

## Introduction to Babcock Noell GmbH

Capital Markets Day “Power Services“ at Moorburg Power Plant

December 2, 2010

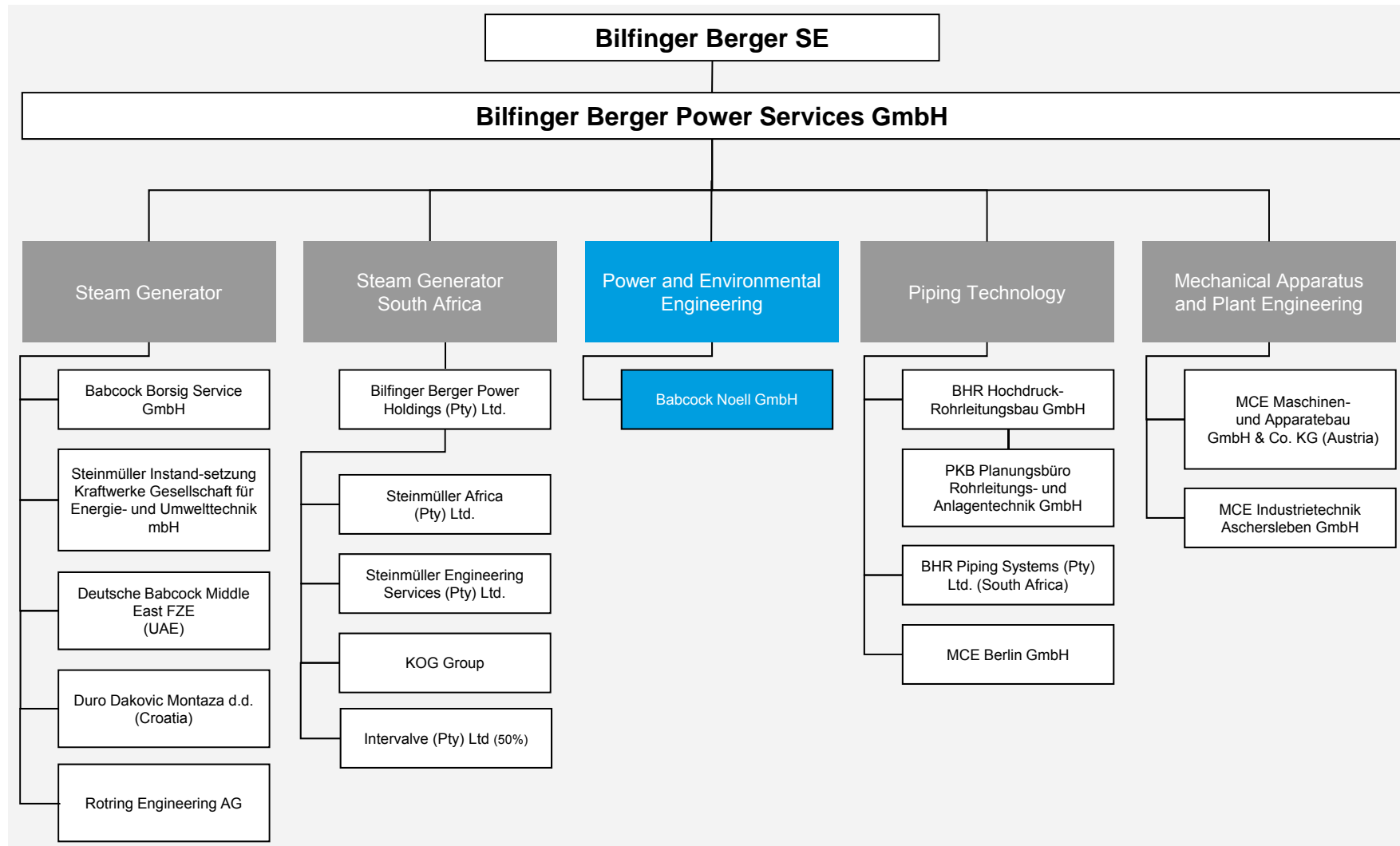
Helmut Welp, Managing Director of Babcock Noell GmbH



# Agenda

- The Company
- Products and Services
- Market Structure, Perspectives
- Success Drivers, Strategy
- The Future, Research & Development
- FGD Hamburg Moorburg Units A + B

# The Company



## The Company

### Babcock Noell - Overview

Babcock Noell GmbH (BNG) is the centre of competence with global responsibility for nuclear, magnet and environmental technology.

- BNG provides maintenance and modernization services for nuclear power plants, as well as the execution of decommissioning and dismantling works.
- BNG designs and supplies components and systems for nuclear installations and is also involved in the construction of nuclear power stations.
- Superconducting magnet technology has become a significant part of BNG's business activities with the participation in fusion and high-energy physics projects.
- Our activities in the environmental field are focused on the design and construction of flue gas treatment plants in the power, waste and industrial fields.
- BNG has great experience in project engineering and execution. The company is thus able to provide engineering and planning for major projects, or to act as a general contractor.

# The Company Product Divisions

## Nuclear Service



**Containment lock  
- preparation of  
seal for leakage  
test**

## Nuclear Technology



**Positioning of a liner-  
segment on EPR  
Reactor OL 3 Finland**

## Magnet Technology



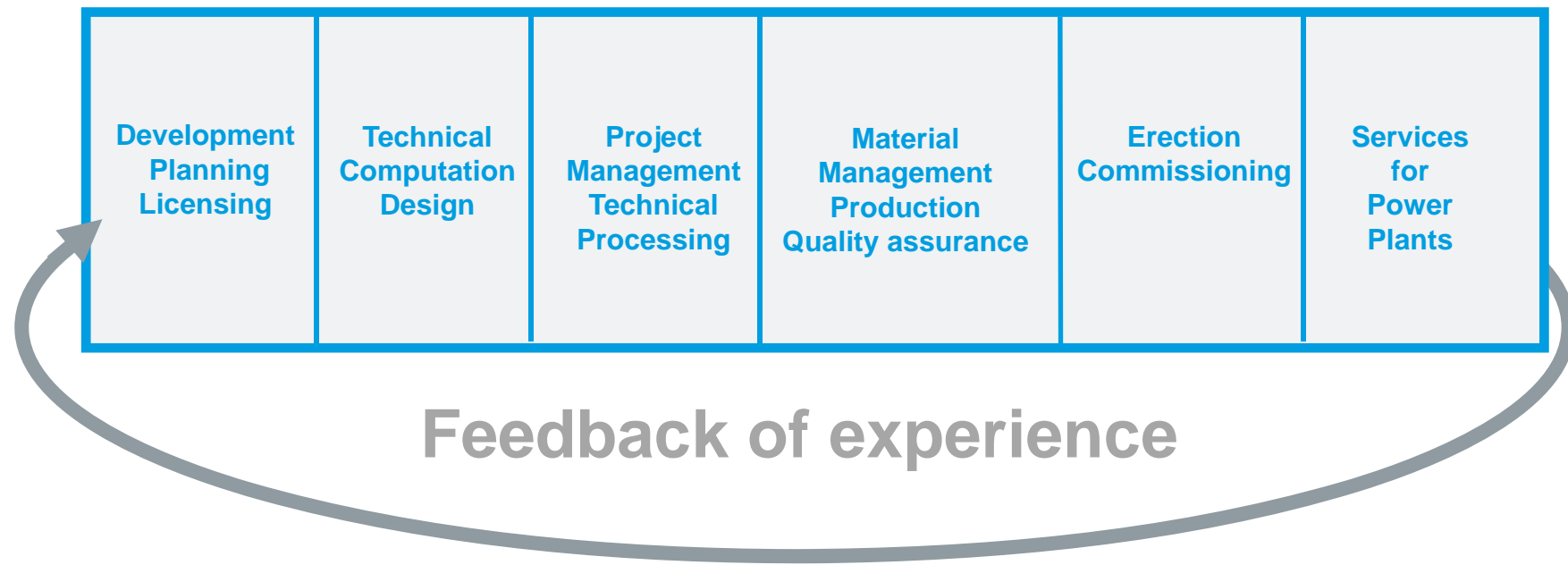
**Superconducting  
dipole for the LHC  
Accelerator,  
CERN, Geneva**

## Environmental Technology



**Components for  
flue gas treatment  
systems**

# The Company Range of services



## The Company

### Key figures 2008 to 2010 (expected)

	FY 2008	FY 2009	FY 2010e
<b>Orders received</b>	€ 100m	€ 80m	€ 136m
<b>Order backlog</b>	€ 111m	€ 125m	€ 187m
<b>Output volume</b>	€ 54m	€ 66m	€ 75m
<b>Employees</b>	300	315	330

- German share of output volume currently at approx. 63%  
However, German share of orders received currently only at approx. 11%
- In five years we target an output volume of approx. € 120m



# Products and Services Nuclear Technology

## Products



Airlock for reactor model EPR (OL 3 Finland)

- Components for nuclear power plants
- Hot cells
- Components for final disposal
- Decommissioning / waste management
- Special components



# Products and Services

## Nuclear Technology - Reference



Nuclear Power Plant Olkiluoto 3

### Nuclear Power Plant Olkiluoto 3 Containment Liner

Customer:	AREVA NP
Contract Value:	approx. € 35m
Duration:	2004 – 2012
Total Weight:	approx. 1,000 t
Liner-plate Thickness:	6 mm
Diameter:	46,800 mm
Total Height:	65,300 m
Welds:	approx. 45 km

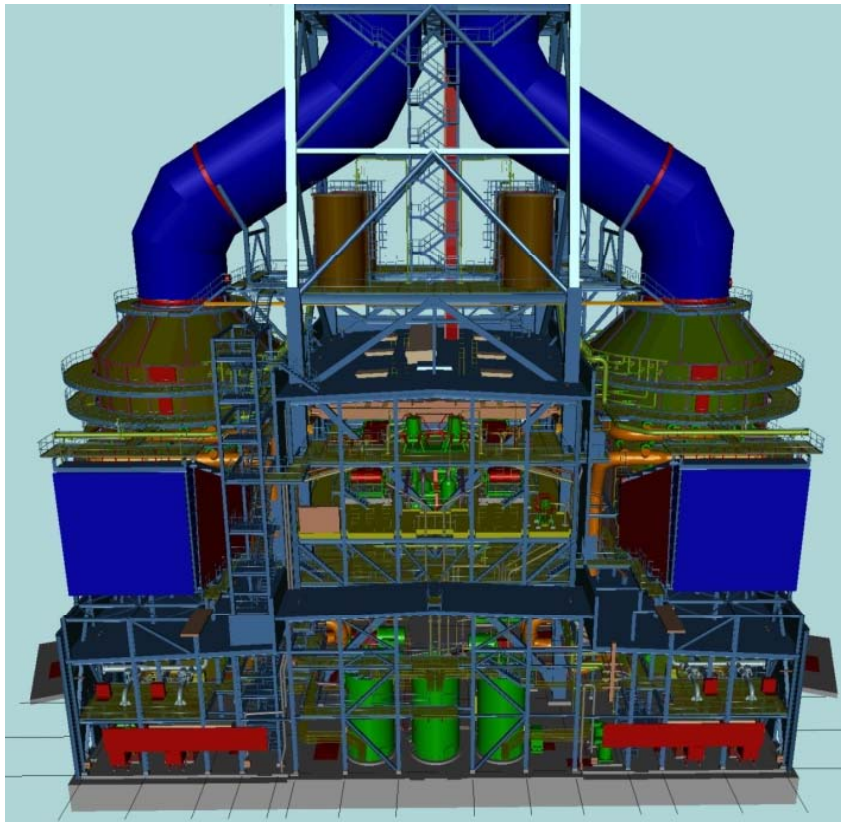
The EPR reactor is an advanced Generation III+ Pressurized Water Reactor (PWR) with 1,600 MW. The latest development in pressurized water reactors, it combines greater competitiveness and safety. EPR reactors are being built in Finland, France and China.

# Products and Services Environmental Technology

## Products

Design, engineering, delivery, complete Installation and commissioning of flue gas treatment systems for fossil power plants, waste-to-energy plants, etc.:

- (F)lue (G)as (D)esulphurization Plants (FGD)
- (S)elective (C)atalytic (R)eduction of NO<sub>x</sub> (SCR)
- Electrostatic filters and fabric filters for dedusting
- Combination of above systems for custom-made applications
- Packed bed filters
- Process optimization, upgrading, retrofitting  
Computational Fluid Dynamics (CFD) Studies



FGD Moorburg Power Plant

## Products and Services

### Environmental Technology - Reference



FGD Boxberg Power Plant

### FGD Boxberg Unit R

Customer:	Vattenfall Europe AG
Power of Boiler:	670 MW
Contract value:	€ 30m
Duration:	2005 - 2011

Absorber system with upstream connected heat extraction system, gypsum dewatering, limestone preparation system

The BNG FGD for the new lignite fired power plant Boxberg Unit R consists basically of a tray absorber (diameter: 18.5 m, height 40 m) with a SO<sub>2</sub> removal efficiency of 98%. The produced gypsum is completely used in the building material industry. The main feature is the very low power consumption.

# Market Structure, Perspectives (next 5 years) Nuclear Technology

Target Market	Product	for BNG accessible Market Volume*	Development
Ukraine	Hot Cells, Waste treatment	} € 200m	⇒
Sweden/Finland	Hot Cells, Waste treatment, Final Storage		
UK	Containment Liner, Pool Liner, Special Components	} € 900m	↑
France	Containment Liner, Pool Liner, Special Components		↗
Germany	Special Components		⇒
Asia	Special Components		↗
		€ 1,100m	

\* total volume in the next five years

# Market Structure, Perspectives (next 5 years) Environmental Technology

Target Market	Product	for BNG accessible Market Volume*	Development
Germany	FGD upgrading, SCR retrofit, Filters	€ 250m	⇒
Italy	FGD upgrading, Filters, W-t-E	€ 200m	⇒
Poland	FGD new and upgrading, SCR, Filters	€ 650m	↑
Romania	FGD retrofit, Filters, W-t-E	€ 500m	↑
Serbia, Croatia, Bosnia	FGD retrofit, Filters	€ 280m	↑
Denmark	FGD for W-t-E plants	€ 80m	⇒
Israel	FGD retrofit, SCR retrofit	€ 400m	⇒
MEA	FGD retrofit	€ 300m	⇒
South Africa	Filter upgrading	€ 100m	⇒
		<b>Σ € 2,760m</b>	

\* total volume in the next five years



# Success Drivers, Strategy

## Differentiating Factors to the Competition

### Competitors

Alstom  
 Austrian Energie & Environment (AE&E)  
 Fisia Babcock  
 Hitachi Power  
 MHI

### Babcock Noell's approach

Standard technology for FGDs

Tray-Absorber Technology for FGD

- Less power consumption
- Less required space
- High possible SO<sub>2</sub>-removal efficiency, CCS ready

Focus on big contracts for complete plants

Mixture of big contracts and sophisticated small retrofits and upgradings

- Less competition and better margin for the small contracts
- More evenly distributed order intake
- Small sophisticated orders facilitate the access to the customer

Focus on standard technologies for gas cleaning system (waste to energy)

Custom-made solutions especially for waste-to-energy plants with the following characteristics:

- Operation with cheap reagents
- Highest removal efficiency for all pollutants
- Lower disposal cost for residues

## Success Drivers, Strategy

- Balanced product mix for all kinds of power generation
- Specialized for Custom-made solutions for new plants as well as upgradings and retrofittings
- Offering of optimized and reliable technologies with unique features to gain technological and financial advantages over the competition
- Engineering staff with long professional experience and intensive education of young engineers
- Intensive Research & Development activities



Overview Oxyfuel Pilot Plant Schwarze Pumpe



Interior view Tray Absorber





Interior view of the Oxyfuel Pilot Plant

## Selection of BNG's R & D Projects

- Development of components/systems for CO<sub>2</sub>-separation Plants (oxyfuel, post combustion)
- Optimization of product portfolio regarding reliability, power consumption, efficiency
- Processing of a product gas from a wood gasification to gain biogenic CO<sub>2</sub> for the food industry and CH<sub>4</sub> as fuel for power generation and vehicles
- Development of “fly wheels” for energy storage purposes

# The Future, Research & Development

## R & D, References CCS



Oxyfuel Pilot Plant in Schwarze Pumpe

### Successful R & D Project

- The high efficiency FGD for the Vattenfall Oxyfuel pilot plant in Schwarze Pumpe
- To research the oxyfuel combustion process Vattenfall Europe commissioned a 30 MW pilot plant at Schwarze Pumpe in 2008
- The BNG high efficiency FGD as key component demonstrates impressively its capability with a SO<sub>2</sub> removal efficiency of 99.8 %
- This performance ensures a very high purity of the CO<sub>2</sub> from the combustion process and is essential for further processing (compression and storage)

## Flue Gas Desulphurization Plant Hamburg Moorburg Units A+B



# FGD Project Hamburg Moorburg A+B

## General

Customer: Vattenfall Europe AG

Contract Value: € 60m

Order Received: March 24, 2006

Contract Duration: 2006 - 2013

## Key Figures

Power of Boiler: 2 x 820 MW

Fuel: Hard Coal

Gas Flow: 2 x 2,300.00 Nm<sup>3</sup>/h

SO<sub>2</sub> Inlet: 4000 mg/Nm<sup>3</sup>

SO<sub>2</sub> Outlet: 100 mg/Nm<sup>3</sup>

SO<sub>2</sub> Removal: 97.5%



FGD Moorburg Power Plant



# FGD Project Hamburg Moorburg A+B



FGD Moorburg Power Plant

## Scope of Services and Supply

Design, manufacture, delivery, construction and commissioning of:

2 FGD units, each with:

- Rawgas ducts, absorber, Stack
- Absorber recirculation system
- Oxidation air supply

Common Systems:

- Limestone preparation system
- Gypsum dewatering system
- Auxiliary systems

# FGD Project Hamburg Moorburg A+B

## Specific Features

- High SO<sub>2</sub>-removal Efficiency combined with optimized power consumption
- Two FRP stacks on top of the absorber in a common steel structure
- Just in time delivery of large components due lack of space available on site



FGD Moorburg Power Plant

Thank you very much for your attention!

