



# **Joint Chapter Meeting**

**of the**

**IEEE PES German Chapter**

**and**

**IEEE IAS/PELS/IES German Chapter**

**Berlin, 12th – 14th May 2004**

**DAY 1:**

Siemens Power Transmission and Distribution

# Schaltwerk Berlin

**SIEMENS**



# SIEMENS PTD at a Glance

High Voltage



- Power Transmission Projects
- Systems, Products and Components for 52 up to 800 kV
- Turnkey Substations for AC/DC Power Switching and Transmission
- Services from Consulting and Engineering up to Training and After Sales Service

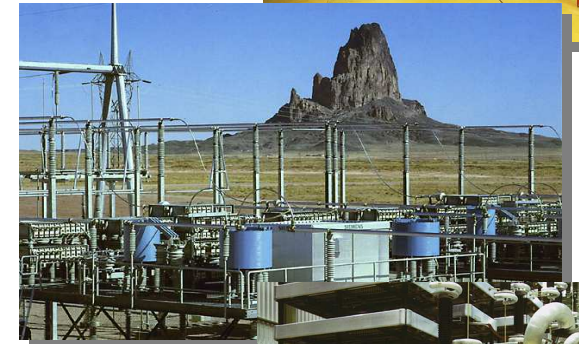


**SIEMENS**

# Turnkey Substations

High Voltage

- Conventional Air-Insulated Switching Stations (AIS)
- Gas-Insulated Switching Stations (GIS) also available as mobile switchgear
- Hybride Switching Stations
- Installations for Reactive Power Compensation
- Installations for HVDC transmission:
  - ▶ long distance transmission
  - ▶ back-to-back ties
- **Products**
  - ▶ Circuit-breakers 72,5 up to 800 kV
  - ▶ Disconnectors and Earthing Switches
  - ▶ Arresters and Limiters





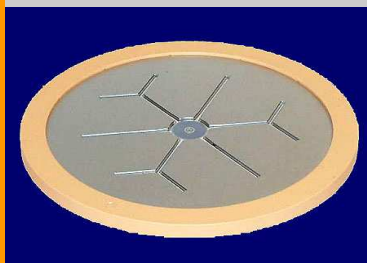
# DC Solutions

High Voltage

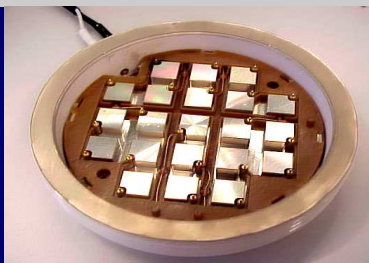


HVDC

HVDC<sup>PLUS</sup>



Light Triggered Thyristor



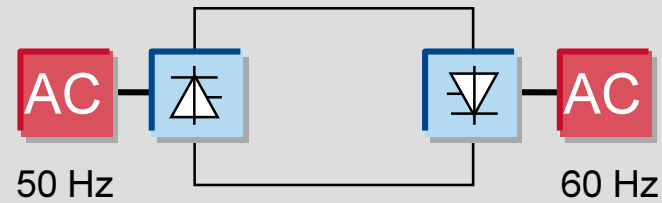
IGBT

## HVDC

## HVDC<sup>PLUS</sup>

up to 800 MW

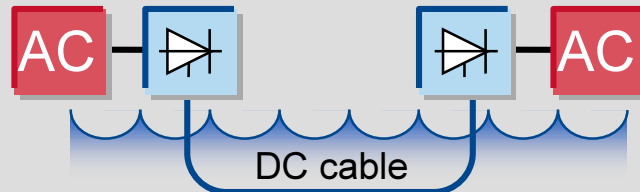
### Back-to-Back Station



bis 250 MW

up to 800 MW

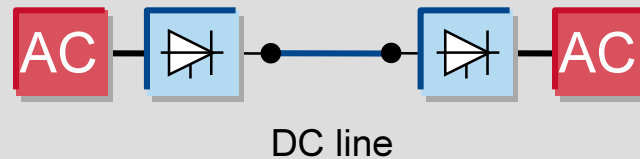
### Long Submarine Transmission



bis 250 MW

up to 3000 MW

### Long Distance Transmission

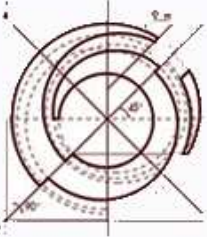


bis 250 MW

# DAY 1 Agenda Highlights

High Voltage

- Opening and Welcome Message
- Company Tour
- Technical Lecture
  - ▶ Dr.-Ing. Andreas Luxa, Siemens PTD, High Voltage Division:  
Benefits of Power Electronics for High Voltage Transmission Systems  
(Advanced Power Transmission Solutions with HVDC and FACTS – an overview)
  - ▶ Prof. Dr.-Ing. Dietmar Retzmann, Siemens PTD, High Voltage Division:  
Use of High-Power Thyristor Technology for Short-Circuit Current Limitation in High Voltage Systems (Short circuit Current Limiter)
  - ▶ Dipl.-Ing. Manfred Kruska, Siemens PTD, Medium Voltage Division:  
Optimized Energy Exchange in Distribution Supply Systems with DC-Links based on Conversion Technologies
- Siemens Reception



# DAY 2: ALSTOM



## Transport



## Energy

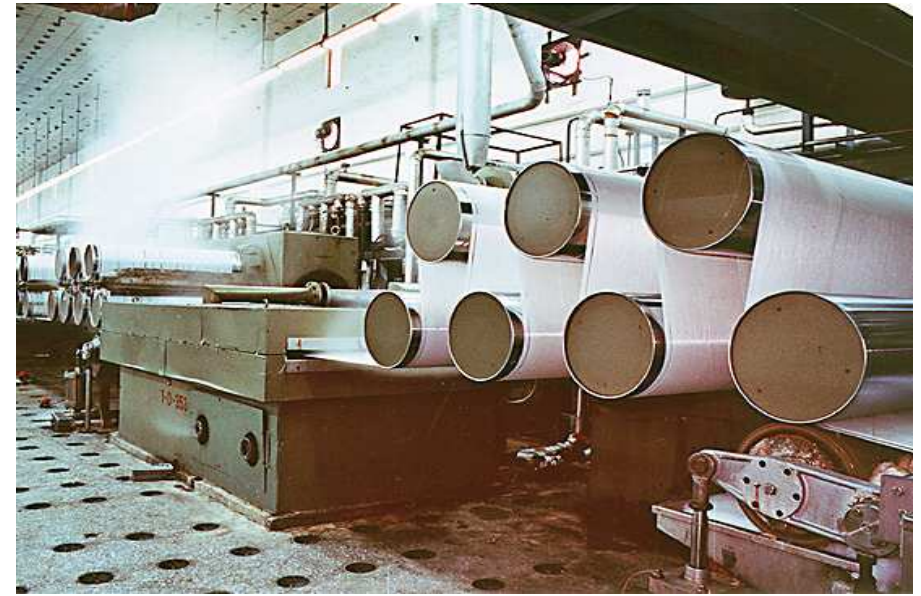
The global specialist in energy and transport infrastructure



# DAY 2: ALSTOM



## Activity “Process Industries”



- Complete automation systems and electrical equipments for systems and plants, in the focused segments
  - Metals Industry
  - Pulp- and Paper Industry
- Solutions for revamping and process improvements

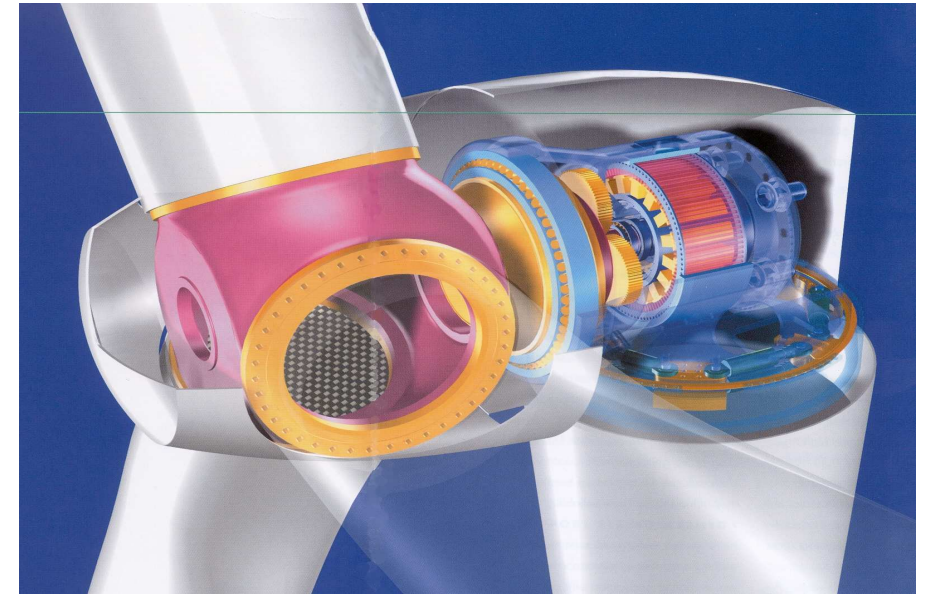
- Products, systems and turn-key solutions including
  - Power supply
  - Motors & generators
  - Drive systems & power electronics
  - Automation & industrial IT
  - Associated Services



# DAY 2: ALSTOM



## Activity “General Drives”



### Drives Systems up to 100 MW:

- Full capabilities to provide drive system solutions for low voltage <1000V and high voltage >1000V for different applications
- Manufacturer of products & systems
- Associated services

### Focused Market Segments

- Oil / Gas / Petrochemical, e.g. high-speed gas compressors
- Systems for Wind Turbines, e.g. 5 MW Generator/Inverter System for „Multibrid“

# DAY 2: ALSTOM



## Activity “General Drives”



Supply of AC drive systems for test benches, typical applications include

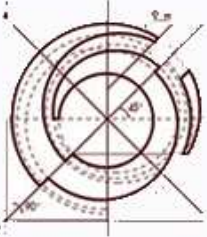
- Engines
- Gearboxes
- Alternators
- Rolling Roades
- Axles
- Deferential gearing and drive trains



Automation solutions for container handling cranes, e.g.

- Rail mounted quayside cranes
- Rubber tyred gantry cranes
- Rail mounted gantry cranes
- Goliath cranes
- Grab type shipunloader
- Slewing cranes





# DAY 2: Location Berlin

**ALSTOM**

Produktionsstandort Berlin-Marienfelde, Deutschland





# DAY 2: Agenda Highlights



- Introduction to ALSTOM Berlin
- Technical Lecture
  - ▶ 300 MW Variable Speed Drives for Pump Storage Plant Application Goldisthal
  - ▶ Application of Multi-Level Medium Voltage Converters for a Traction Test Bench
  - ▶ Active Earth fault Compensation and Railway Application of Medium Voltage Converters
  - ▶ Comparison of the Behavior of Wind Energy Farms and Conventional Large Power Station during Grid Failure Conditions
  - ▶ 5 MW Permanent Magnet Offshore Wind Mill Prototype
- Company Tour
- ALSTOM Reception and Dinner



**DAY 3:**



# Berlin University of Technology



# Berlin University of Technology



## Organization

- ⇒ Berlin University of Technology (TU Berlin)
  - ⇒ Faculty IV: Electrical Engineering and Computer Science
    - ⇒ Institute of Energy and Automation Technology
      - ⇒ Power Electronics Research Group  
Prof. Steffen Bernet (Prof. em. Manfred Michel)
      - ⇒ Electric Machines, Drives, and Renewable Energies Group  
Prof. Rolf Hanitsch (Prof. em. Manfred Stiebler)



1770-1821 Founding of the predecessors of the TU Berlin

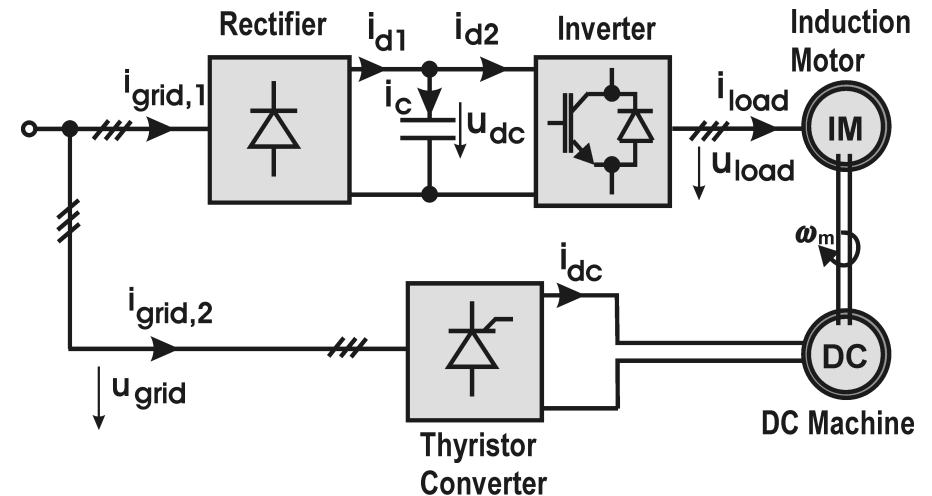
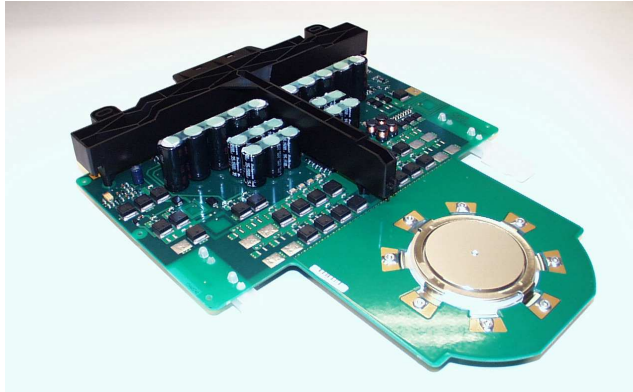
2003 Modern University with 30.700 Students and 388 Professors





# Power Electronics Research Group

Professor Dr.-Ing. Steffen Bernet



## Research Areas / Areas of Expertise

⇒ **Power Semiconductors**

Characterization of power devices

⇒ **Converters**

Multi-level converters, modulation, simulation, and modeling for industry, traction, and automotive applications

⇒ **Control and Drives**

Development, fast prototyping, and optimization of new modulation and control schemes for drives

# Electric Machines and Renewable Energies

Prof. Dr.-Ing. habil. Rolf Hanitsch

## Research Areas

### ⇒ Energy Efficient Industrial Drives

Motor & generators with NdFeB magnets, brushless dc-, high speed asynchronous-, and switched reluctance motors



### ⇒ Motor control

Fuzzy logic control of drives, DSP control of inverters in wind energy conversions systems

### ⇒ Energy storage

Electrochemical storage

### ⇒ Wind Energy and Photovoltaic Systems

Modeling and investigation of power quality, inverter control, safety and protection

Electric Machines, Drives,  
and Renewable Energies Group



# DAY 3 Agenda Highlights



- Introduction to TU Berlin

- Technical Lecture

- ▶ Prof. Dr.-Ing. S. Bernet: Characteristics and Applications of 10kV IGCTs
- ▶ Prof. Dr.-Ing. M. Stiebler: Direct Driven PM Synchronous Generators for Wind Energy Systems
- ▶ Dipl.-Ing. T. Brückner: Loss Balancing of a Three Level Active NPC Voltage Source Converter
- ▶ Dipl.-Ing. D. Krug: Comparison of State-of-the-Art Voltage Source Converters for MV Drives
- ▶ Dr.-Ing. S. Schulz: Power Quality of Wind Parks

- Laboratory Tour

- ▶ 15kV, 5kA Semiconductor Test Bench
- ▶ 40kW Drive Test Bench & Multilevel Converters

- Closing Message

- Reception and Dinner



# See you next year in Berlin ...

