Sheikh Zayed Desert Learning Center

Innovative Gebäudetechnik

Klaus Kogler
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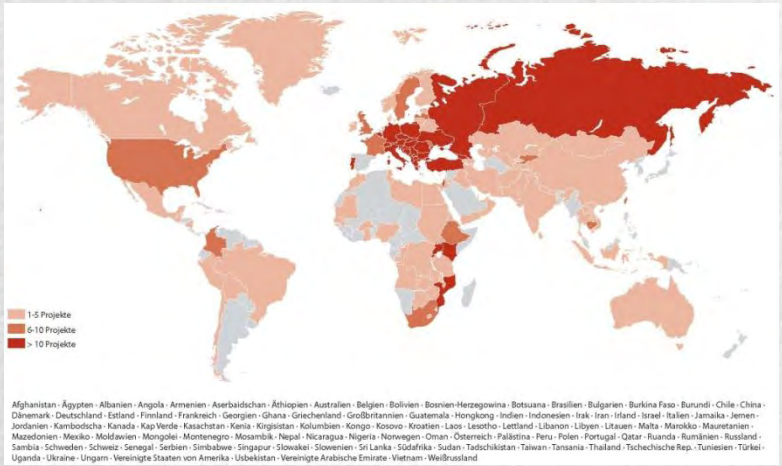
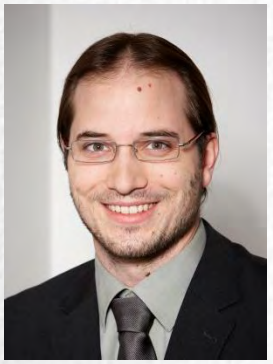
Wer sind wir?

- iC clean energy solutions GmbH => ab 2014: CES clean energy solutions GmbH
- Hintergrund: Expertenteam für “Neue Dienstleistungen” der iC group of companies im Bereich Energie und Umwelt
- Abteilungen:
  1. Innovative Gebäudetechnik, F&E
  2. Energieeffizienz
  3. Wasserkraft
  4. Anlagenbau
  5. Umwelt



Meine Person



- Klaus Kogler
- Gruppenleitung Innovative Gebäudetechnik, F&E
- Leitender Experte:
  - Gebäudezertifizierung, LEED, BREEAM; ÖGNB; ÖGNI; DGNB
    Green Building, Estidama, QSAS
  - Energieeffizienz
    Low Carbon MEP Design, Revit/BIM Services,… in Neubau und Bestand
  - Innovationsmanagement
    Lebenszykluskostenverfizierung (durch Monitoring), Energie, Enregieeffizienz, Smart Cities und Technologieberatung
- Kontakt:
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  - k.kogler@ic-ces.at

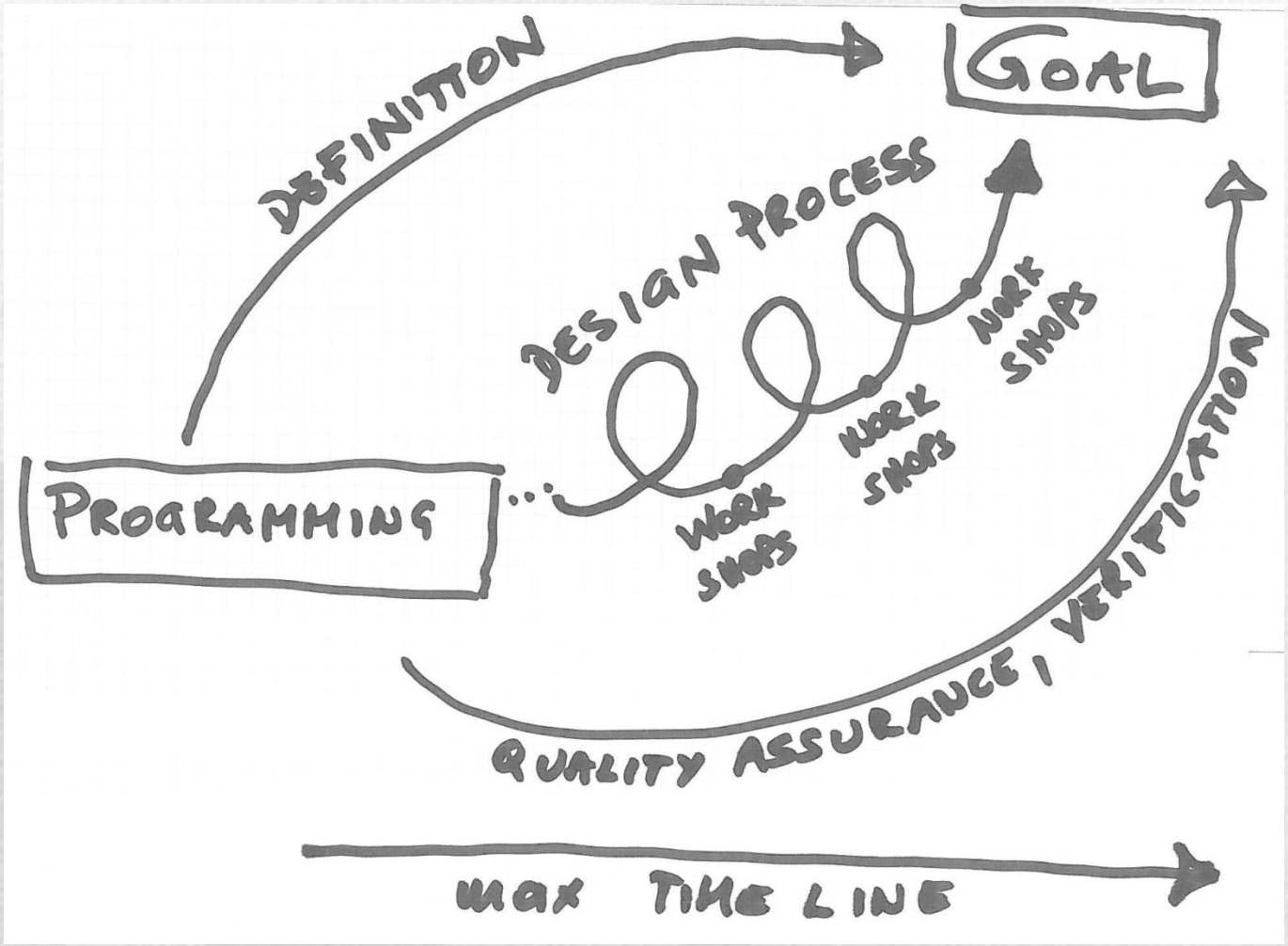
Technische Gebäudeausrüstung (TGA)

- Man sieht sie nicht
- Man hört sie üblicherweise nicht
- Man spürt sie nicht, außer es funktioniert etwas nicht

Technische Gebäudeausrüstung (TGA)

- 25 % - 50 % der Investitionskosten fliesen in die TGA
- ca. 80 % der Objektfolgekosten resultieren aus der TGA und sind hierüber beeinflussbar

Innovative Gebäudetechnik



Innovative Gebäudetechnik SZDLC

MEP Coordinated Detailed Design

Key components of MEP design are listed in vertical order below. On the horizontal axis events with significant influence on at least one field of activity are listed. A change in colour indicates a change in the basic concept within the respective field. Thus the table below shows the most significant changes on the conceptual design during the overall design process, till 100 % coordinated detailed design.

	Variety of technologies available (MEP concept status)	MEP Workshop, Vienna, 29.08.2008	MEP, Water Summit in Al Ain, 13. - 16.09.2008	MEP Workshop, Vienna, 07.10.2008	MEP Workshop, Vienna, 24.10.2008	MEP 50 % Schmatic Design , 06.11.2008	MEP 100 % Schmatic Design , 17.12.2008	MEP 100 % Coordinated Detail Design, 08.05.2009
HVAC, Air Intake and Ventilation	Mechanically forced ventilation, also throughout the exhibition areas	No change	No change	No change	No change	No change	No change	Mechanically forced ventilation, also throughout the exhibition areas
	Natural ventilation for exhibition areas	It is expected being technically not feasable						
	Natural ventilation with climatic zones for exhibition areas	No change	No change	It is expected being technically not feasable				
	Concrete core activation, water/air based	No change	No change	No change	No change	No change	Concrete core activation, water/air based	Concrete core activation, water based
HVAC, Cooling System	Free cooling via utilization of ground water	No change	No change, but discussion on availability of ground water	No change, but discussion on availability of ground water	No change, but discussion on availability of ground water	No change, but discussion on availability of ground water	Free cooling via utilization of ground water	No utilization of ground water due to legal restrictions
	Conventional, chiller based	1. choice backup for solar cooling, ca. 50 % coverage	Increase to 100 %, but ecological operation mode via solar cooling	100 % load coverage, but bivalent mode via solar cooling	No change	No change	No change	100 % load coverage, but bivalent mode via solar cooling
	Solar cooling, water based	1. choice covering primary load	Solar cooling for ecological operation mode, ca. 30 % coverage	300-400 kW solar cooling for concrete core activation and eco-mode	No change	No change	No change	300-400 kW solar cooling for concrete core activation and eco-mode
	Solar cooling, electricity based	No change, remains as an option	No change, remains as an option	Photovoltaic for pump opartion and lighitng only	No change	No change	No change	Photovoltaic for pump operation and lighting
	Solar cooling, Fresnel	No change, remains as an option	No change, remains as an option	Technical feasibility => preference is given to solar cooling water based				
				Introduction of air based free cooling	No change	No change	No change	Air based free cooling
				Introduction of dessicant recuperation weels	No change	No change	No change	Desiccant recuberation weels
Sanitary and Sewage System	Standard installations	Stormwater, greywater reuse, blackwater to sewer	No change	Stormwater, greywater reuse, blackwater treatment via local facility	No change	No change	Stormwater, greywater reuse, blackwater treatment via local facility	Stormwater, greywater reuse
	Water saving installtions, incl. water free urinals	No change	No change	Vaccum based water saving installations	No change	No change	Vaccum based water saving installations	Vaccum based water saving installations, and water free urinals
Electrical Engineering, BMS	Energy efficient lighting	No change	No change	No change	No change	No change	No change	Energy efficient lighting
	BMS	No change	No change	No change	No change	No change	BMS	BMS incl. predictive weather control
Fire Protection	Sprinkler System	No change	No change	No change	Water mist system througout the building	Water mist system througout the building	A mixture of mist and sprinkler system has to be applied	A mixture of sprinkler and inert gas has to be applied
	Mechancially forced smoke removal in the atrium	No change	No change	No change	Mechanically forced smoke removal required in one starehouse only	Mechanically forced smoke removal required in one starehouse only	Pressurised stairhouses and foreced smoke removal in certain areas	Pressurised stairhouses and foreced smoke removal in certain areas
	Increase in number of fire compartments	No change	No change	No change	Number of fire compartement can significantly be reduced	No change	No change	Number of fire compartements can significantly be reduced

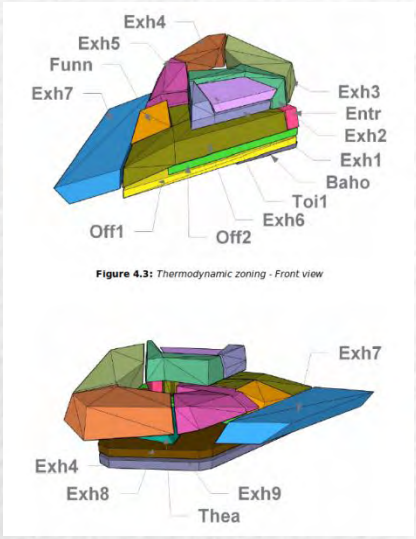
Planungsleistungen iC

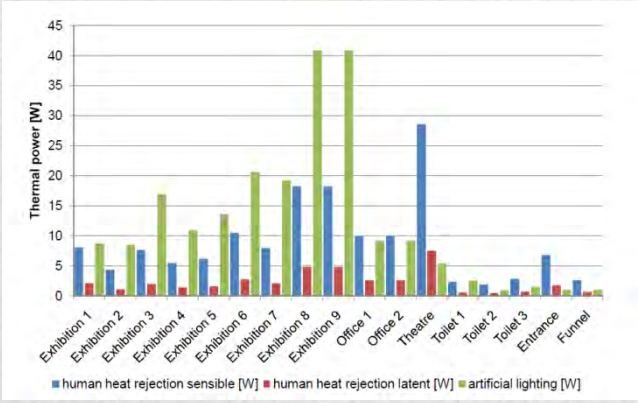
- Lüftung
- Klimatisierung
- Sanitär
- Elektrotechnik
- Gebäudeleittechnik
- Simulationsleistungen
- Brandschutz
- Sicherheitstechnik
- Kommunikationstechnik
- Bauphysik
- Akkustik

17+ Fachbereiche, 15 Senior Staff, 25 Engineers

Wo beginnen wir?

- Definition der Anforderungen / Kundenwunsch (21/40 bei 45/33)
- LEED Platinum, Estidama 5 Pearls
- Zonenmodell
- Belegungsprofile
- Lastprofile
- Bauphysik
- Gebäudetechnik
- Simulationen





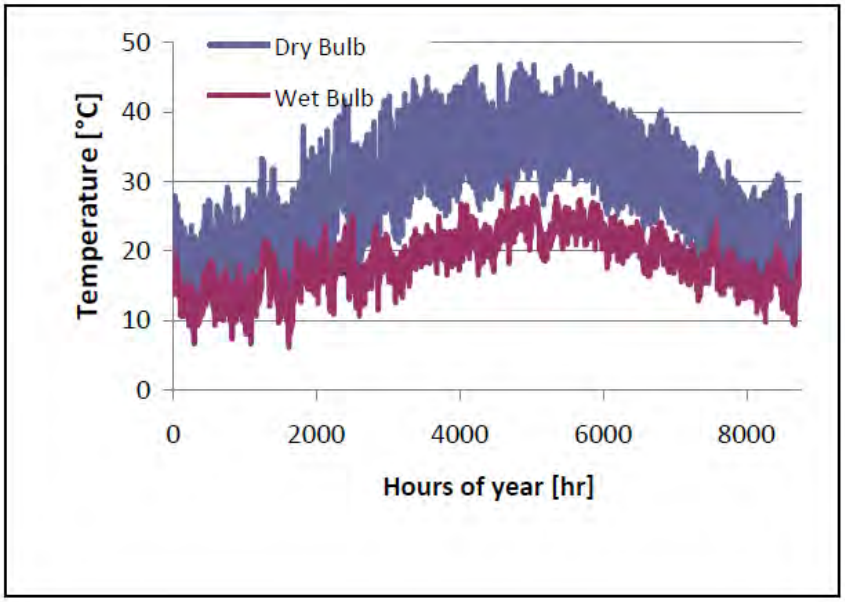
Technische Highlights im SZDLC

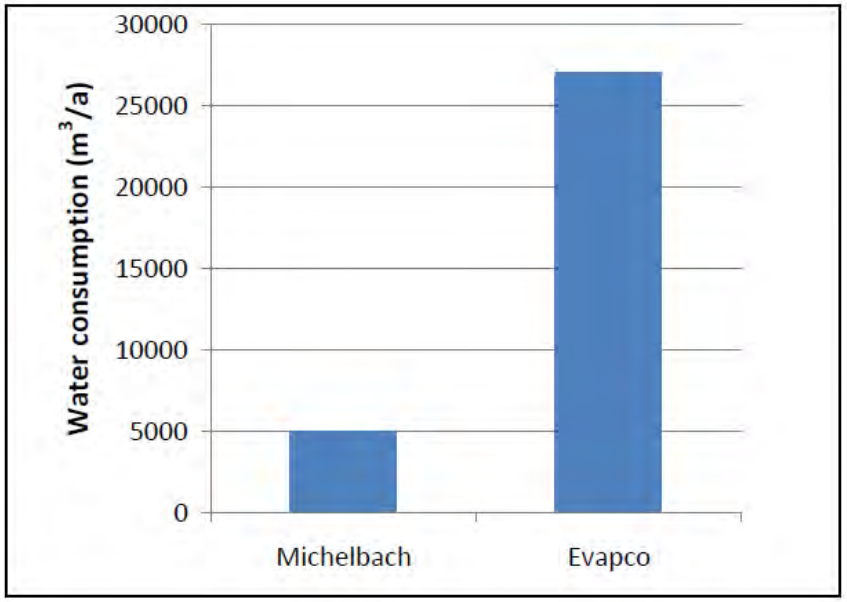
- Erstmalige Implementierung von Vacuumtoiletten im Emirat AbuDhabi
- Erstmalige Implementierung eines Erdwärmetauschers in den VAE
- Erstmalig Betonkernaktivierung mit einer Fläche von über 100 m²
- Erstmalige Verwendung von Adiabatischen Kühltürmen
- Die erste funktionierende Solarthermische Absorptionskühlung in den VAE

Wasser (1 m³ Trinkwasser = 4 kWhel)

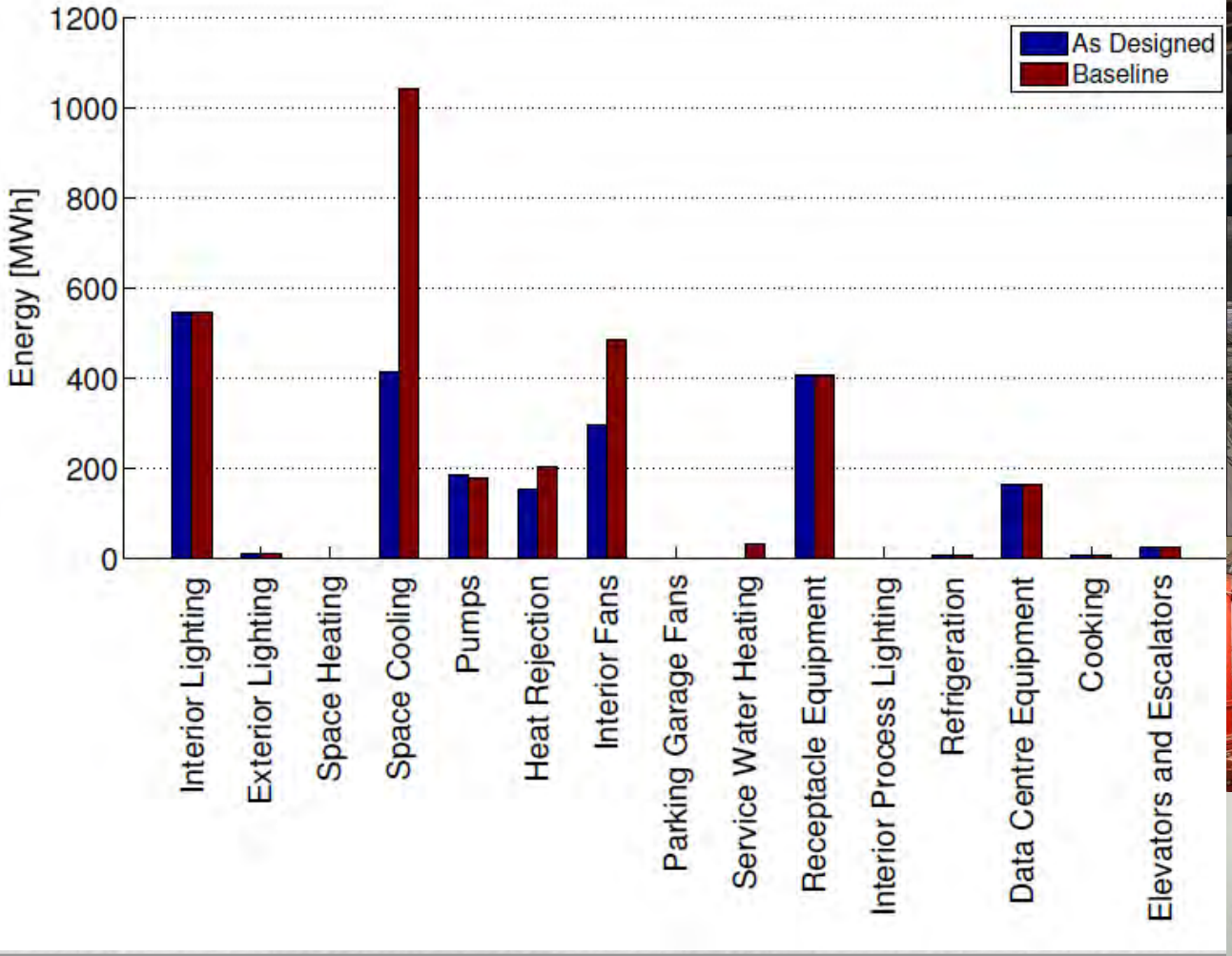
- 80 % Einsparung an Trinkwasser durch
  - Verwendung von gereinigtem Wasser der Kläranlage für die Rückkühlwerke
  - Aufbereitung von Grauwasser
  - Energiesparармaturen und Vacuumtoiletten
  - Verwendung des Kondensatwassers aus den Lüftungsanlagen
  - Verwendung von Regenwasser

Wassereinsparung Kühlturm

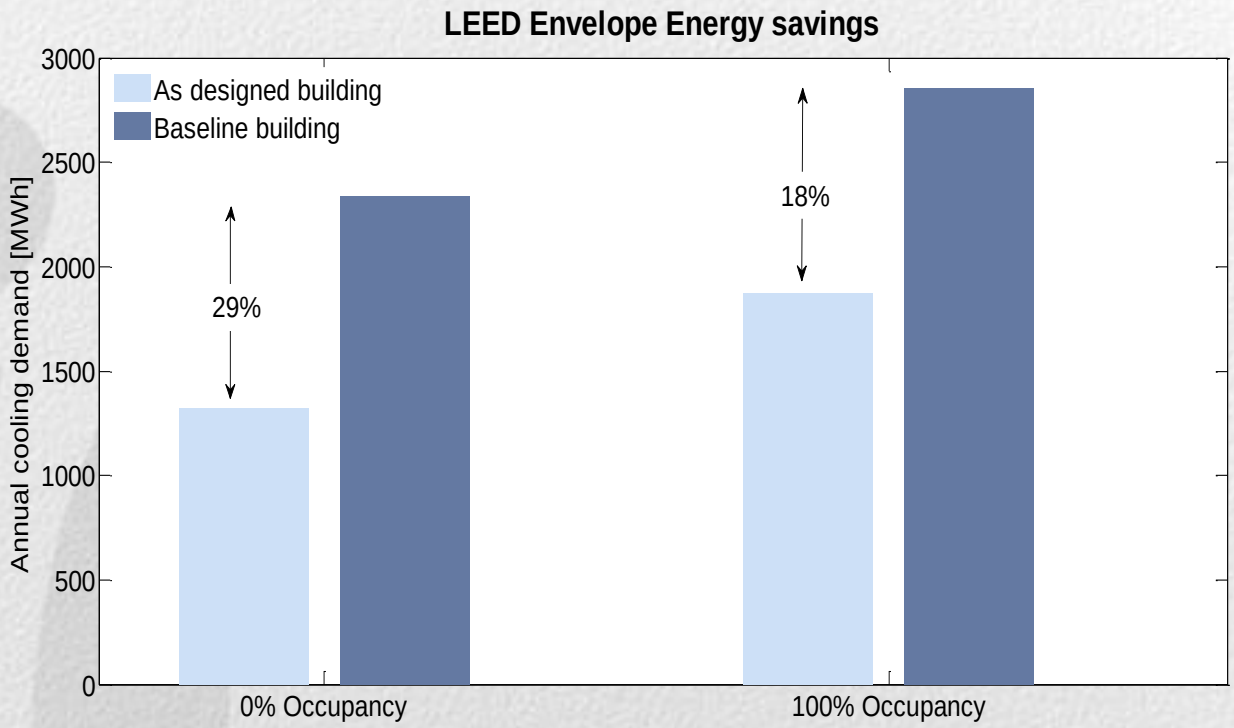




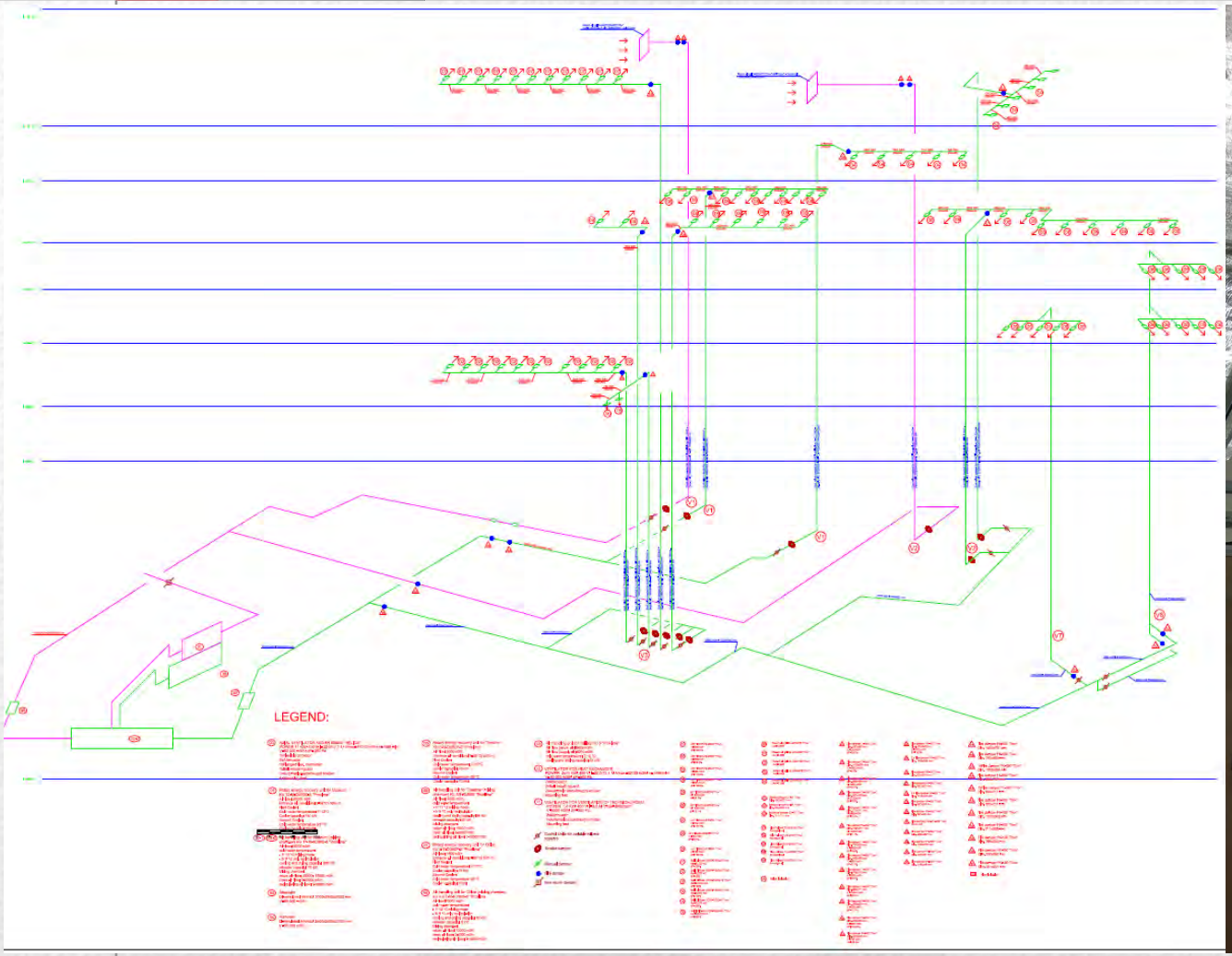
Energieeffizienz



Gebäudehülle



Lüftung



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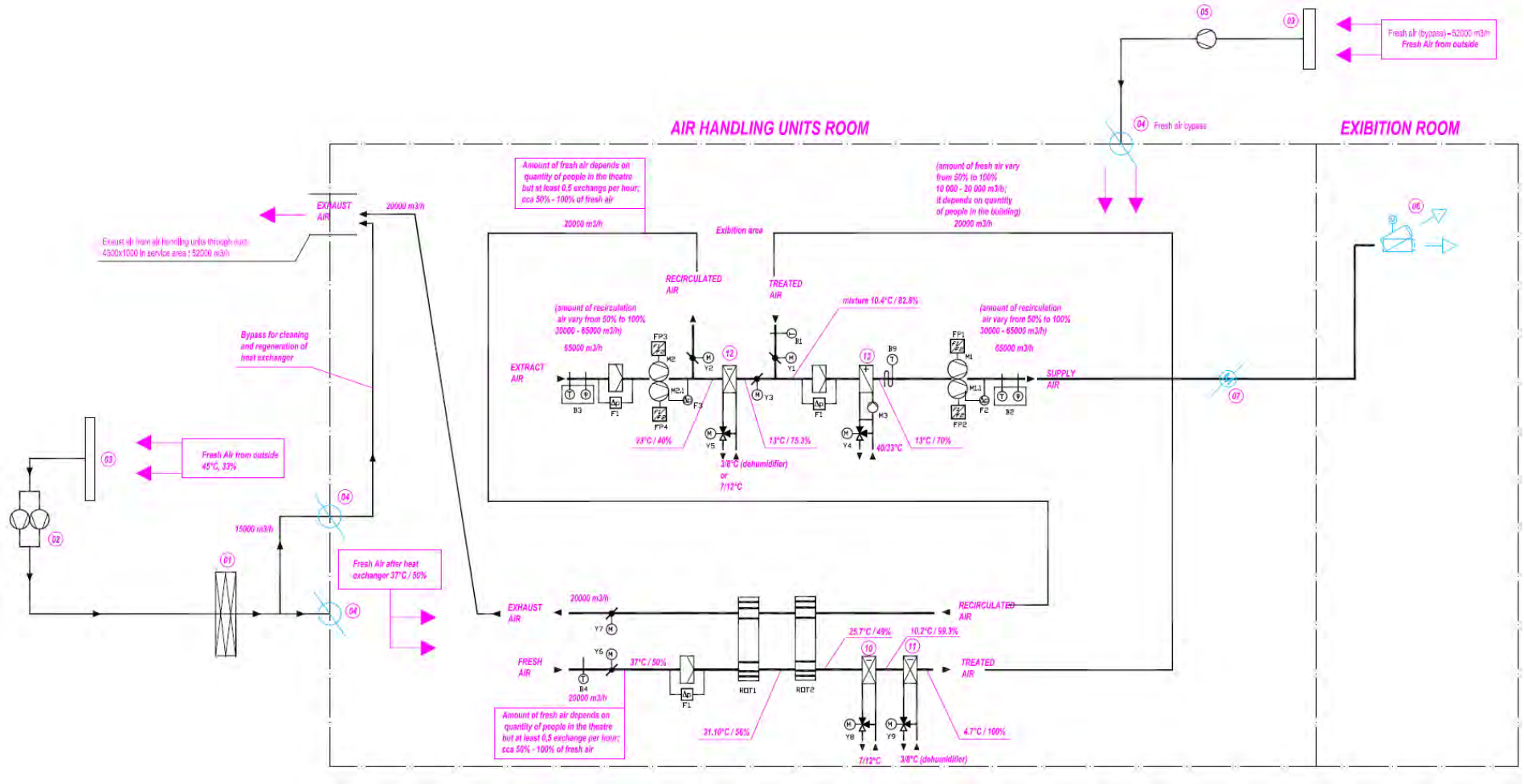
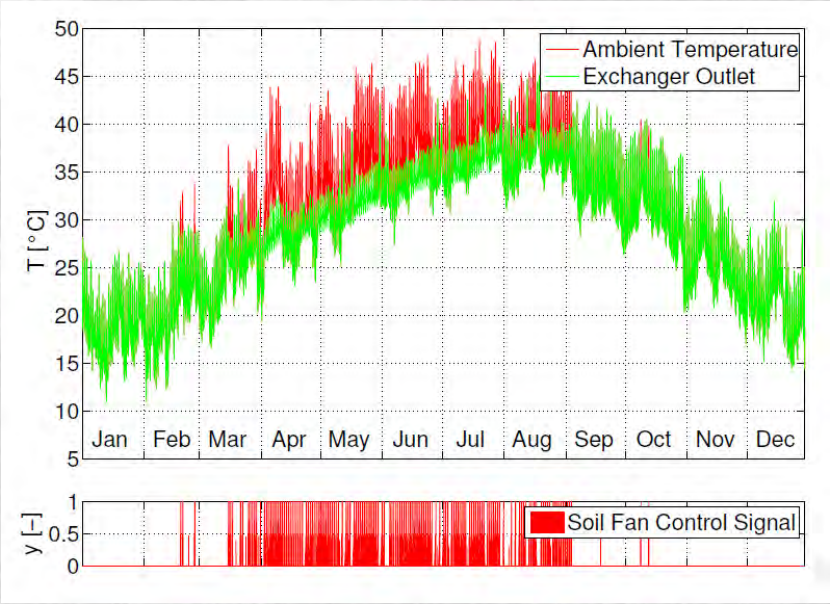


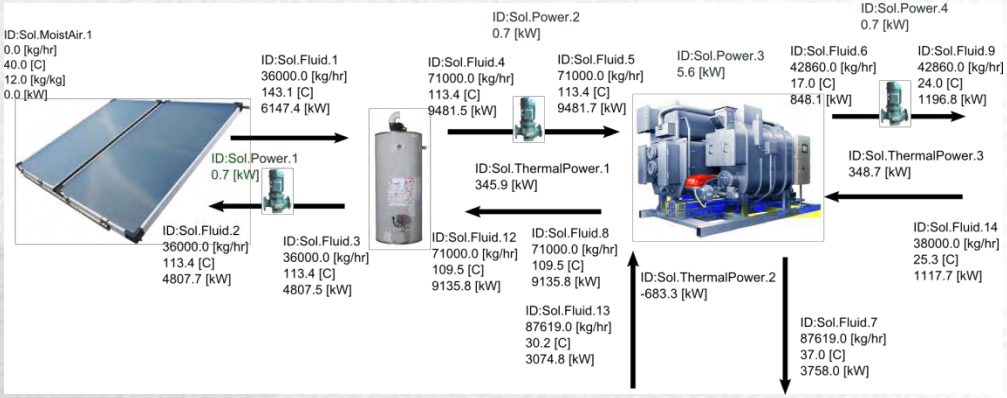
Erdkollektor

- 1200 m Tunnel / Rohrsystem
- max. 60.000 m³ / h
- Delta T up to 10 K
- Approx. 120 MWH_{th} savings

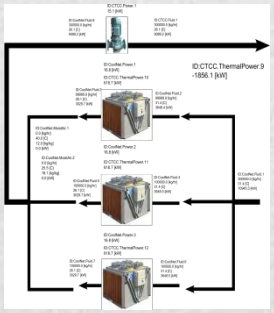


Kühlsystem

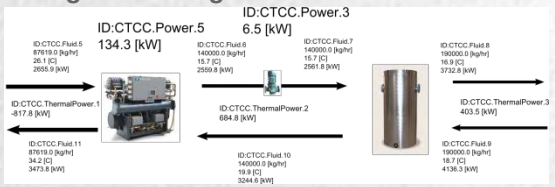
- 350 kW Absorptionskälte (13/18)
- 350 kW Latente (3/8)
- 630 kW Sensible(7/12)
- 630 kW Sensible (Reserve)



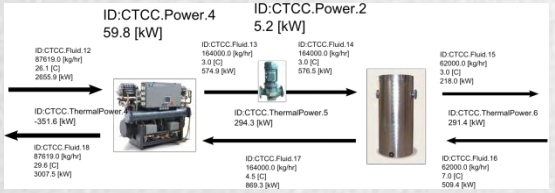
Heat Rejection



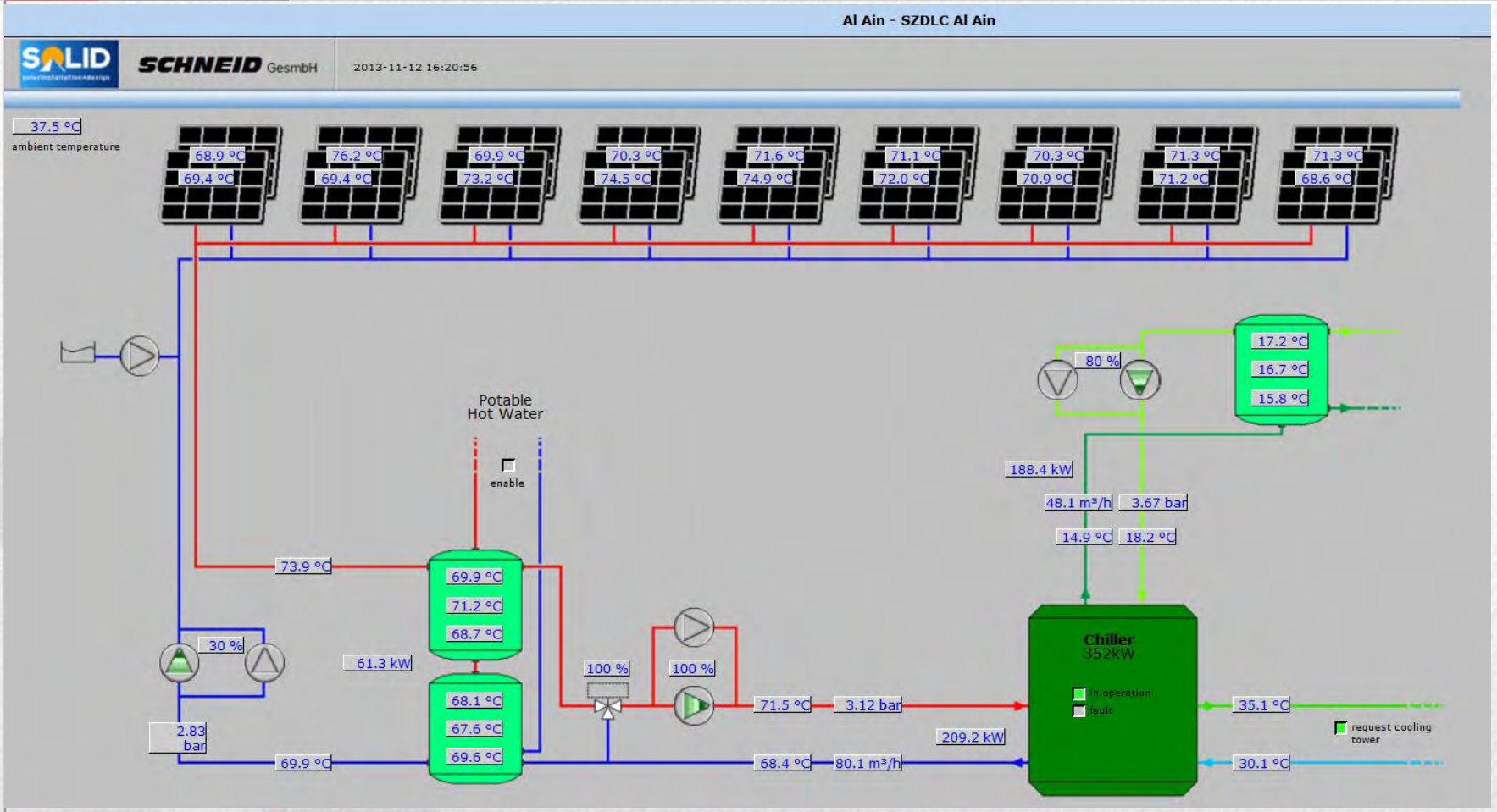
Stage 1 Cooling



Stage 2 Cooling



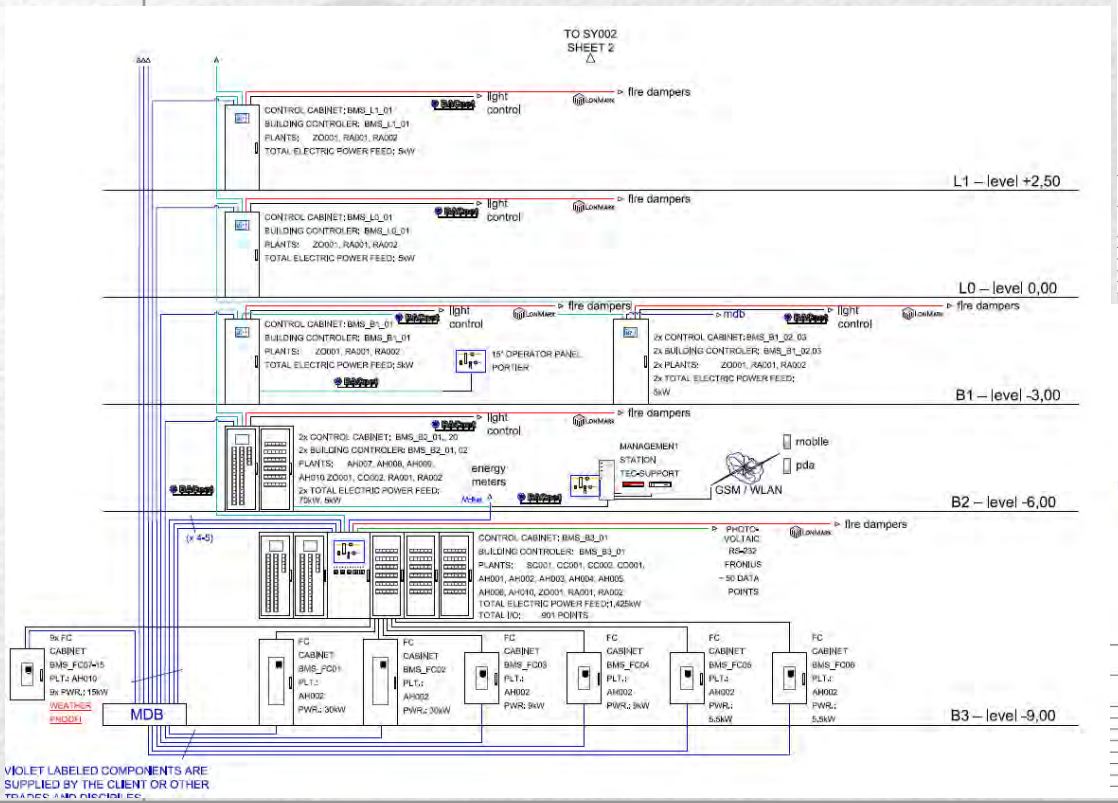
Solare Absorptionskälte (COP 0,90!!)

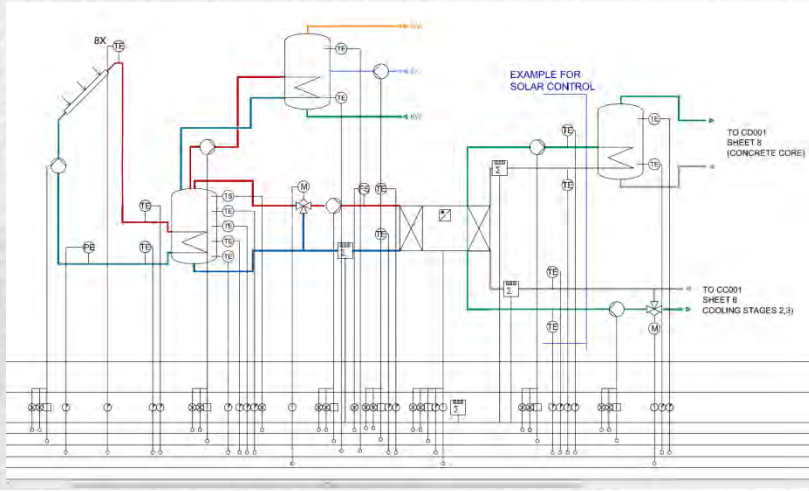


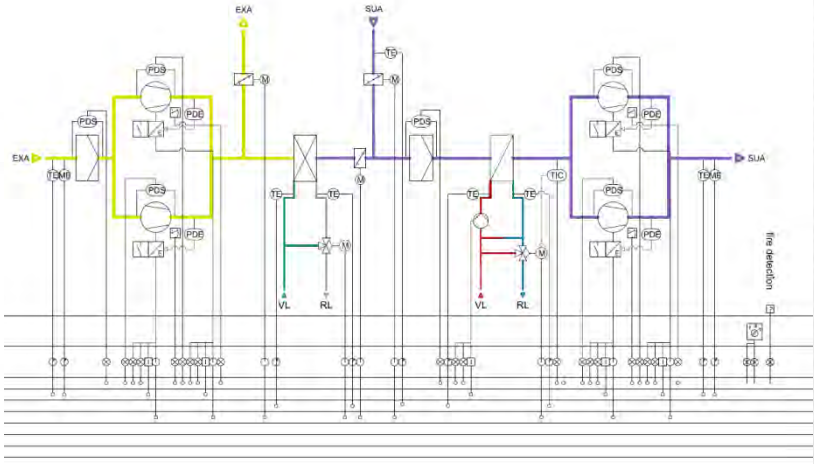
http://alain.heizwerk.at/?email=free&pw=free

Das “Gehirn”, die GLT

- Ca. 2000 Datenpunkte!
- Das Gebäudeverhalten steht im Mittelpunkt







Zusammenfassung SZDLC

- ✓ Herausragendes Gebäude mit internationaler Strahlkraft
- ✓ Österreichisches Planungs-Knowhow im Export
- ✓ Neue Technologien wurden implementiert
- ✓ ca. 40 % reduzierter Endenergieverbrauch
- ✓ ca. 80 % weniger Wasserverbrauch
- ✓ LEED Platinum Design
- ✓ Estidama 5 Pearls rating achieved

CAP

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

BOLLINGER + GROHMANN Ingenieure

Innovative Gebäudetechnik

…das Gebäudeverhalten rückt in den Mittelpunkt

Danke für Ihr Interesse!