The Multi Service Group. BILFINGER BERGER

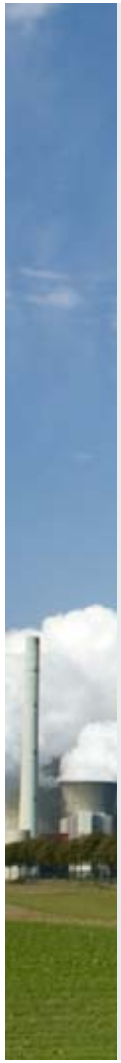
High Pressure Piping in Power Plants – Water / Steam Cycles

Capital Markets Day “Power Services“ at Moorburg Power Plant

December 2, 2010

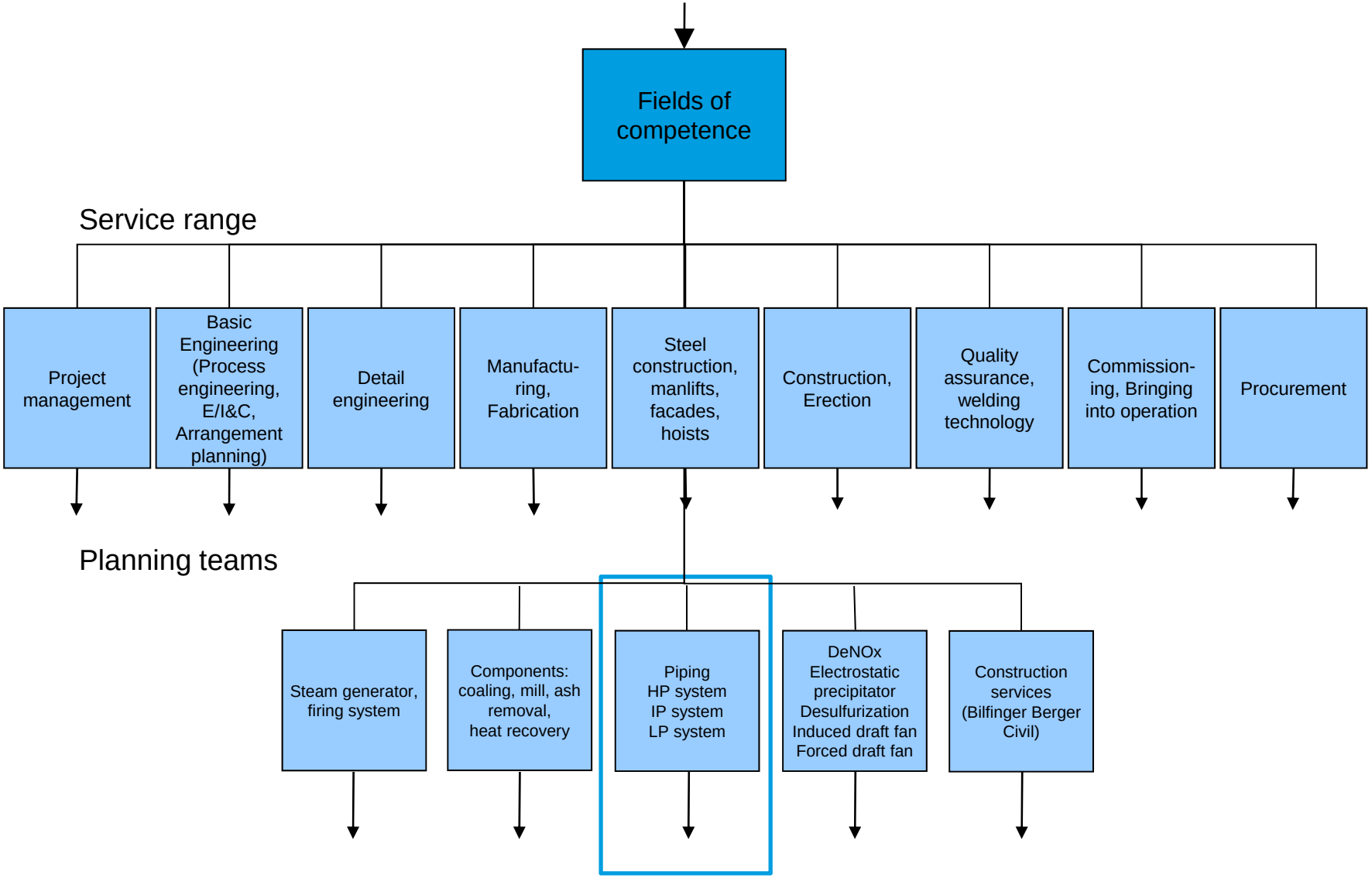
Ronald Diehl, Member of the Executive Board of BB Power Services GmbH

Agenda

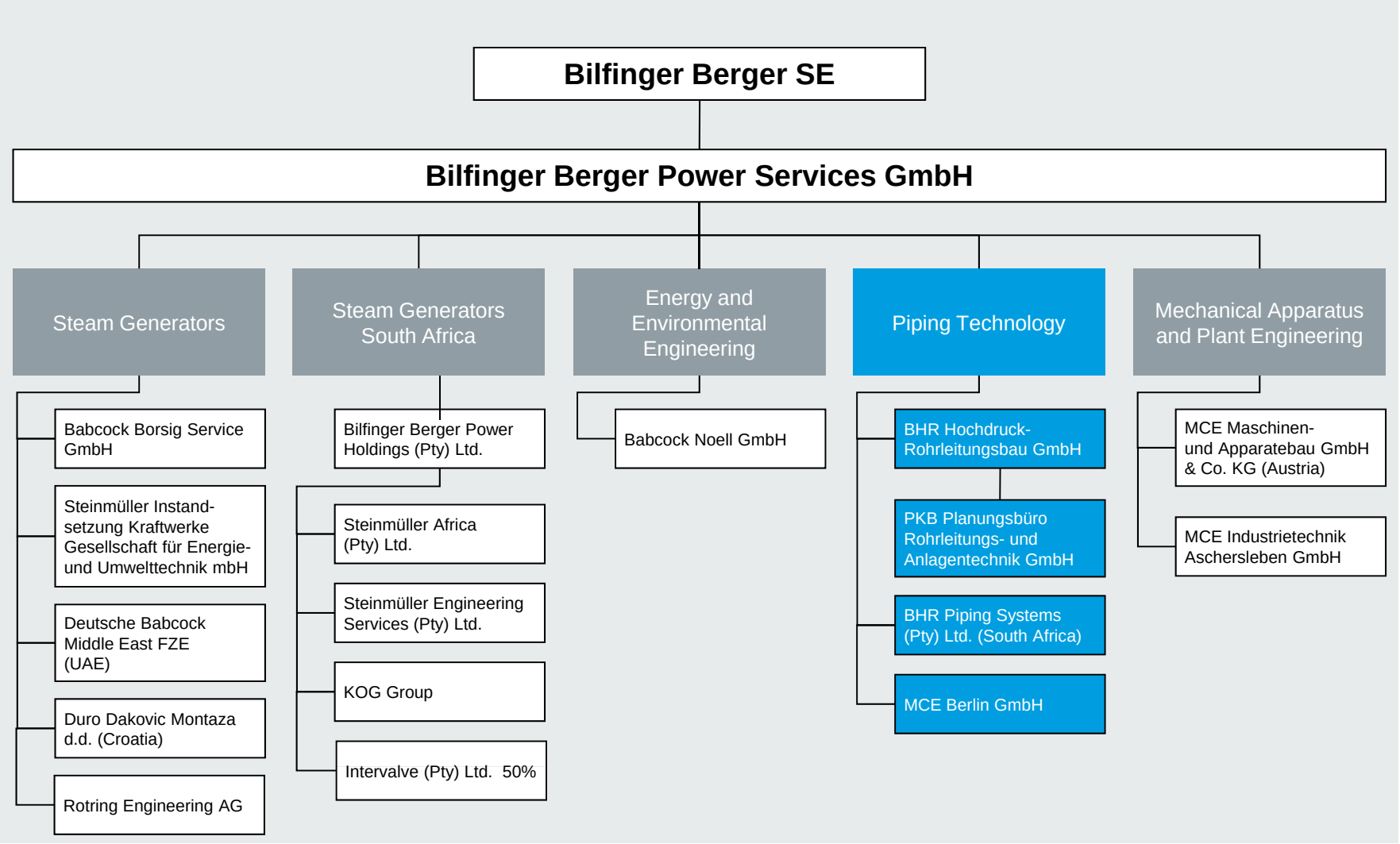


1. Overview division
   Piping Technology
2. High-Pressure Piping Systems
3. Service Range
4. Market Structure
5. Clients
6. Contract Types
7. Competitive differentiators
   and success factors
8. References

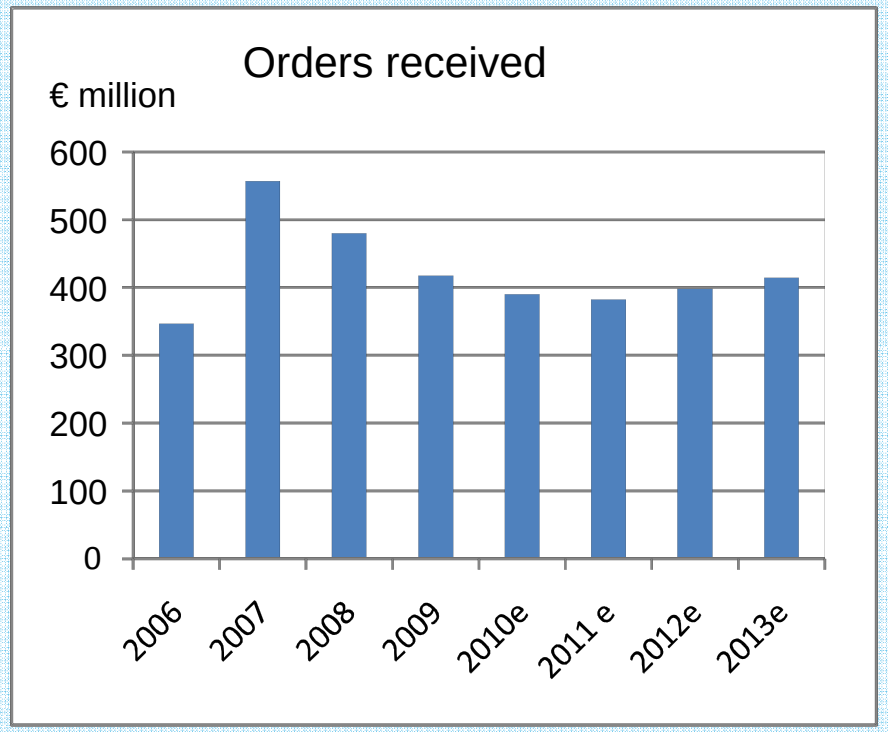
1. Overview division Piping Technology
Bilfinger Berger activities in the power plant sector

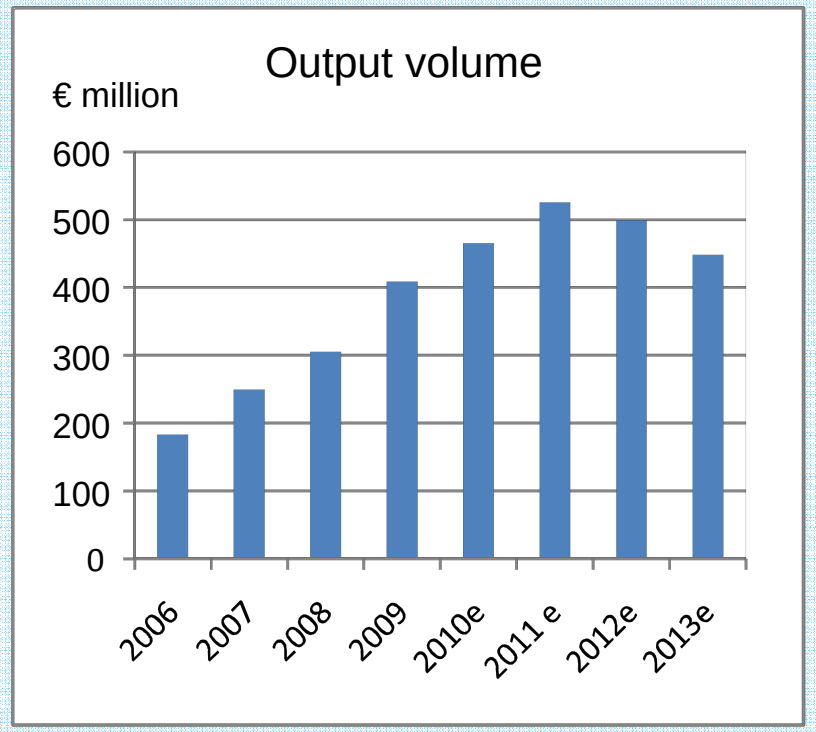


1. Overview division Piping Technology
Power Services Companies active in Piping Technology



1. Overview division Piping Technology
Development and volume forecast



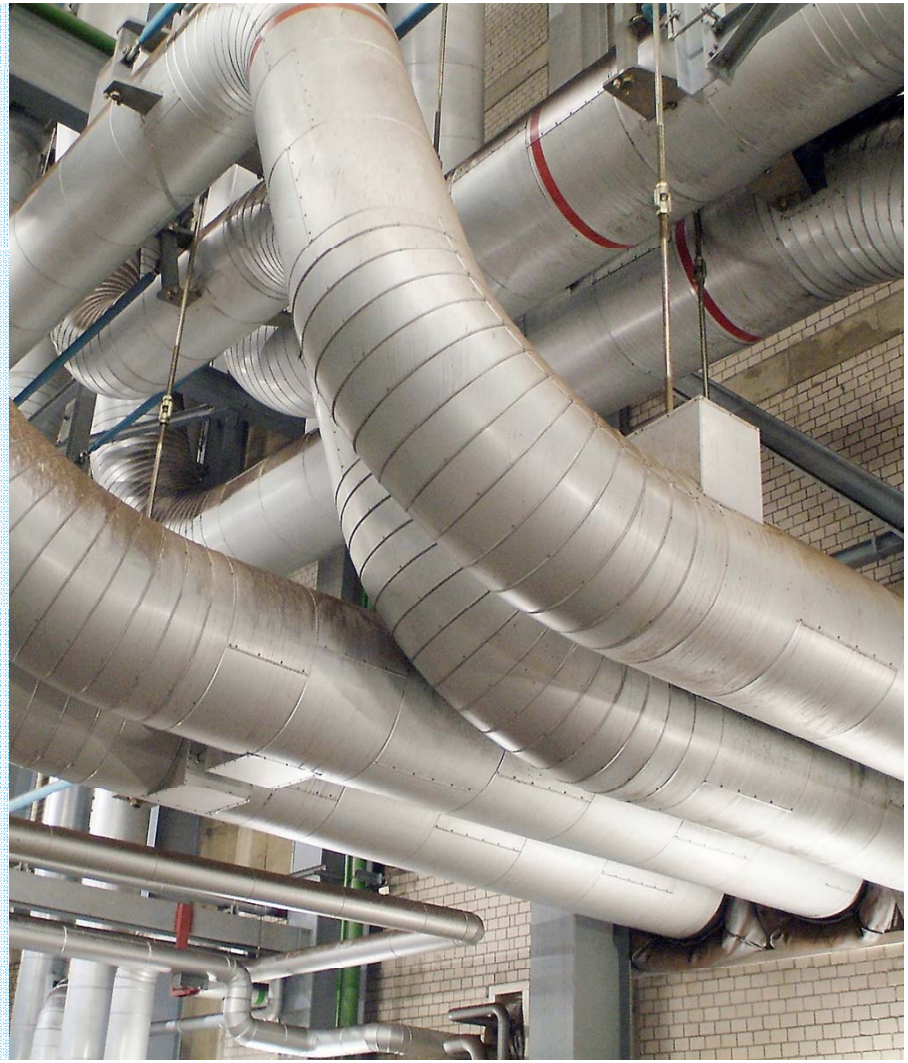


Orders received and output volume include between €120m and €150m / year standard business (service).

2. High-Pressure Piping Systems
Power plant types

Water/steam cycles in thermal power plants are the connections between the feed water pumps, the boiler / heat exchanger and the turbine.

- Coal-fired power plants
- Lignite-fired power plants
- Nuclear power plants
- Combined-cycle power stations
- Biomass power plants
- Surrogate fuel power plants



2. High-Pressure Piping Systems
BoA power plant – reference

RWE Neurath lignite-fired power plant (optimised plant design, BoA), 1,100 MW

Total material	approx. 3,100 t / unit
Pipes	approx. 2,200 t
Form pieces	approx. 115 t
Fittings	approx. 190 t
Supports/hangers	approx. 600 t
Total pipe length	approx. 11,000 m
Main piping	approx. 4,400 m
Total circumferential welds	approx. 7,000
Total circumferential welds of main piping	approx. 1,400

2. High-Pressure Piping Systems
BoA power plant – reference

RWE Neurath lignite-fired power plant (optimised plant design, BoA), 1,100 MW

Feed water
430 bar, 250 °C, Ø 588 mm, w.th. 44

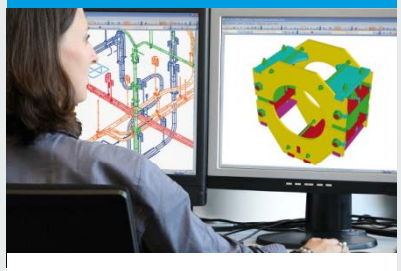
Main steam
295 bar, 610 °C, Ø 549 mm, w.th. 97

Cold reheat
75 bar, 435 °C, Ø 824 mm, w.th. 31

Hot reheat
70 bar, 615 °C, Ø 806 mm, w.th. 43

3. Service range
High, intermediate and low pressure piping

Engineering



- Piping conceptual / basic design
- Piping detail design
- Pressure design
- System analysis
- Stress calcluation
- Pipe hanger design
- Project management

Manufacturing

Fabrication of piping spools

- Bending
- Welding
- Heat treatment
- Machining
- Destructive and non-destructive material testing

Erection

Assembly of the prefabricated pipe spools and hangers

- Power plant new builds
- Replacement during power plant outages

Procurement

- Expediting
- Specifications
- Quality Assurance
- Scheduling

Service

- Plant maintenance consulting service
- Plant maintenance engineering
- Plant optimization
- Power plant retrofits
- Assessment of residual service life

4. Market Structure
Position in Target Markets

High-Pressure Piping Systems

Market leader in Europe

Market leader in South Africa

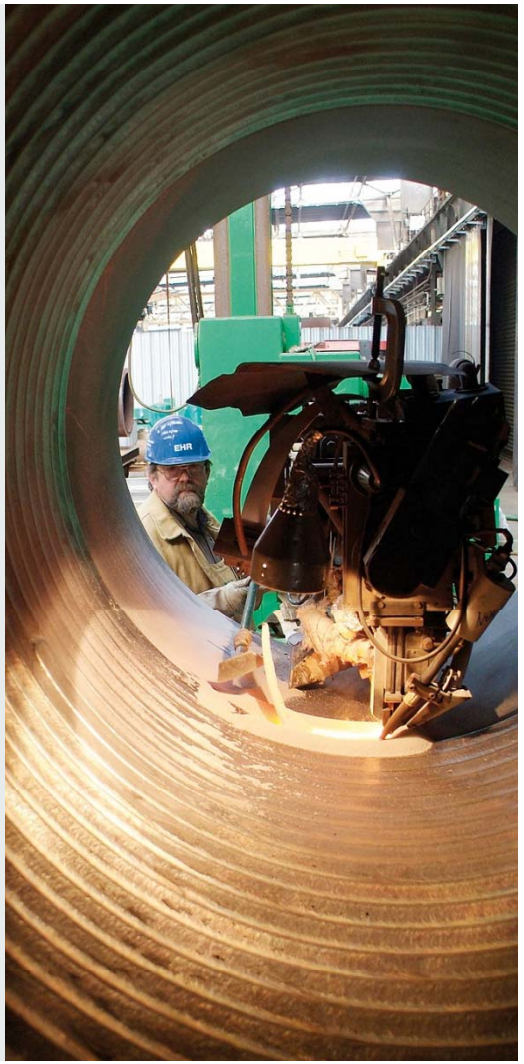
One of six leading contractors worldwide

Piping Systems in Nuclear Power Plants

Market leader in Europe

Main Coolant Piping in Nuclear Power Plants (internally cladded pipes)

One of three contractors worldwide

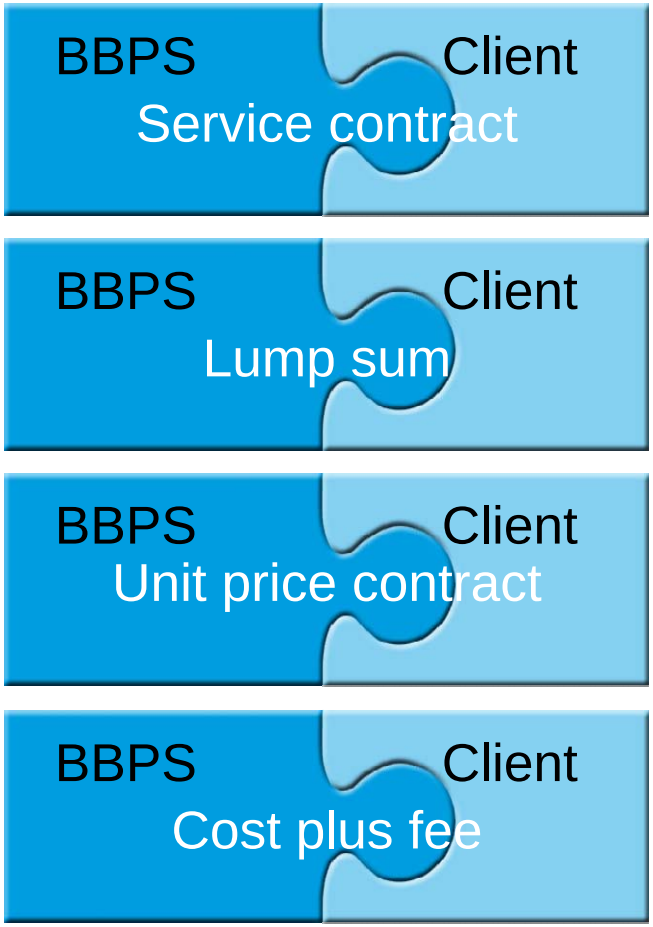


4. Market Structure
Competitors

Germany	KAM (Kraftanlagen München) BIP (Babcock Industry and Power) E.ON Anlagenservice WWV (Wärmeverwertung)
Europe	YIT (Industrial and Network Services), Finland Fives Nordon, France Fabricom (Suez Gaz de France), Belgium Boccard, France Bassi, Italy Integral, Austria
World	Shaw / Stone & Webster, USA Bentec, USA ATE (Atomtech Energy & Industrials), Taiwan BHEL (Bharat Heavy Electricals Ltd.), India Seongwha Industrial, Korea Fabricom / Endel (Suez Gaz de France), Belgium/France

5. Clients
Top ten operators and turnkey suppliers / general contractors

6. Contract Types



Hourly rates
Billing on basis of hours and
material spent according to unit rate list

Lump sum fixed price for exactly defined
scope of supplies and services
e.g. water/steam cycles

Unit rate lists with defined quantities
e.g. major contract OL3 Finland
- AREVA reactor building
- SIEMENS turbine hall

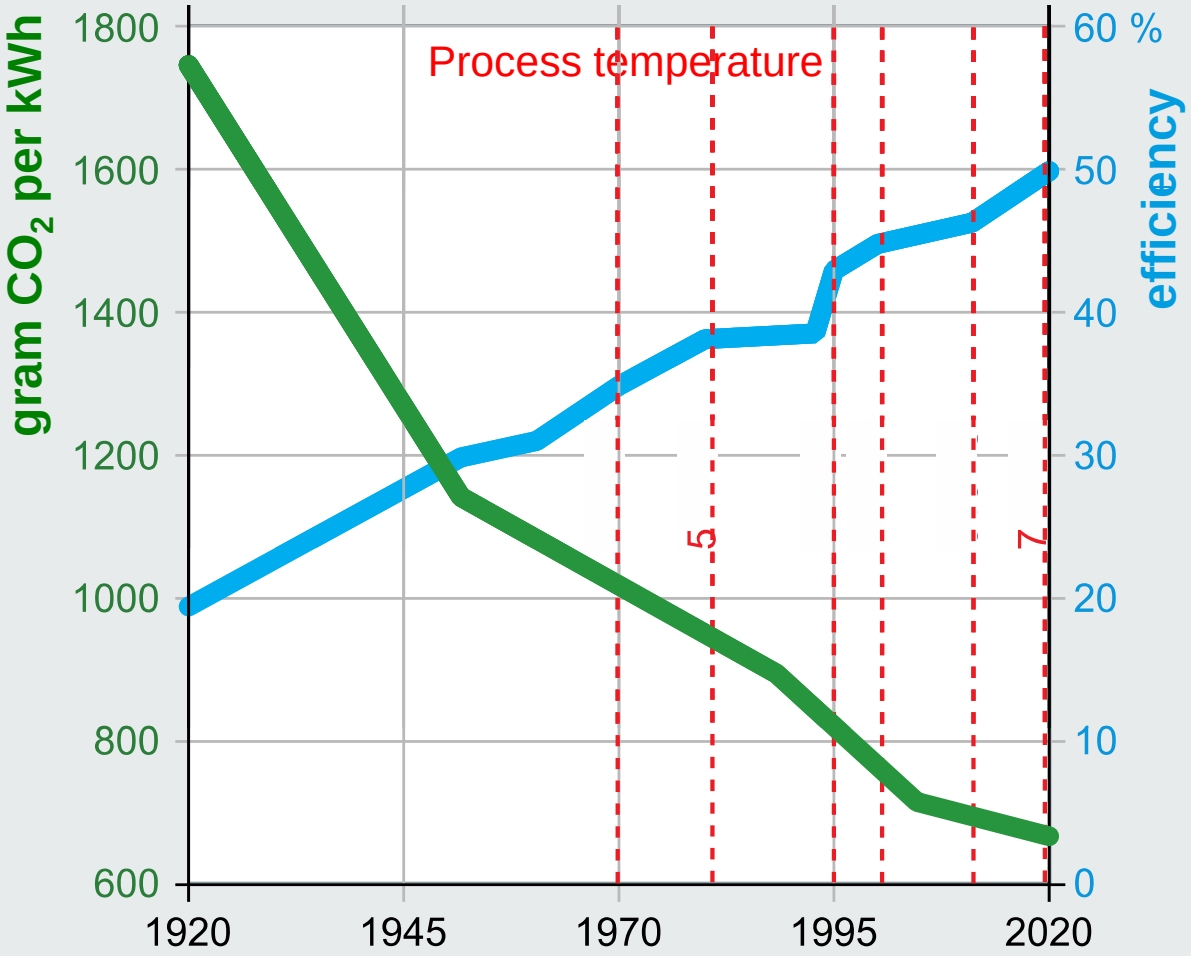
Hours spent with hour charge rates
all materials and third-party services (cost plus fee)
– no major contracts –

7. Competitive differentiators and success factors Development of efficiency and CO2- Emission in Coal-Fired Power Plants

Higher process temperatures and pressures …

… increase net Efficiency and reduce CO2 emissions.

… require better materials with higher demands for development, manufacturing and fabrication.



7. Competitive differentiators and success factors
Competitive differentiators

More than 100 years of expertise and know-how from

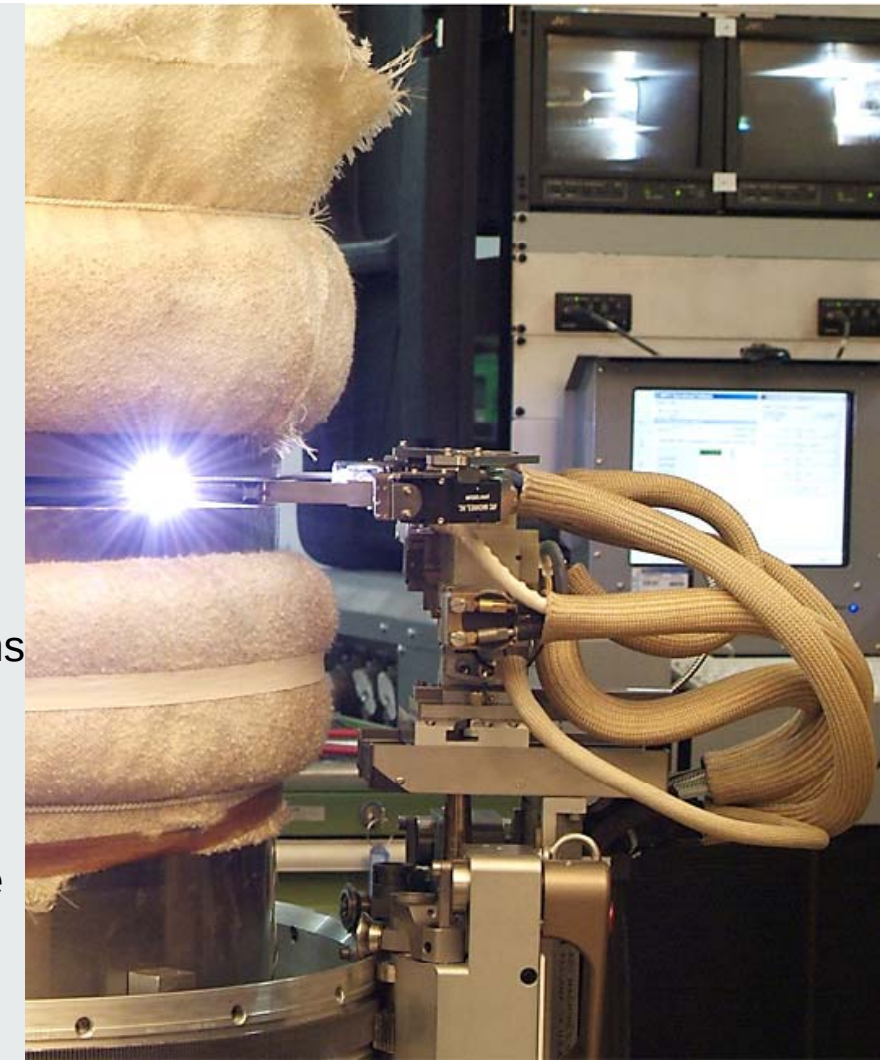
- Mannesmann Anlagenbau (MAB), today BHR
- Babcock Rohrbau, today BHR

Close cooperation with world market leader Vallourec & Mannesmann (V&M), formerly Mannesmann Röhrenwerke

Global leader in equipping power plants with seamless pipes for high-pressure piping systems

Joint research projects with Vallourec & Mannesmann (V&M)

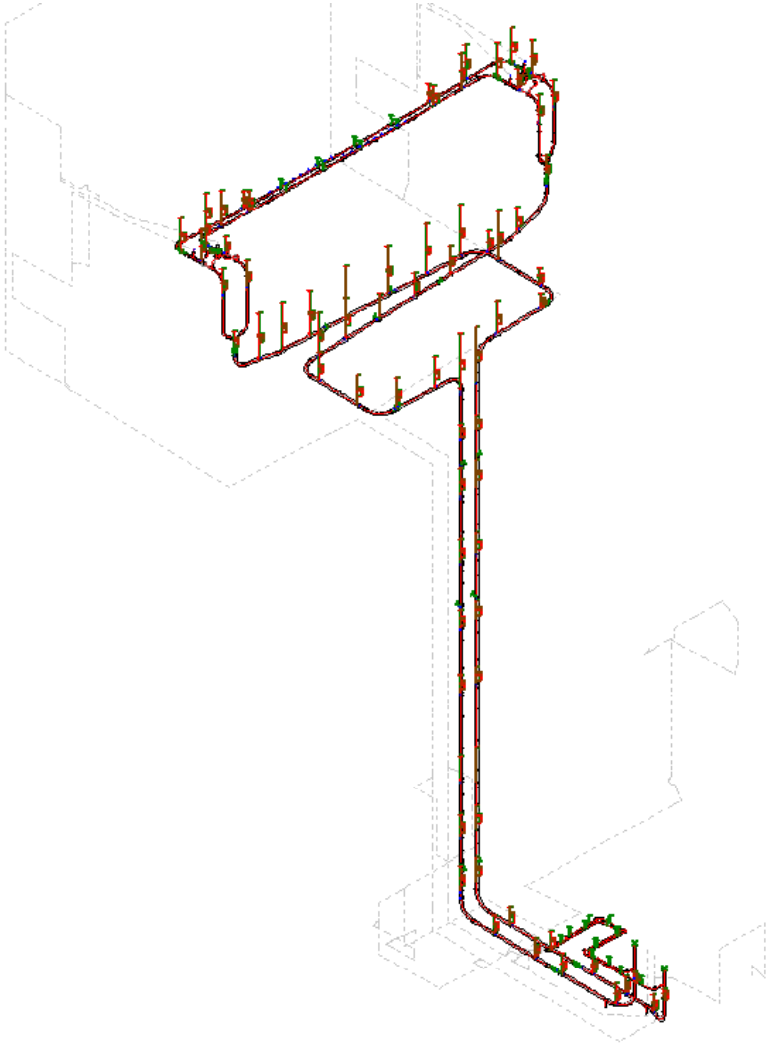
Ongoing development and improvement of pipe materials (V&M) and their process technologies (BHR)



7. Competitive differentiators and success factors
Core competence
Process engineering and design calculation

Pressure surge calculation of the main steam piping system

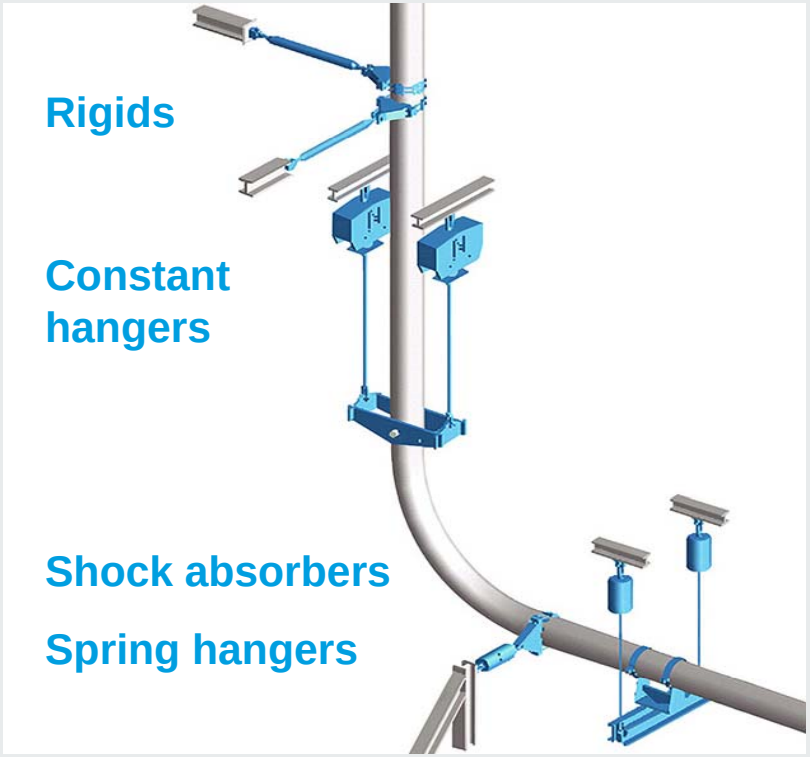
- Turbine safety shutdown in max. 150 milliseconds
- Velocity of steam flow up to approx. 210 km/h

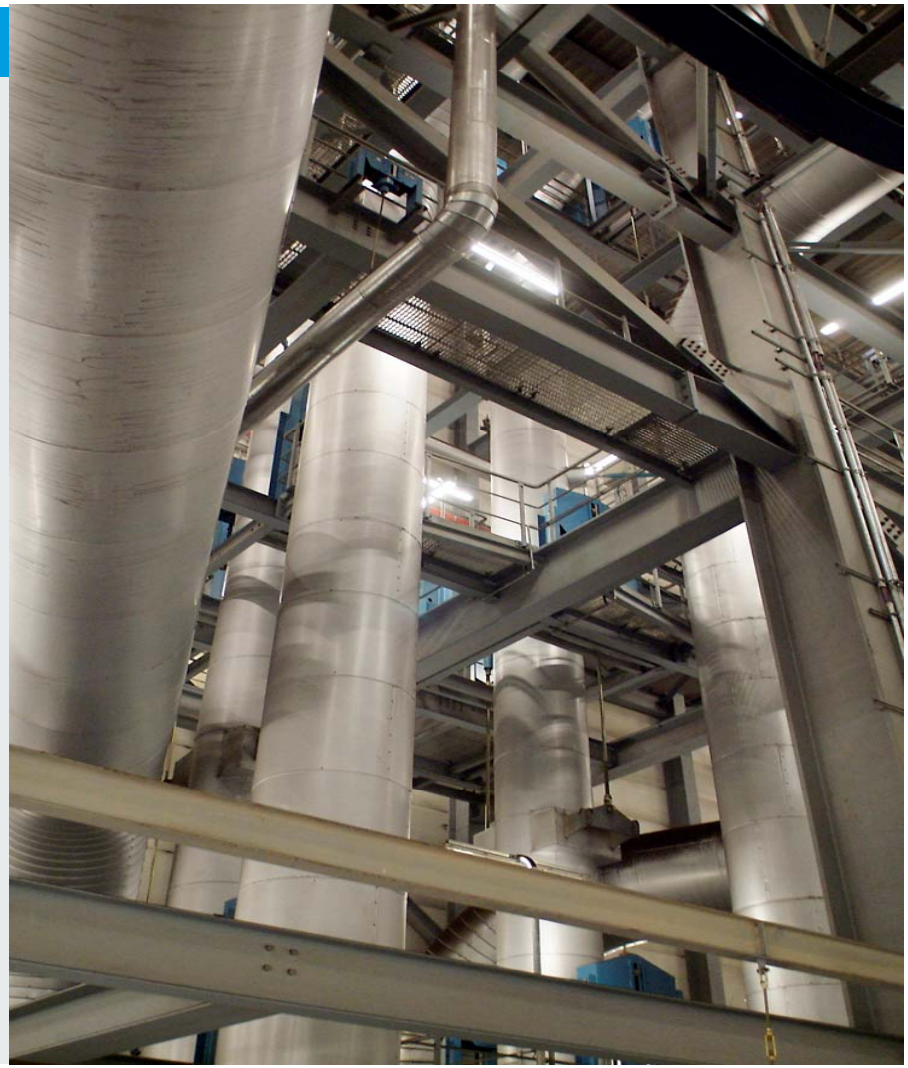


7. Competitive differentiators and success factors
Core competence
Detail engineering and calculation

Control of forces and loads

Transfer of forces and loads into the building steel structure by means of Lisega Pipe Hangers





7. Competitive differentiators and success factors
Core competence
The key technologies

- Inductive bending
- Submerged arc welding (SAW)
- SAW socket welding
- SAW-narrow gap welding
- Weld cladding
- Manual arc welding
- Inert-gas tungsten-arc welding (TIG)
- TIG pulse orbital narrow gap welding
- Heat treatment
- Material testing non-destructive / destructive

7. Competitive differentiators and success factors
Example: Key technology inductive bending

Pipe bends

- Production of bends with flow optimised radii = minimised pressure loss
- Reduction of number of welds = increased benefit

7. Competitive differentiators and success factors
Example: Key technology inductive bending

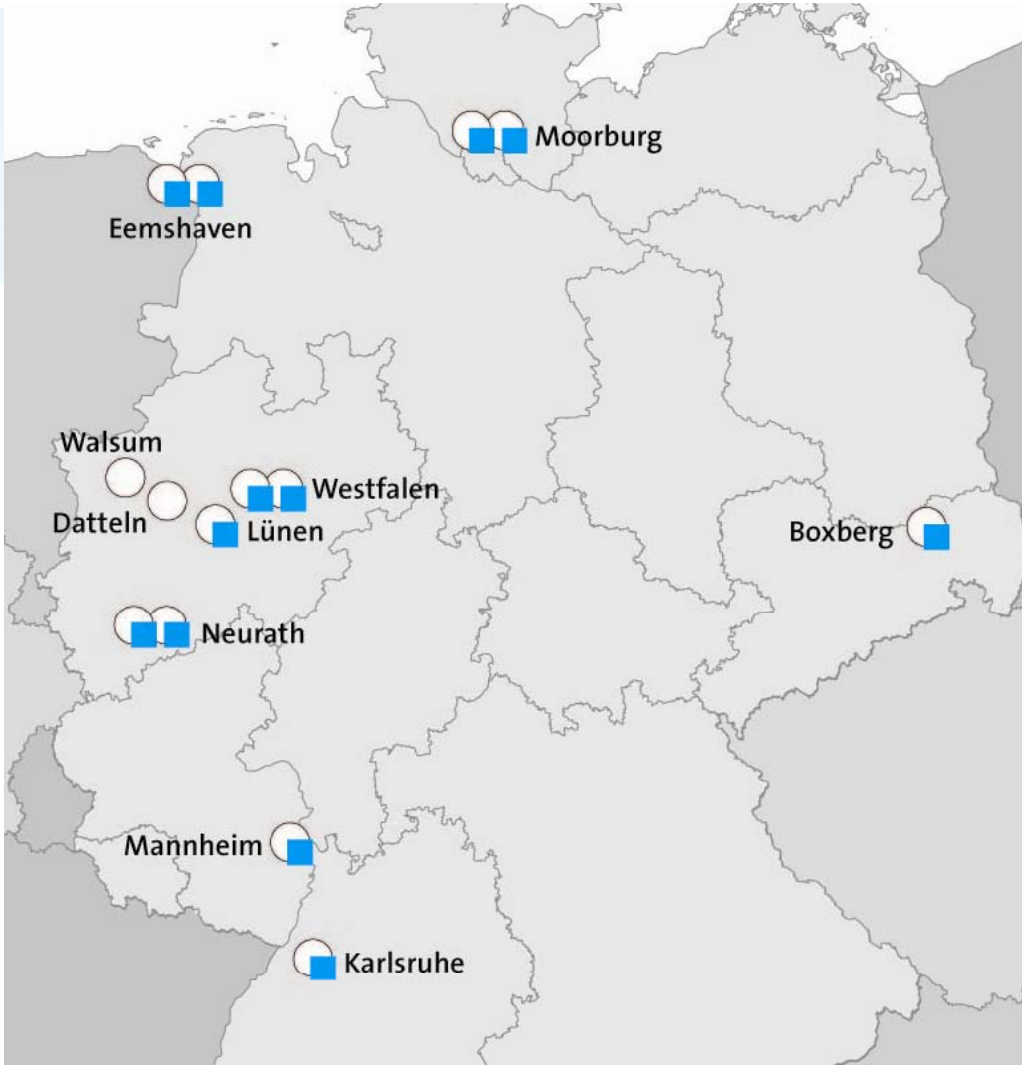
Movie Inductive Bending

7. Competitive differentiators and success factors
Successful in the market

Coal- and lignite-fired big sized power plant new builds in Germany

◯ Number of power plant units **(14)**

■ Number of BHR projects **(12)**



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Olkiluoto 3, Finland, EPR 1,600 MWe

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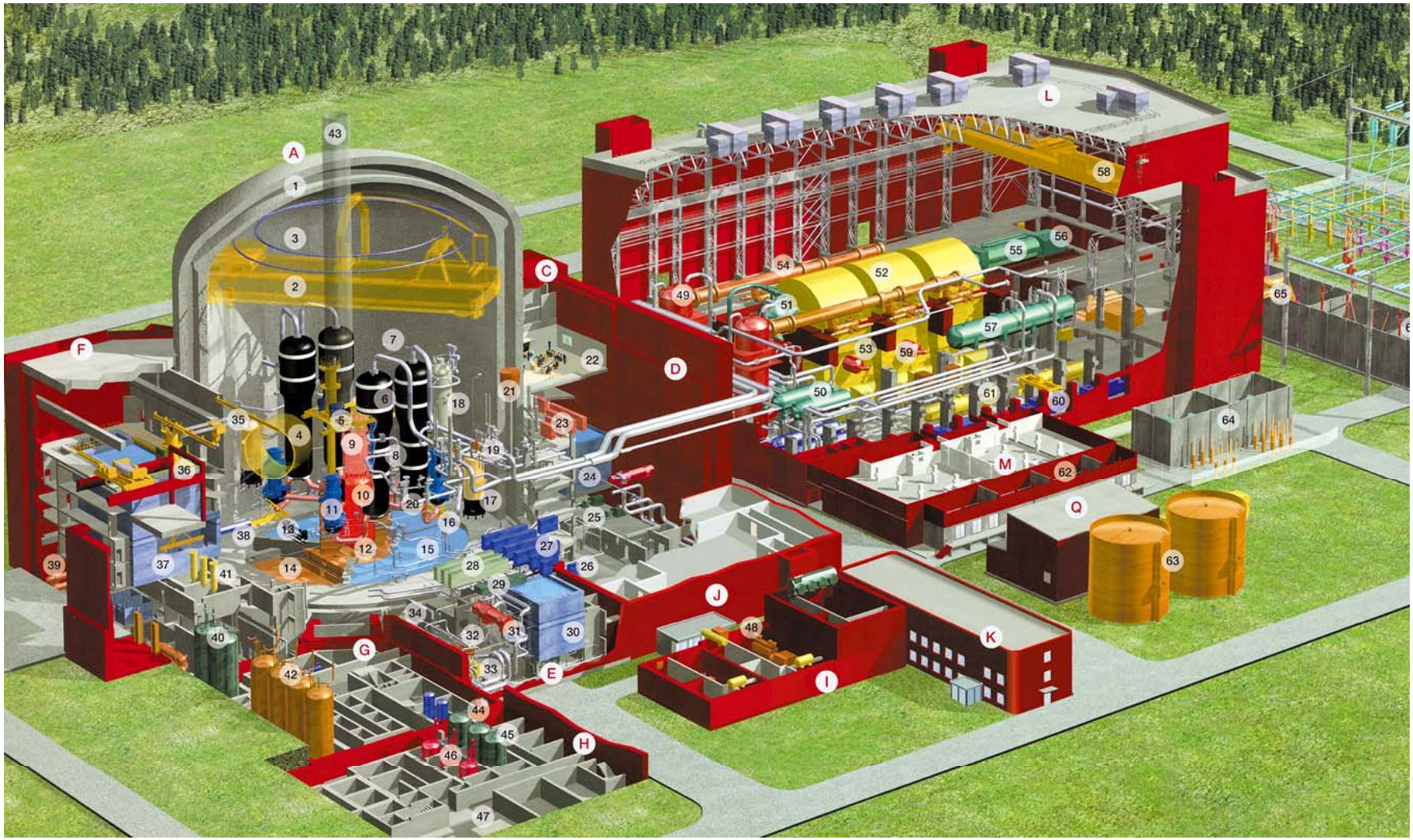

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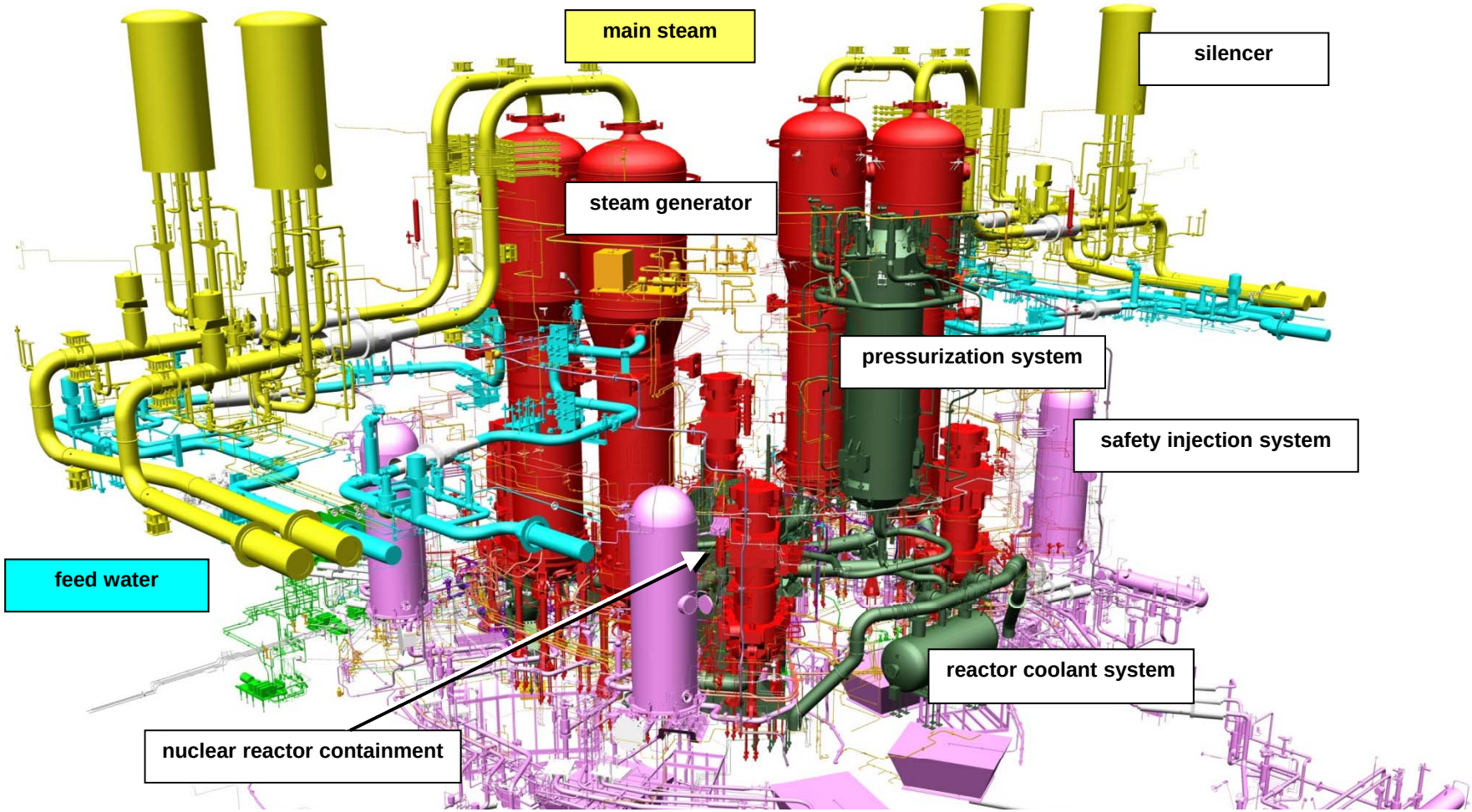

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High-pressure piping in thermal solar power plants
Water / Steam Cycles

Photo: Siemens press release

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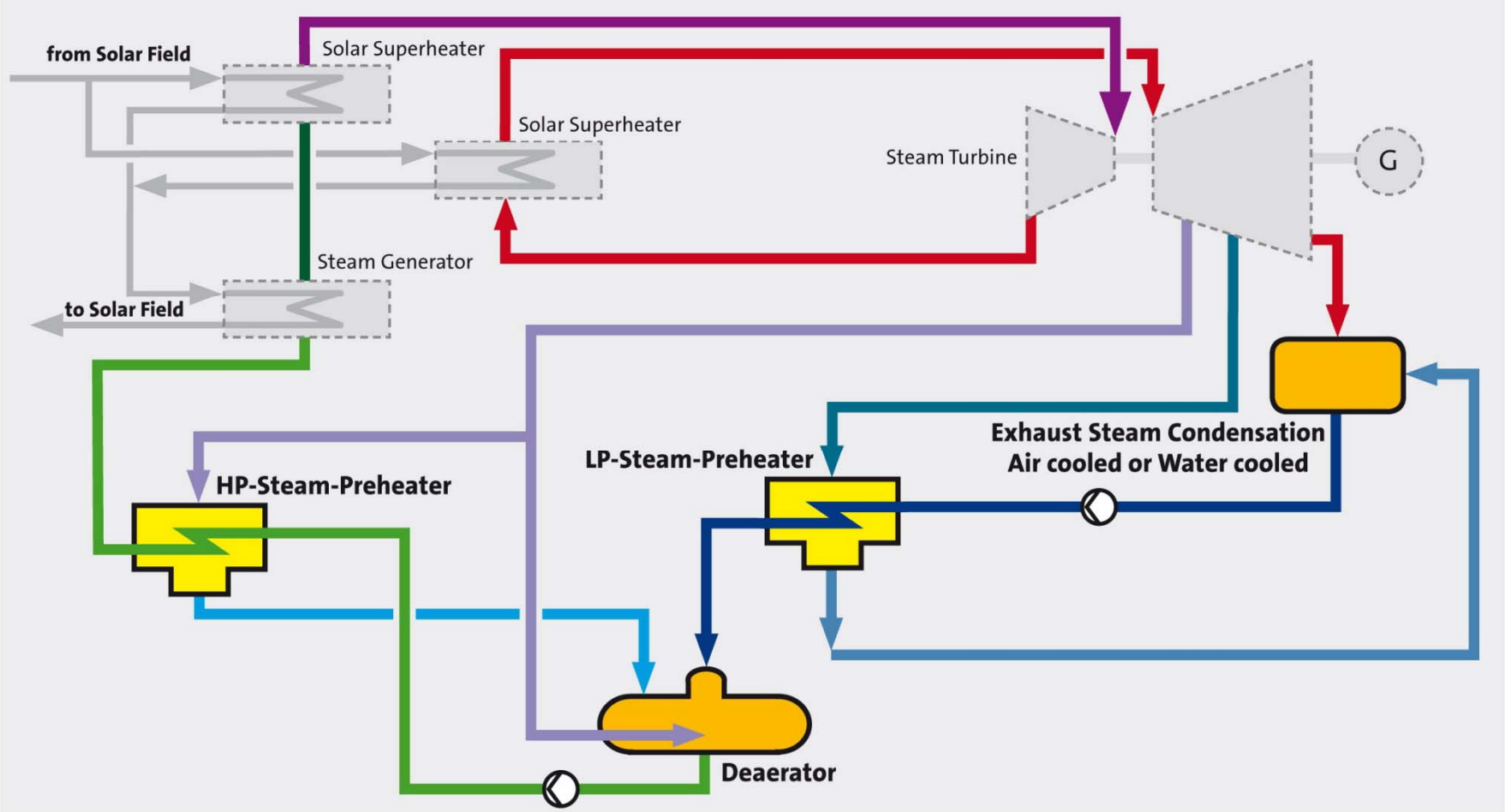

8. References
Piping solutions in offshore wind power plants
Steel pipes for offshore foundations

Strong arguments for a successful expansion of the share in the worldwide power piping market

Thank you for your attention