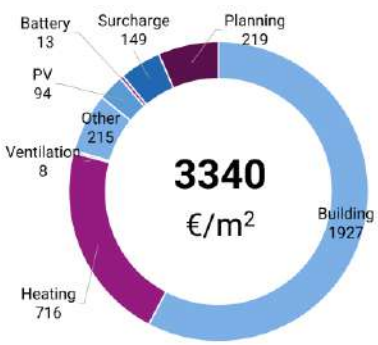
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Getting rid of cleaning odours

RESPONSE
Opening windows instead of using mechanical ventilation

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

A4

Fact sheet CON_LR_2

SOLUTION SET 2

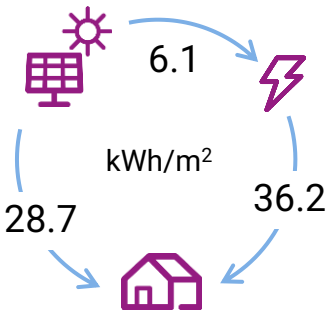
- Mechanical ventilation through a decentralized system
- Space heating, cooling and DHW through a decentralized PHP
- Air movement through ceiling fan

LOW-RISE BUILDING

3 floors, 7 dwellings of 80-110m² each

CONTINENTAL GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



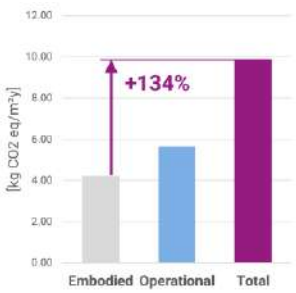
Self-generation
Self-consumption

Primary energy

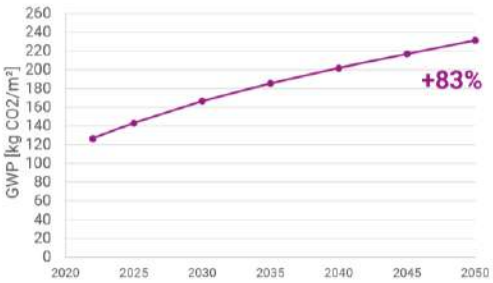
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

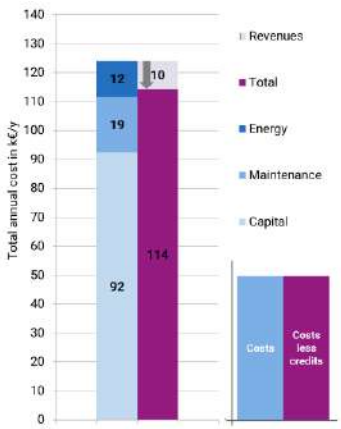


INDOOR COMFORT

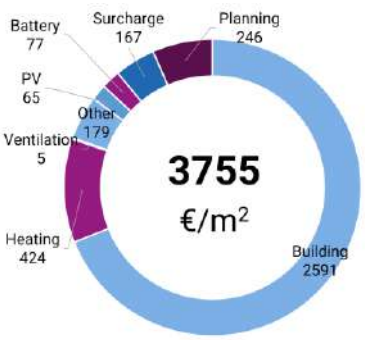
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Pleasing visitors when hosting at home

RESPONSE
Adjusting temperature to the visitors' thermal comfort expectations

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

C3

Fact sheet CON_HR_2

SOLUTION SET 2

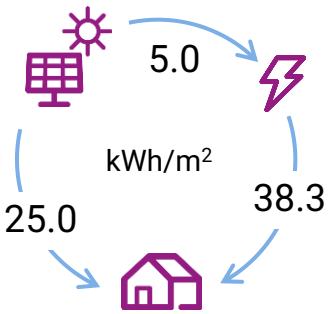
- Mechanical ventilation through a decentralized system
- Space heating, cooling and DHW through a decentralized PHP
- Air movement through ceiling fan

HIGH-RISE BUILDING

8 floors, 20 dwellings of 50-75m^2 each

CONTINENTAL GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



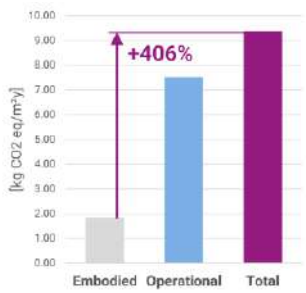
Self-generation
Self-consumption

Primary energy

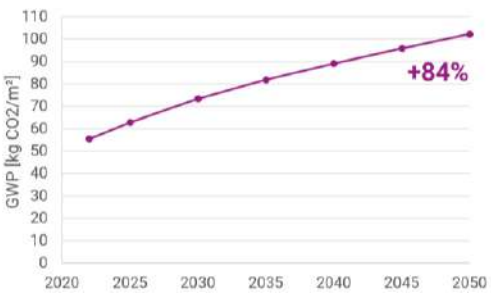
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

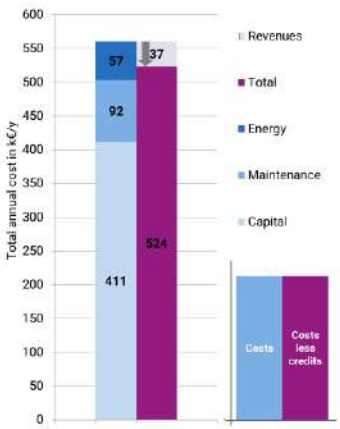


INDOOR COMFORT

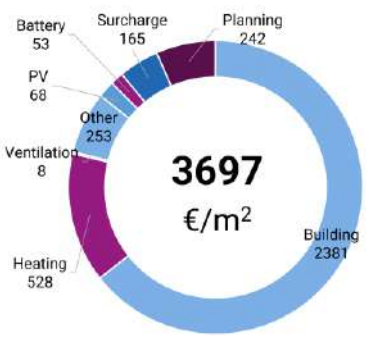
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Getting rid of cooking smells

RESPONSE
Using both mechanical ventilation and natural ventilation (creating a draught)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

C4

Fact sheet OCE_LR_2

SOLUTION SET 2

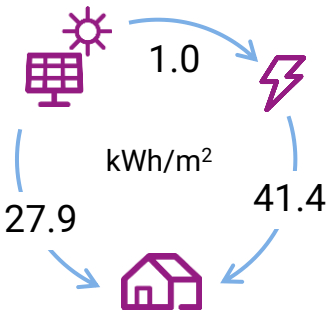
- Mechanical ventilation through a decentralized system
- Space heating, cooling and DHW through a decentralized PHP
- Air movement through ceiling fan

LOW-RISE BUILDING

3 floors, 7 dwellings of 80-110m^2 each

OCEANIC GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



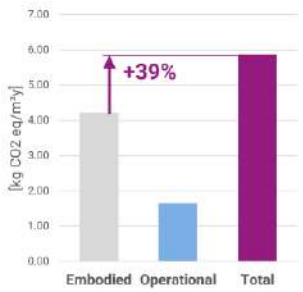
Self-generation
Self-consumption

Primary energy

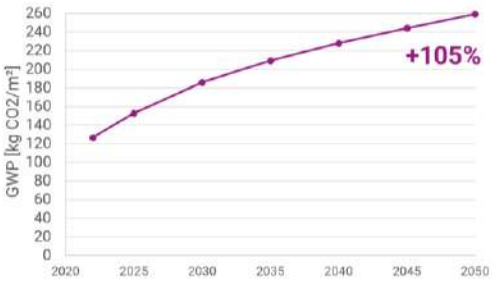
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

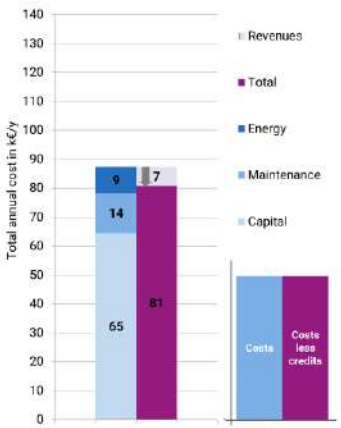


INDOOR COMFORT

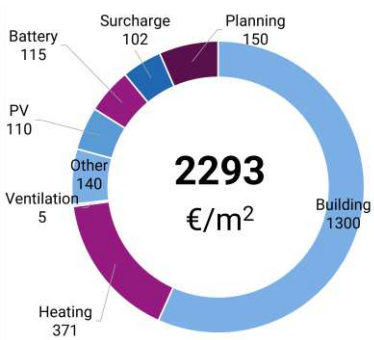
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Taking care of a loved one with special health needs

RESPONSE
Extra heating by adding an electric heater

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B3

Fact sheet OCE_HR_2

SOLUTION SET 2

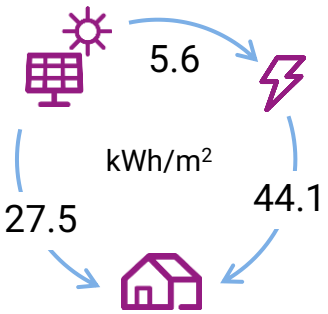
- Mechanical ventilation through a decentralized system
- Space heating, cooling and DHW through a decentralized PHP
- Air movement through ceiling fan

HIGH-RISE BUILDING

8 floors, 20 dwellings of 50-75m^2 each

OCEANIC GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



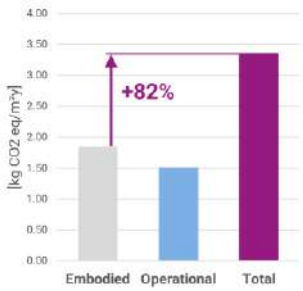
Self-generation
Self-consumption

Primary energy

Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



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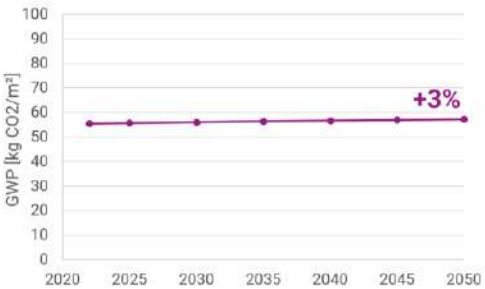
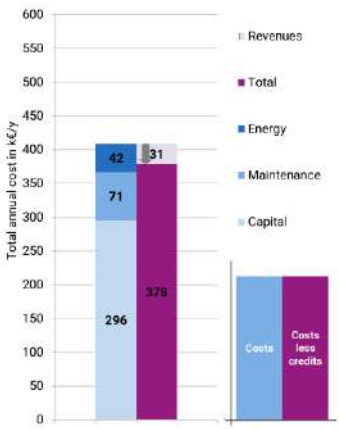


INDOOR COMFORT

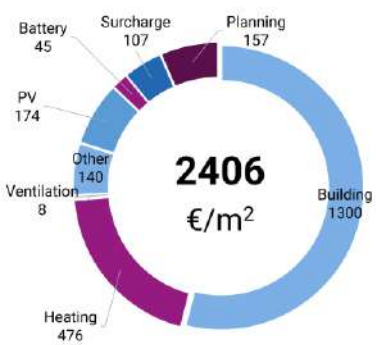
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Ventilating while having health issues (asthma, allergies)

RESPONSE
Opening windows for a short time

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

B4

Fact sheet ARC_LR_2

SOLUTION SET 2

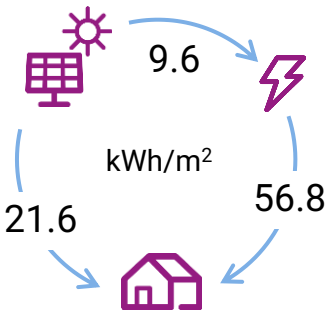
- Mechanical ventilation through a decentralized system
- Space heating, cooling and DHW through a decentralized PHP
- Air movement through ceiling fan

LOW-RISE BUILDING

3 floors, 7 dwellings of 80-110m² each

SUB-ARCTIC GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



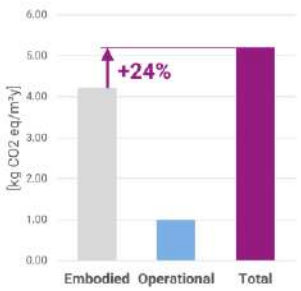
Self-generation
Self-consumption

Primary energy

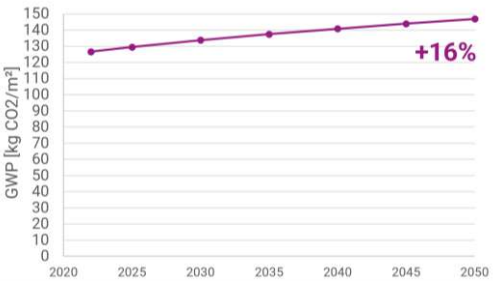
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

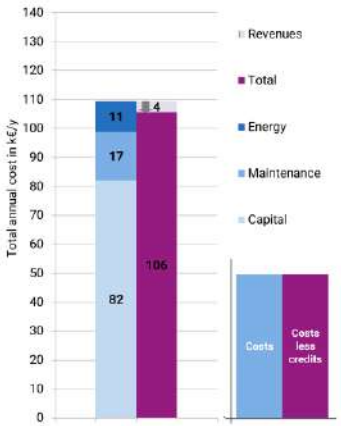


INDOOR COMFORT

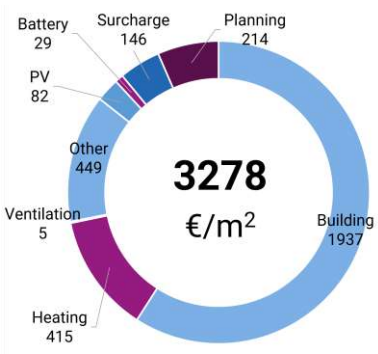
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Working easier with residents that have special needs

RESPONSE
Leaving apartment main doors open, which jeopardizes mechanical ventilation

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **N. 870072**.

D3

Fact sheet ARC_HR_2

SOLUTION SET 2

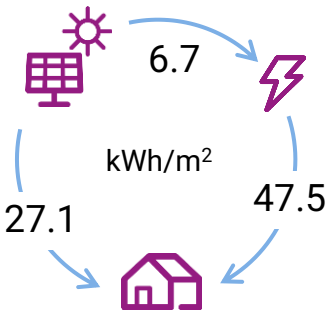
- Mechanical ventilation through a decentralized system
- Space heating, cooling and DHW through a decentralized PHP
- Air movement through ceiling fan

HIGH-RISE BUILDING

8 floors, 20 dwellings of 50-75m^2 each

SUB-ARCTIC GEO-CLUSTER

ENERGY, LOAD MATCHING AND GRID INTERACTION



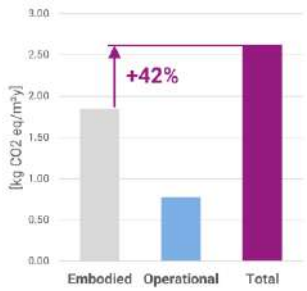
Self-generation
Self-consumption

Primary energy

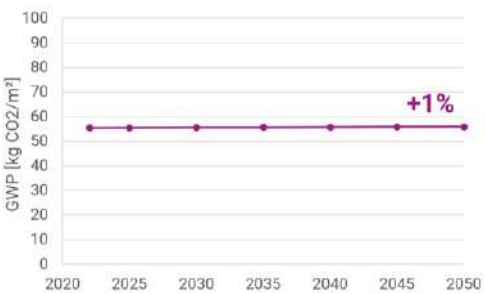
Final energy

LIFE CYCLE ASSESSMENT

Global Warming Potential (GWP)



Dynamic GWP

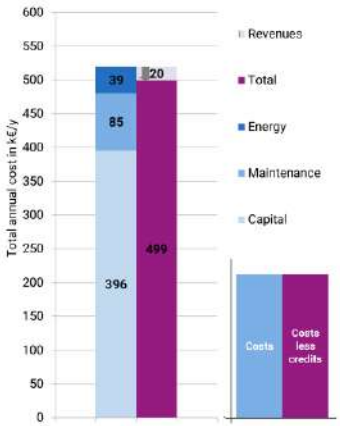


INDOOR COMFORT

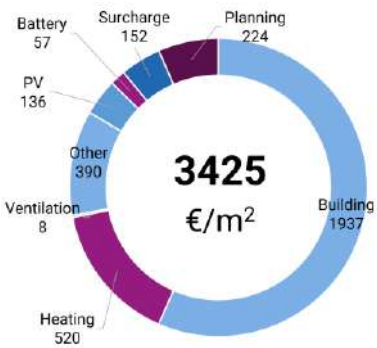
Thermal comfort
Relative Humidity comfort

ECONOMIC IMPACT

Overall cost



Investment cost



THE RESIDENTS' VOICES

Conflicting practices

NEED
Sleeping comfortably with an adequate temperature

RESPONSE
Opening windows (having "cracked open" windows) & having appropriate duvets

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D4