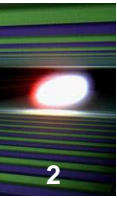


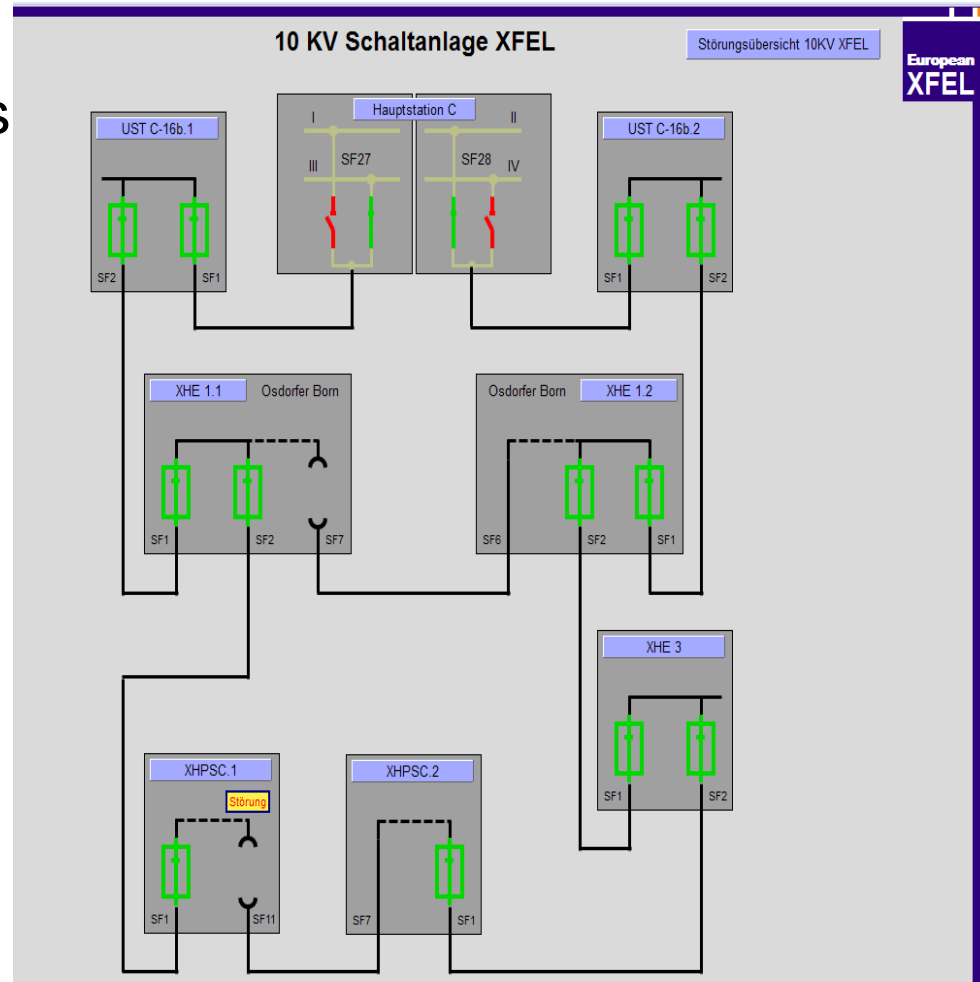
XFEL Technical Infrastructure Installation

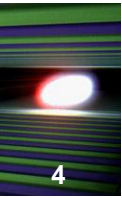
Japanese Visit to DESY on July 10, for ILC-Civil-Engineering-study
Jens-Peter Jensen, DESY –MKK-



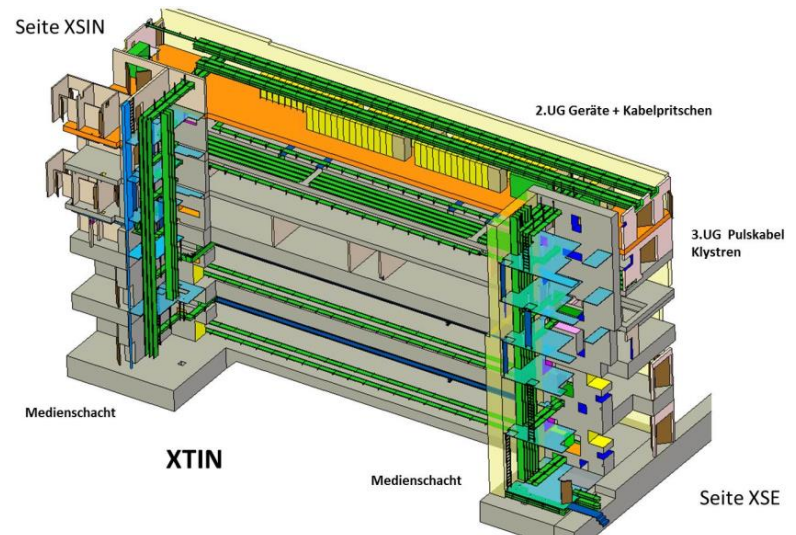
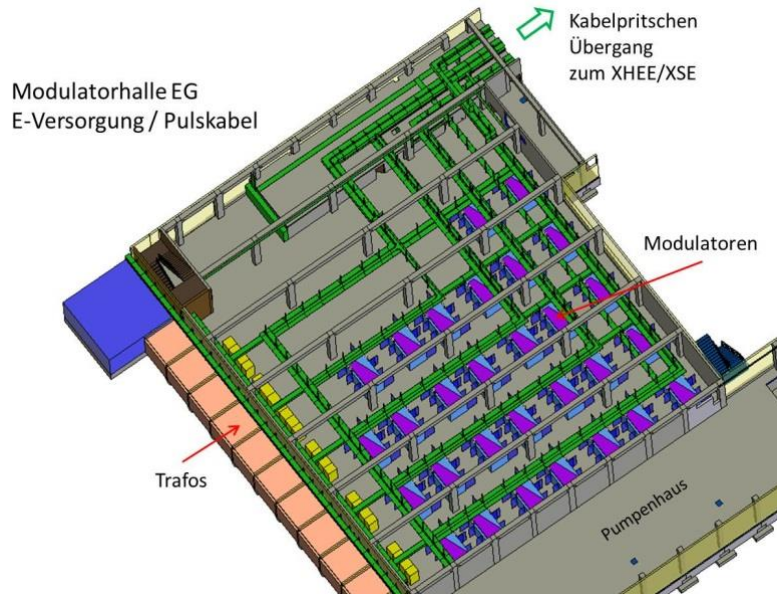
- MKK stands for machine, power, cooling, ventilation
- We took over the Technical Infrastructure TI
- We belong to the machine division
 - Main power consumption comes from the klystron and magnet power supplies
 - They dominate the design of the mains, water cooling, ventilation, air condition and process control
- The machine also needs IT infrastructure, safety systems and alarming

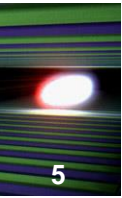
- High Power Supply
 - 10 kV and 400 V/230 V mains, cables, transformers
 - distribution boards, grounding, EMC
 - lighting, safety lighting, emergency supply, UPS
- Power Consumption 18 MW
 - Cryogenic 2700 kW
 - Modulators 7000 kW
 - Tunnels, Shafts 4000 kW
 - Power Supplies 1000 kW
 - Techn. Systems 3000 kW
 - Exp.-Hutches 300 kW



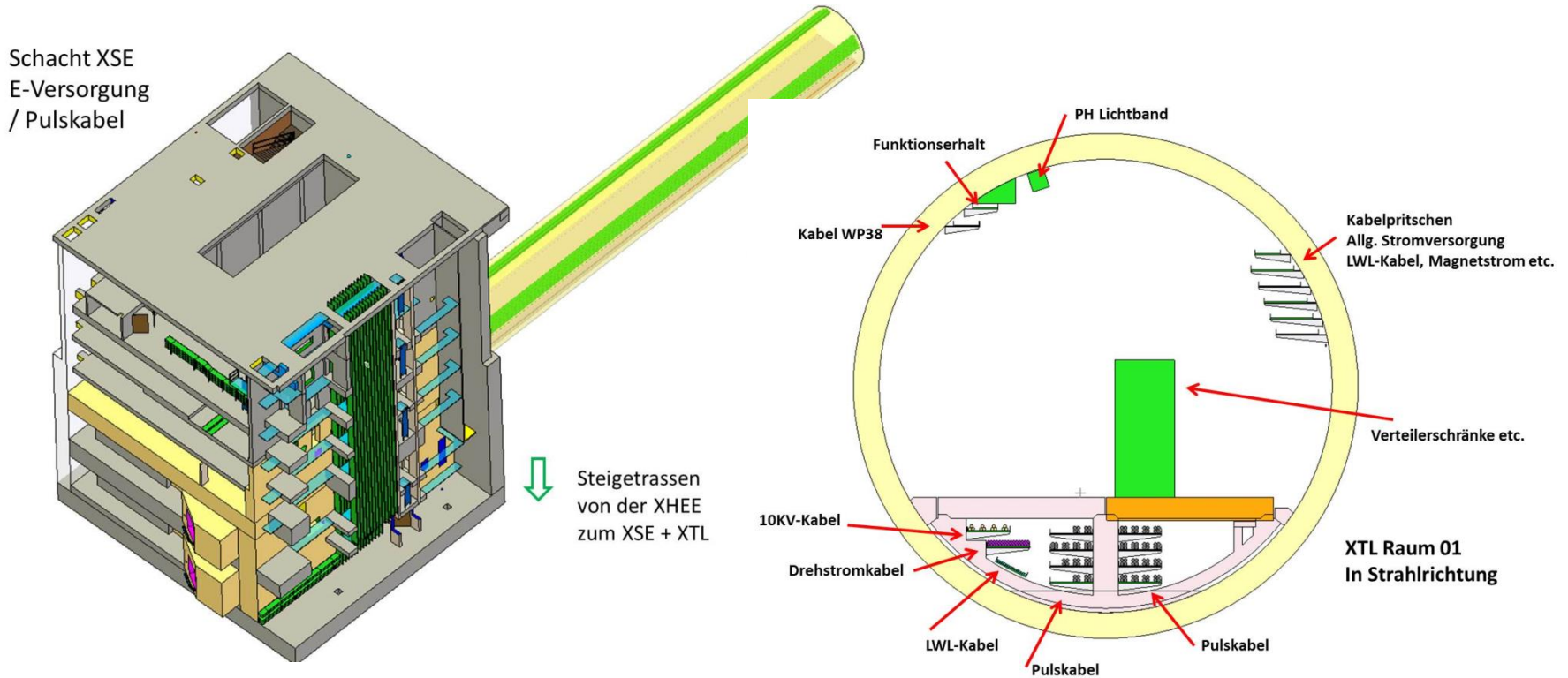


■ Modulator Hall XHM and Injector Shaft XTIN



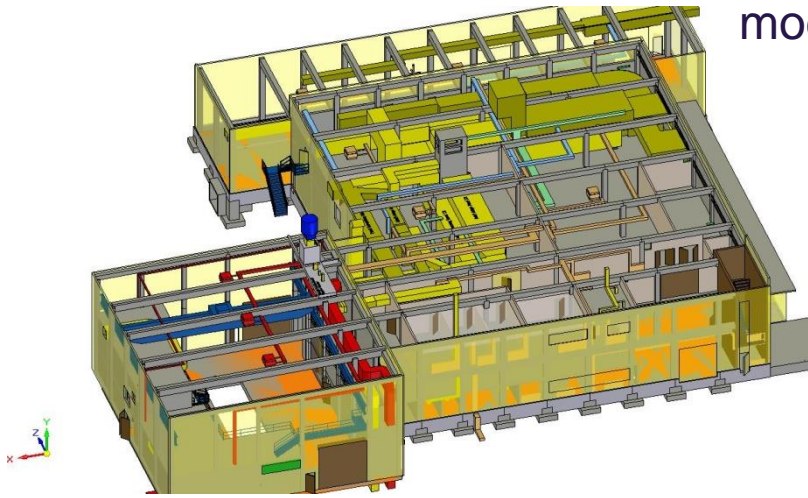


HPS in entrance shaft XSE and linac tunnel XTL

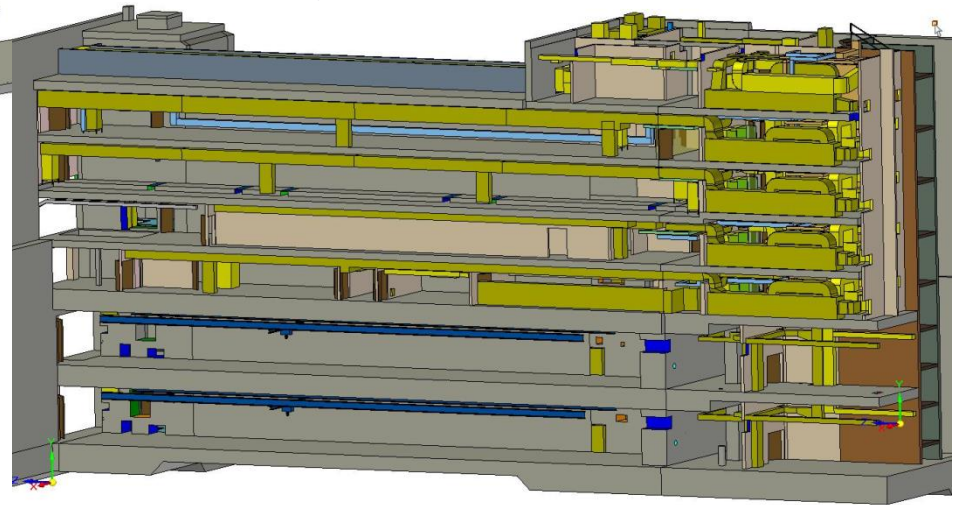


■ Heating, ventilation, air conditioning HVAC

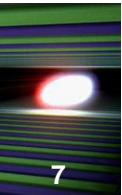
modulator hall XHM



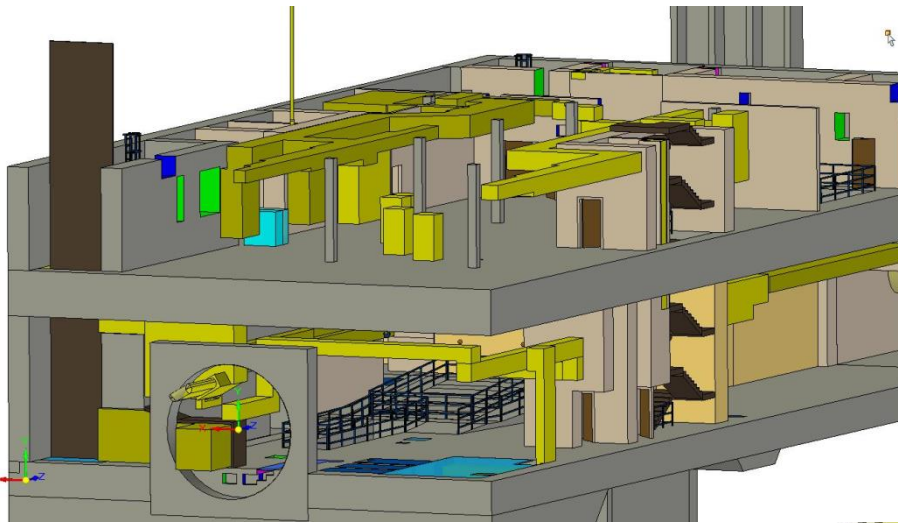
injector complex



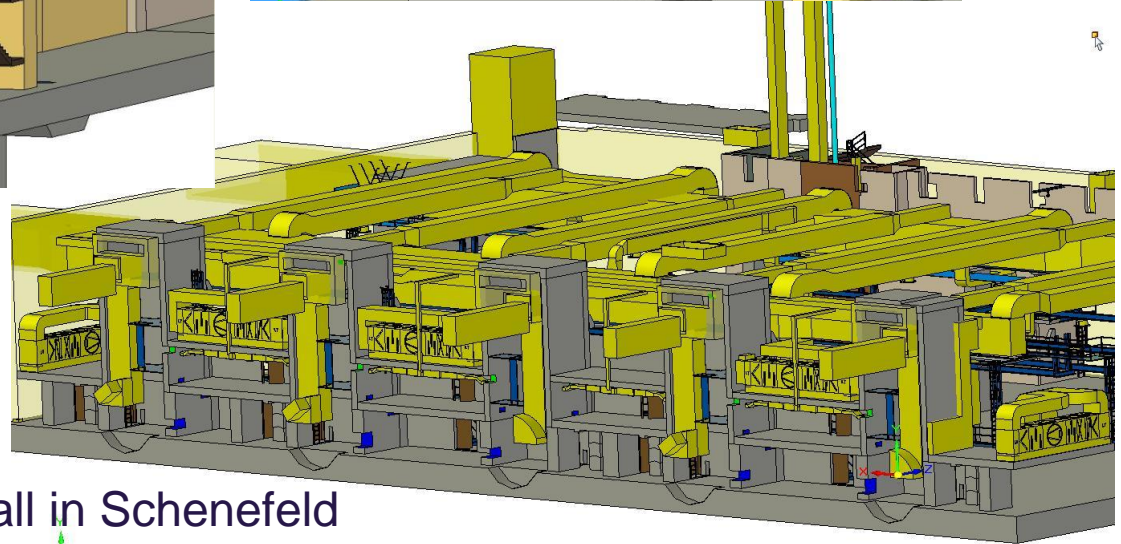
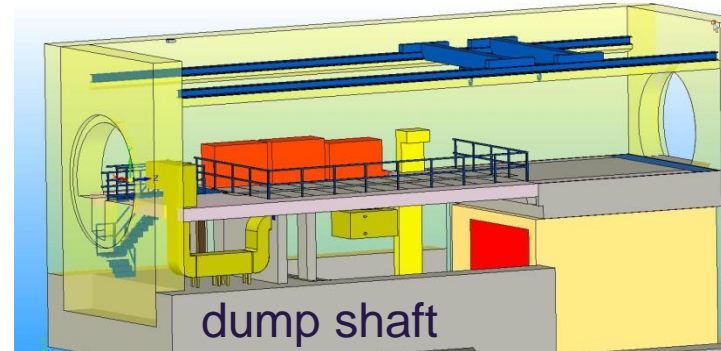
Deliverables of Technical Infrastructure



■ Heating, ventilation, air conditioning HVAC



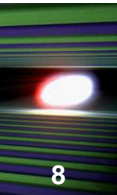
hall in Osdorfer Born



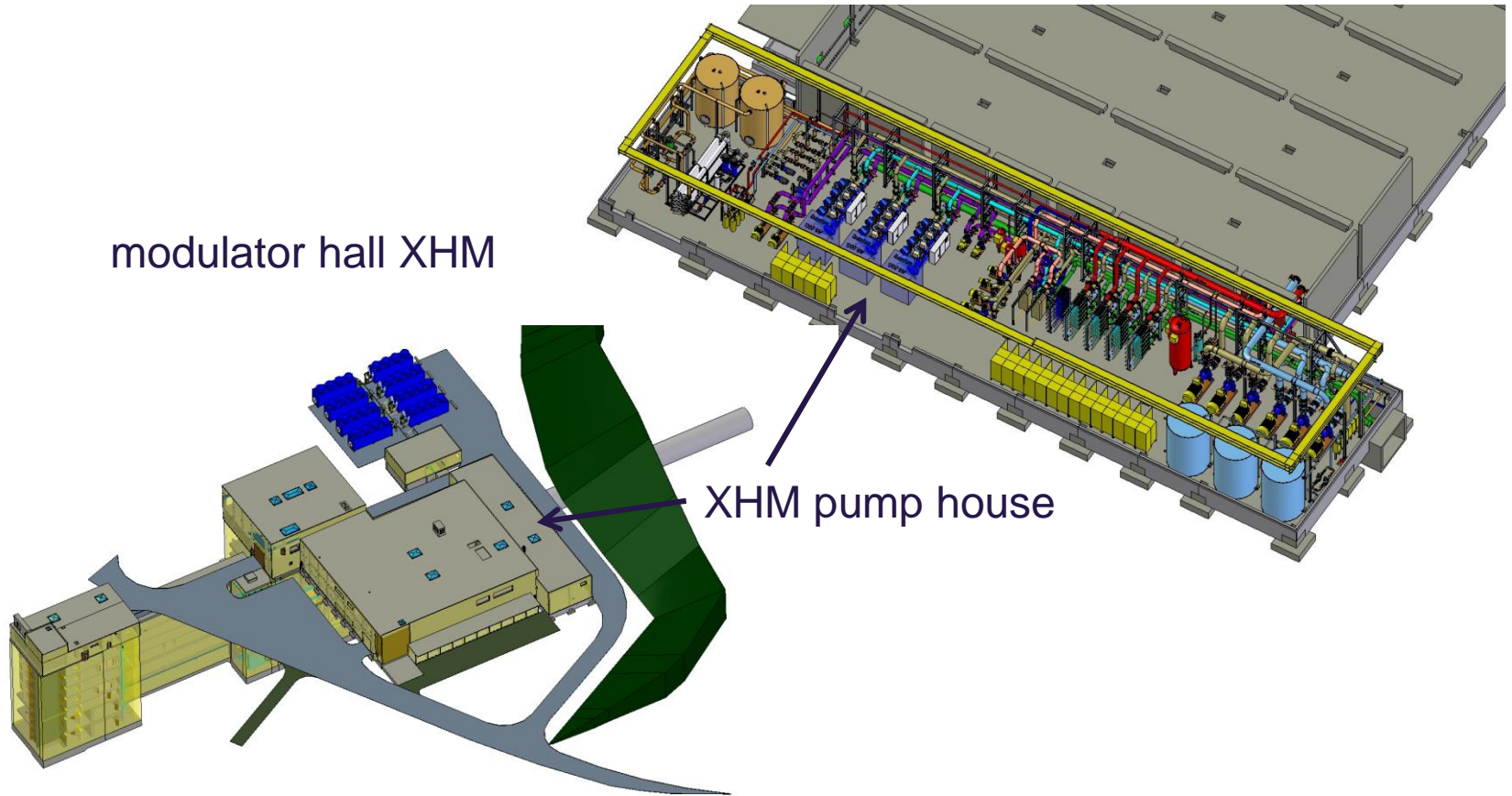
Experimental hall in Schenefeld



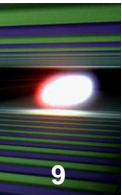
Deliverables of Technical Infrastructure



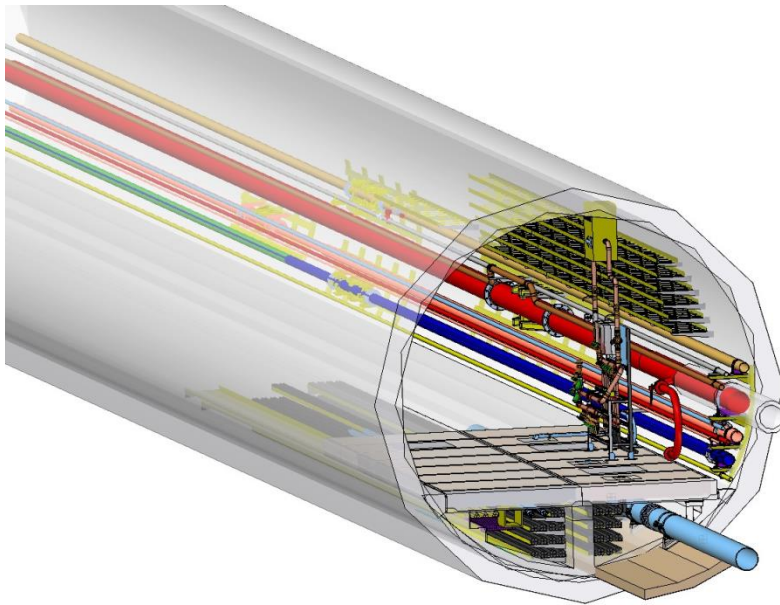
- Water cooling, cold water, compressed air



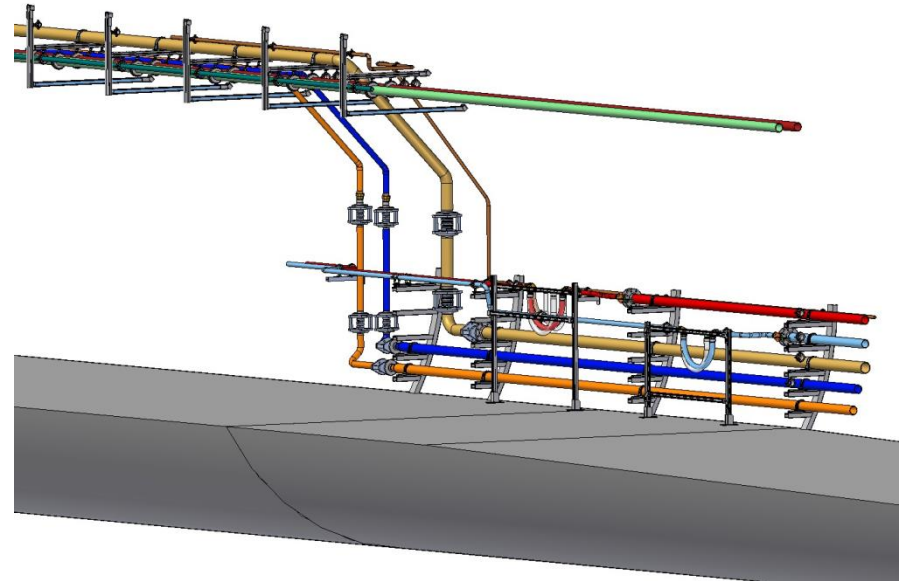
Deliverables of Technical Infrastructure



- Water cooling, cold water, compressed air

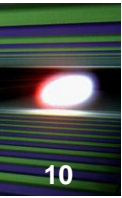


linac tunnel XTL

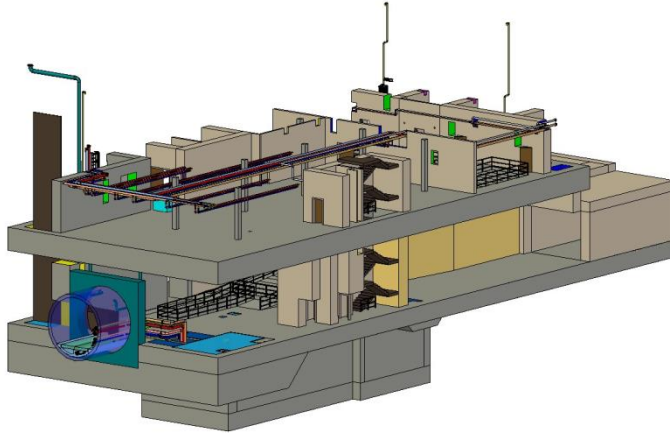


Photon tunnel XTD

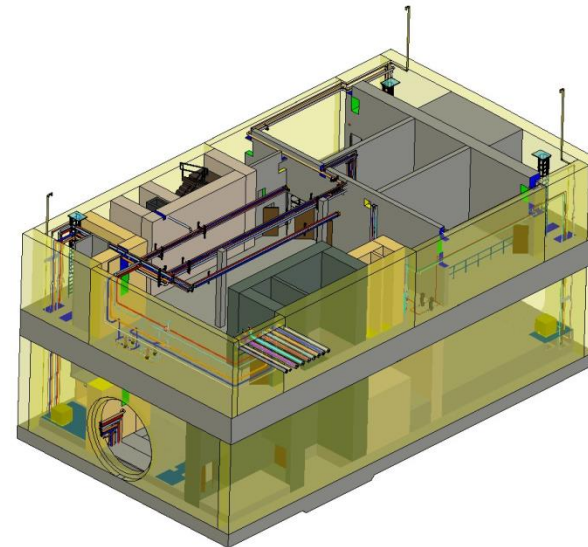
Deliverables of Technical Infrastructure



- Water cooling, cold water, compressed air



Shaft Osdorfer Born XS1



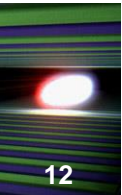
Shaft Schenefeld XS3

- Magnet power supplies, magnet cables

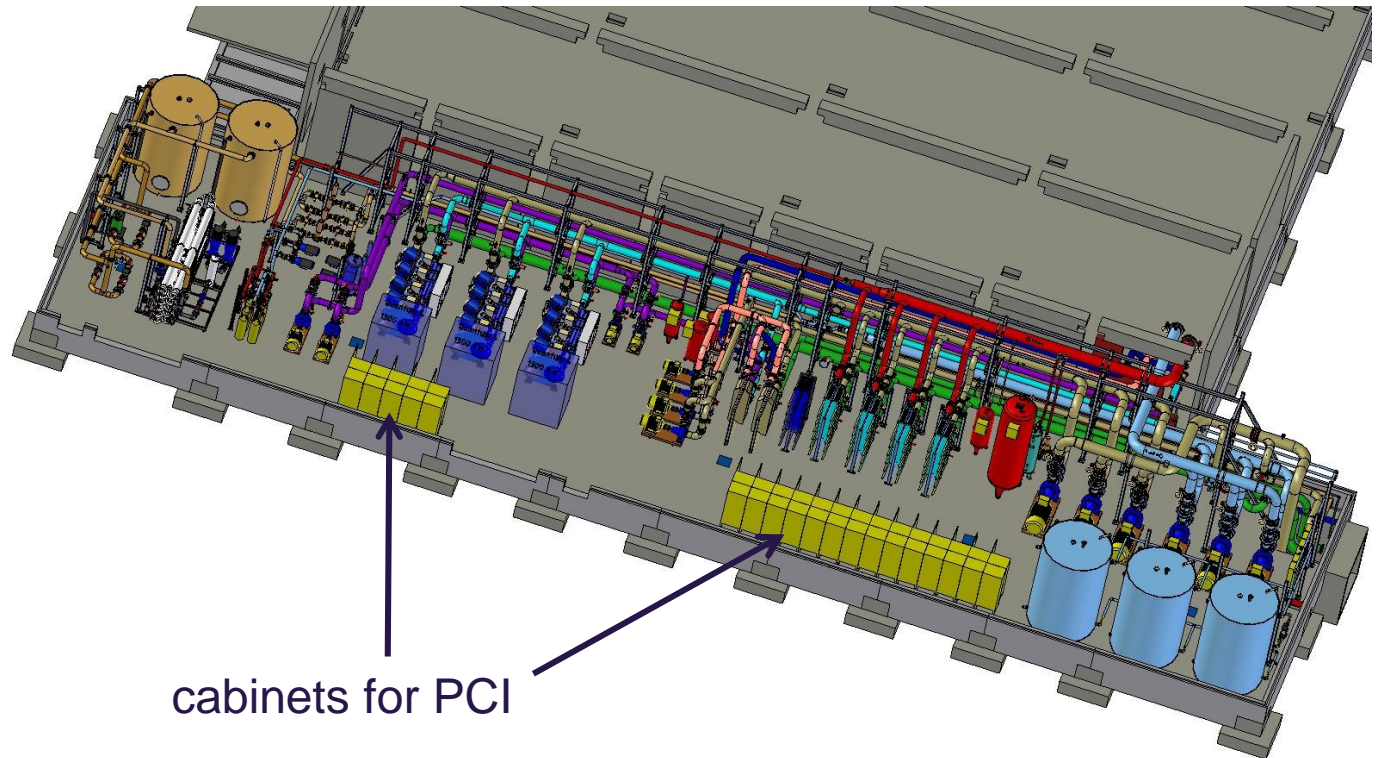


power supply room XFEL injector

Deliverables of Technical Infrastructure



■ Process control and instrumentation PCI

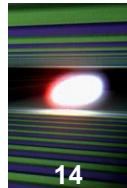


■ IT

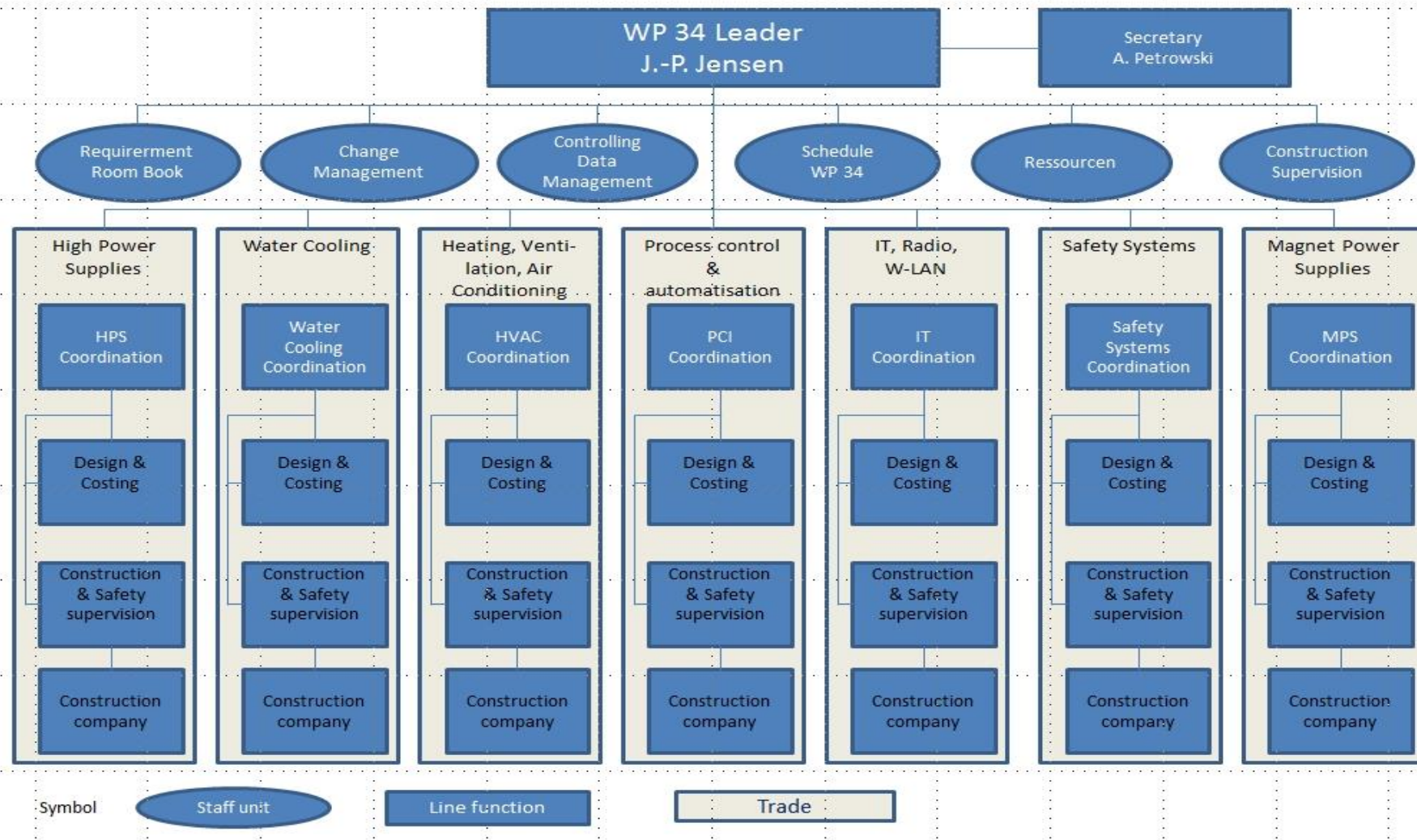
- Fiber cable
- router
- 2-way-radio
- W-LAN
- IP telefon

■ Safety systems

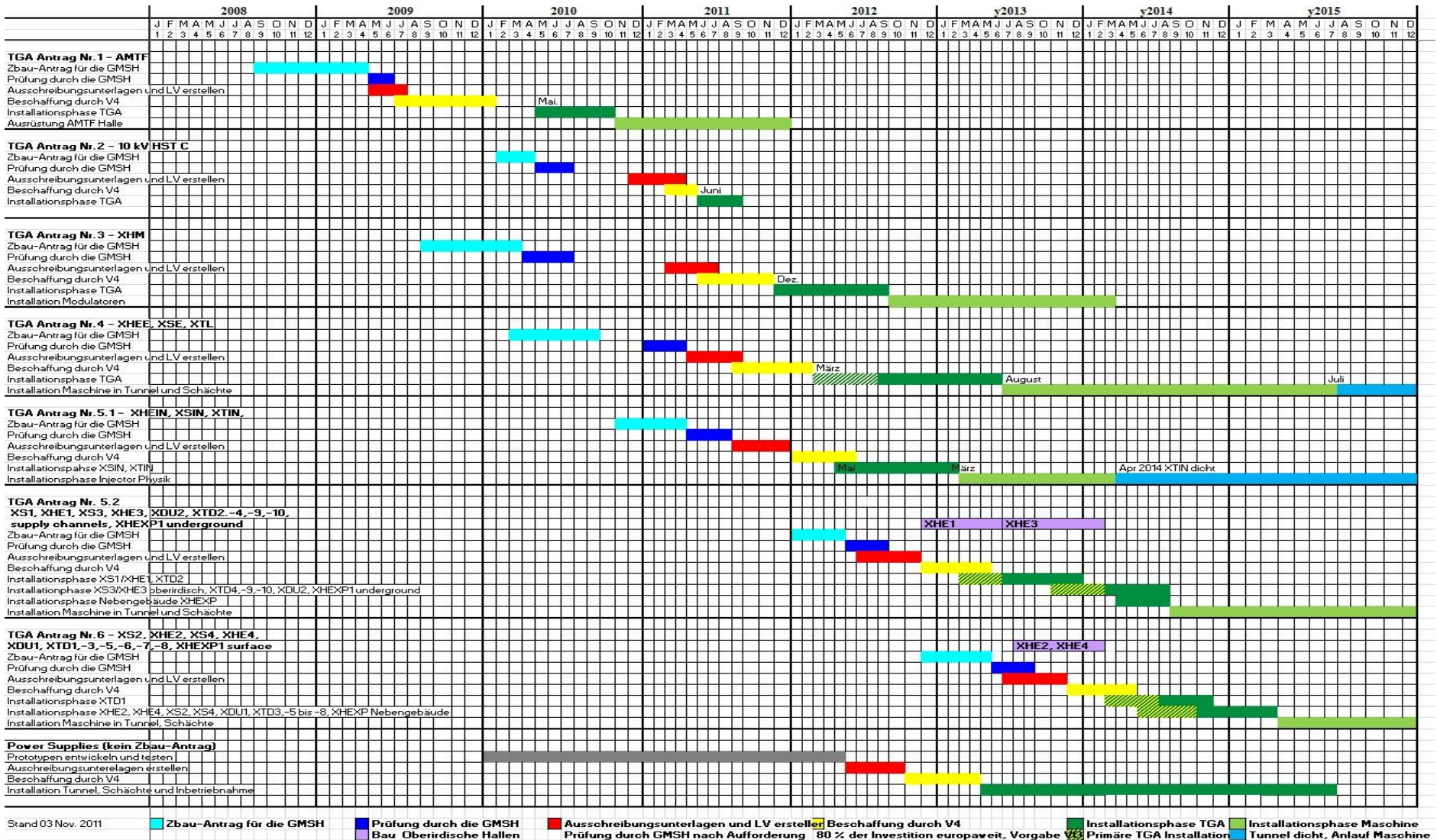
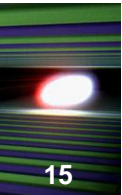
- smoke detection, fire alarm,
- access control
- Fire-extinguishing system



WP34 TEAM ORGANISATION



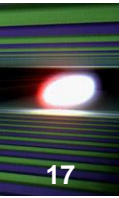
WP34 Lots and Schedule



Some important remarks for the project handling

First Step: Basic evaluation for the CDR

- Project structure and responsibilities
- Project meetings weekly with the work packages
- Data base of requirements for each trade
- Conceptual design and cost estimate
- “Budget Book” was very helpful
- Common CAD program and data exchange is a must



What is important for the project handling

Second Step: Requirement lists are vital

- We invented a so called “room book”
- Room book collects all the requirements for each room
- High power supply, Water cooling, Ventilation, Air conditioning, Heating, IT, Safety, Power Converter, Modulators etc.
- Tunnels are divided in rooms

Some important remarks for the project handling

Second Step: Valid engineering

- Verify the requirements of your list
- They are often overvalued
- Invent the concurrency factor, it is a cost safer !
 - Example: PETRA Experimental Hall
 - Demand: $P_{el} = 2.000 \text{ kW}$, $P_{\text{cold water}} = 3.000 \text{ kW}$
 - Measured: $P_{el} = 600 \text{ kW}$, $P_{\text{cold water}} = 800 \text{ kW}$
 - Systems are overdesigned and expensive
 - And at the end the performance is not the best

■ Power Consumption Forecast		Actual
■ Total Power	18 MW	12 MW
■ Cryogenic	2700 kW	2700 kW
■ Modulators	7000 kW	5000 kW
■ Tunnels, Shafts	4000 kW	1500 kW
■ Power Supplies	1000 kW	1000 kW
■ Techn. Systems	3000 kW	1500 kW
■ Schenefeld Premises		2000 kW
■ Exp.-Hutches	300 kW	300 kW

What helped us a lot?

Place holder design

- Place holder means the space for components
 - Pipes, cable trays, air ducts, magnets, supports, chambers, air handling units
 - Simple blocks and tubes are good
 - “Detail grade DG1”

Detail design

- Detail design within the given space
 - “DG2 and DG3”

Thank you for your attention

Questions?