

# GREEN INSTITUTE & ACADEMY / BOLOGNA

## INTRODUCTION GREEN INSTITUTE & ACADEMY / BOLOGNA

The former paper factory of Marzabotto houses the green institute & academy by DISMECO. The institute contains an academy with high-level training facilities, a green business incubator and an interactive museum, all of them educating a broad public in sustainable science.

### ACADEMY

In the academy of DISMECO a new generation will be educated in green and sustainable science. A new self-contained volume is added to facilitate in a healthy and flexible environment for this new school. The academy has its own entrance, but is connected to the other building to ensure collaboration between the business incubator and the young students.

Besides regular classrooms and workplaces the new building houses a library, a gym and an experimental lab, where students can put their ideas into practice.

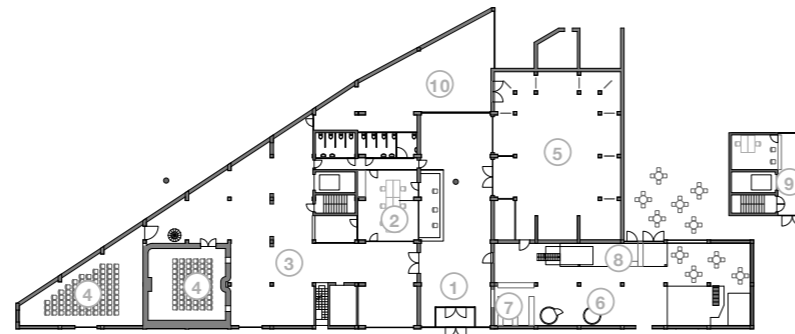
### GREEN BUSINESS INCUBATOR

The green business incubator is facilitated on the ground level of the former paper plant. Here innovative start-ups can present their ideas to the public and invite business relations.

On the first and second floor informal workplaces are situated for interaction and silence areas when concentration is required.

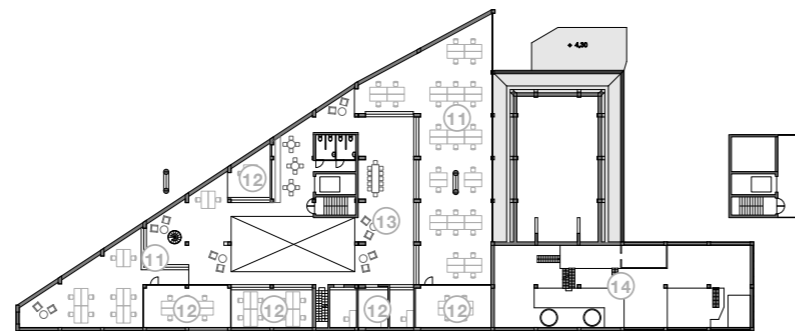
### SUSTAINABILITY EXHIBIT

Within the majestic hall in the former paper plant an exhibition space is realised where small conferences can be organized. Between the old silos the scientific and technological evolution of recovery is shown to visitors. Here children can follow a playful and interactive sustainability route, whilst their parents are watching them enjoying a cup of coffee.



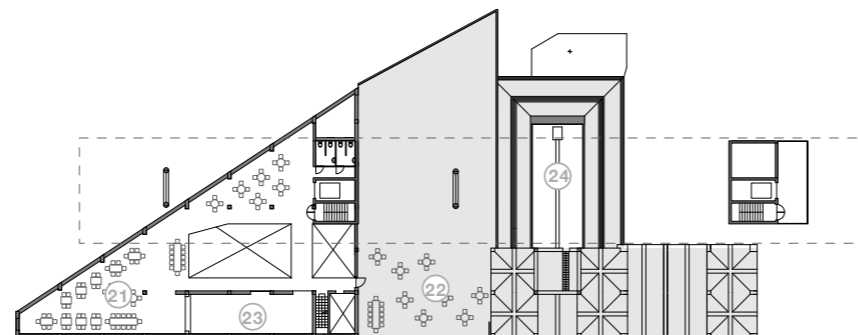
level 0

- ① entrance green institute
- ② administration office
- ③ green business incubator
- ④ presentation room
- ⑤ film theatre science museum
- ⑥ exhibition hall / children's experience route
- ⑦ bookstore
- ⑧ coffee shop with terrace
- ⑨ entrance green academy
- ⑩ expedition



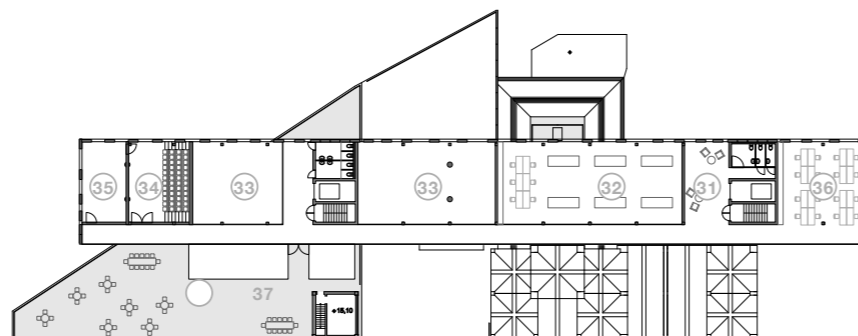
level 1

- ① start-up workflow
- ② silence area for start-ups'
- ③ relax area
- ④ exhibition hall / children's experience route



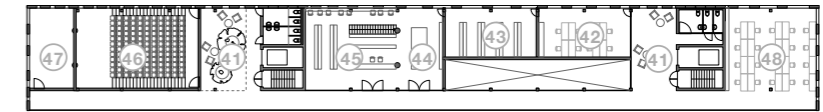
level 2

- ②1 restaurant
- ②2 terrace
- ②3 kitchen
- ②4 lookout point



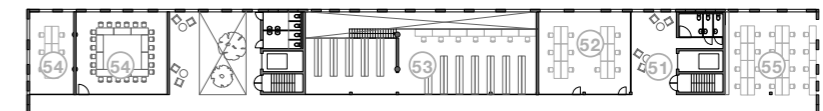
level 3

- ③1 pantry
- ③2 experimental lab
- ③3 installation exhibit
- ③4 auditorium
- ③5 storage
- ③6 study area
- ③7 student terrace



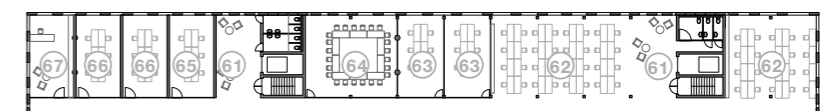
level 4

- ④1 pantry
- ④2 ICT centre
- ④3 server room
- ④4 bookstore
- ④5 library
- ④6 auditorium
- ④7 storage
- ④8 study area



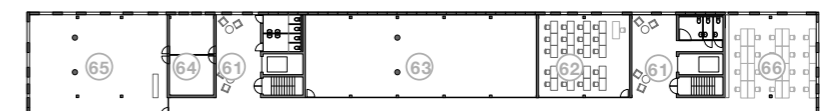
level 5

- ⑤1 pantry
- ⑤2 work studio
- ⑤3 library
- ⑤4 classroom
- ⑤5 study area



level 6

- ⑥1 pantry
- ⑥2 study area
- ⑥3 concentration room
- ⑥4 classroom
- ⑥5 PhDs' office
- ⑥6 teachers' office
- ⑥7 deans' office



level 7

- ⑦1 pantry
- ⑦2 classroom
- ⑦3 technical installations
- ⑦4 dressing room
- ⑦5 gym
- ⑦6 study area



## BUILDING as a LEARNING EXAMPLE

As an institute for green and sustainable science, the building itself should embrace the mission. Therefore we strive to realize an energy-efficient building with a minimal impact on the environment.

A sustainable building also constitutes a building with a healthy and pleasant environment for those working in it, and those visiting the building.

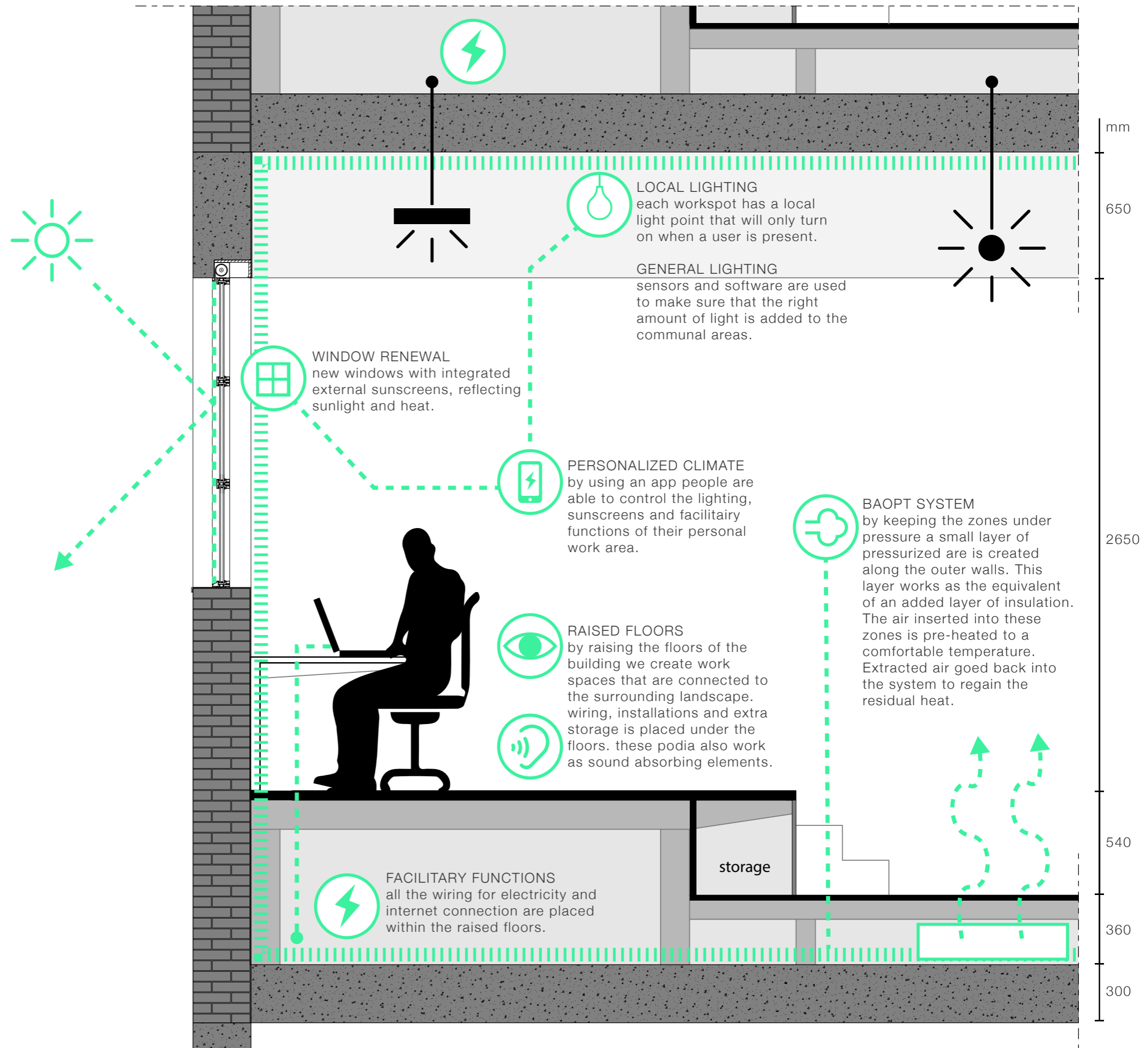
As an educational concept the building technologies used to achieve those goals will all be visible and locally explained to the users. In this way the impact of new technologies is clearly shown and will be an inspiration to the students and other visitors.

### RENOVATION vs. BUILDING NEW

Sustainable design in renovation or in new buildings asks for a completely different approach. To be able to illustrate the wide range of possibilities within sustainable design we created a composition of two different volumes that act as a playground for sustainable design.

The majestic paper factory showcases the measures one could take in reuse, bringing an beautiful old building up to standards.

The newly added volume of the academy gives us the possibility to go wild in showing the technologies that one could use starting from scratch. The goal is to make this volume completely energy passive.



## ENERGY PASSIVE

### PASSIVE BUILDING

Creating a passive building has different consequences for its design. The goal is to give the facade a thermal resistance of 10 m<sup>2</sup>K/W. Also triple glass (HR+++ ) is used to prevent cold draught. It is extremely important that there is no heat-leakage in the building, connections between roof and facade have to be detailed with great care.

The energy use of the building is reduced with different interventions. The south facade will have a more closed facade to reduce the radiation heat entering the building. Geothermal heat storage is used to heat the building in the winter and to cool it down in summer.

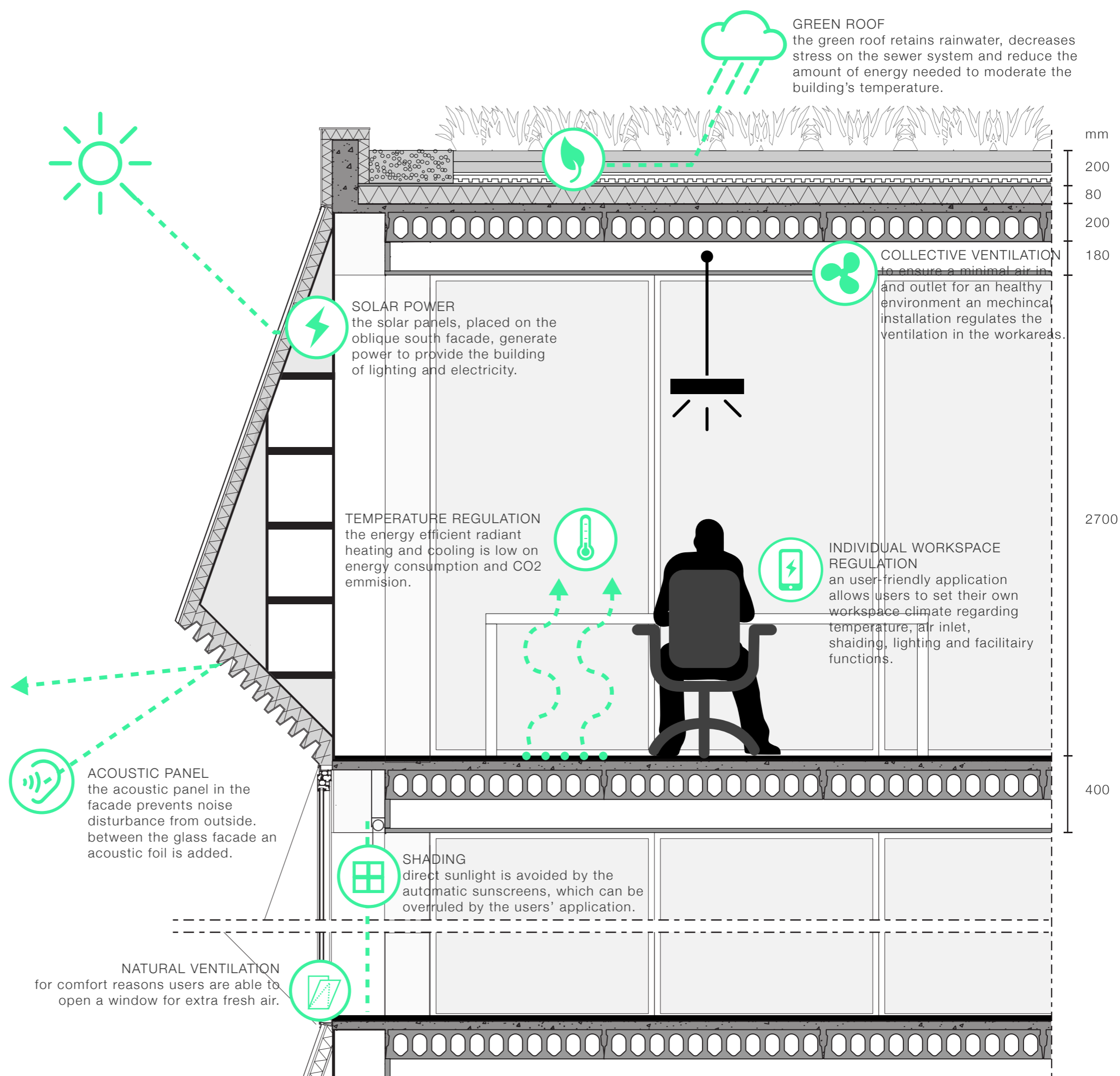
### STIMULATE EFFICIENT USE OF ENERGY

Another factor of energy consumption are the users of the building. Stimulating them to reduce their energy use can benefit more than expected. This is done by:

- individual regulated workspaces.
- an app which gives insight in energy-use.
- show applied techniques for saving energy.

### SOLAR ENERGY

The south facade, which is mainly closed to prevent overheating, gives a good opportunity to generate solar energy. The slanted facade makes sure that the efficiency of the solar panels is raised. As this facade is the long facade of the building, this gives an enormous effect on the CO<sub>2</sub> balance of the building.



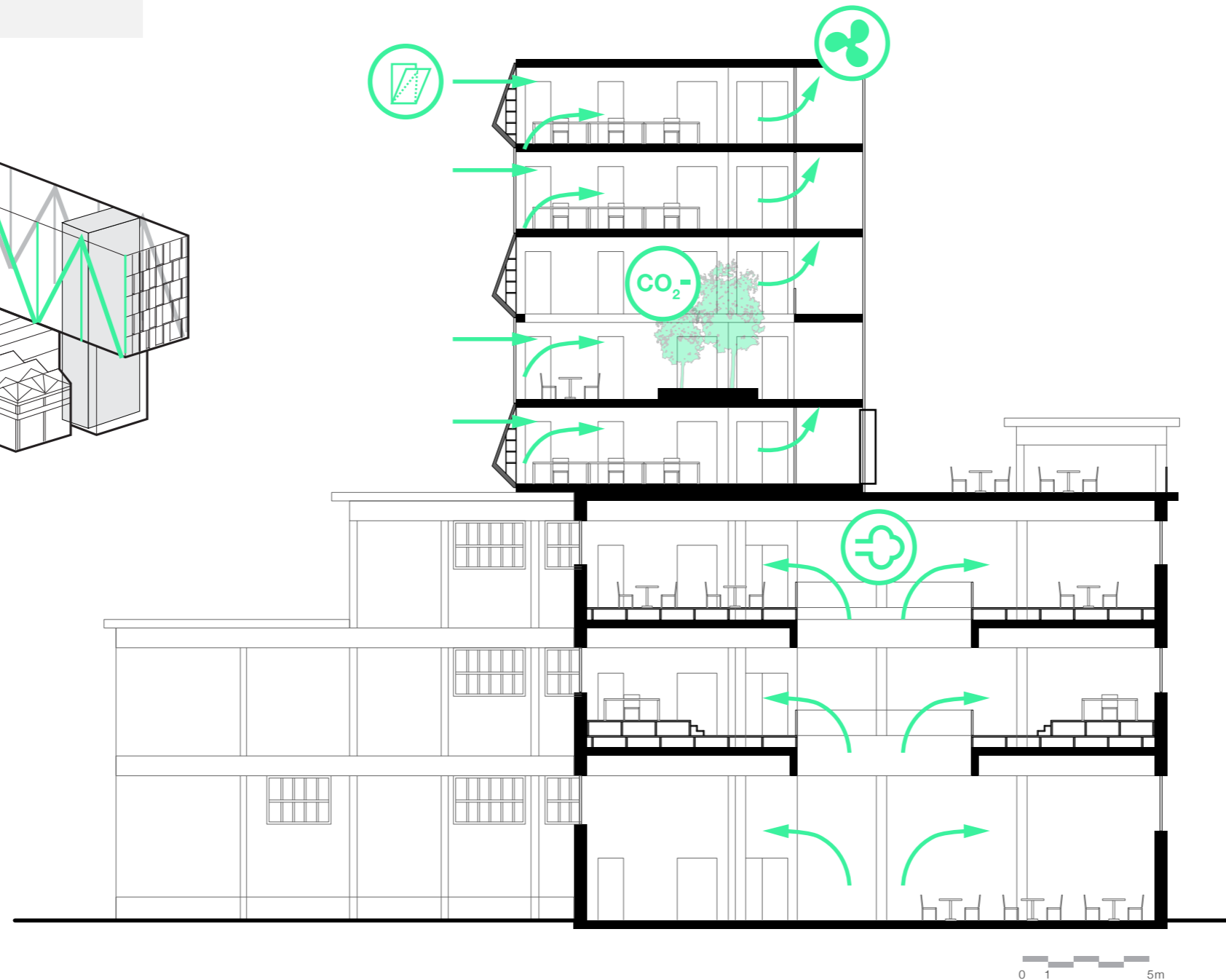
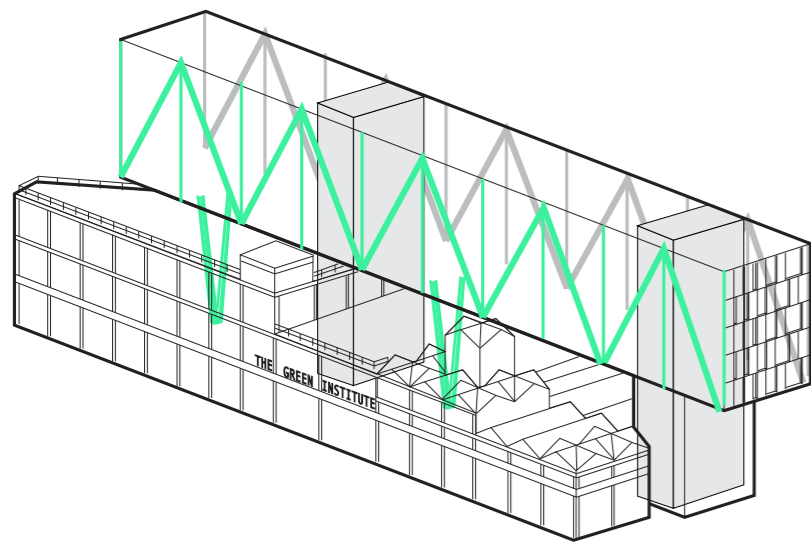
## MAIN STRUCTURE

### LOW-RISE

The existing building structure of the factory will be sustained. Some floors will be closed and a central atrium is added to improve the inner connectivity and lightness.

### HIGH-RISE

The high-rise will be carried by a self sustaining steel structure piercing the old factory. Making use of large cantilevers the building floats above the low-rise, completing the composition.



## HEALTHY ENVIRONMENT

### LOW-RISE

#### BAOPT-SYSTEM

The BaOpt system takes care of heating, insulation and ventilation in one simple money and material saving intervention. Through a central vent air is blown into the public space of the building. By pressurizing the different zones of the building a small layer of air presses down on the outer walls, functioning as an insulation layer. With local sensors the climate is measured and automatically adjusted to comfortable and fresh air quality.

#### ACOUSTICS

New windows are placed using improved glass with acoustic foil against sounds from the trains.

The inner acoustics are regulated by creating raised wooden floors with sound absorbing quality, combined with sound-absorbing art works hanging in the atrium.

### HIGH-RISE

#### INDIVIDUAL CLIMATE CONTROL

With the provided app users can control the climate for their local workspace. Underfloor heating is arranged in zones that can be connected to the app. A regulator makes sure the general climate is comfortable.

Local natural ventilation is combined with central air-extraction. The automatic control system will add fresh preheated air when needed.

#### DAYLIGHT

For a healthy work environment the workspaces get enough indirect daylight through the open northfacade. Trough this facade the students have a good overview over the area. While the full-height windows on the south facade allow them to look over the green valley on the other side of the train track.

**GREEN BUILDING MATERIALS with MINIMAL IMPACT on the ENVIRONMENT**

**MATERIALS**

**STRUCTURE**

The existing building will be sustained as much as possible. Some of the brickwork will be renewed and old plaster will be replaced with local lime-stone based plaster.

The new building structure is a demontable, adjustable steel construction with hollow core slabs. The use of hollow core slabs makes it possible to add or remove voids.

**FLOORING**

Partly cork flooring is used as a aesthetic, sound absorbing material. Cork is a local, renewable source. It has anti-microbial properties that reduce allergens in the home, is fire retardant, easy to maintain and acts as a natural insect repellent too.

The rest of the floors will be suited with rubber tiling made from old tires. Rubber floors are hardwearing, water resistant and dampen sounds.

Local common oak is used for the general construction of the raised floors and the rest of the interior build-up.

**WINDOWS**

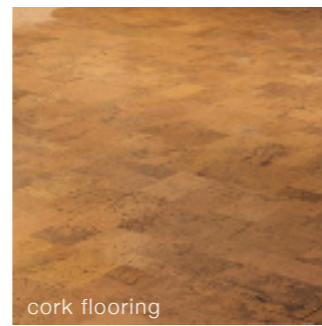
Passive house aluminium frames (Reynaers CS 104-AP) filled with a special foam and suited with HR+++ glass are used to assure the low Uf down to 0.88 W/m²K.

**FINISHING**

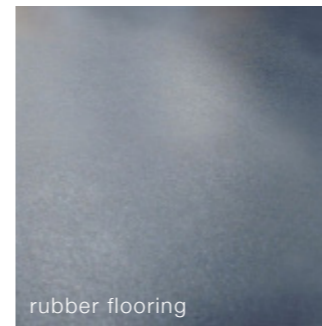
The movable walls within the High-rise (Style Movable Partition) will be finished with PET Berber Carpet made of reused PET bottles.



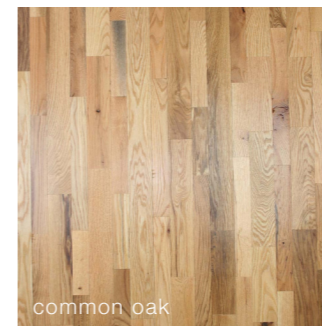
lime-stone plaster



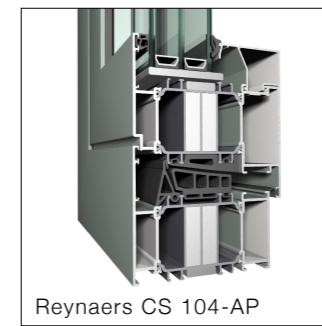
cork flooring



rubber flooring



common oak



Reynaers CS 104-AP



PET Berber Finish



**GENERIC FLOOR PLANS for OPTIMAL FLEXIBILITY**

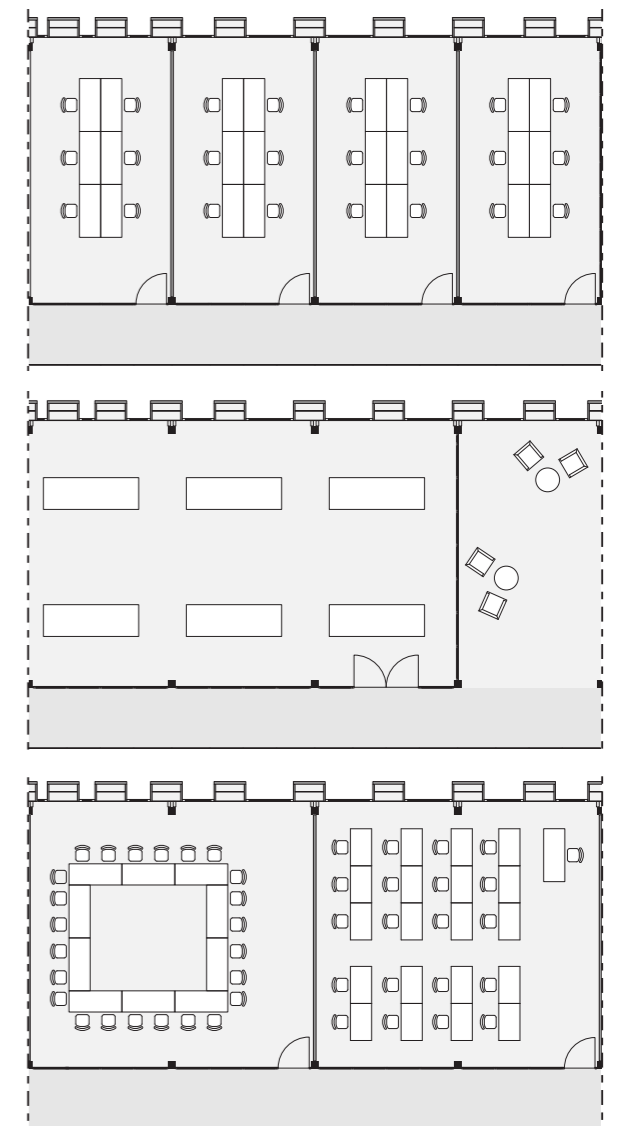
A generic way of constructing has a lot of benefits in costs, planning and use. To cut costs a basic way of detailing, construction and finishing are important.

**MICRO-FLEXIBILITY**

The more a building is adjustable to its users wishes the longer it will stand the hands of time. On a small scale level it is possible to move walls and create smaller or bigger spaces. Movable furniture makes for flexible use of the same space, over and over again.

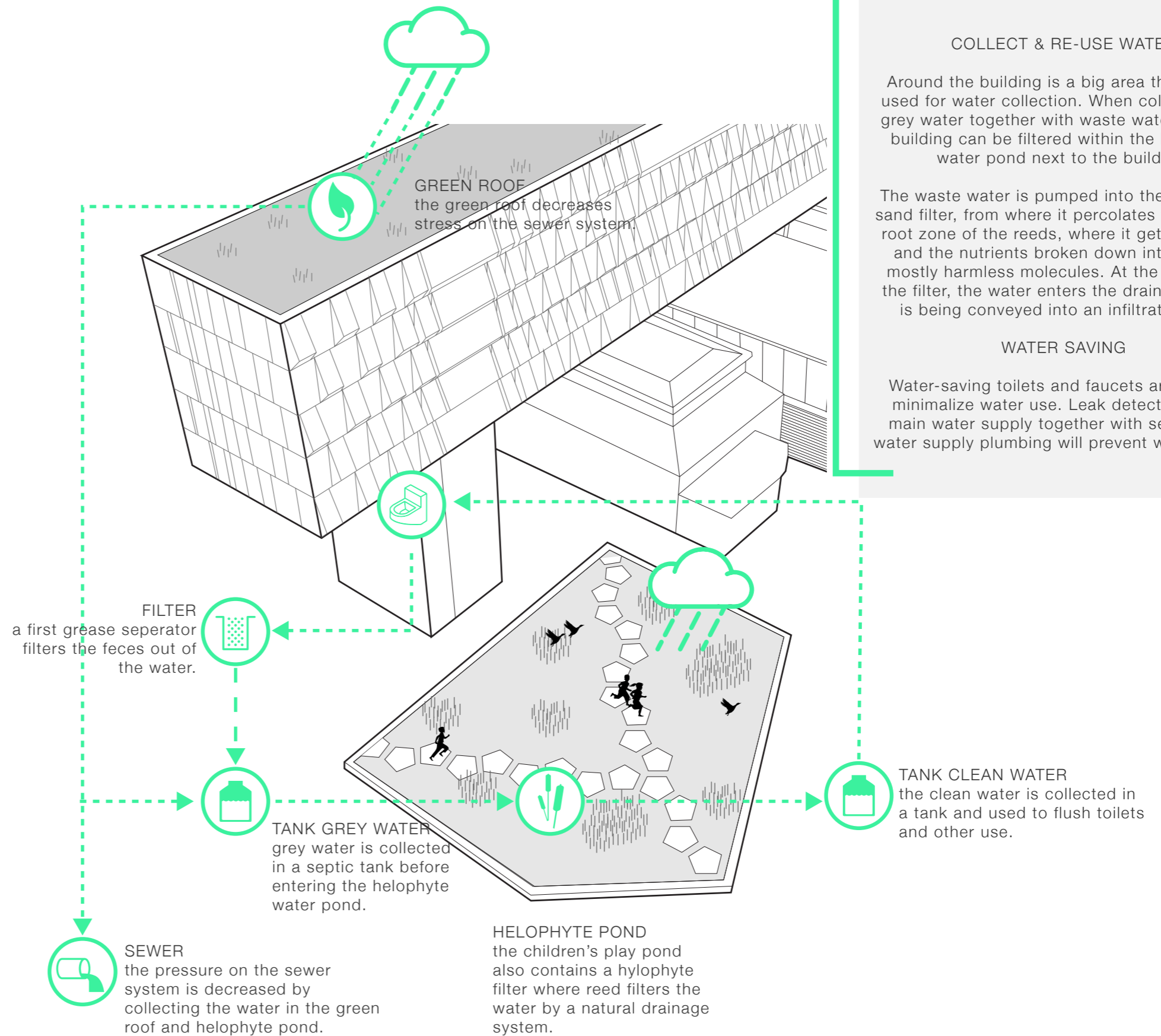
**MACRO-FLEXIBILITY**

The steel structure combined with hollow core slabs is a perfect system for adjusting voids and floors. There are very little constructional walls, which gives the rest of the space a maximized flexibility. When the university moves out it is fairly easy to convert the building into an office building, or even an apartment complex.





**INTERIOR MUSEUM WITH CHILDRENS' EXPERIENCE ROUTE**



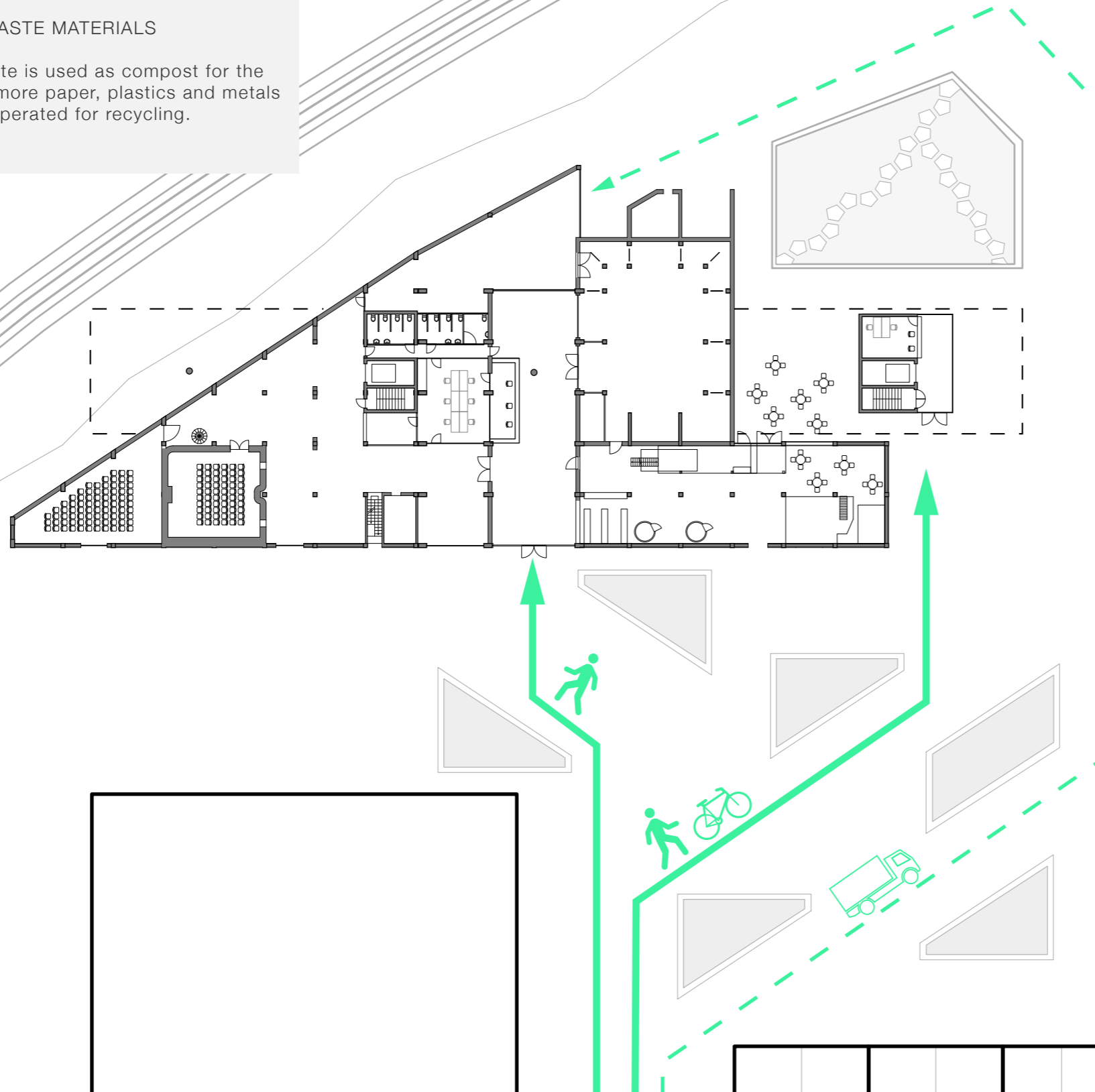
## ECOLOGY

### PLANTS & ANIMALS

On the roof and in different planters around the building trees, plants and herbs are planted to provide small birds and insects with a safe living environment. Within the facade bird and bat housing will be provided. These specific boxes are cleared within the facade.

### WASTE MATERIALS

Biological waste is used as compost for the garden. Furthermore paper, plastics and metals are separated for recycling.



## STIMULATE CYCLING and PUBLIC TRANSPORT

### BICYCLE STORAGE

To encourage the use of bicycles a safe and accesible bicycle storage is provided within the foot of the new building. New bicycle lanes are added to the surrounding area, including a route going to the train station.

### SAFETY

The surrounding area will be lighted with low-cost LED-street lanterns. Entrances are minimized so that a maximum of two gatekeepers can survey the area.