GARBARNIA

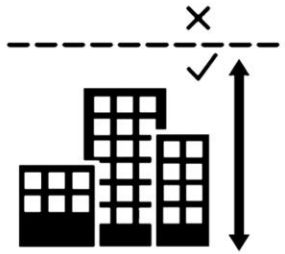
STUDENT HOUSING - MODULAR WOODEN ARCHITECTURE

37 - SLOVAKIA

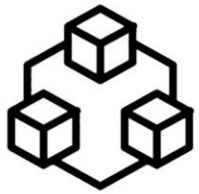
SAINT-GOBAIN

STUDENT HOUSING
250x rooms

RESTORATION OF
THE MONUMENT
old factory



BUILDING HEIGHT
zone B1 - 16m,B2,B3 - 25m

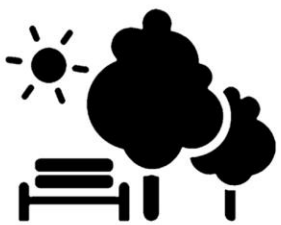


MODULAR CONSTRUCTION
size 3x6m

CONCEPT

ACOUSTICS
railway soundproofing

SOLAR ENERGY
photovoltaic panels



RECREATION
park + pergolas
quality public space

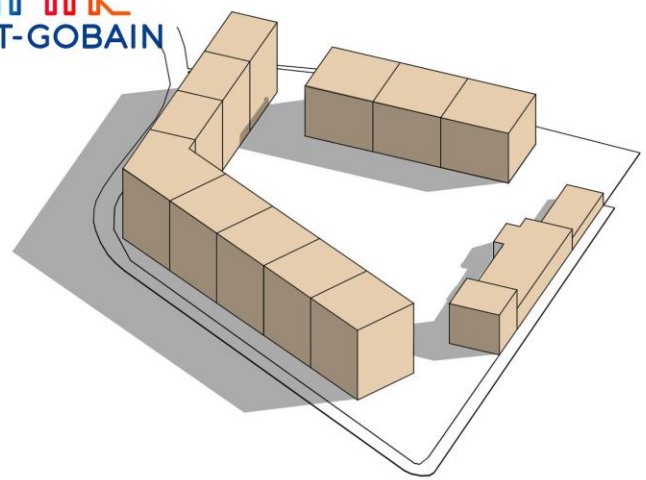
CULTURE
indoor and outdoor
events

SPORT
playground

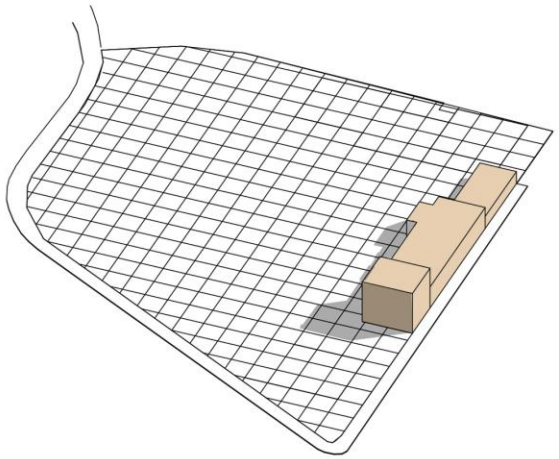
TRANSPORTATION
promoting green
transport

STUDENT HOUSING

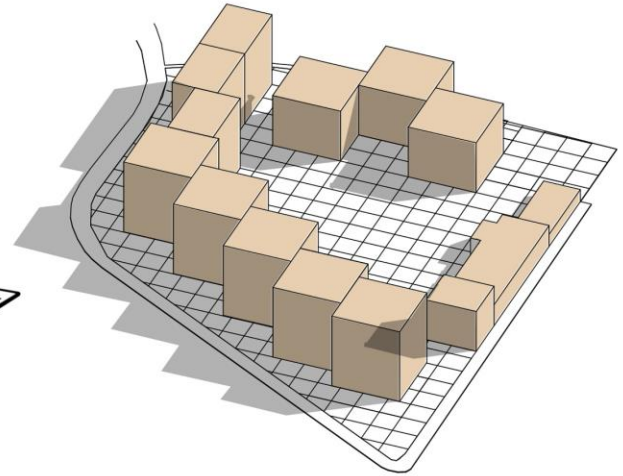
SAINT-GOBAIN



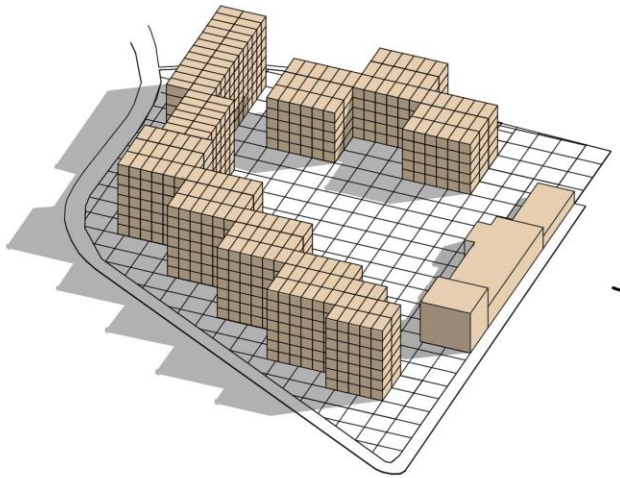
THE FIRST BUILD FORMS
ON THE SITE



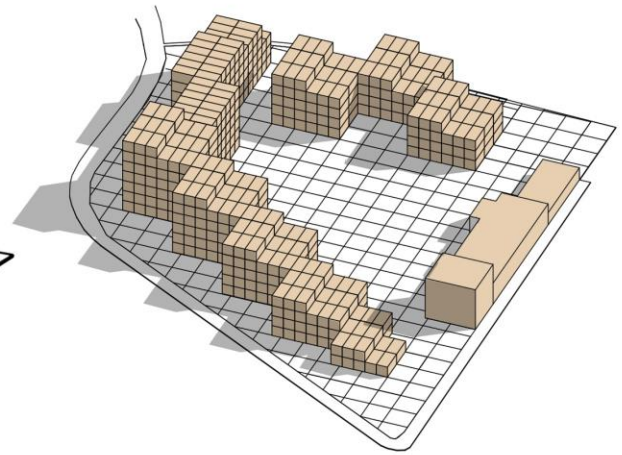
SITE WITH A MODULAR GRID
IN DIMENSIONS 6x6 m



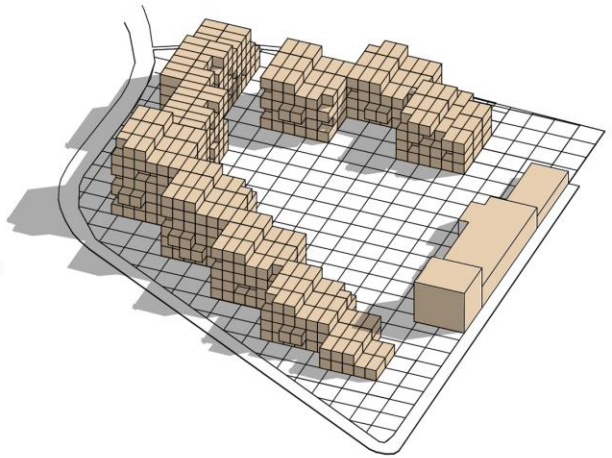
LAYOUT OF BUILDINGS IN THE MODULAR GRID,
MAKEING OF MICROPLACES



ORGANIZATION OF WOODEN CONTAINERS
IN OBJECTS WITH DIMENSIONS 3x6 m



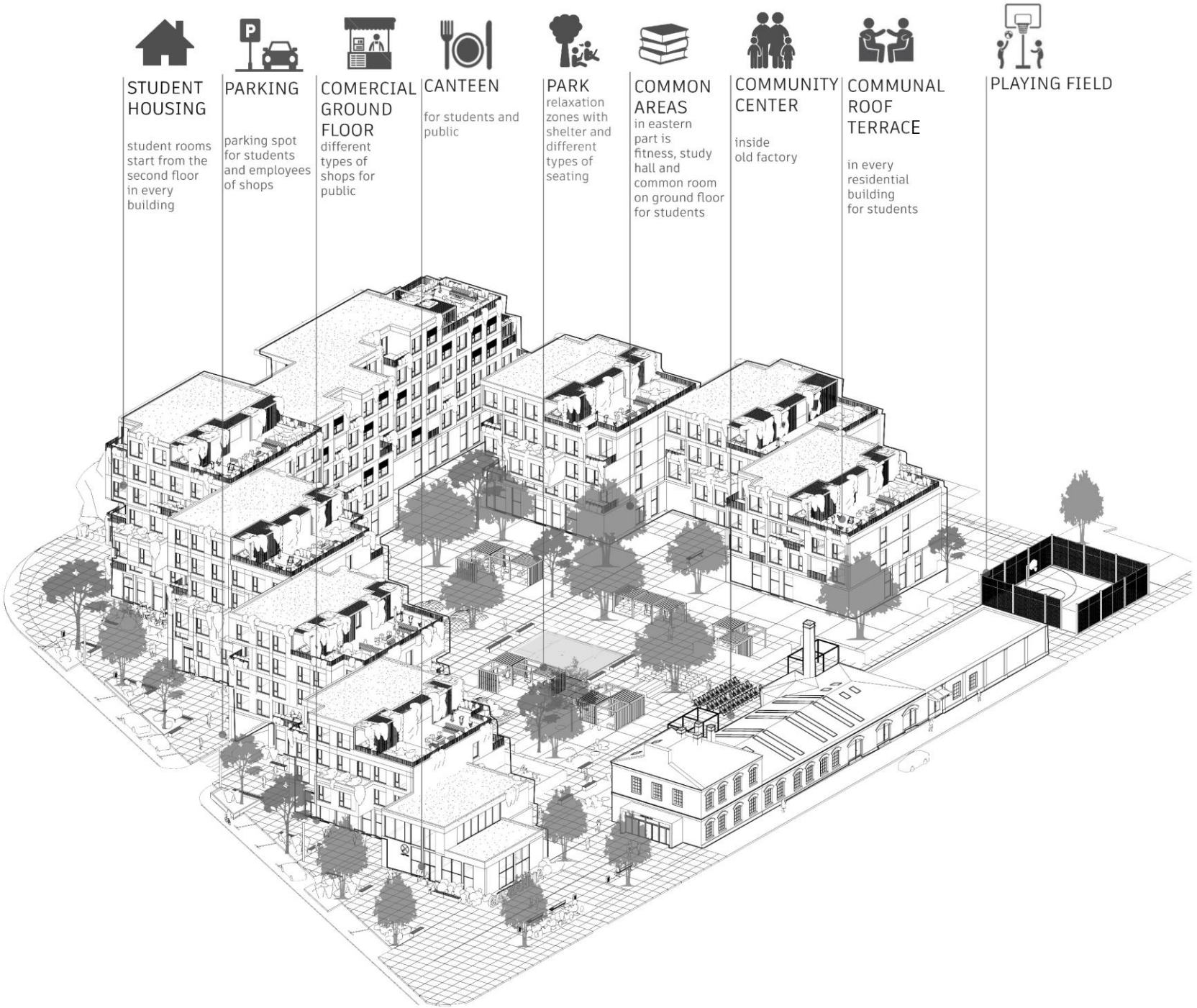
GRADATION OF BUILT FORMS AND CONTINUITY
WITH THE OLD FACTORY



SLIDING OF WOODEN CONTAINERS IN BLOCKS
TO CREATE PRIVATE LOGGIAS

EVOLUTION OF DESIGN

SAINT-GOBAIN



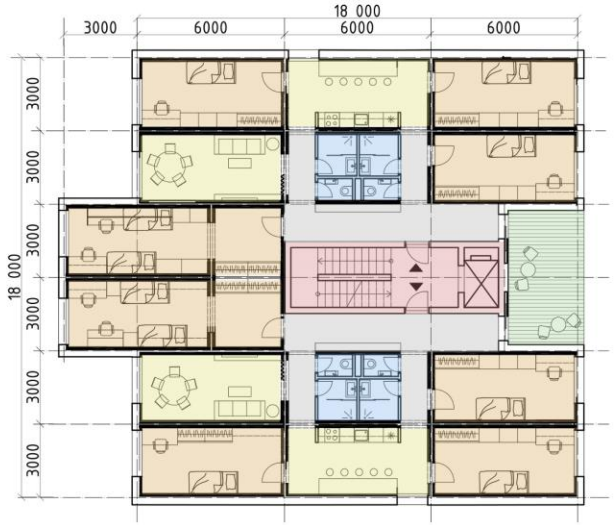
GENERAL PLAN

CANTEEN

SAINT-GOBAIN

- VERTICAL CORE
- STUDENT ROOM
- DAY ROOM
- SANITATION
- LOGGIA
- CORRIDOR

TYPICAL FLOOR PLAN OF
STUDENT HOUSING WITH
LOGGIAS



TYPICAL FLOOR PLAN OF
STUDENT HOUSING WITH
PULL-OUT

TYPICAL FLOOR PLAN OF
STUDENT HOUSING WITH
PULL-OUT

TYPICAL FLOOR PLAN OF
STUDENT HOUSING
WITH A BALCONY TYPE

TYPICAL FLOOR PLAN OF
STUDENT HOUSING IN THE
CORNER OF THE PLOT

TYPICAL FLOOR PLAN OF
STUDENT HOUSING WITH
A RESIDENTIAL ROOFS

0 5 10[m]

FLOOR PLAN

SAINT-GOBAIN

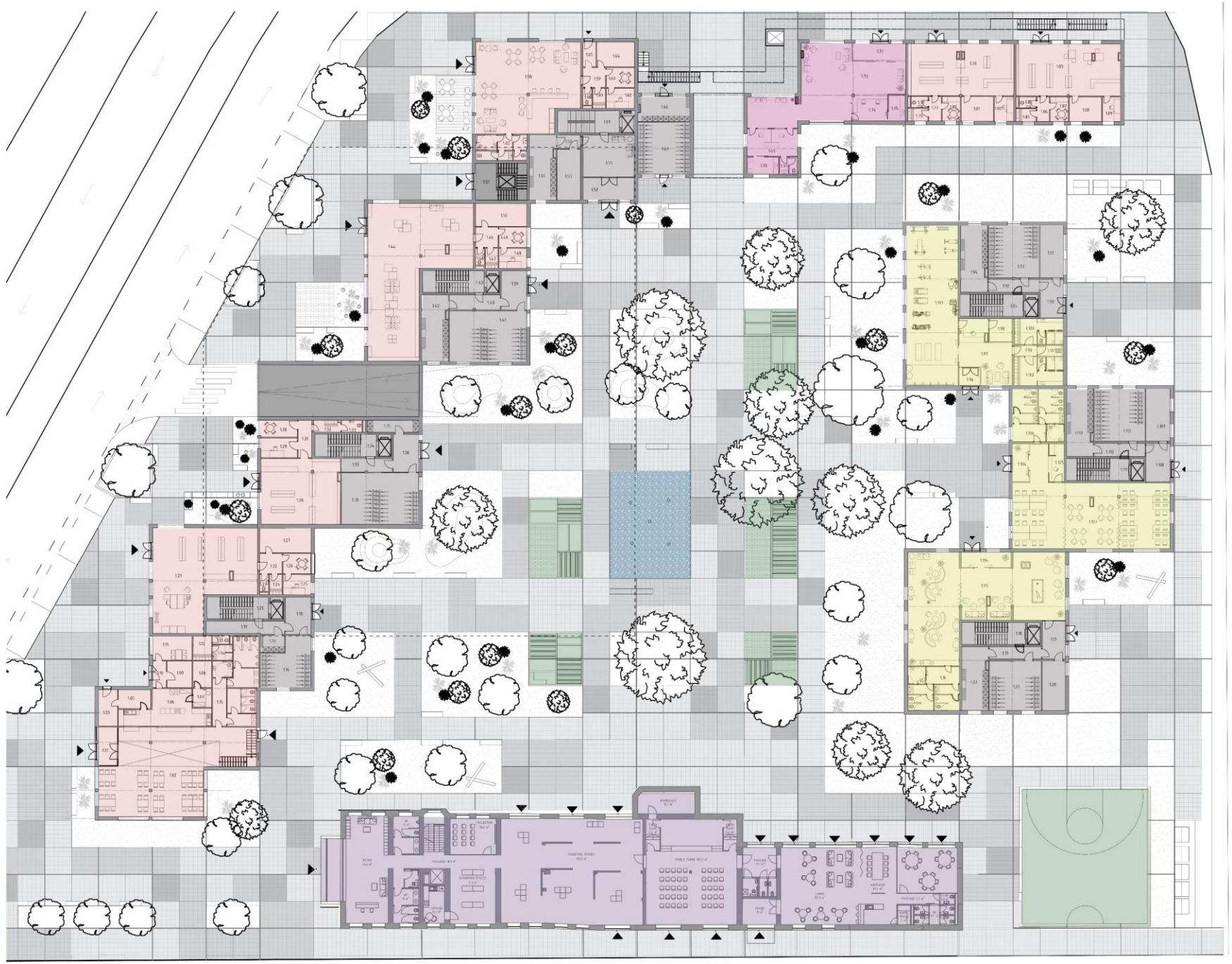
GARAGE FLOOR PLAN

The entrance to the underground garage is also accessible from Lubelska Street, where 57 parking spaces are located not only for students but also for employees on the active ground floor. To support ecological transport, a bicycle storage room is designed in each block of the student dormitory.

0 5 10[m]

SAINT-GOBAIN

- RENTAL PREMISES
- RECEPCION
- COMMUNITY CENTER IN OLD FACTORY
- STUDENT PREMISES
- EXTERIOR ACTIVITIES
- FOUNTAIN
- TECHNICAL PREMISES OF THE DORMITORY
- ENTRY TO THE GARAGE



0 10 20[m]

GROUND FLOOR PLAN

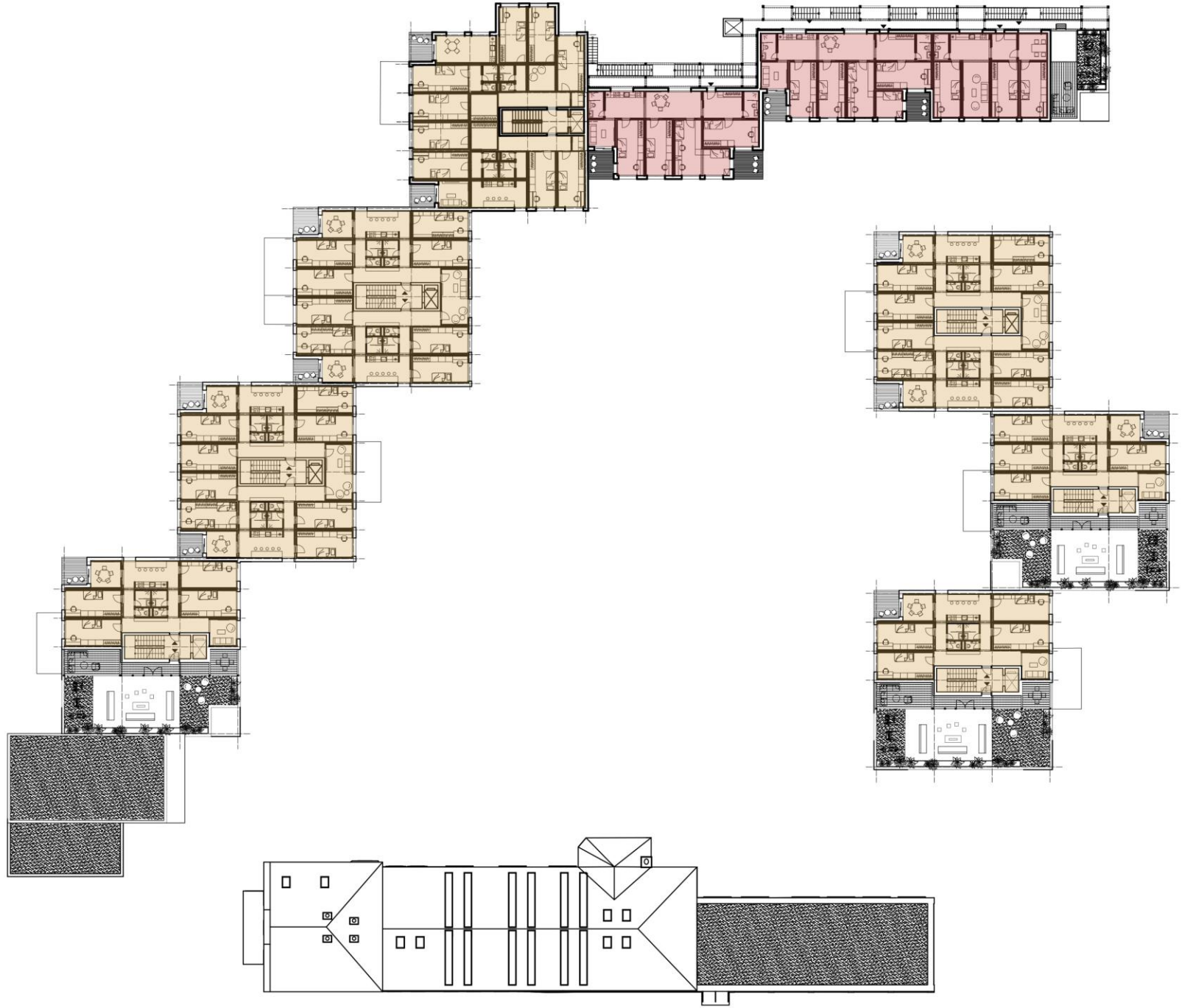
SAINT-GOBAIN

FLOOR PLAN 4TH

Floor plan are fixed and variously arraged in buildings.

SECTION TYPE STUDENT HOUSING

BALCONY TYPE STUDENT HOUSING



0 10 20[m]

FLOOR PLAN

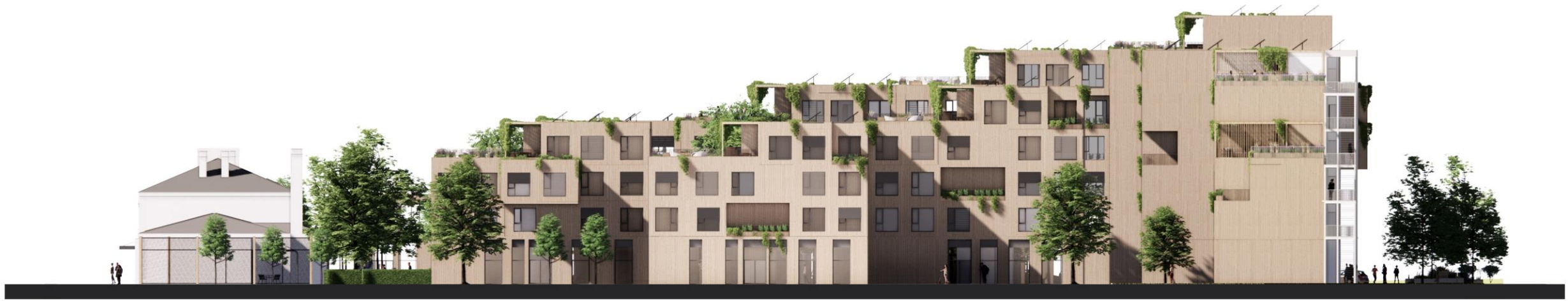
SAINT-GOBAIN

NORTHWEST ELEVATION

SOUTHEAST ELEVATION

SAINT-GOBAIN

SOUTHWEST ELEVATION



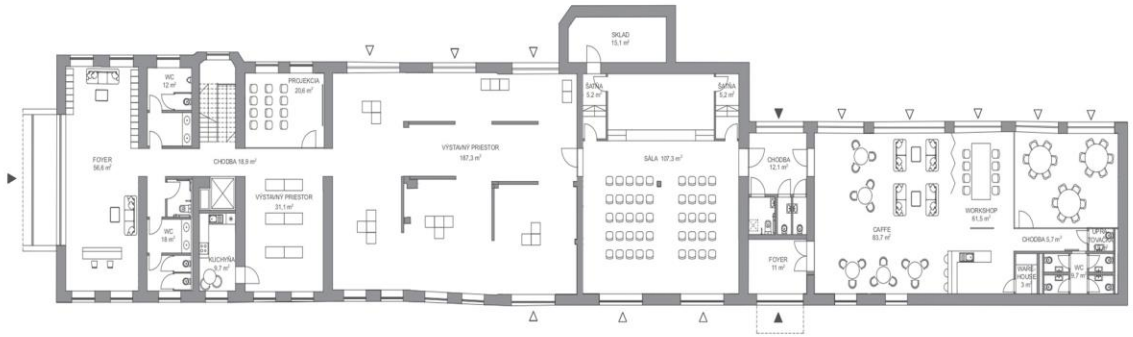
NORTHEAST ELEVATION

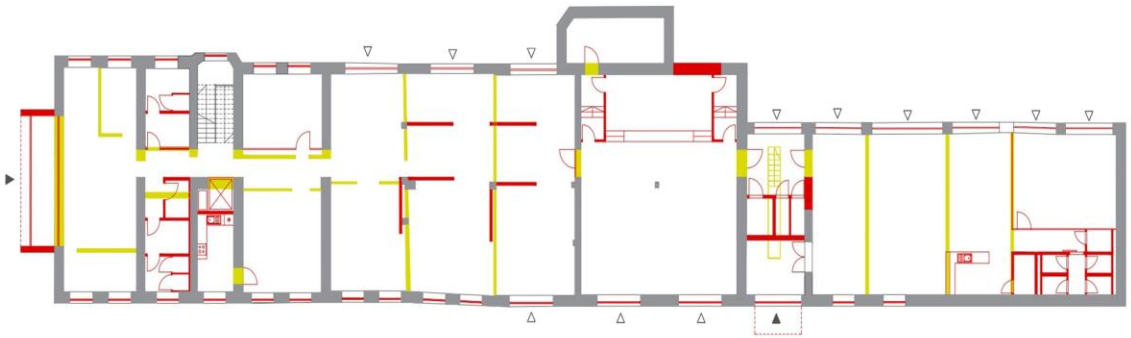
STUDENT HOUSING

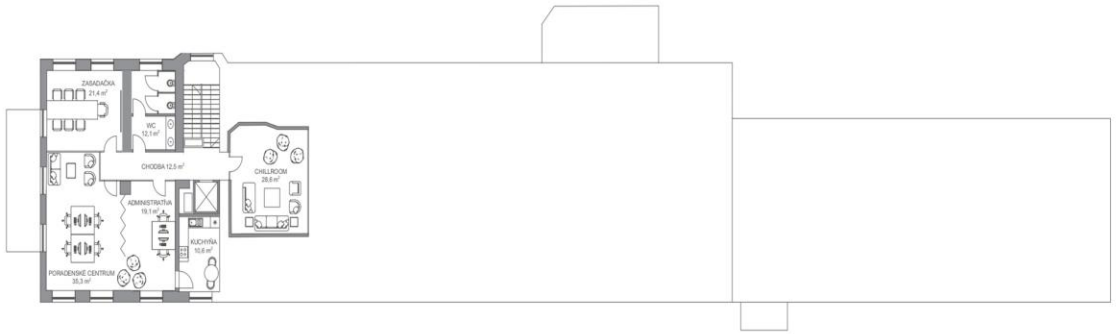
STUDENT HOUSING

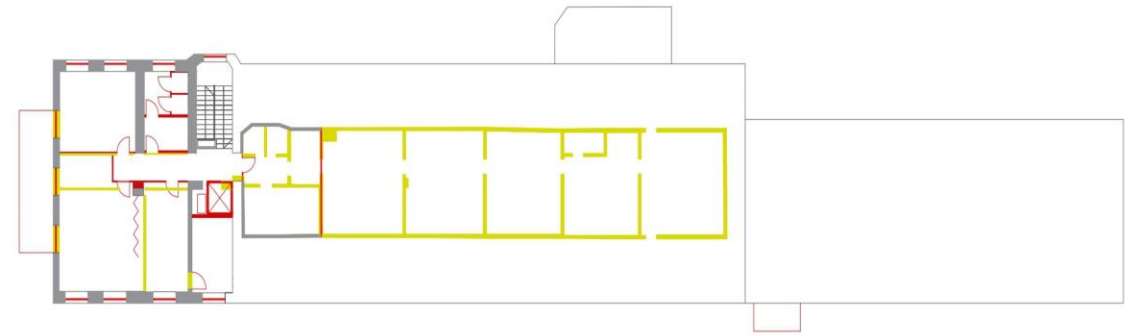

COMMUNAL ROOF TERRACE

SAINT-GOBAIN









FLOOR PLAN OLD FACTORY

The factory began operations as a joint stock company in 1935 and is one of the few buildings that survived the Second World War, after which it was transformed into a car repair shop and warehouse.. It was originally adjacent to a farm building and was probably not plastered but simply bricked. Although it does not represent top architecture, it is certainly a valuable testimony to the industrial past. We used the original name of the Garbarnia factory for the name of our project.

CONSTRUCTION WORK

The old factory offers a new function for exhibition spaces, screenings, a hall, workshops and consulting services. The exhibition part can be extended to the exterior , where is a metal structure used for the installation of works and projection. The main entrance to the building is located in the facade that originally adjoined the farm building. The entrance is covered with sheet steel. On the second floor are three window openings . The windows in the factory were changed to windows with a typical industrial division and the factory is covered with white plaster.

0 10 20[m]

OLD FACTORY

SAINT-GOBAIN

SOUTH ELEVATION

WEST ELEVATION

NORTH ELEVATION

EAST ELEVATION

PROJECTION IN COURTYARD

SAINT-GOBAIN

AXONOMETRY OF SITE

PERGOLA IN THE SHAPE OF L

MAIN AMPHITHEATER WITH WATER ELEMENT

PERGOLA IN THE SHAPE OF L AND SQUARE

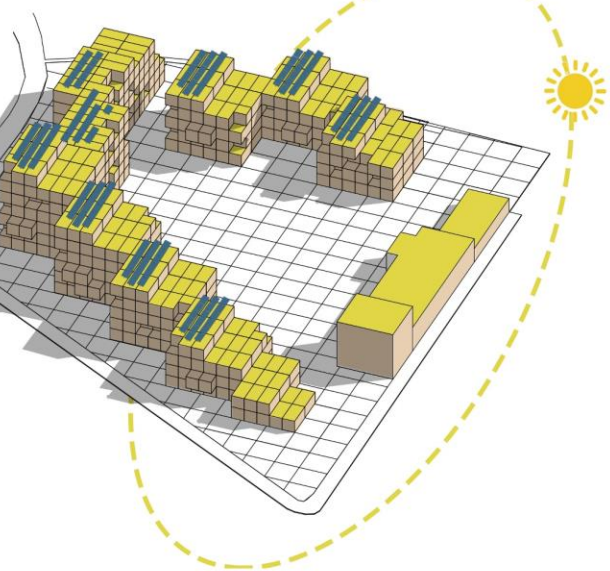
PERGOLA IN THE SHAPE OF I AND L

In the courtyard, black steel pergolas and wooden slats are used. Pergolas are filled with different types and shapes of seating and swings. The dimensions of the individual pergola are 3x3m, they are variously folded together and adapted to the shape of the coirtyard. They serve as a relaxation area for students.

SAINT-GOBAIN

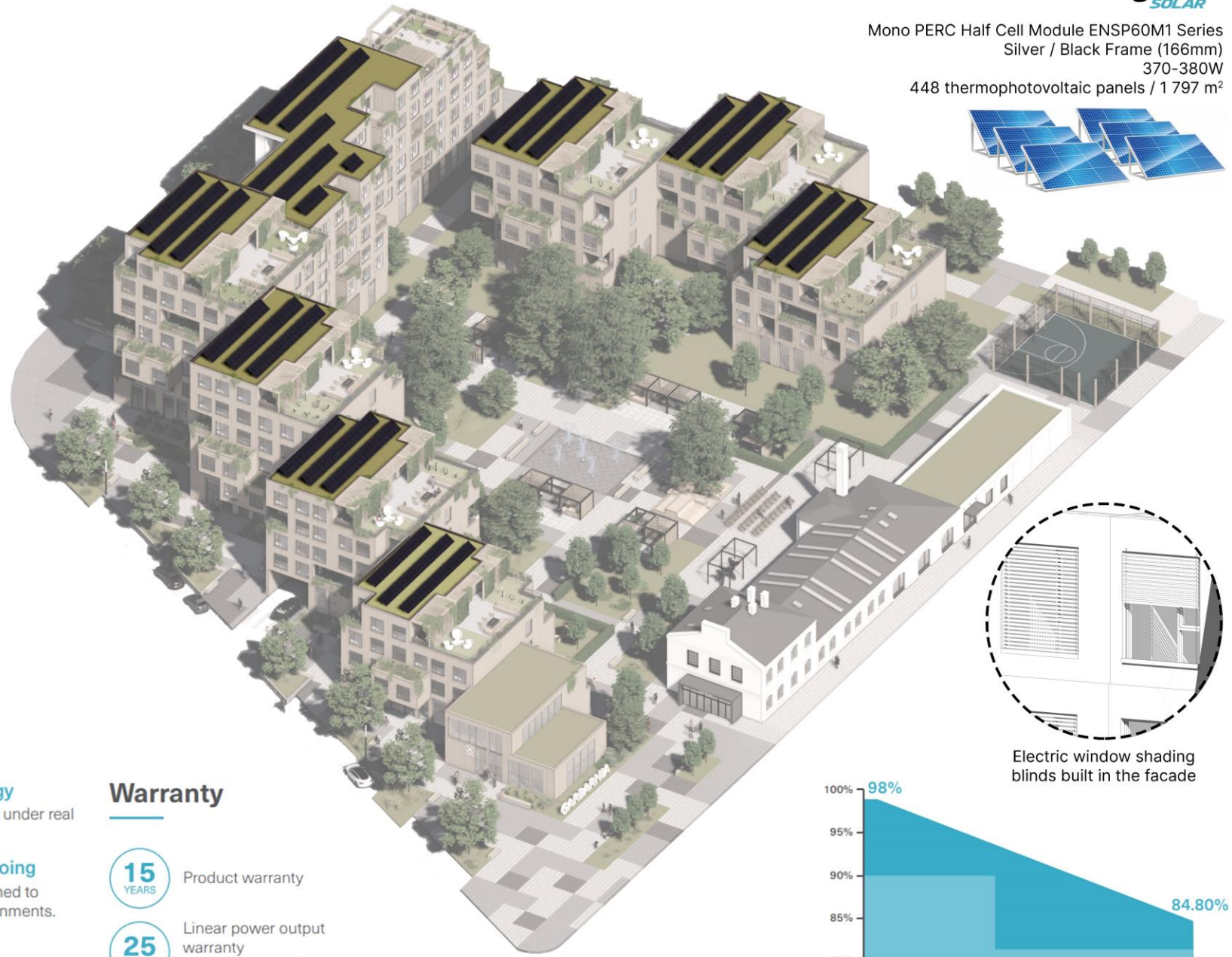
Energizer SOLAR

Mono PERC Half Cell Module ENSP60M1 Series
Silver / Black Frame (166mm)
370-380W
448 thermophotovoltaic panels / 1 797 m²



PATH OF THE SUN

The shape of the building is adapted to the path of the sun so that they do not shade. Photovoltaic panels on the roofs enable energy recovery.



Electric window shading blinds built in the facade

Key Features

Lower power loss
Better performance in shaded and low-light conditions.

Higher efficiency
Higher module power efficiency up to 20.6%.

Lower operating temperatures
Low operating temperatures and coefficients increases performance.

Half Cell technology
Excellent performance under real conditions.

Keeps going and going
Engineered and designed to withstand harsh environments.

Warranty

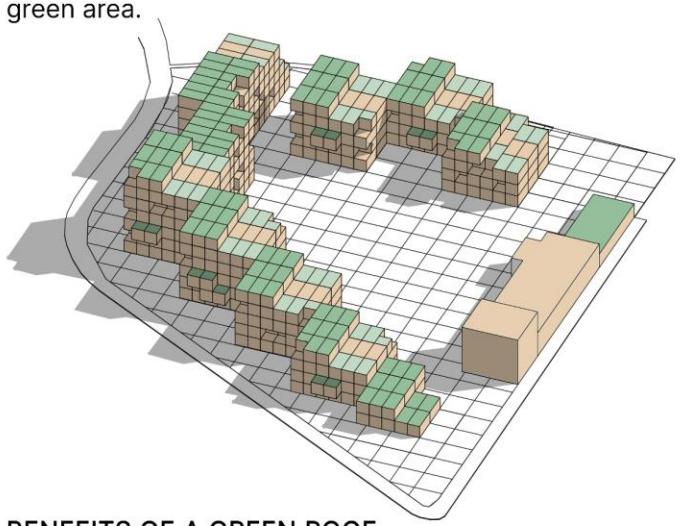
15 YEARS Product warranty

25 YEARS Linear power output warranty
(1st year ≤ 2.0%, 2nd~25th years ≤ 0.55% / year)

SAINT-GOBAIN

GREEN ROOFS

Top floor roofs are impassable green roofs, communal terraces are complemented by pedestrian green area.



BENEFITS OF A GREEN ROOF

Provides a rainwater buffer
A green roof absorbs rain water by the water buffering in the plants, substrate and drainage layer.

Purifies the air
The plants filter particulate matter from the air and convert CO2 into oxygen.

Reduces the ambient temperature
Plants absorb sunlight, 50% is absorbed and 30% reflected; so this helps to create a cooler and more pleasant climate.

Increases solar panel efficiency
A green roof reduces the temperature on the roof.

Reduces ambient noise outside and inside
It absorbs sound and thus provides a quieter environment, both inside and outside your building.

Extends life span of roof
A green roof protects the roofing material from external influences such as the sun, rain, wind and temperature fluctuations.

Increases biodiversity
The host plants that are included in the a green roof promote the habitat, especially in the city environment

Creates fire-resistant layer
With a green roof you create a natural fire-resistant layer on your house or office building.

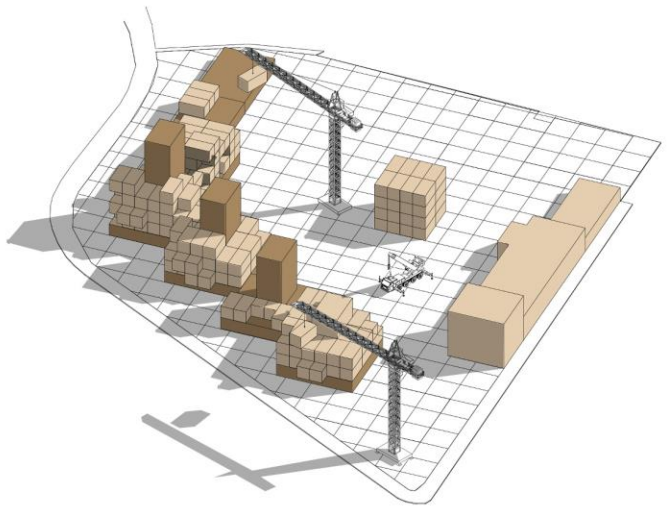
Increases the feeling of well-being
Living and working in a green environment has a positive effect on the well-being of people. Greenery offers relaxation and reduces stress.

TREE SHADING
preserved trees
new planting

SAINT-GOBAIN

PREFABRICATED PRODUCTION

The vertical core and the ground floor form a reinforced concrete skeleton, in which wooden module units the size of 3x6m are placed.



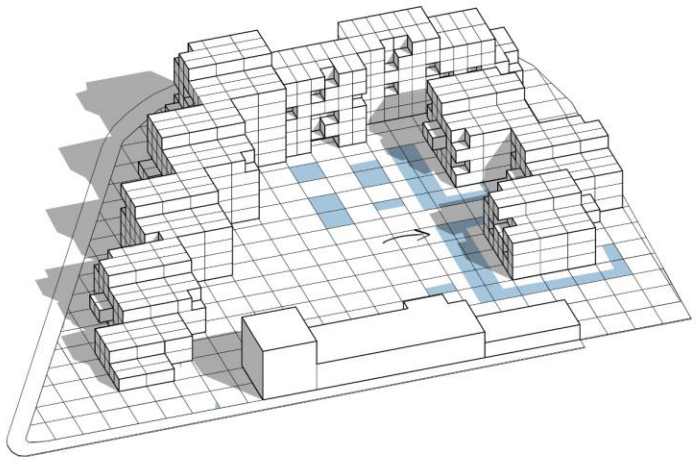
The buildings within the student dormitory are designed sustainably with regard to longevity. Prefabrication of modules ensures easy, economical and sustainable production. Modules made of CLT panels are recyclable, accumulate heat in winter and prevent overheating in summer. The wooden cladding of the spruce wood facade is also recyclable.

CLT PANELS, 5 FOLDS
625x prefabrication wooden modular units
2916 m²

SAINT-GOBAIN

RAIN GARDENS

Rainwater collection from fixed areas. Rainwater collected from the roofs using to flush toilets, wash and water the surrounding plantings.

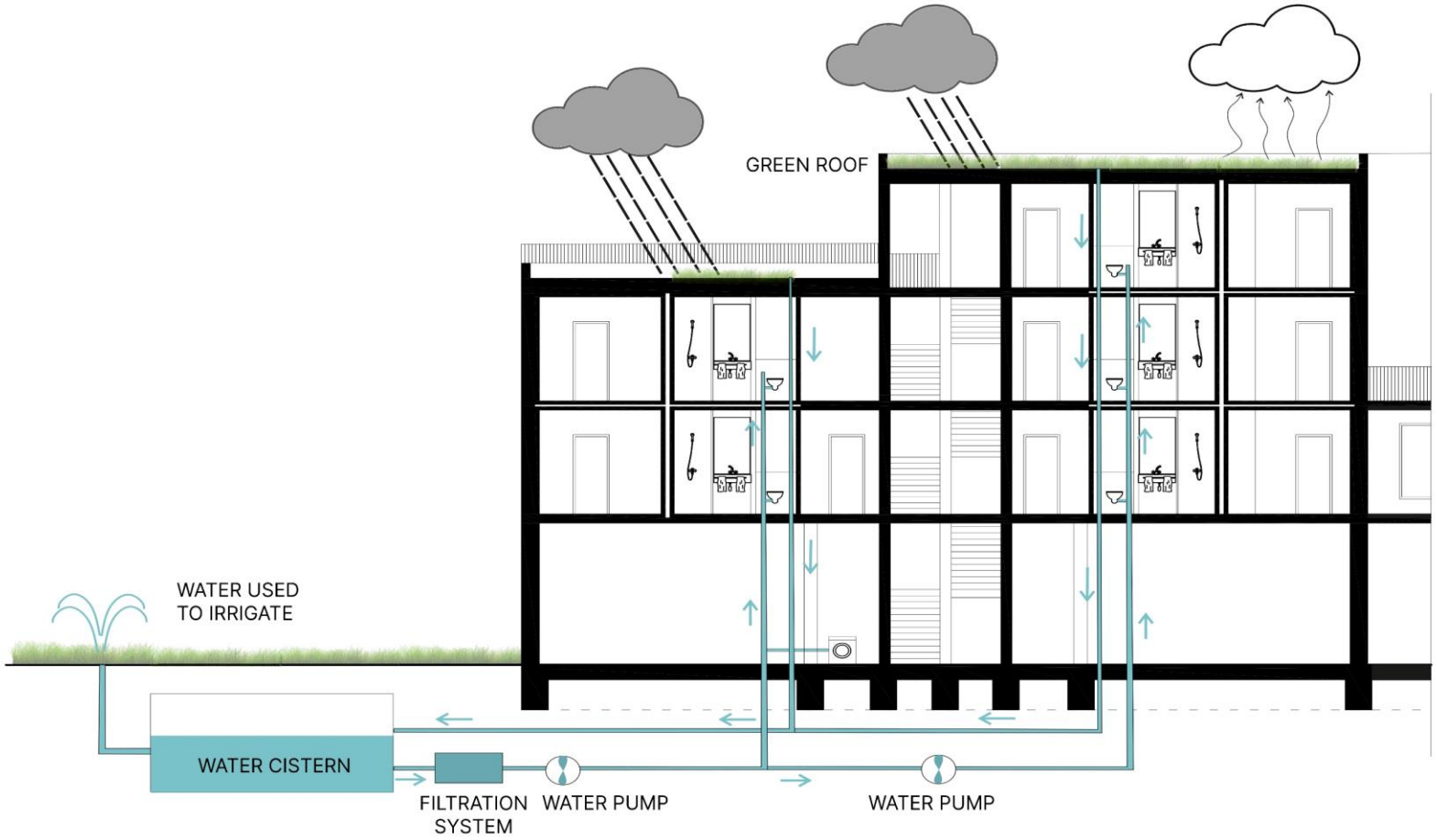


Water conservation
After rain gardens are fully established, they won't require watering except in extreme drought conditions. They save you time and money while reducing your carbon footprint.

Groundwater recharge
Rain gardens help recharge depleted groundwater sources. Water captured by a rain garden drains back into the soil, which replenishes local aquifers.

No fertilizer, herbicide, or pesticide required
Native plants are adapted to your region and soil type, so they won't need fertilizers or harsh chemicals.

Water pollution protection
Rain gardens divert rainwater away from storm sewers, reducing the load on the sewer system. This means that less contaminated water gushes into rivers and lakes and harms aquatic wildlife.

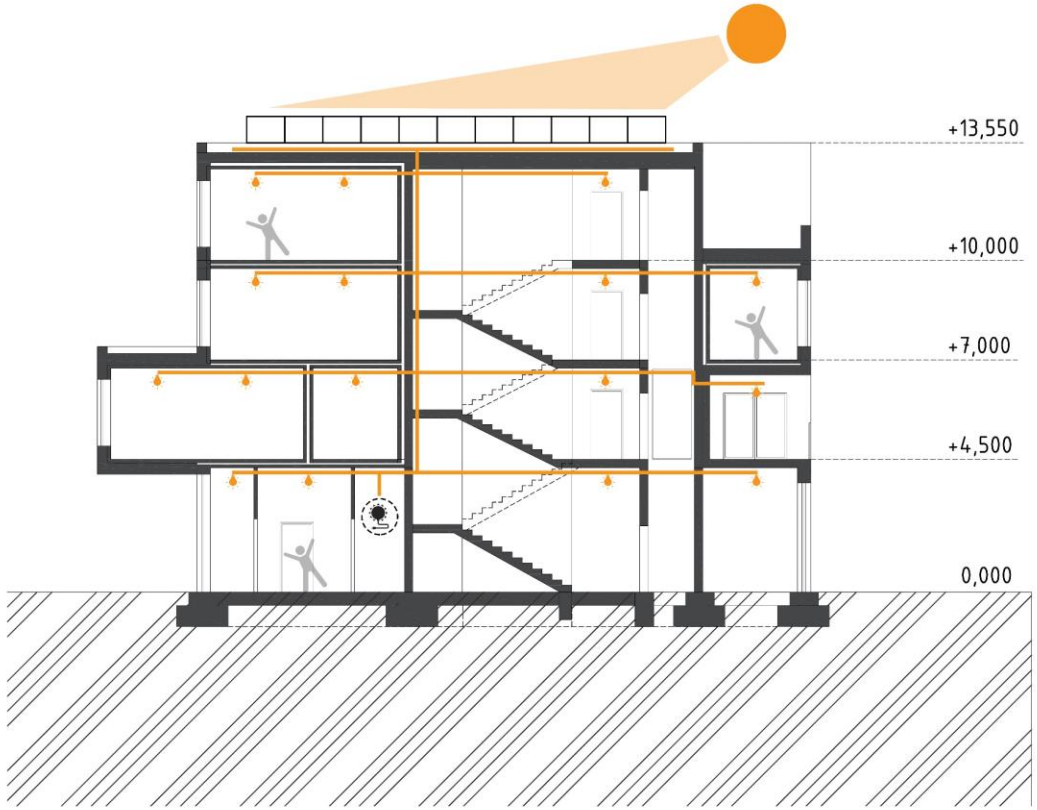


RAINWATER HARVESTING


FOUNTAIN

FIRE SAFERY CONCEPT

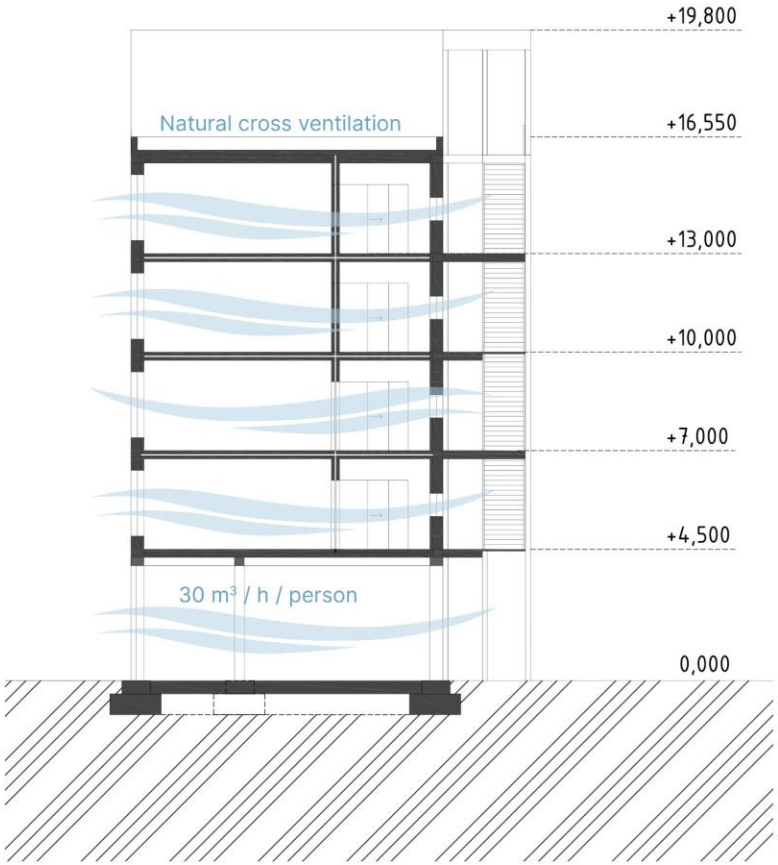
Fire escapes in buildings are always within 20 m. The fire escape is secured through stairs in the middle of the buildings, which are closed and forced ventilated. Prefabricated modules made of CLT panels are fire resistant for 60 minutes and also Siberian spruce facades are more fire resistant than conventional wood cladding. From the inside, the unit is protected by a fireproof board from Rigips.



ELECTRICAL CONCEPT

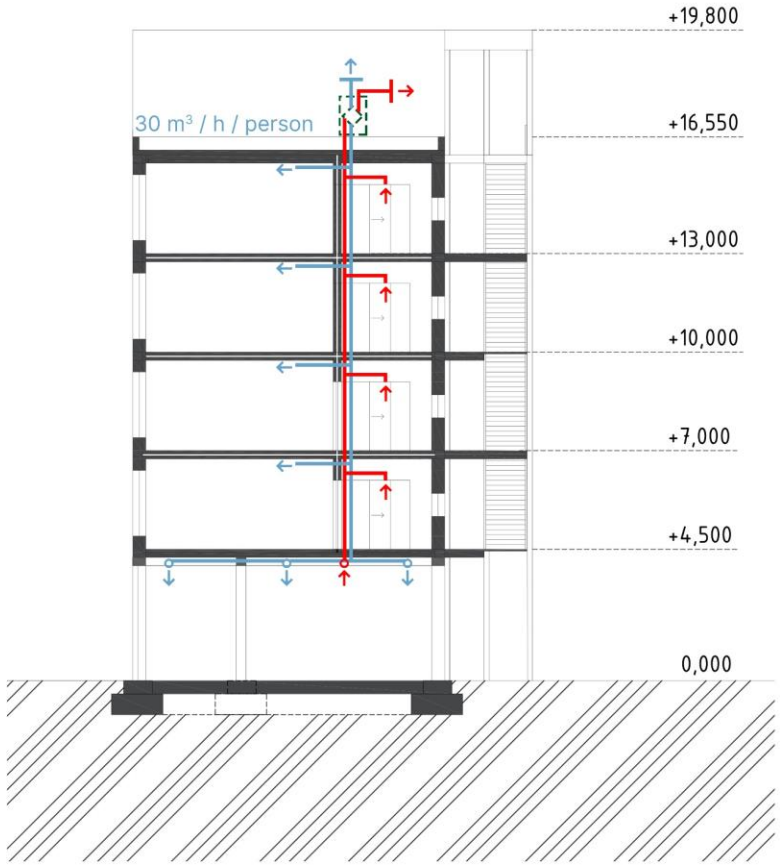
The building uses renewable energy sources by photovoltaic panels on the roof for electricity. Photovoltaic panels are used from the company ENERGIZER SOLAR, which is based directly in Warsaw. The number of panels used is 448 pieces. Each panel has an output of 370 - 380 W and covers an area of 1797 m2.

SAINT-GOBAIN



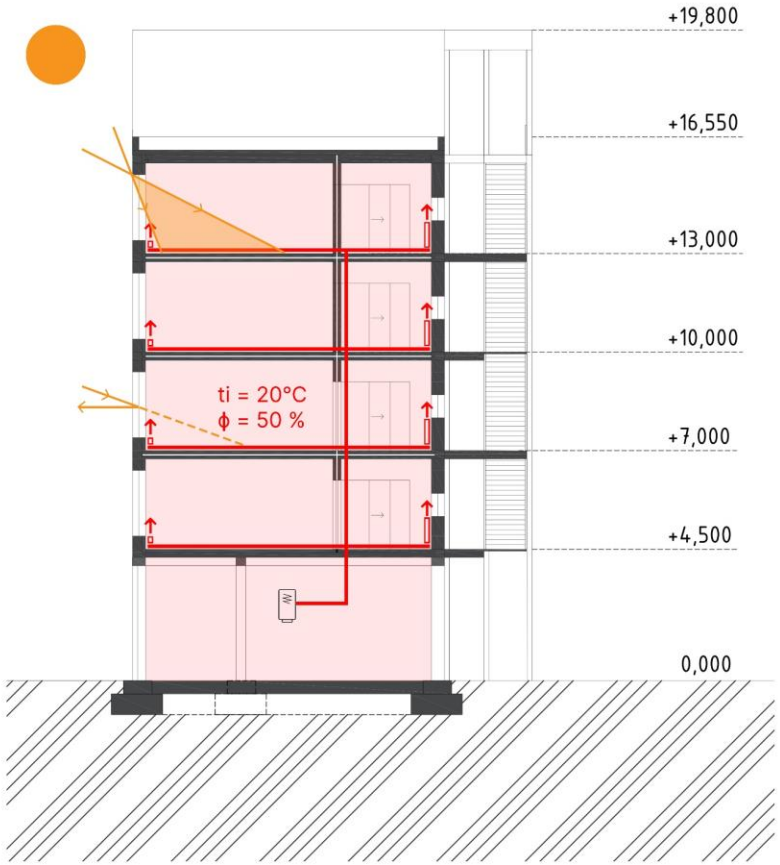
AIR VENTILATION CONCEPT

Each student unit has a window area to floor area ratio of 1: 4, which satisfies the condition that the window area to floor area ratio cannot be less than 1: 8. Most of the windows of the units are oriented to the west and east side and also the cells in the balcony type of housing to the south, so the is ensured natural ventilation.



RECUPERATION

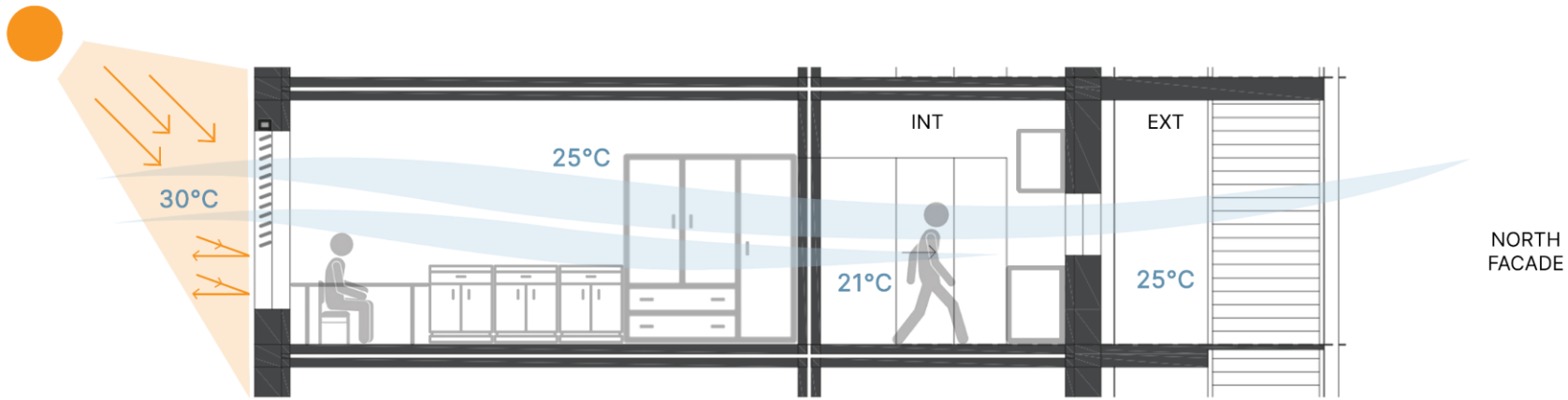
Recuperation with a minimum air exchange rate of 30 m3 / h per person is used for ventilation. There is a window that can be opened on each student unit for ventilation.



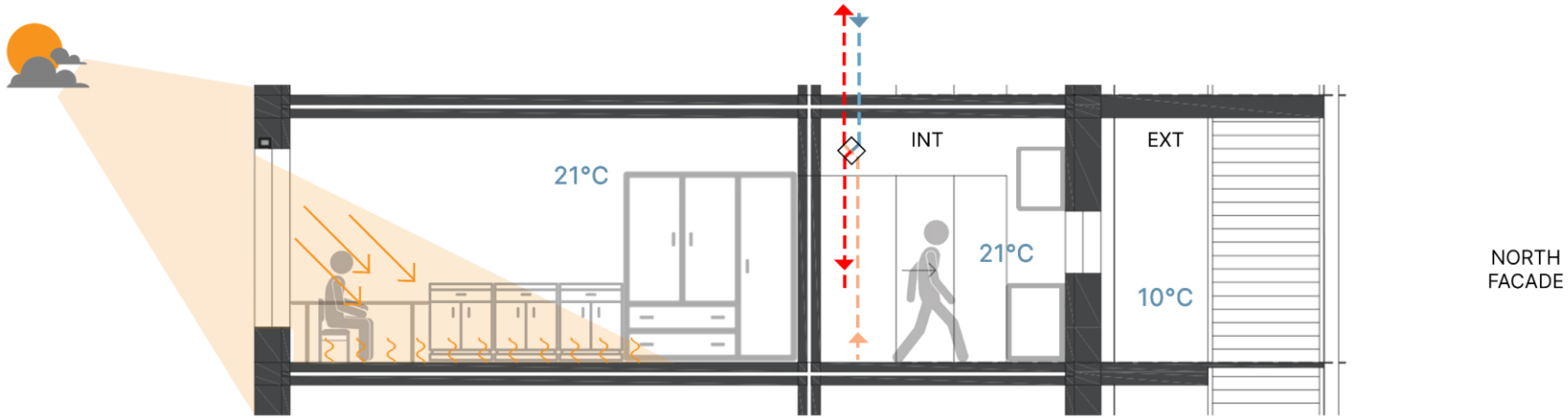
THERMAL COMFORT

Among other things, the natural cooling system provides a park in the middle of the plot in combination with northwest winds. Green roofs, light facade shades and external blinds on the south side also counteract the overheating of the building, reducing heating costs by up to 70%. Heat pumps are used for heating and cooling.

SAINT-GOBAIN

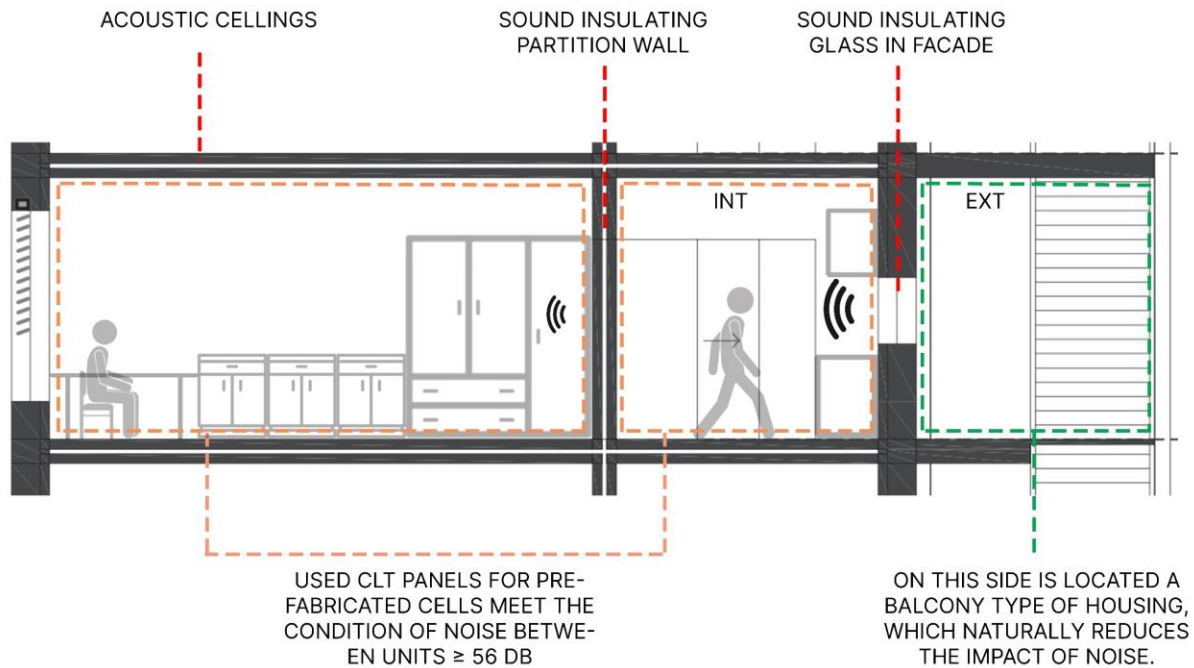


SUMMER COMFORT



WINTER COMFORT

SAINT-GOBAIN



SOUTH FASADE

NORTH FASADE

RAILWAY NOISE

ACOUSTIC COMFORT

STUDENT HOUSING – BALCONY TYPE

ICON SIGN

COMMERCIAL GROUND FLOOR

SECTION A-A´

SECTION B-B´

SAINT-GOBAIN

CONSTRUCTIVE PRINCIPLE:
MODULAR PREFABRICATION WOOODEN ARCHITECTURE

- FAST CONSTRUCTION
- LOW CARBON IMPACT
- THERMAL QUALITIES
- SUSTAINABILITY
- CLT'S ABILITY TO RESIST HIGH RACKING AND COMPRESSIVE FORCES

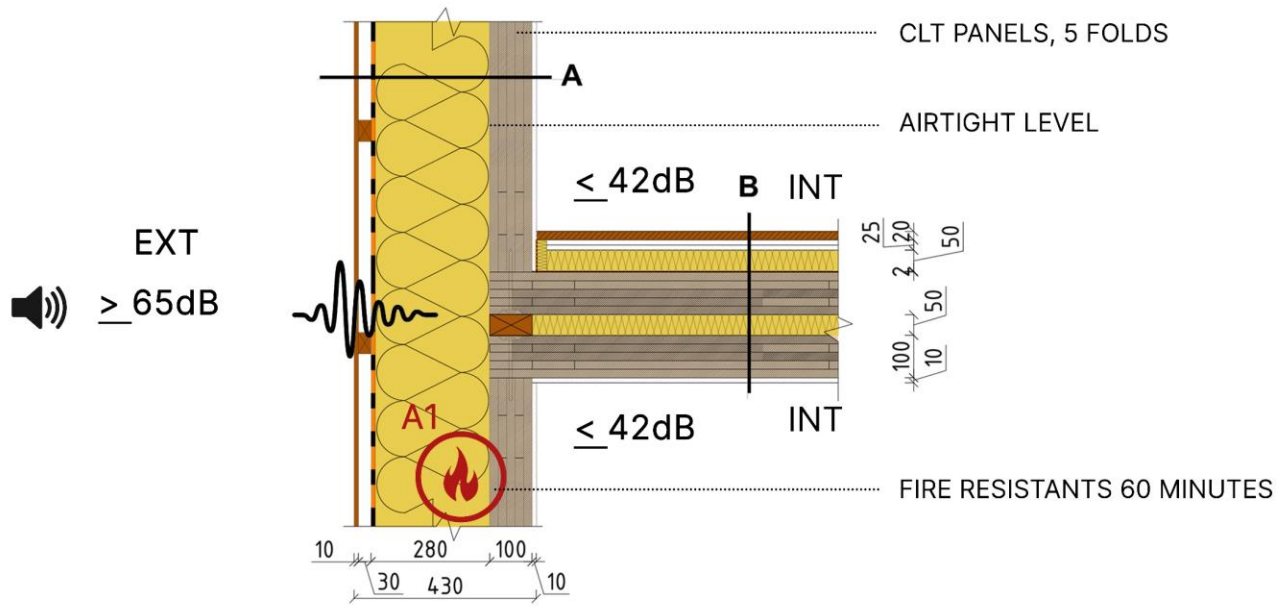
$R = 8{,}91\ m^2\ K/W$
$U = 0{,}112\ W/\ m^2K$

BUILD UP A [mm]

10	Gypsum fibre board Rigidur
100	CLT PANEL - prefabricated module
280	Thermal Insulation ISOVER TF PROFI
0,35	Diffuse permeable foil 95
30	Ventilated gap
15	Exterior cladding (Siberian spruce)

BUILD UP B [mm]

10	Gypsum fibre board Rigidur
100	CLT PANEL- prefabricated module
10	ISOVER ORSET(in the installation plane, glass wool), (wooden grate 50x100mm)
100	CLT PANEL - prefabricated module
2	Insurance waterproofing
50	Thermal and sound mineral insulation (Steprock HD)
25	Spreading layer (gypsum fiber boards - 2 layers)
20	Tread layer (floor covering)



EXTERNAL WALL DETAIL
WITH MODULE CONNECTION

ISOVER SAINT-GOBAIN

SAINT-GOBAIN

CONSTRUCTIVE PRINCIPLE:
MODULAR PREFABRICATION WOOODEN ARCHITECTURE

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- THERMAL QUALITIES
- SUSTAINABILITY
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$R = 8,91\ m^2\ K/W$
$U = 0,112\ W/\ m^2K$

BUILD UP A [mm]

10 Gypsum fibre board Rigidur
100 CLT PANEL - prefabricated module
2 ISOVER VARIO KM DUPLEX U
280 Thermal insulation ISOVER TF PROFI
120 Cover plate with blinds
30 Ventilated gap
15 Exterior cladding (Siberian spruce)

BUILD UP B [mm]

10 Gypsum fibre board Rigidur
100 CLT PANEL -prefabricated module
2 ISOVER VARIO KM DUPLEX U
280 Thermal insulation ISOVER TF PROFI
0,35 Diffuse permeable foil 95
30 Ventilated gap
15 Exterior cladding (Siberian spruce)

WINDOW

MIXED ALIUMINIU/ WOOD FRAME WINDOW U=0,62K/m2K

WINDOW DETAIL

ISOVER SAINT-GOBAIN

SAINT-GOBAIN

CONSTRUCTIVE PRINCIPLE:
MODULAR PREFABRICATION WOOODEN ARCHITECTURE

- FAST CONSTRUCTION
- LOW CARBON IMPACT
- THERMAL QUALITIES
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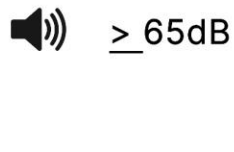
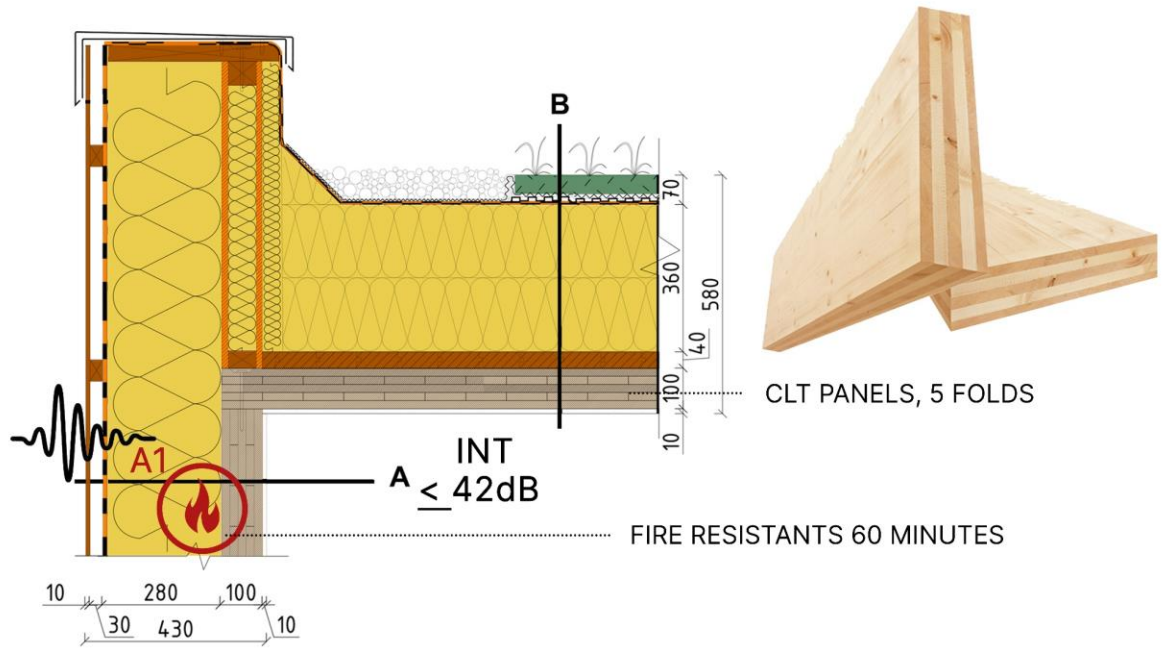
BUILD UP A [mm]

10 Gypsum fibre board Rigidur
100 CLT PANEL -prefabricated module
2 ISOVER VARIO KM DUPLEX U
280 Thermal insulation ISOVER TF PROFI
0,35 Diffuse permeable foil 95
30 Ventilated gap
15 Exterior cladding (Siberian spruce)

BUILD UP B [mm]

50 Vegetation substrate
7 Drainage layer
5 Protective geotextile
8 Waterproofing membrane placed in two layers, glued and melted
180 Thermal Insulation ISOVER S
180 Thermal Insulation ISOVER S ISOVER Metac DSB, vapor barrier for flat roofs
40 Fire-resistant flap on the supporting structure in the slope
100 CLT panel - prefabricated module
10 Gypsum fibre board Rigidur





ROOF DETAIL

ISOVER SAINT-GOBAIN

CONSTRUCTIVE PRINCIPLE:
MODULAR PREFABRICATION WOOODEN ARCHITECTURE

- FAST CONSTRUCTION
- LOW CARBON IMPACT
- THERMAL QUALITIES
- SUSTAINABILITY
- CLT'S ABILITY TO RESIST HIGH RACKING AND COMPRESSIVE FORCES

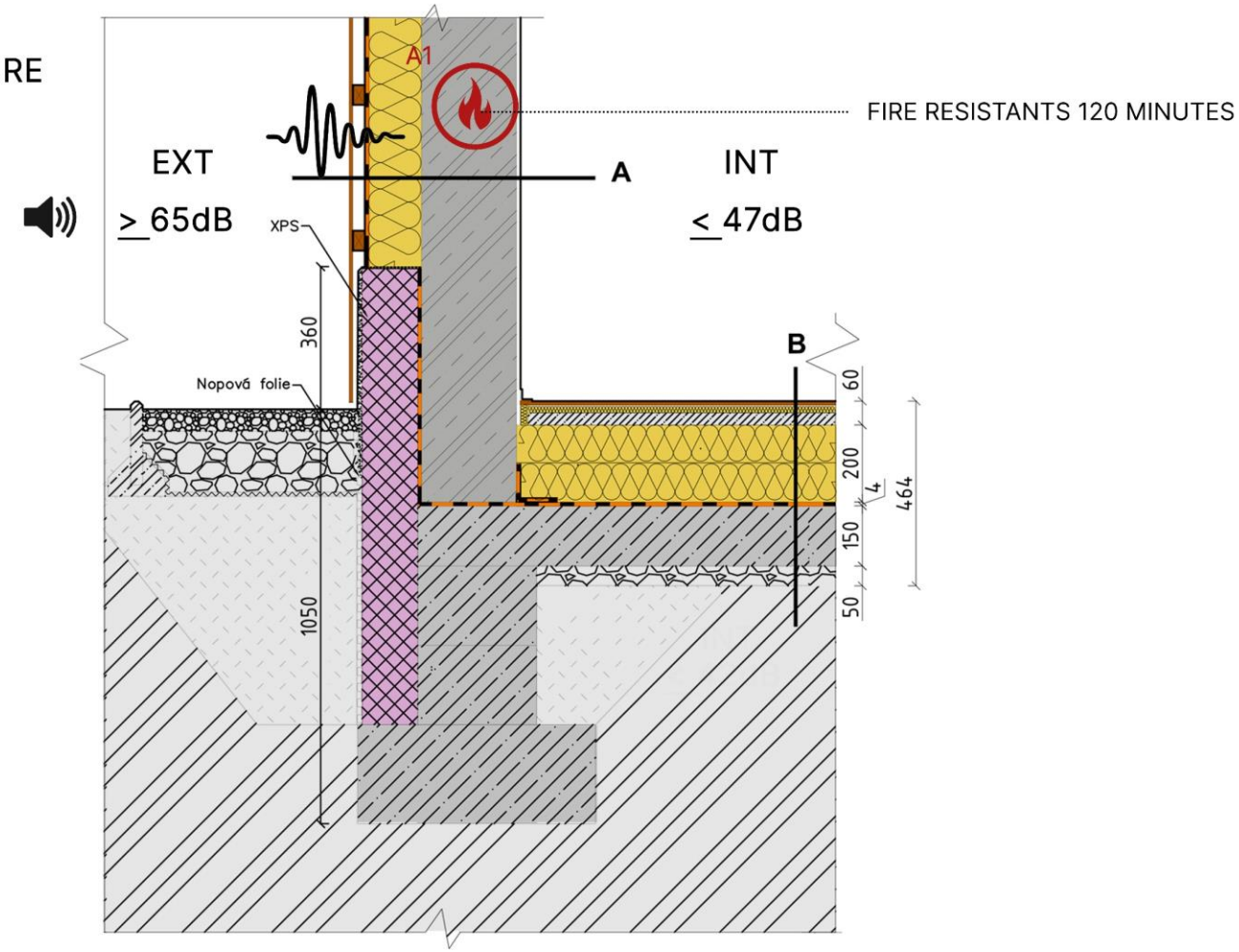
$R = 8,7\ m^2\ K/W$
$U = 0,115\ W/\ m^2K$

BUILD UP A [mm]

10	Gypsum fibre board Rigidur
240	Reinforced concrete load - bearing structure
130	Thermal insulation ISOVER TF PROFI
0,35	Diffuse permeable foil Jutadach 95
30	Ventilated gap
15	Exterior cladding (Siberian spruce)

BUILD UP B [mm]

60	Floor layers
100	Thermal insulation ISOVER S
100	Thermal insulation ISOVER S
4	Waterproofing membrane
150	Reinforced concrete slab
50	Packed gravel



GROUND FLOOR DETAIL
IN CONNECTION WITH EXTERNAL WALL

SAINT-GOBAIN

CONSTRUCTIVE PRINCIPLE:
MODULAR PREFABRICATION WOOODEN ARCHITECTURE

- FAST CONSTRUCTION
- LOW CARBON IMPACT
- THERMAL QUALITIES
- SUSTAINABILITY
- CLT'S ABILITY TO RESIST HIGH RACKING AND COMPRESSIVE FORCES

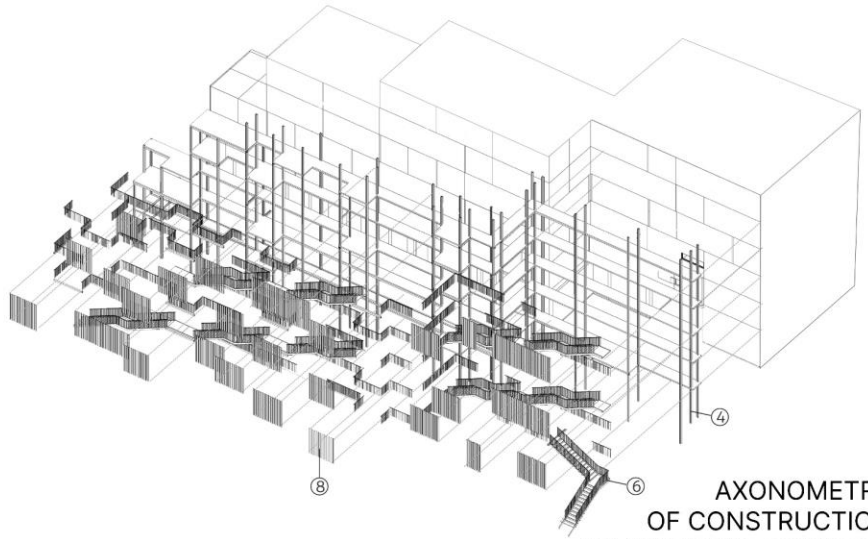
$R = 8,91\ m^2\ K/W$
$U = 0,112\ W/\ m^2K$

BUILD UP A [mm]

10	Gypsum fibre board Rigidur
100	CLT PANEL - prefabricated module
280	Thermal Insulation ISOVER TF PROFI
0,35	Diffuse permeable foil 95
10	Exterior white plaster

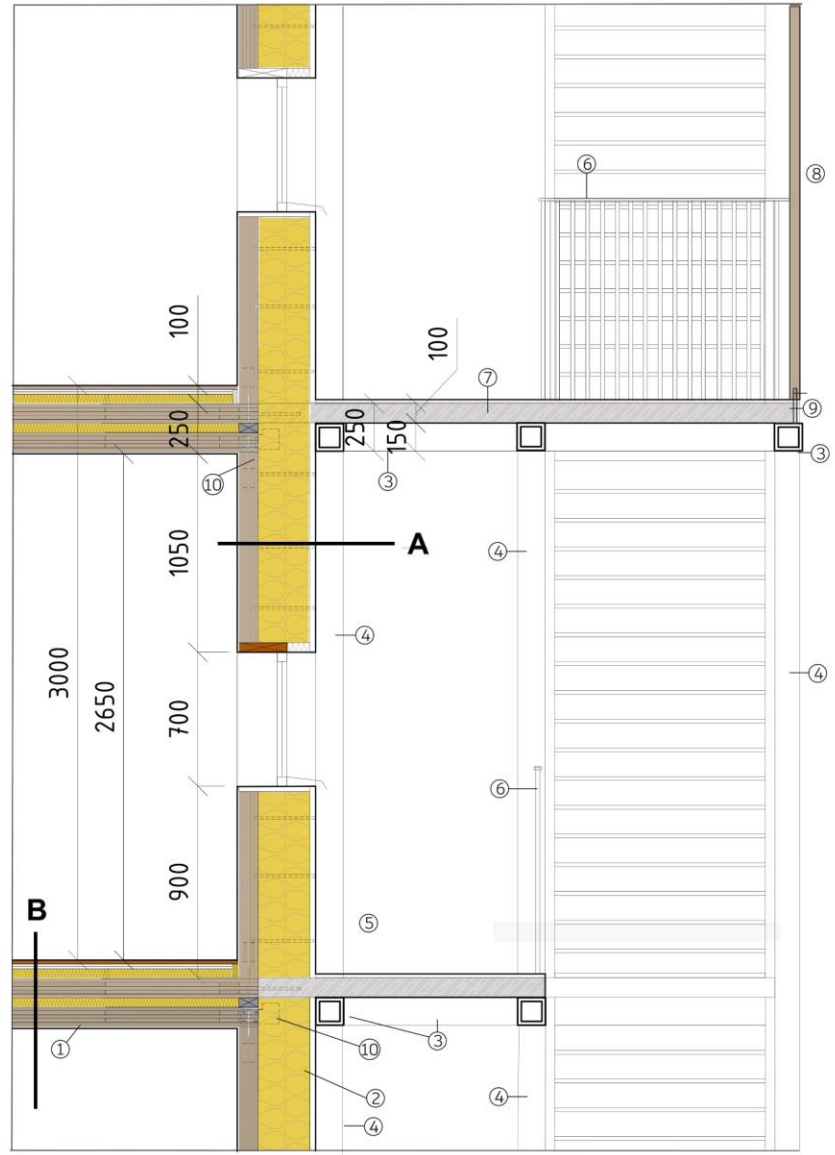
BUILD UP B [mm]

10	Gypsum fibre board Rigidur
100	CLT PANEL- prefabricated module
10	ISOVER ORSET(in the installation plane, glass wool), (wooden grate 50x100mm)
100	CLT PANEL - prefabricated module
2	Insurance waterproofing
50	Thermal and sound mineral insulation (Steprock HD)
25	Spreading layer (gypsum fiber boards - 2 layers)
20	Tread layer (floor covering)



AXONOMETRY
OF CONSTRUCTION
OF EXTERNAL CORRIDOR

1. WOODEN CONSTRUCTION OF A PREFABRICATED MODULE
2. THERMAL INSULATION
3. STEEL BEAM WITH A SQUARE CROSS-SECTION OD 150X150mm
4. STEEL BEAM WITH I-SHAPED CROSS SECTION
5. EXTERNAL WHITE PLASTER
6. STEEL RAILINGS
7. CONCRETE SCREED 100mm
8. WOODEN LAMELLA
9. ANCHORING THE WOODEN LAMELLA TO THE STEEL BEAM
10. ANCHORING THE CONSTRUCTION OF EXTERNAL CORRIDOR AND WOODEN MODULES



DETAIL OF BALCONY TYPE STUDENT HOUSING
SELF-SUPPORTING CONSTRUCTION OF THE EXTERNAL CORRIDOR AND STAIRCASE

ISOVER SAINT-GOBAIN

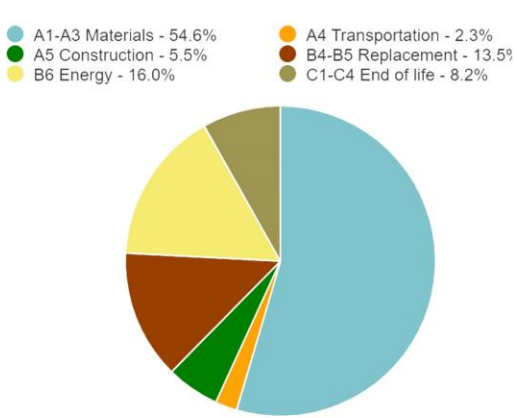
SAINT-GOBAIN

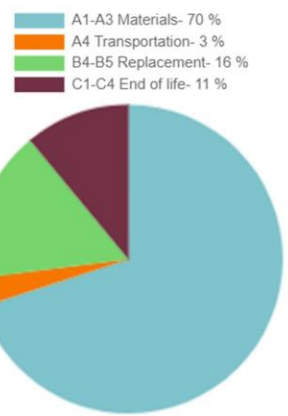
MULTICONFORT

LCA

Cradle to grave (A1-A4, B4-B5, C1-C4)	kg CO_2e/m^2
(< 350) A (350-450) B (450-550) C (550-650) D (650-750) E (750-850) F (> 850) G	299

Global warming kg CO2e - Life-cycle stages





4 723 Tons CO_2e

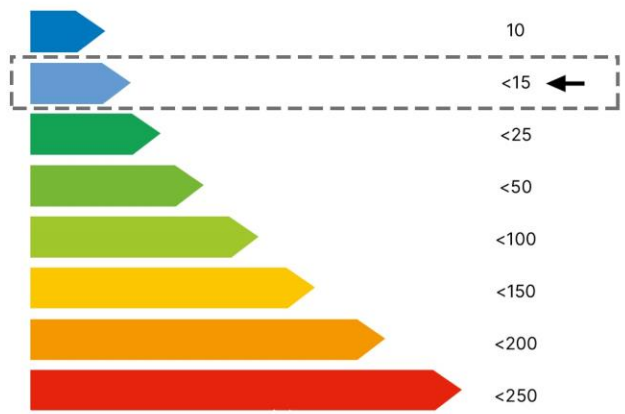
6.44 kg CO_2e / m^2 / year

CALCULATIONS

Specific Heat Demand

Transmission Heat Losses:	291275.90	kWh/a
Ventilation Heat Losses:	212313.73	kWh/a
Total Heat Losses:	503589.63	kWh/a
Internal Heat Gains:	178426.19	kWh/a
Solar Heat Gains:	133594.50	kWh/a
Total Heat Gains:	300532.33	kWh/a
Annual Heat Demand:	203057.30	kWh/a
Specific Heat Demand:	12.50	kWh/(m2a)

Energy efficiency classes



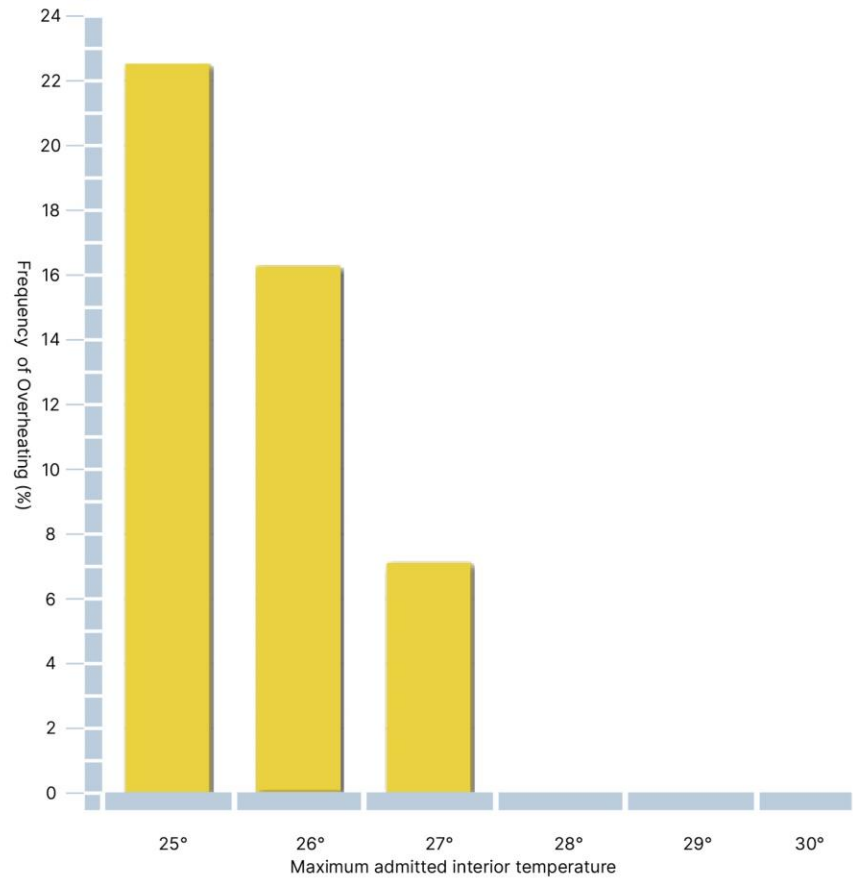
12.50 kWh/(m2a)
Specific Heat Demand

236 158 € Social cost of carbon

CALCULATIONS

Overheating

Exterior Thermal Transmittance:	2987.74	W/K
Ground Thermal Transmittance:	191.33	W/K
Ventilation Transmittion Ambient:	3418.15	W/K
Ventilation Transmission Ground:	0.00	W/K
Solar Aperture:	611.69	m2
Frequency of Overheating:	22.50	%



STUDENT HOUSING

COMMERCIAL GROUND FLOOR


COMMUNAL ROOF TERRACE


COMMUNAL ROOF TERRACE


COURTYARD

PLAYING FIELD

GARBARNIA – NUMBER 37 - SLOVAKIA