

# **The Solar Tower Project in Jülich**

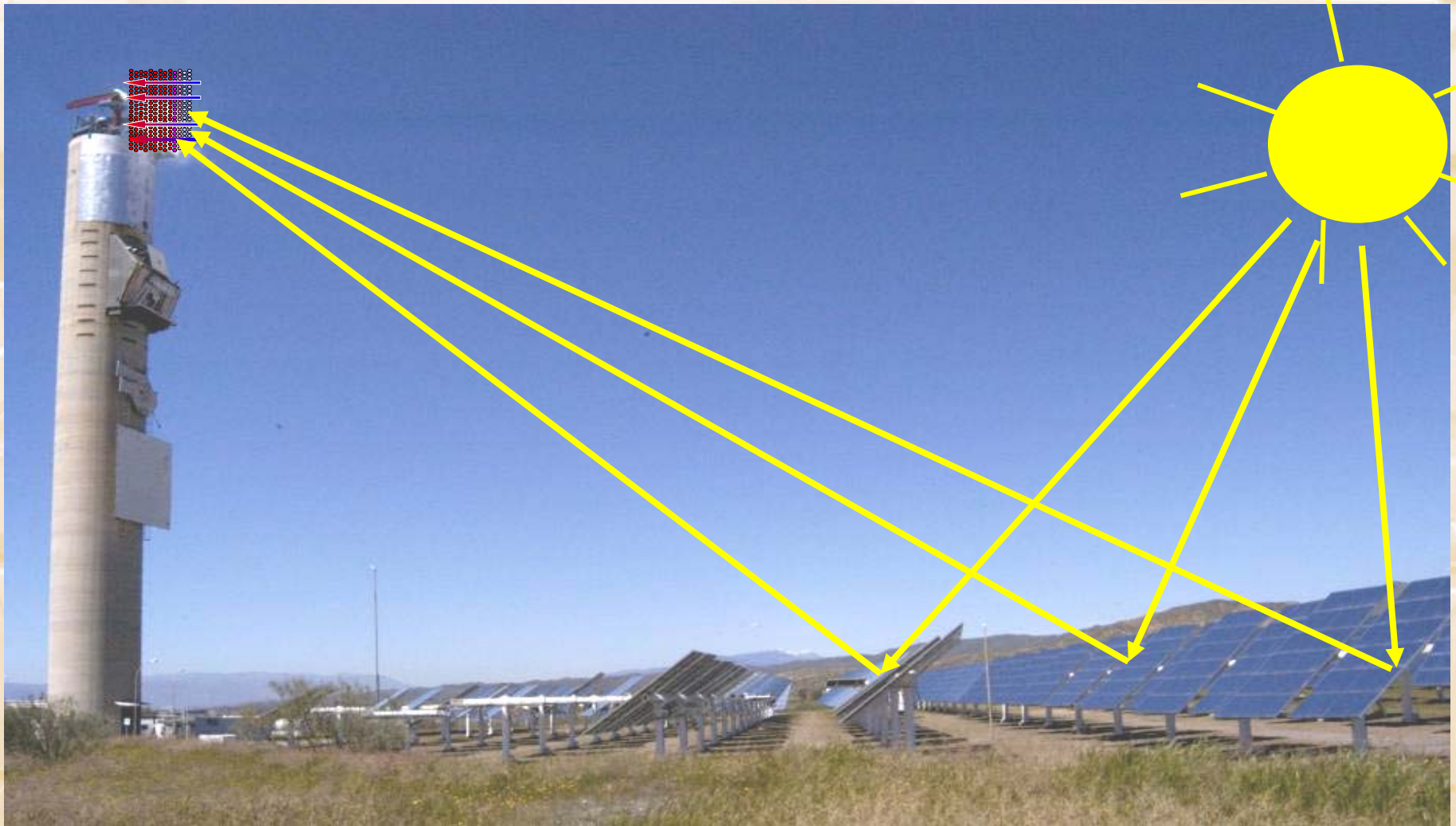
## **A Milestone to Commercialisation of Solar Thermal Power Generation**

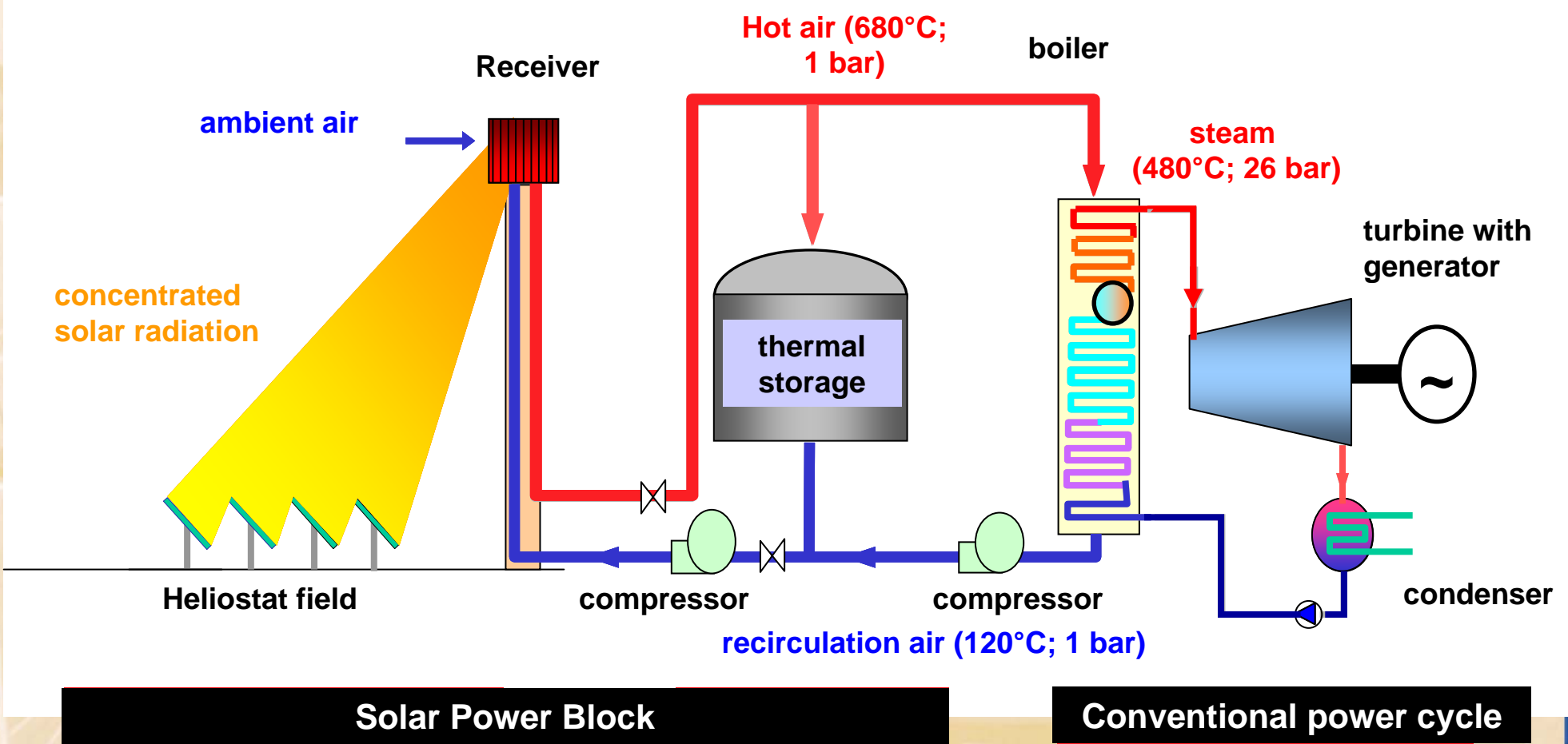
**Solar-Institut Jülich**

**FH Aachen**

**Prof. Dr.-Ing. Bernhard Hoffschmidt**

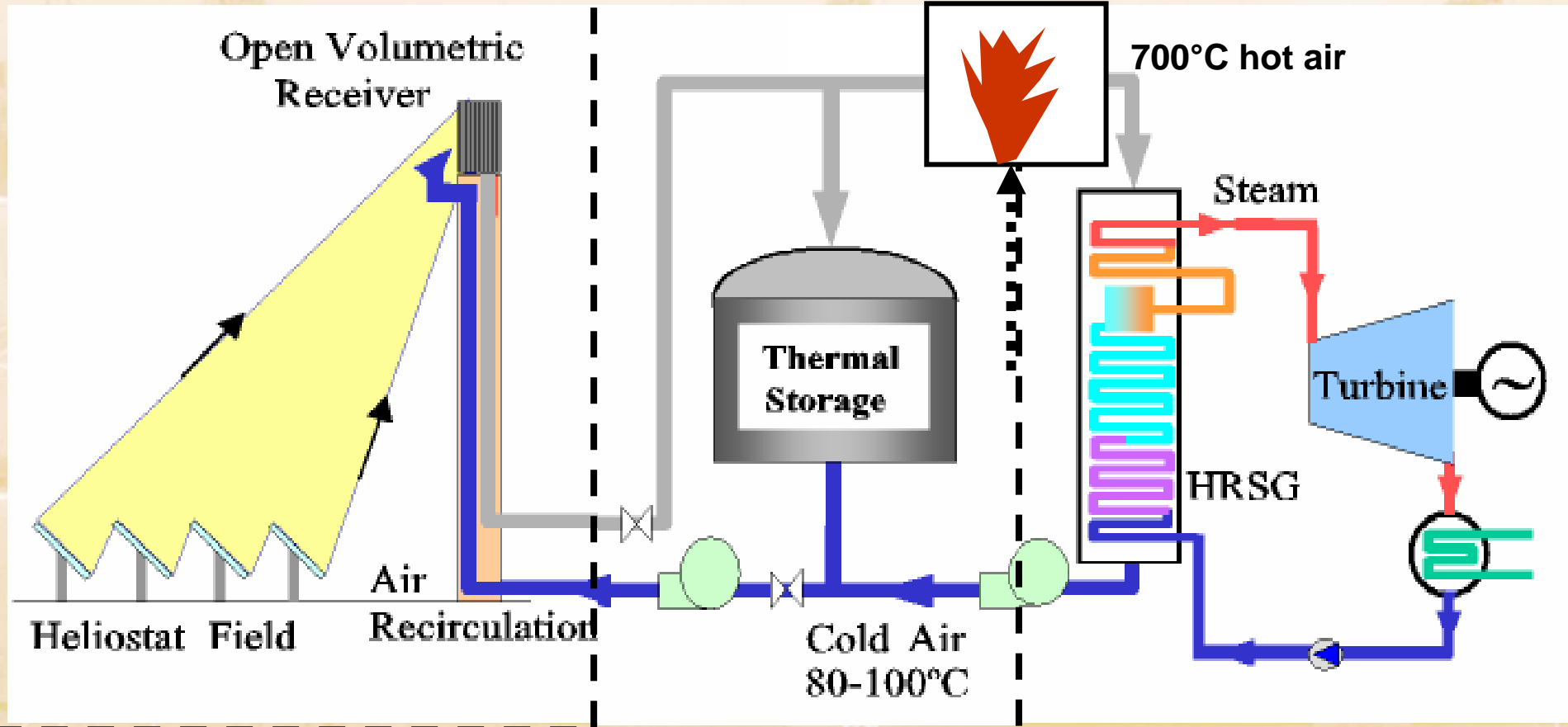




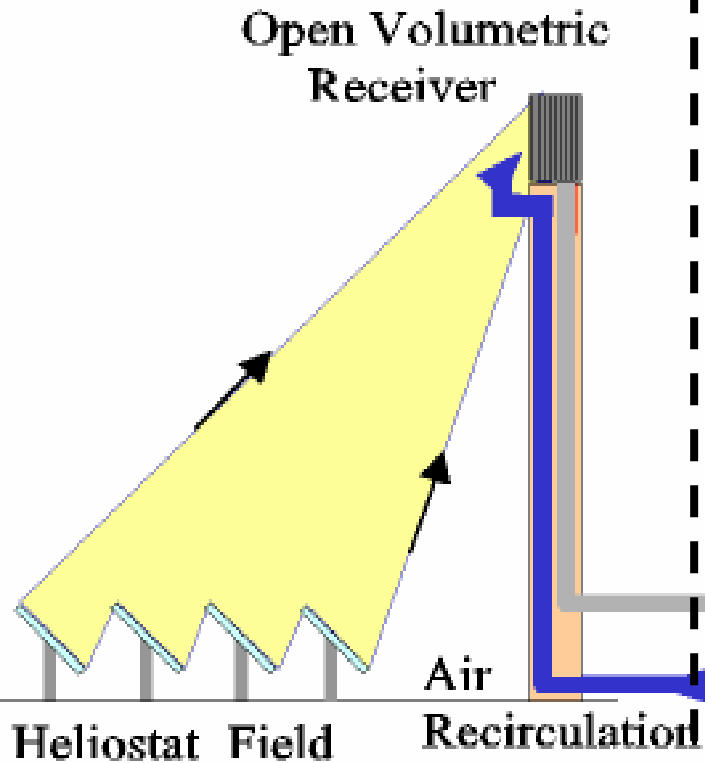


## Solar Power Block

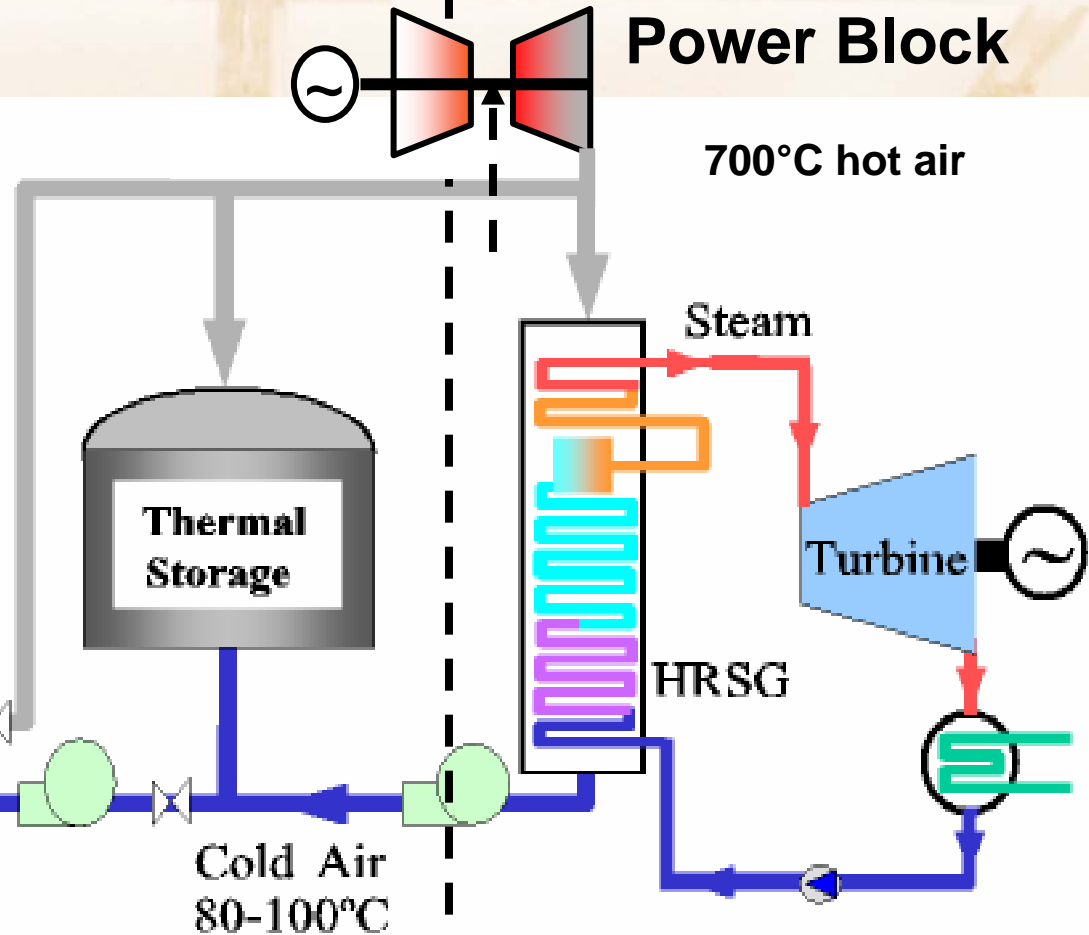
## Conventional Power Block



## Solar Power Block



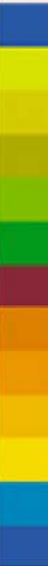
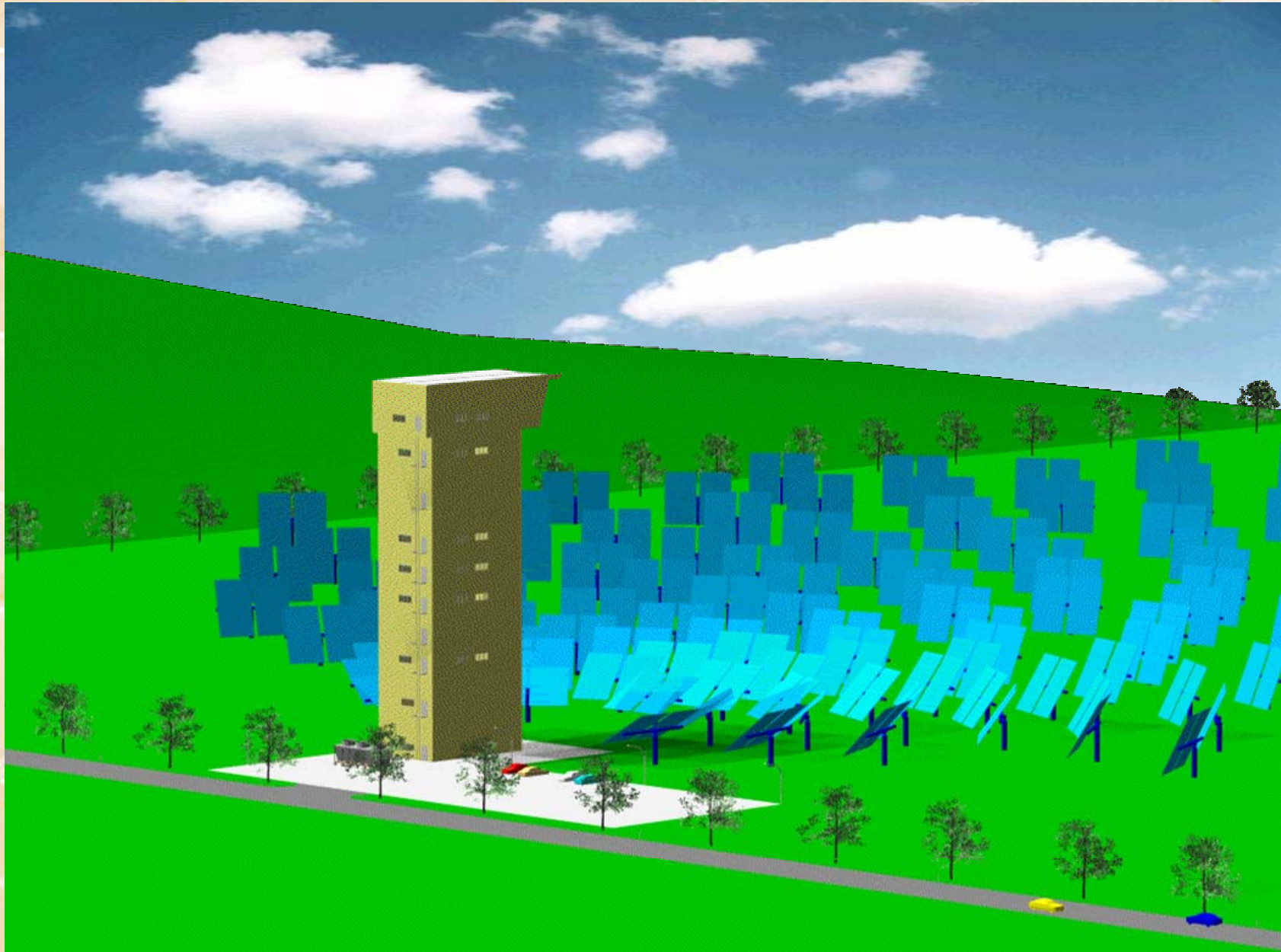
## Conventional Power Block



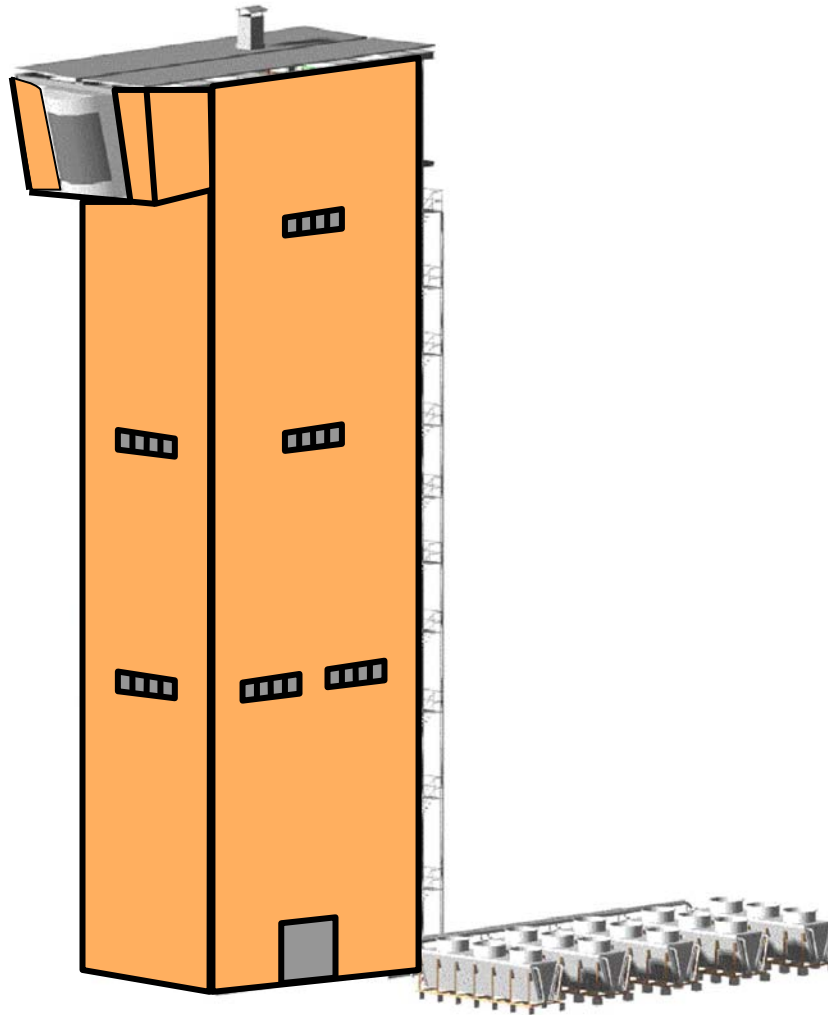
# Pilot plant - Movie

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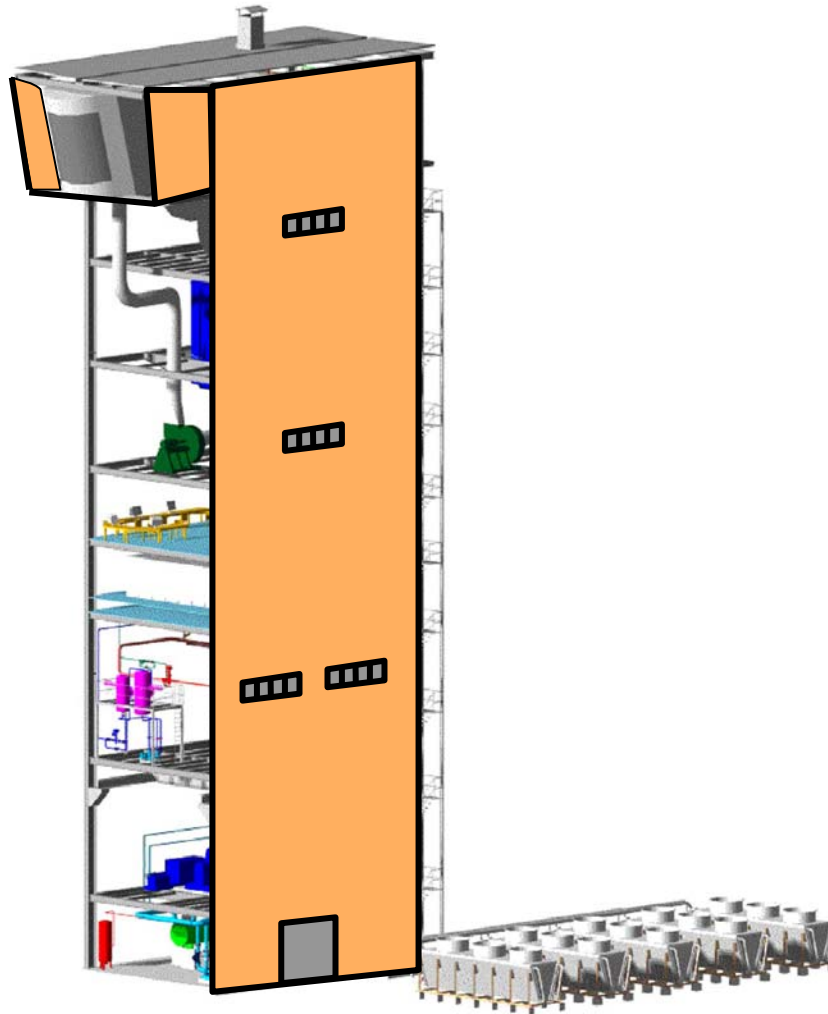


### Tower

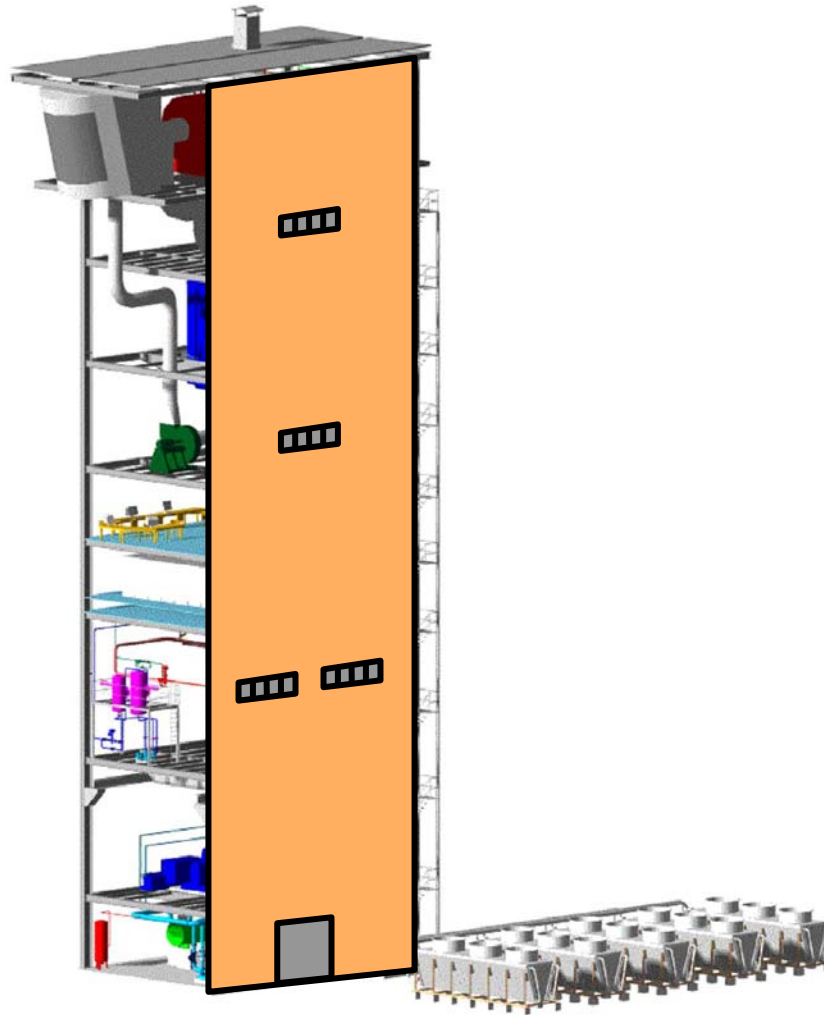




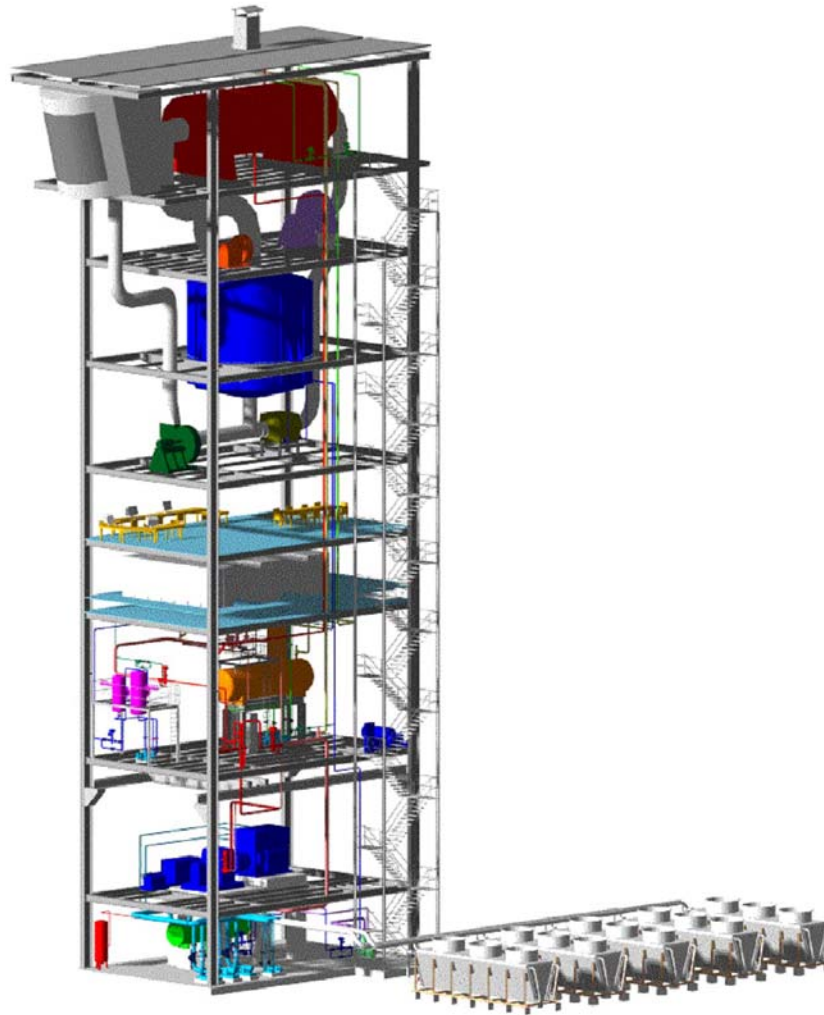
### Tower



### Tower

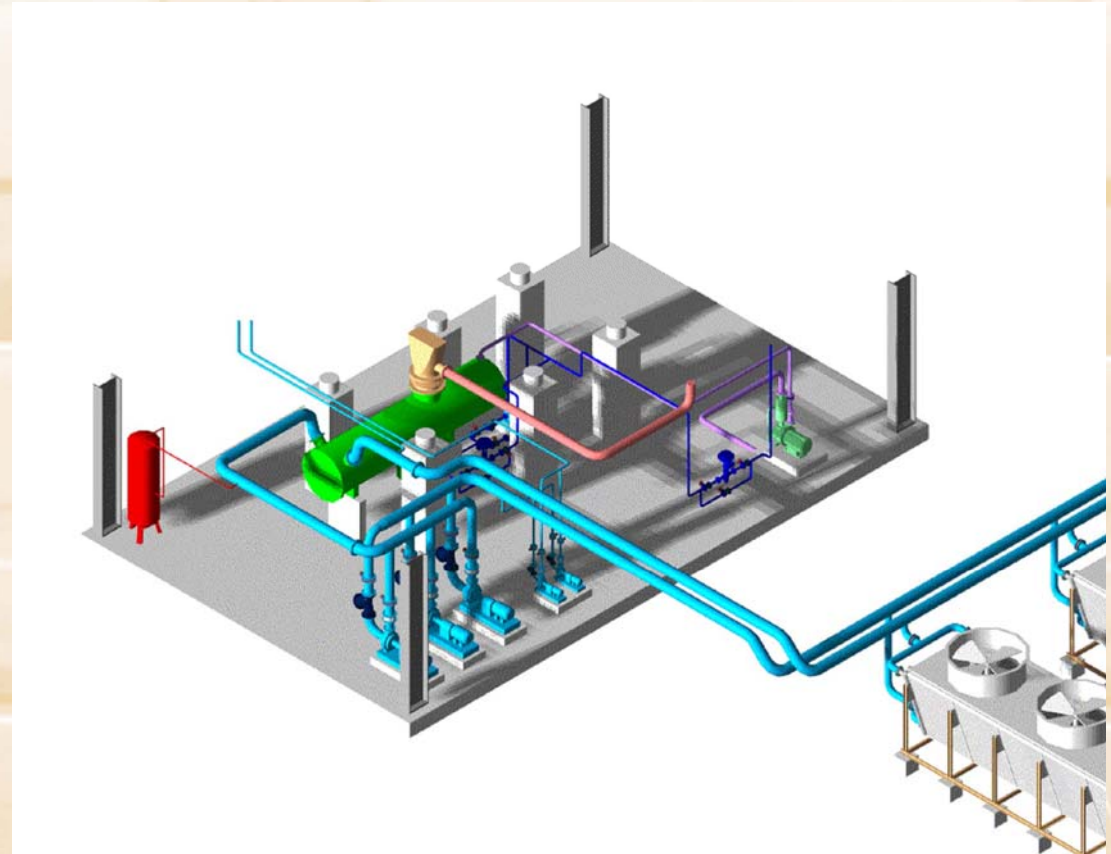


### Tower



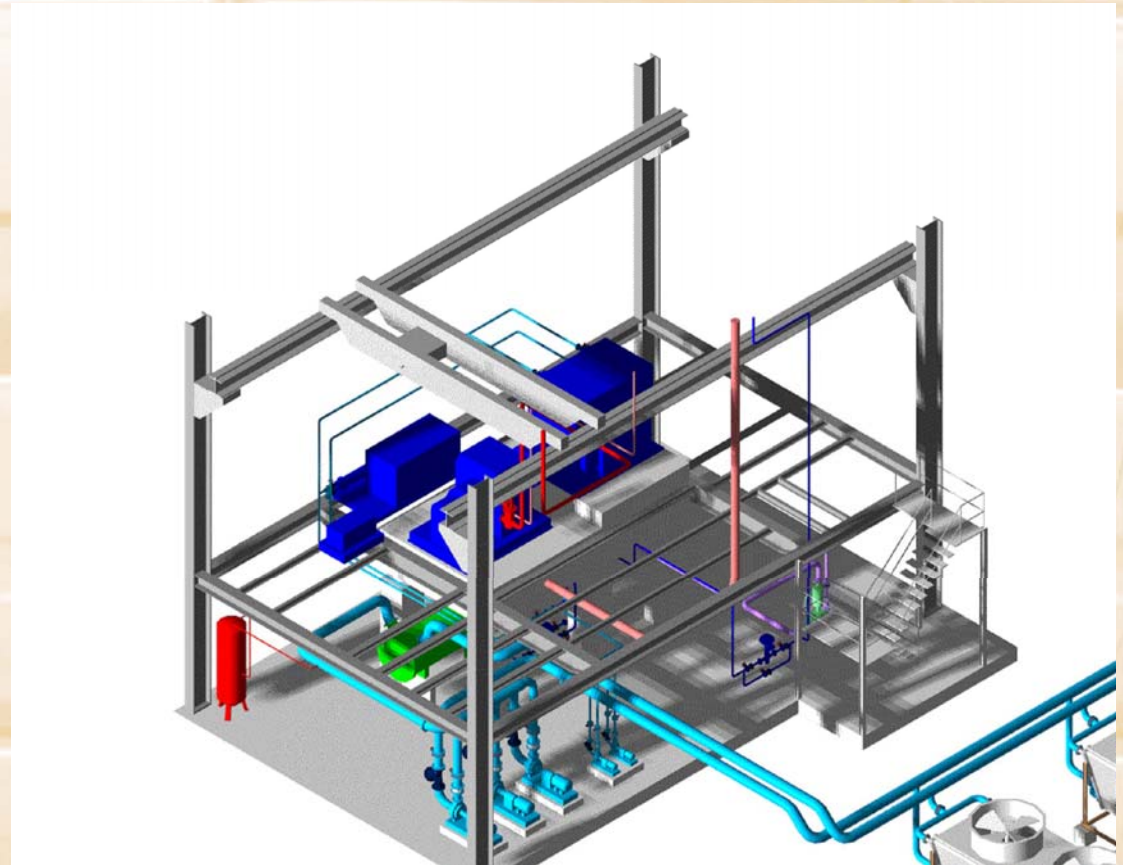
### Function: Condenser

- Condensation of wet steam
- Water-Air Cooler
- Usable for quick start up and shut done



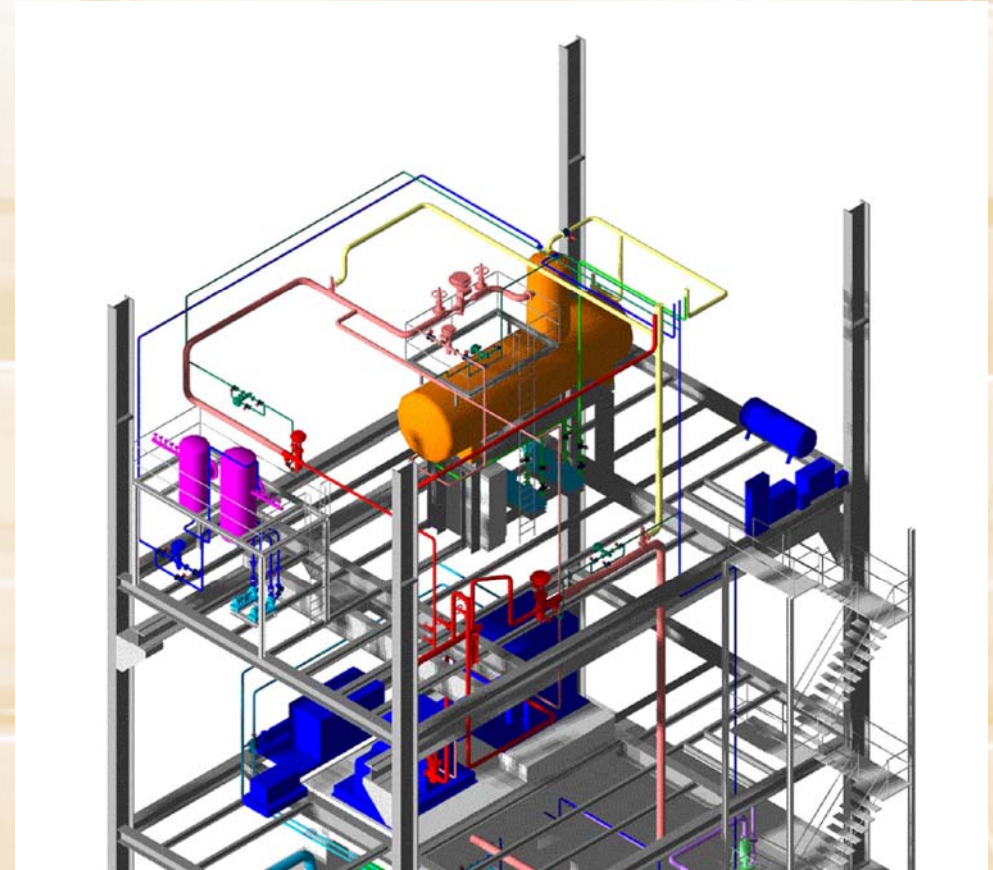
### Function: Turbine

- Production of electrical power
- Usable for quick start up and shut done
- Max. electrical power  
1500 kW



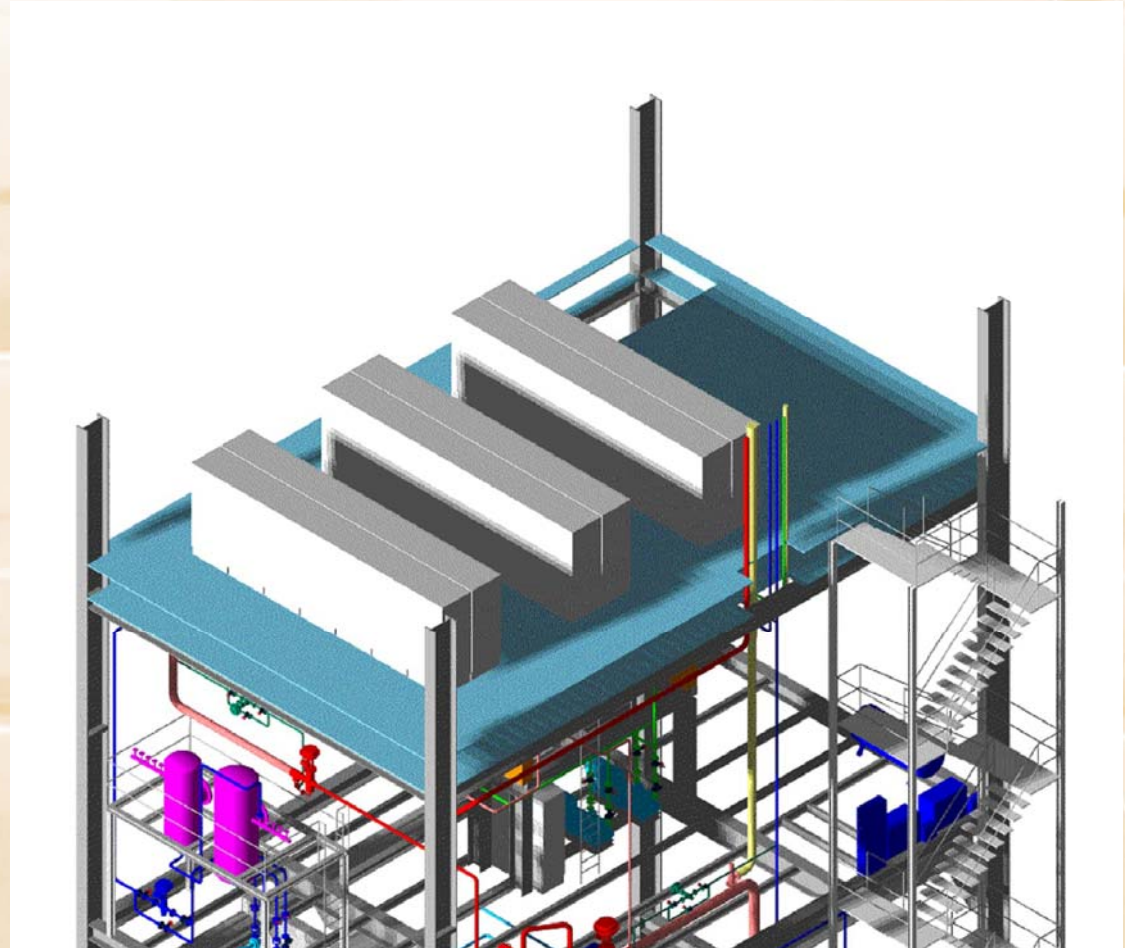
### Function: Water Treatment

- Water treatment of condensate for re-feeding into the boiler
- Usable for quick start up and shut done



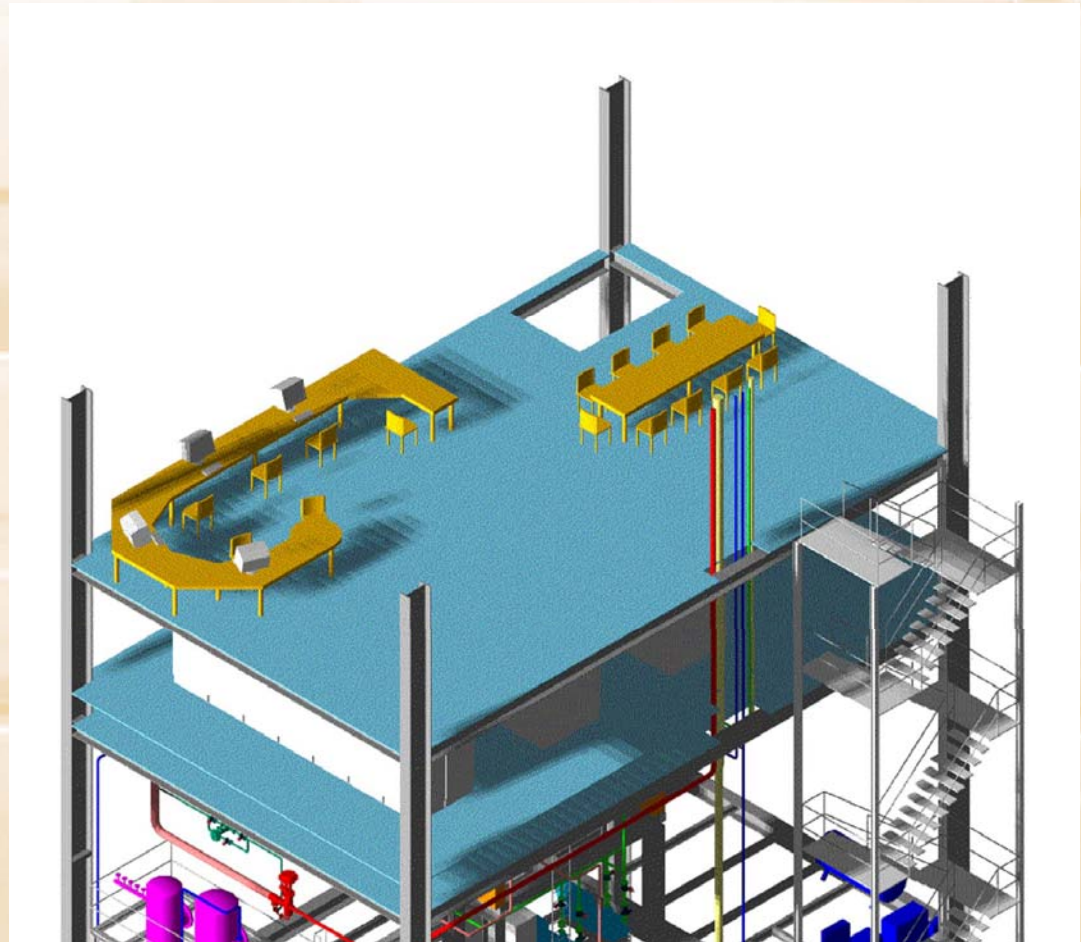
### Function: Powerhouse

- Junction of all data lines
- Processing
- Documentation



### Function: Control Center

- Control of plant
- Visualization of operational and sensor data





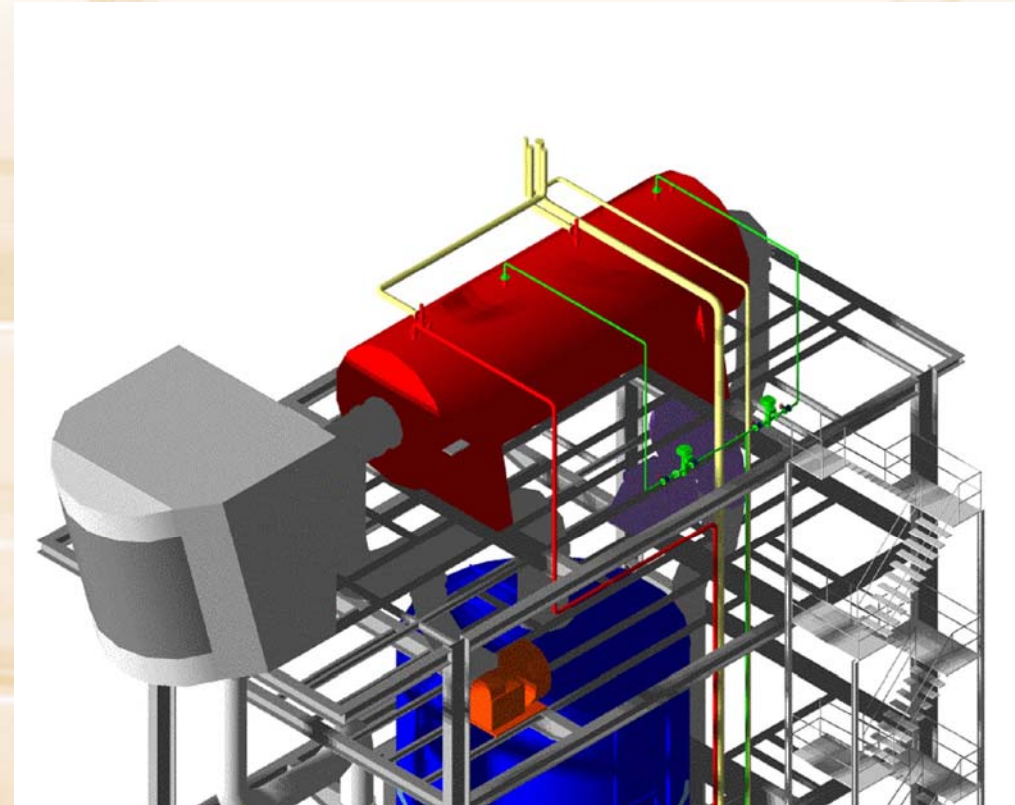
### Function: Storage

- Compensation of fluctuating radiation
- Keeping operation temperature during non operation
- Capacity 1 hour of nominal operation



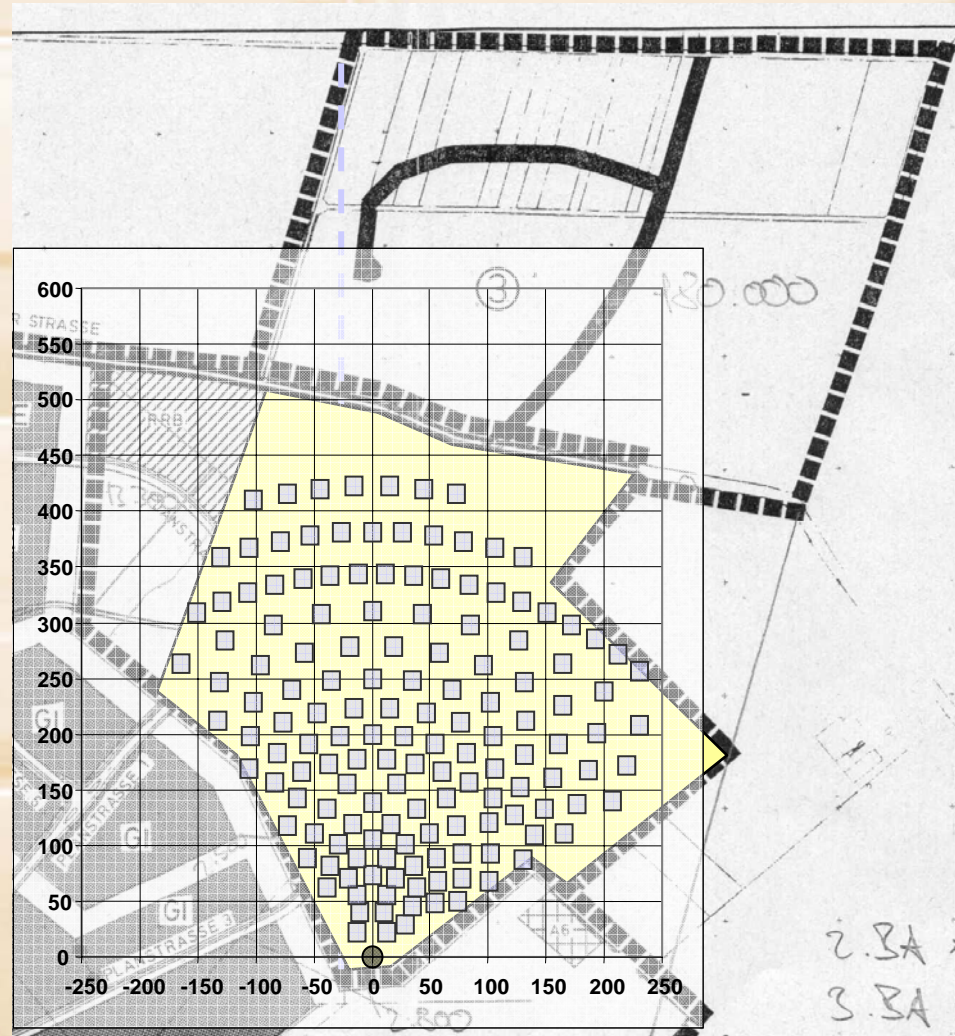
### Function: Receiver and Steam Generator

- Receiver (conversion of radiation energy in to hot air of 700°C)
- Energy ducting from receiver to the steam generator and storage
- Controlled vans, hot air distribution to steam generator and storage



### Function: Location

- Adaptation to local topography
- Selection of heliostats (mirrors) position
- Fixing of tower dimension



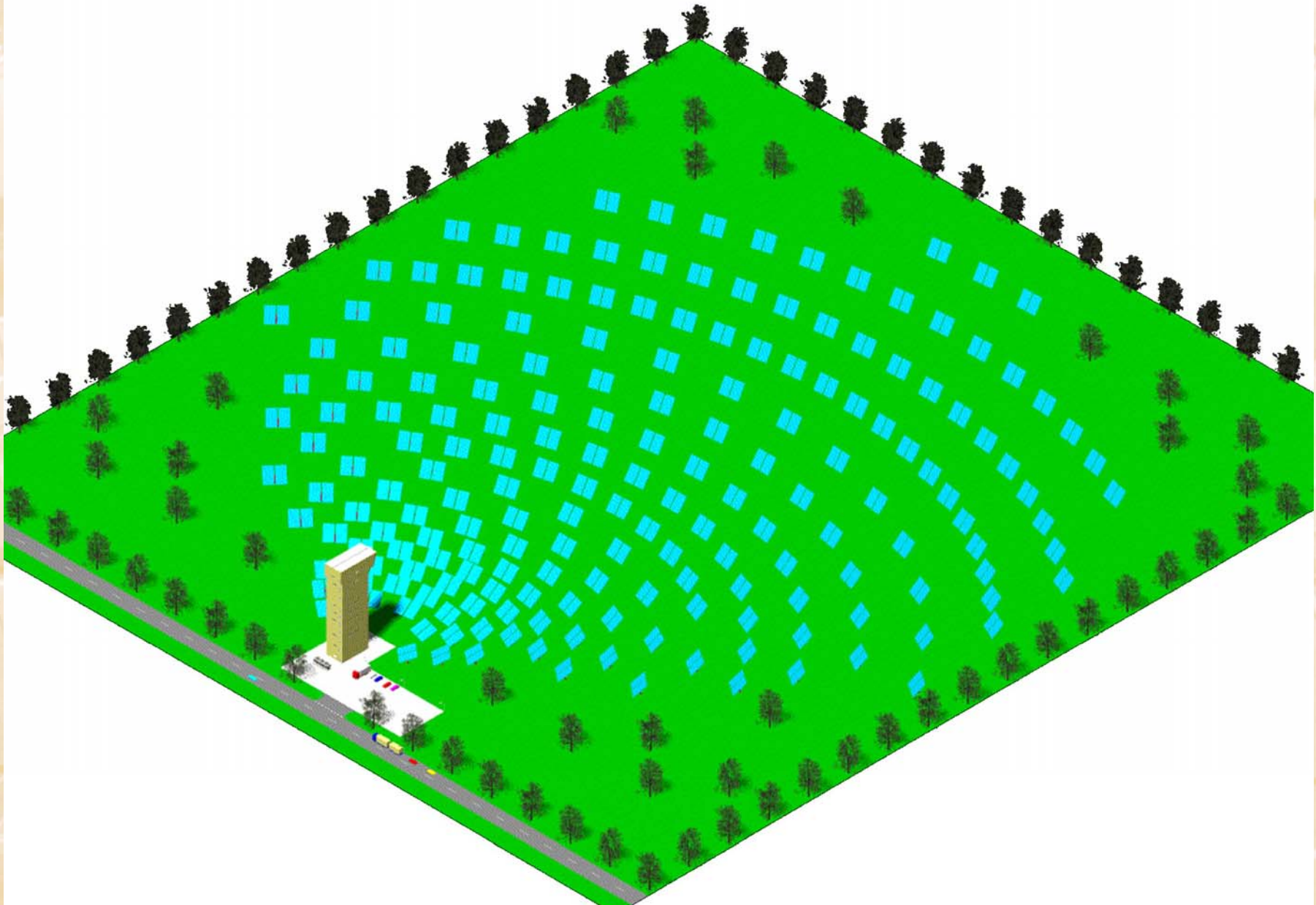
### Performance of Plant in Jülich

- **Maximal Electrical Power:** 1,5 MW
- **Solar Radiation / DNI** 800 kWh/m<sup>2</sup>a
- **Solar Multiple** 1,2
- **Full Load hours** 1000 h
- **Energy Production** 1000 MWh/a
- **Ground Demand** 18 ha (Algeria 6-8 ha)

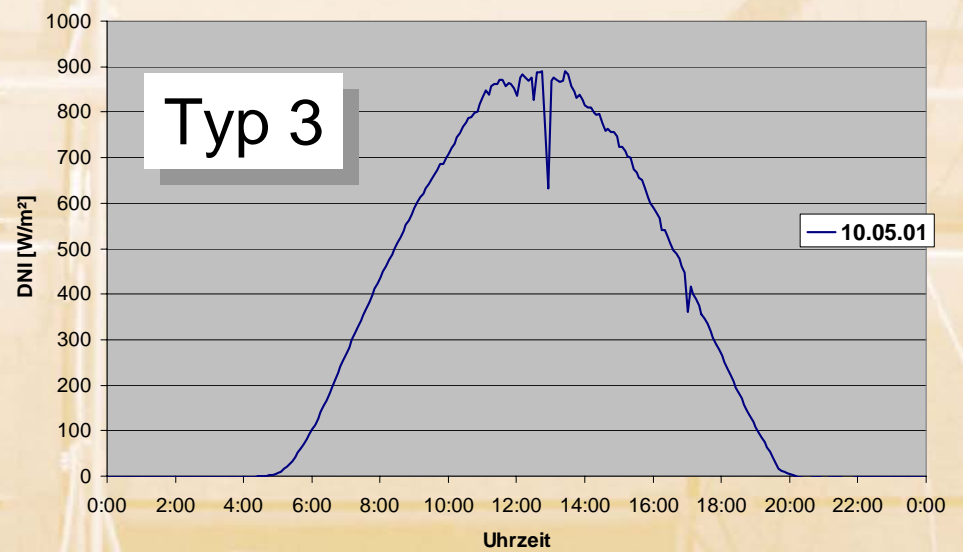
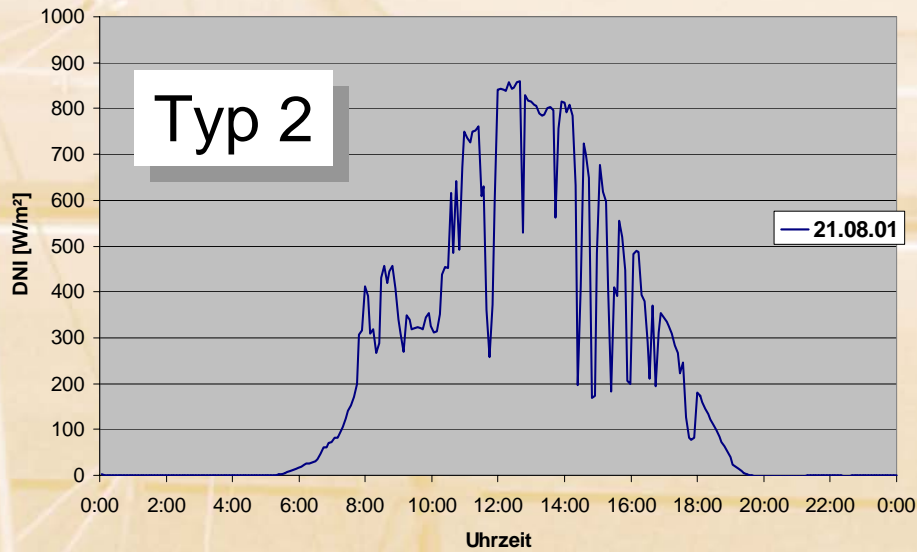
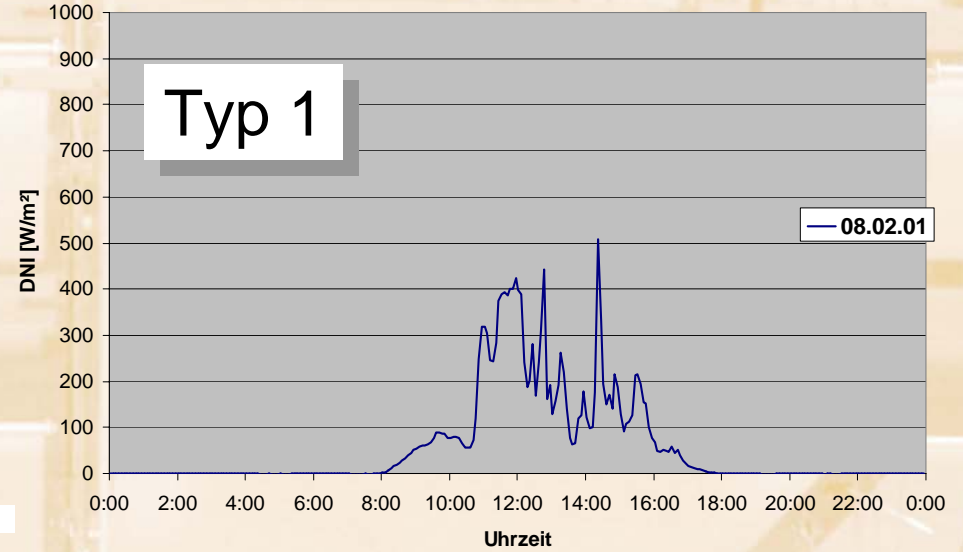
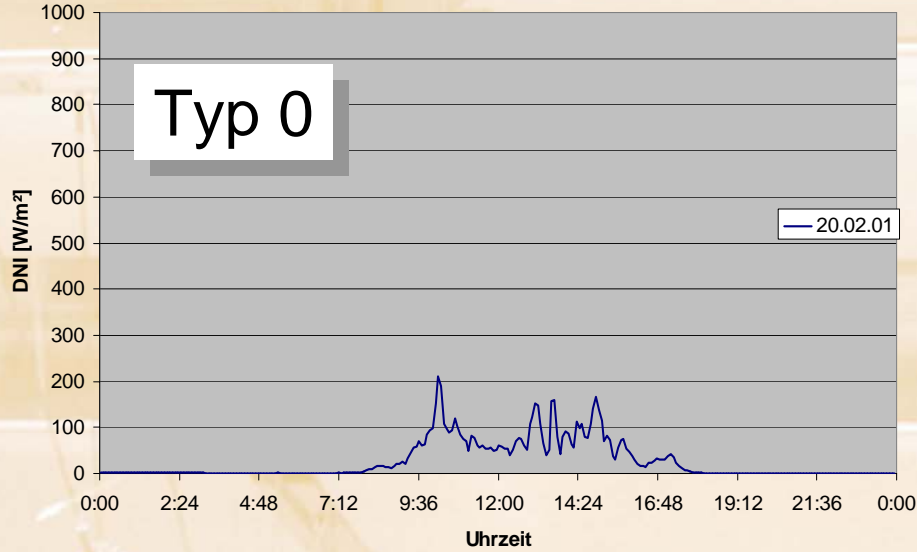


# Machbarkeitsstudie: Gesamtanlage

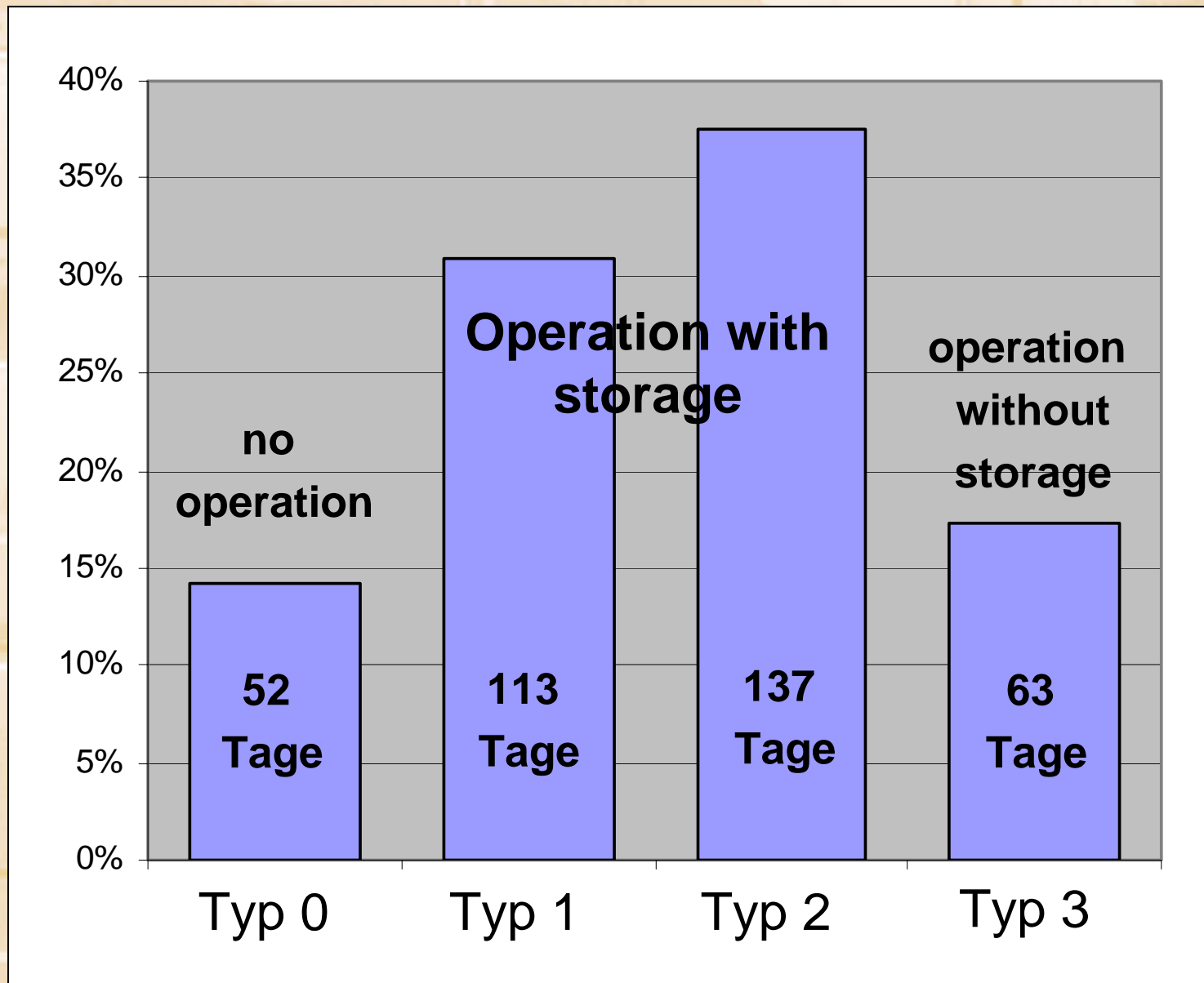
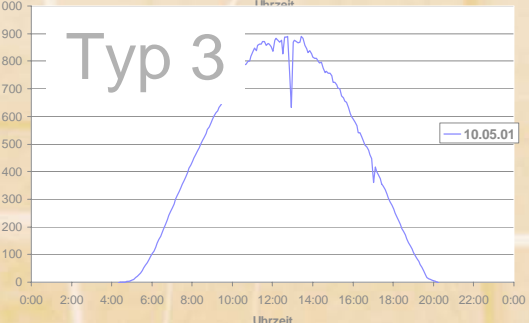
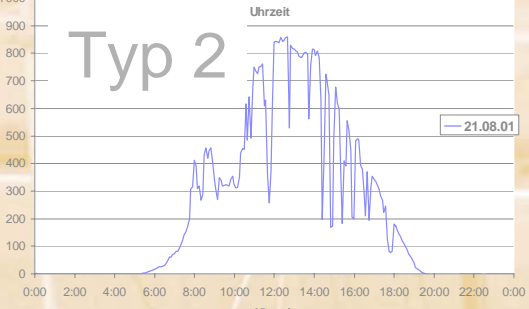
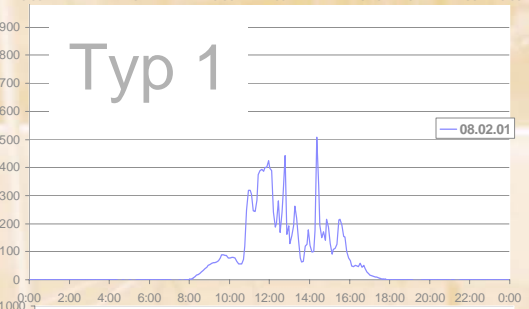
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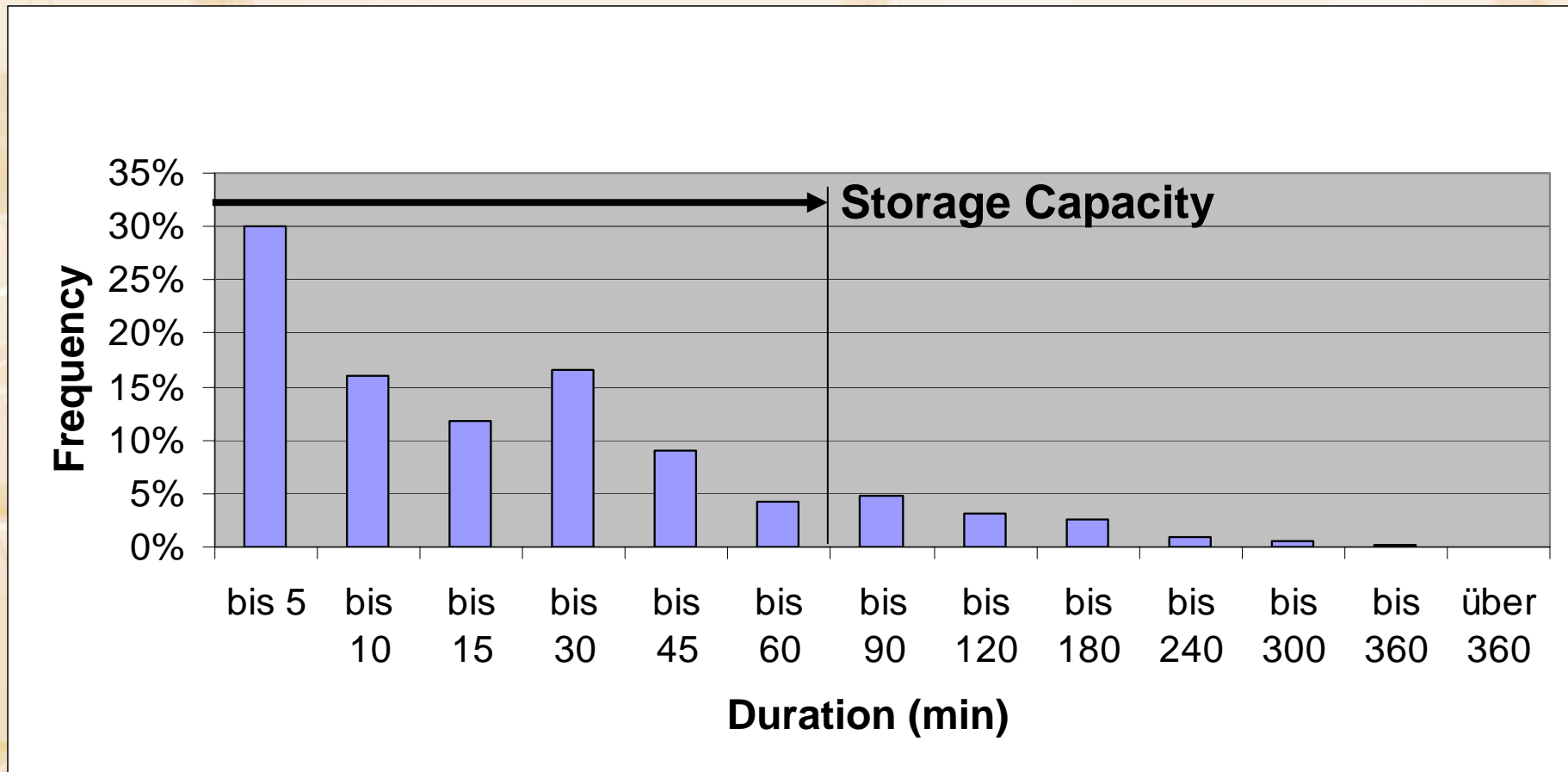
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Direktorstablung



## Relative frequency of radiation gaps





### Integration of a research platform

- Material tests under concentrated radiation ( $<2 \text{ MW/m}^2$ )
- Absorber design
- Sensor system and control strategies
- Development of the system components
- Direct Hydrogen production/ synthetic fuels

