In this graduation project I will make a redevelopment of the Q-Port building in a Hotel and Congress Centre. The main focus of my project lies on the recycling of an office façade into an energy producing façade. This means an architectural, social and economic improvement. These three aspects reflect my sustainable approach. On the other hand the reuse of the existing façade contributes for the Q-Port building to become a hybrid façade building. The new task of the façade is to be a link between the urban concept and the energy concept within the façade design. The re-design of the Q-Port building is linked to the historic urban planning strategy to be a green recreational area. Urban porosity is the key element of the new hybrid Q-Port building with the use of prefabricated modular units. The transformed Q-Port building becomes loneliness of new communities and new uses. The “GRÜNE LUNGE”, an open public space opens up for the public and guides the people through the building.ESME Calculation | Exemplary calculation of 3 office floors

**SBEM Calculation**

**Exemplary calculation of 3 office floors**

**Technical information**

**Building environment:**
- Total useful floor area: 1,200 m²
- Building density (in plan): 1,200 m²
- Roof area: 300 m²
- Building height: 10 m

**Building envelope:**
- U-value of external walls: 0.25 W/m²K
- U-value of windows: 1.0 W/m²K

**Heating system:**
- Central heating system

**Cooling system:**
- Air conditioning system

**Ventilation system:**
- Mechanical ventilation with heat recovery

**Energy performance:**
- **A**: Excellent
- **B**: Good
- **C**: Satisfactory
- **D**: Poor
- **E**: Unsatisfactory
- **F**: Very poor
- **G**: Very bad

**Building category:**
- Office building

**Benchmarks:**
- **A** (Exemplary): 100%
- **B**: 80%
- **C**: 60%
- **D**: 40%
- **E**: 20%
- **F**: 0%

**Overall energy demand:**
- **A**: 0 kWhe/m²
- **B**: 20 kWhe/m²
- **C**: 40 kWhe/m²
- **D**: 60 kWhe/m²
- **E**: 80 kWhe/m²
- **F**: 100 kWhe/m²
- **G**: 120 kWhe/m²

**Overall CO₂ emissions:**
- **A**: 0 kg CO₂/m²
- **B**: 20 kg CO₂/m²
- **C**: 40 kg CO₂/m²
- **D**: 60 kg CO₂/m²
- **E**: 80 kg CO₂/m²
- **F**: 100 kg CO₂/m²
- **G**: 120 kg CO₂/m²

**End use of energy:**
- **A**: 100%
- **B**: 80%
- **C**: 60%
- **D**: 40%
- **E**: 20%
- **F**: 0%

**End use of CO₂ emissions:**
- **A**: 100%
- **B**: 80%
- **C**: 60%
- **D**: 40%
- **E**: 20%
- **F**: 0%

**End use of energy demand:**
- **A**: 100%
- **B**: 80%
- **C**: 60%
- **D**: 40%
- **E**: 20%
- **F**: 0%
"GRÜNE LUNGE" | Benchmark for the Brettenzone

"GRÜNE LUNGE" | Recreation

"GRÜNE LUNGE" | Spreads upwards

"GRÜNE LUNGE" | Sequence of different scenarios

"GRÜNE LUNGE" | Visible from the street

"GRÜNE LUNGE" | Comes out in the north and spirals around the existing core
Summer:
- Night Cooling out of the building over the "Grüne Lunge" in the summer.
- Enhancement of the building storage mass by activated screed floors.

Media Facade:
- Colored glass with BIPV at the south side.

Natural Ventilation Concept:
- Natural ventilation over the "Grüne Lunge" is possible without noise and air pollution from the surrounding streets.
- In the Winter time preheated air will be transported from the south side of the building over an air guide system in the raised floors to the rooms in the north part of the building.
- In the Summer time cold air will be transported from the north side of the building over an air guide system in the raised floors to the rooms in the south part of the building.
- In addition, the air will be controlled and the temperature will be adjusted by Heat Exchangers over the Interseasonale Heatstorage of the Aquifer.
- Linked to Heat Recovery.
- Controlable Louver for an adjustable Ventilation Strategy depending on the weather conditions.

Air Control Unit / Air Guide System
- Oxygen Production
- Evaporative Cooling by the plants
Oxygen Production by the plants

Evaporative Cooling

Summer:
Night Cooling out of the building over the "Grüne Lunge" in the summer.

Enhancement of the building storage mass by activated screed floors.

Media Facade:
Colored glass with BIPV at the south side.

Linked to Heat Recovery.
Controlable Louver for an adjustable Ventilation Strategy depending on the weather conditions.