This design is a primary investigation of a correlation between building energy efficiency and production versus architecture. This project is a statement that energy producing buildings are possible, which is an often ignored space in building design.

**SITE CONDITIONS**

The site is situated between the Chalmers university campus and the Mossen stadium, creating a green area towards the south.

**CONSERVATIVE URBAN RESTRICTIONS**

The plot urban restrictions are very conservative and give a specific form to the area, which is depicted in diagram 1.

**THE SQUARE - CREATING A MEETING POINT**

The square re-engages the adjacent buildings and creates a central distribution point, making this space more lively. Additionally, the square marks the clear ending of the Chalmers university campus.

**SHAPE - COMPOSITION OF THREE ELEMENTS**

This configuration enhances pedestrian connections and makes the building more public by enabling the possibility to go through the building. In addition, the separate volumes create the possibility for a decentralization of a climate system.

**OFFICE BUILDING WITH PUBLIC CHARACTER**

The Johanneberg Science Park is an office complex with a public character. Therefore, some parts of the building represent full public zones.

**MATERIALIZATION - STAYING WITHIN SWEDISH TRADITION**

The adjacent buildings have a very conservative, traditional shaped façade architecture, which is very common in Sweden and which formed the basic idea for the shape. The material choice for the facade materialization was based on both the Swedish building tradition (using wood as finishing) and sustainability profile of the building. Resysta wood (rice based planks) have the qualities of regular wood while the colour of the element is more durable. The fact that the building has a dynamic facade which results in uneven external loads for aging and uneven colouring of the wood makes Resysta wood the right choice for providing the same architectural appearance as regular wood.

**FAÇADE COMPOSITION - NORTH IS FORMAL, SOUTH IS PLAYFUL, INFORMAL**

Considering the fact that the north side of the building faces the Chalmers campus and it has considerably low energy production, the north façade has a more formal composition. The south façade, on the other hand, is designed to be more playful, informal, and energy-producing elements are used to determine the façade composition.

**FLEXIBLE OFFICE SPACE**

The building has the ability to accommodate different users (up to 12) within the building.
Substantial part of the design is the reunion of the energy producing elements into the design. The design concept is that the system is a tool to save energy, but at the same time creates beauty. The system is made of several components using different techniques. The most important elements of the production are solar panels and photovoltaic systems.

Solar PV roof as a prominent architectural element. Roof of the main building is made of solar panels. This roof is the main element of the design and is a significant source of energy production. It creates a strong visual impact and enhances the aesthetic of the building. The roof is designed to maximize the energy production by following the sun path in the sky.

Dynamic façade system (north) – enhancing thermal resistance at night. In contrast to the south façade, north façade does not have high potential for energy production, but it requires certain (formal) aesthetics from architectural point of view. The wooden louvers create desired facade composition using energy producing elements. The most important feature of the façade is the ability of the louvers to change position according to the needs of energy production and thermal comfort. The louvers are opened during the day to provide shading and closed at night to enhance thermal resistance.

Experimental energy source – algae array. About 90 m² of the bio-photo-reactor has been incorporated in the self-shading double glass façade. This system is primary a sun shading system, but it also acts as an energy producing element (PV panel) and enhancing thermal resistance at night. The algae array captures the energy from the sun and converts it into electricity. This energy is then used to power the building.

Climate design as a part of interior design. The interior configuration is adapted to climate design. Atrium, in combination with a roof configuration act as a solar chimney in summer, providing the building with a natural ventilation and cooling. The interior configuration is designed to enhance energy production and thermal comfort.

Mechanical ventilation in the winter - controlling energy flows. Important aspect of the climate design for winter situation is the ability of the full control of the energy: heat recovery, heat storage. In this case natural ventilation is not the most energy efficient system. Therefore the success of the energy production concept is ground source heat pomp in combination with the heat and cold storage. This installation covers the heat and the cold needs during the year. Additional heat of the solar roofs enhances the heat balance and decreases recuperation time of the source.

Level 1
- lobby
- 9 m²
- reception office
- 68 m²
- Restaurant
- 331 m²
- Level 0
- open office landscape
- 182 m²
- open office space
- 102 m²
- services
- 23 m²
- Level -1
- experimental energy source – algae array
- 68 m²
- Level -2
- structure and construction - wooden structure, wooden floors, wooden façade walls.
- mechanical ventilation in the winter - controlling energy flows.
- structure and construction - wooden structure, wooden floors, wooden façade walls.
- Level 3
- 14400
- mechanical ventilation in the winter - controlling energy flows.
- Level 4
- solar energy, solar panels, solar PV roof.
- Level 5
- dynamic façade system (north) – enhancing thermal resistance at night.
- Level 6
- experimental energy source – algae array.

*GSHP *

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entrance fragment 1:50 facade fragment 1:20

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