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ABB Process Automation



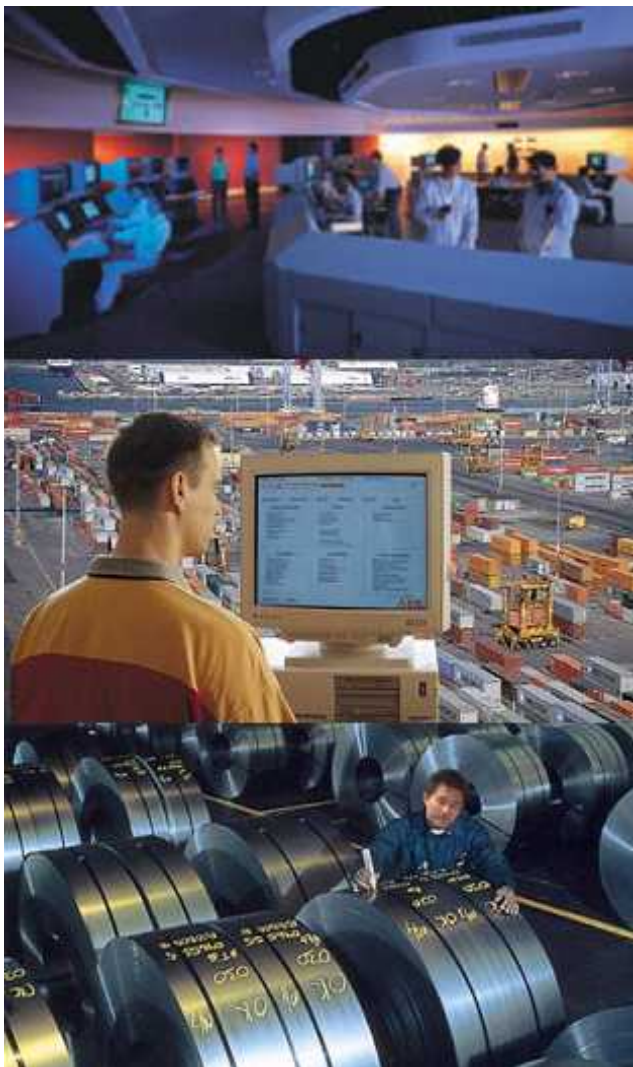
Overview Agenda



- Process Automation Division
- ABB in the mining industry
- Key technologies for the mining industries
- Summary



Key facts: ABB Process Automation



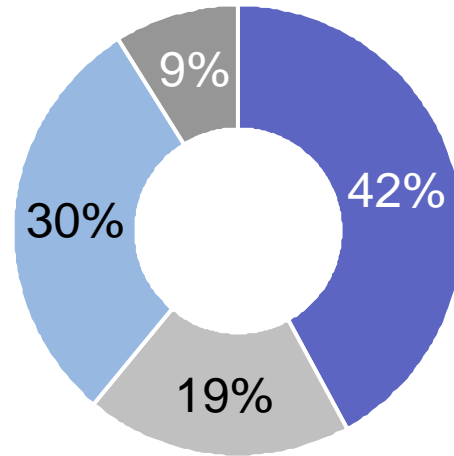
- 2007 Orders: \$7.9 billion, Revenues: \$6,4 billion
- More than 26,000 employees in over 50 countries
- Centers of Excellence for project execution and R&D in Europe, Americas, Asia
- 2007 R&D investments: \$ 233 million
- Global market leadership in all major industries and major product portfolio

Key deliverables

- Fully engineered solutions and products for process control, safety, energy and information management systems
- Industrial process solutions
- Maintenance Consulting, Lifecycle Services and Full Service – accounting for 36% of 2007 division revenues



Global business – 2007 revenues by region



■ Europe

■ Americas

■ Asia

■ Middle East & Africa



Process Automation market position

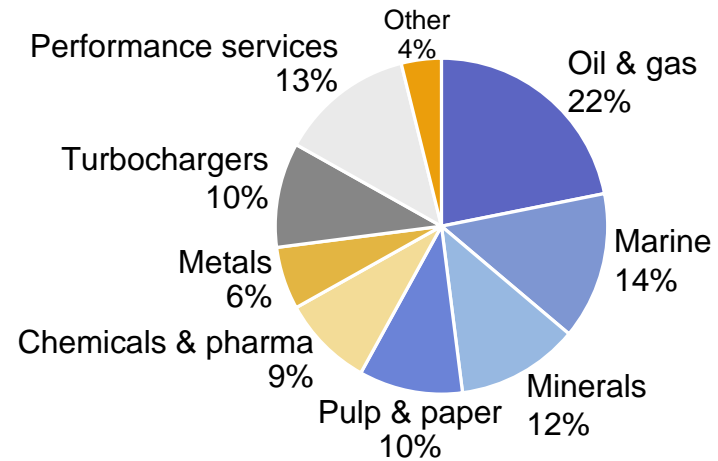
Market outlook/drivers

- High energy and commodity prices
- Energy efficiency
- GDP growth (esp. in emerging countries)
- Customer investments in productivity, reliability and longer equipment life

Competitive advantages

- Technology leadership: e.g. System 800xA control platform offers state-of-the-art functionality, allows integration of existing control systems, reduces development costs for product variants
- Economies of scope: Broad industrial and geographic presence, industry expertise for tailor-made solutions in many sectors, e.g. mining & minerals
- Captive service business: Largest installed base > \$20 bn

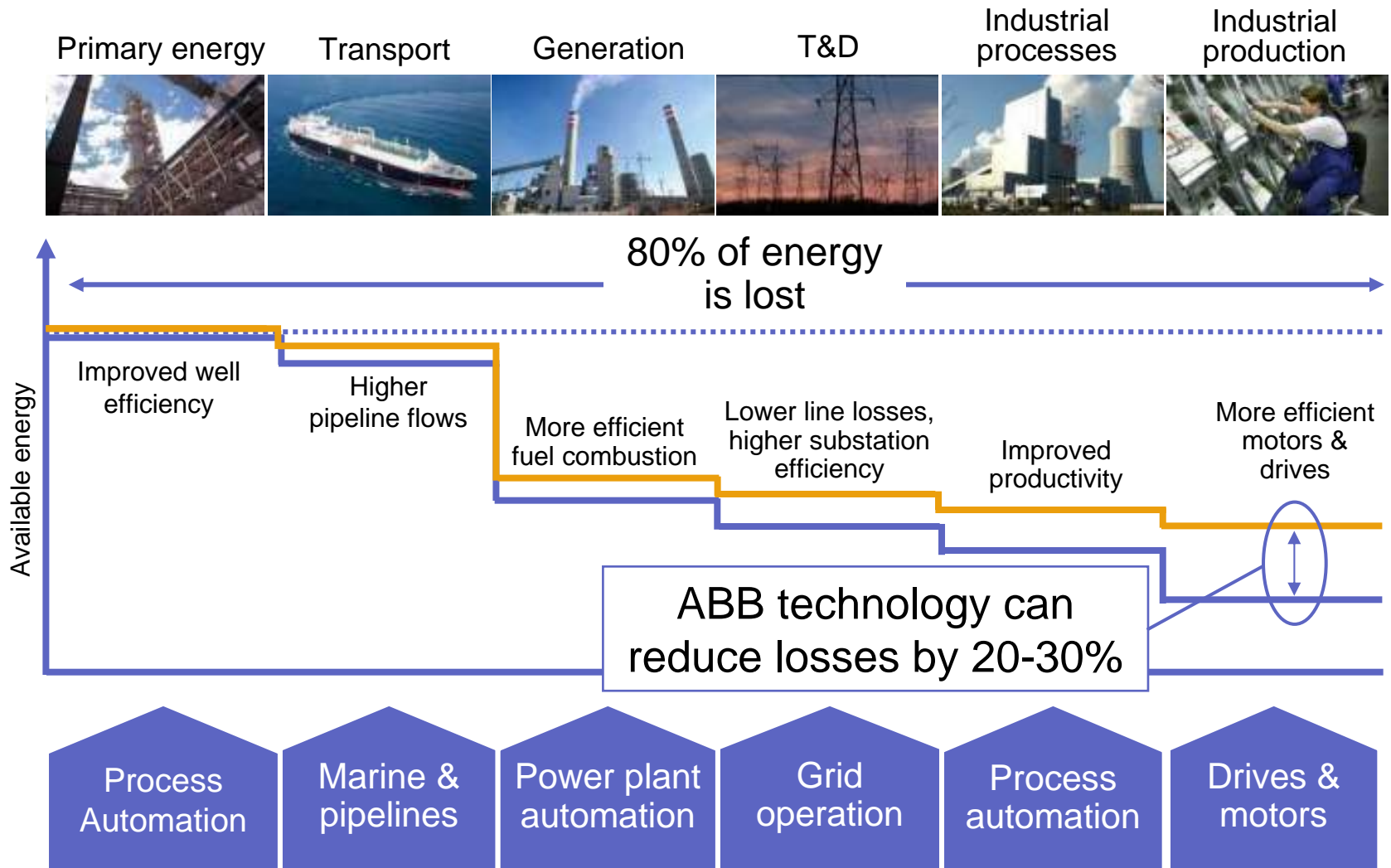
Business lines**



** Expressed as percentage of total 2006 Process Automation orders

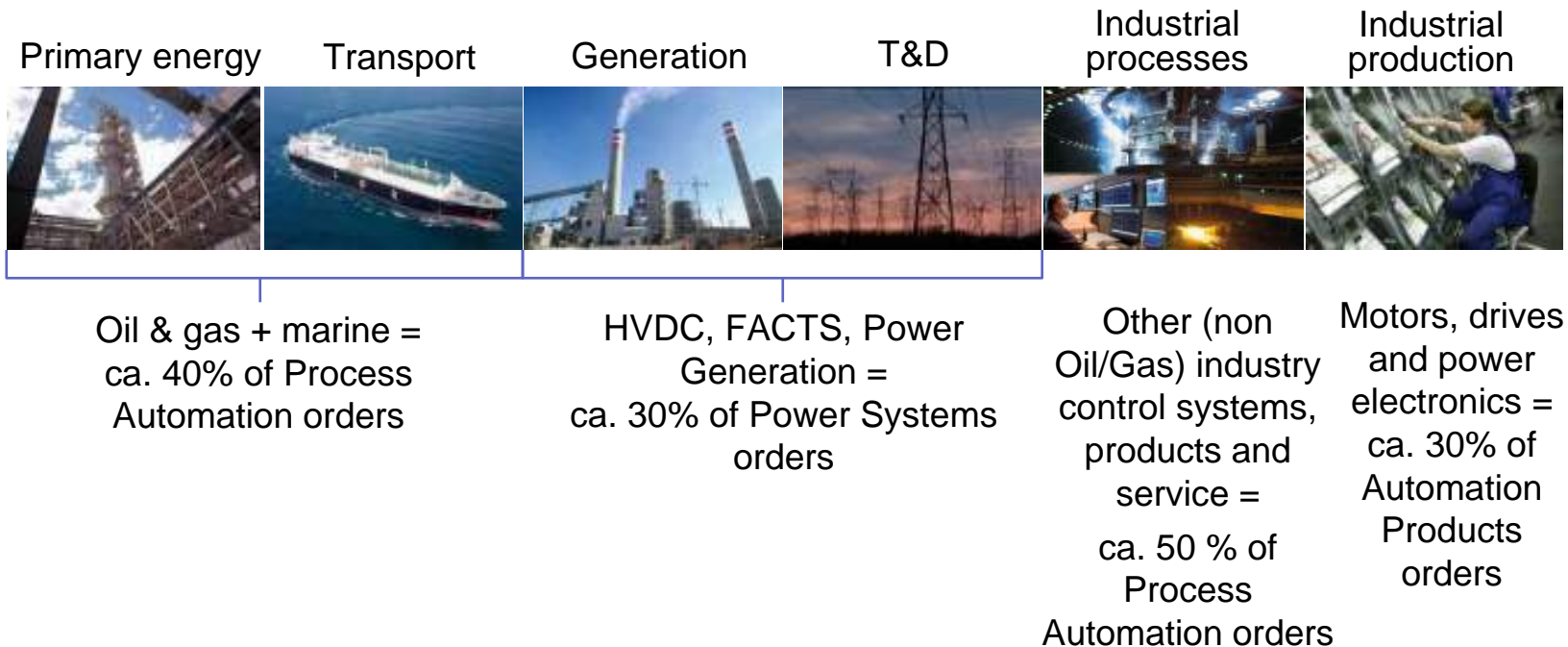


Market driver energy efficiency

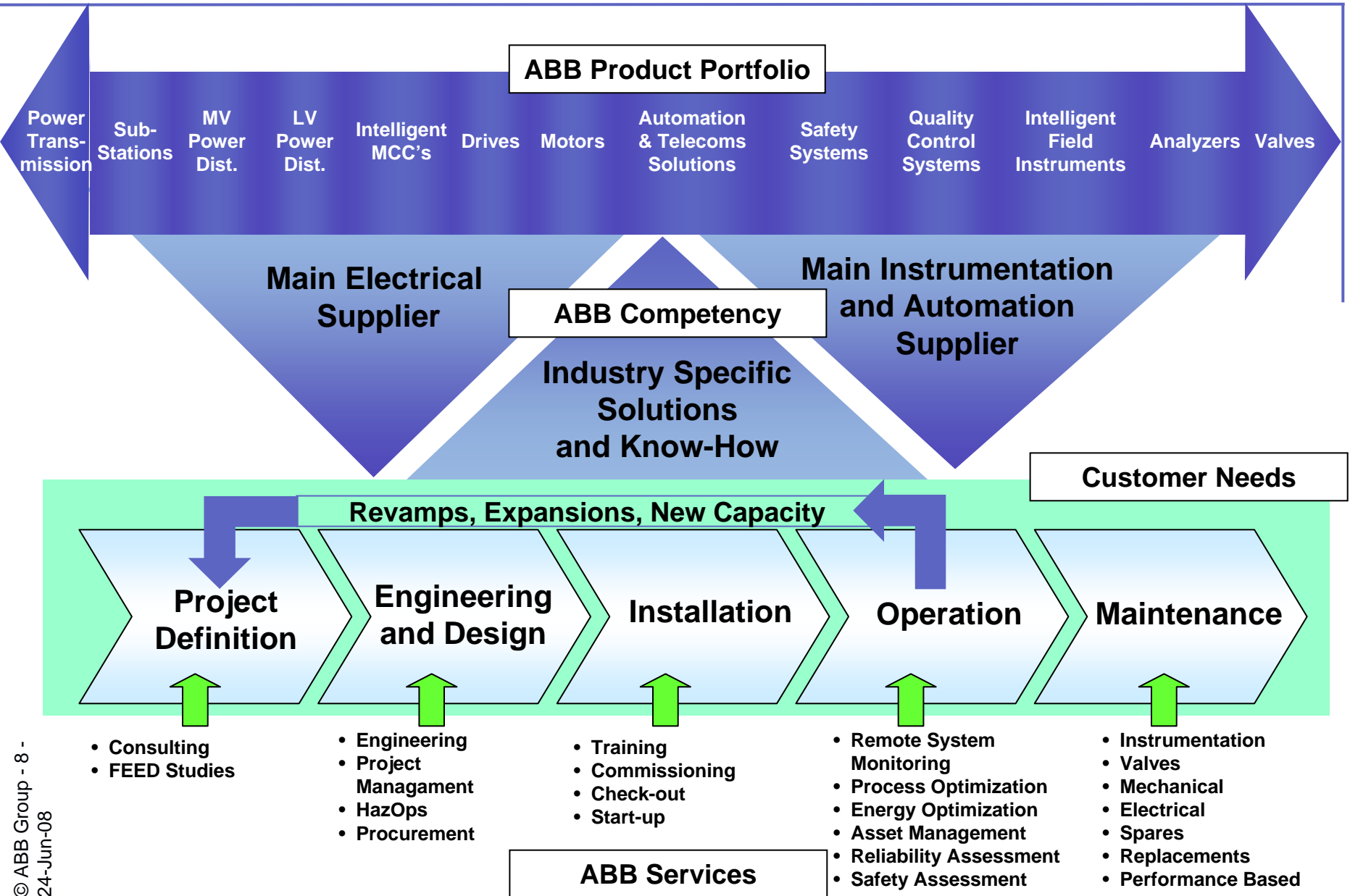


ABB's exposure to energy efficiency demand

- All ABB divisions provide solutions to improve utility and industrial efficiency
- Process Automation offers increased energy efficiency across the energy chain, mainly for oil&gas, marine and industrial processes



ABB's offering for Process Automation



Serving the full range of process industries



- Life Sciences
- Marine and Cranes
- Metals
- Minerals
- Oil, Gas and Petrochemical
- Pulp & Paper
- Turbocharging



Note: Power Automation systems are supported from the ABB Power Systems Division

Offering a wide range of specialized products



- Control Systems and products
- Production Management
- Analytics
- TotalFlow
- Force Measurement



Note: Power Automation systems are supported from the ABB Power Systems Division

Process Industries Products: 800xA Extended Automation

Common Automation Platform for:

- Process Control
- Electrical Control
- Safety Systems
- SCADA
- Information Management
- Asset Management
- Batch and Recipe Management



Statistics

- Initial release of 800xA in January, 2004
- Over 3600 systems sold since introduction (as of April, 2008)
- Supports evolution from all previous ABB systems
- Part of ABB's Control System portfolio

IndustrialIT™
▶▶ enabled

ABB is the world's largest supplier of Distributed Control Systems*

*2007 ARC Advisory Group



Industry-specific products and solutions



Paper machine
valves and
actuators



Azipod marine
propulsion



Gearless Mill Drive



FTS Instruments for
Atmospheric Chemistry
& Weather Satellites



Paper quality
control systems



Metallurgical
analyzers



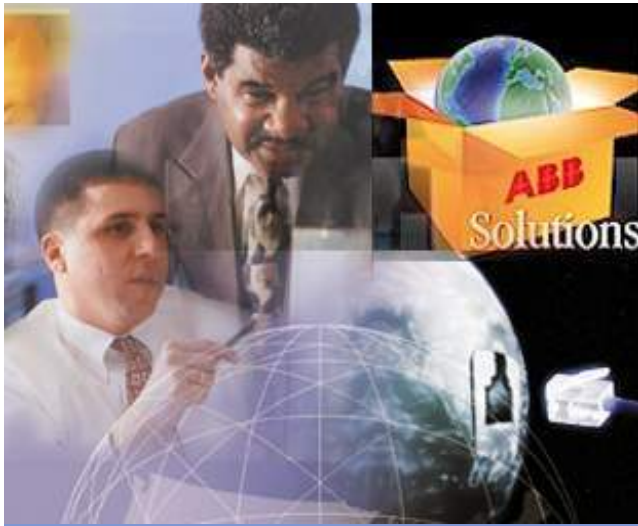
Turbochargers



Mining Hoists



ABB service business



More than 10,000 service professionals

“Largest portfolio of services of any automation supplier worldwide.”

– ARC Advisory Group

Service solutions for every phase of a plant's equipment lifecycle across all industries including:

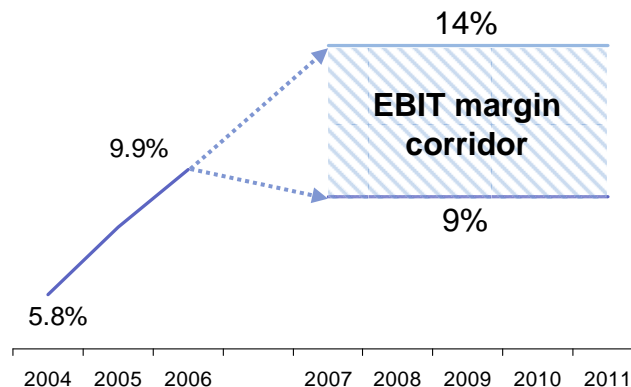
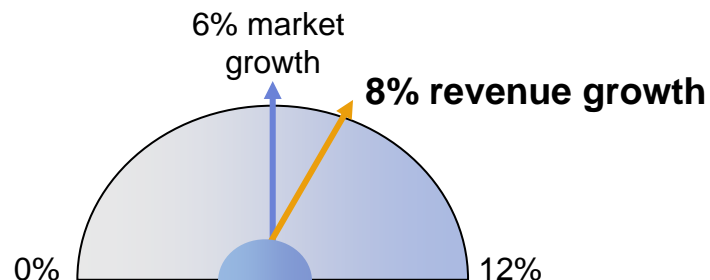
- Lifecycle Services
 - Advanced Application Services
 - Field Service
 - Remote Services
 - Spare Parts
 - Training
 - Upgrades & Retrofits
- ABB Full Service
- Equipment Performance Management
- Industrial Energy Management
- Reliability Engineering



On track for 2011 targets

Targets 2007-11

Compound annual growth rates



Q1/08 Results

	Q1 08	Q1 07	Change	
			US\$	Local
Orders	2'555	1'741	47%	31%
Revenues	1'749	1'383	26%	14%
EBIT	225	139	62%	
<i>as % of revenues</i>	12.9%	10.1%		
Cash from ops	139	83		

- Demand from metals, minerals and marine drove order growth
- Revenues up on execution of strong backlog, product & service sales
- Project execution, higher product & service revenues lifted EBIT margin



ABB in Mining and Minerals – Key Facts



Markets served

- Open pit & underground mining
- Cement manufacturing
- Primary aluminum production
- Minerals processing

Business Overview

- About 1800 employees in 29 countries
- Centers of Excellence in Germany, Sweden and Switzerland
- 2007 orders: US\$ 1.3 billion

Key deliverables

- Automation and drives solutions
- Plant electrification
- Analytical Products and Systems
- Optimization solutions
- Project management
- Engineering



Outotec



RioTintoAlcan



Mining and Minerals Market Outlook

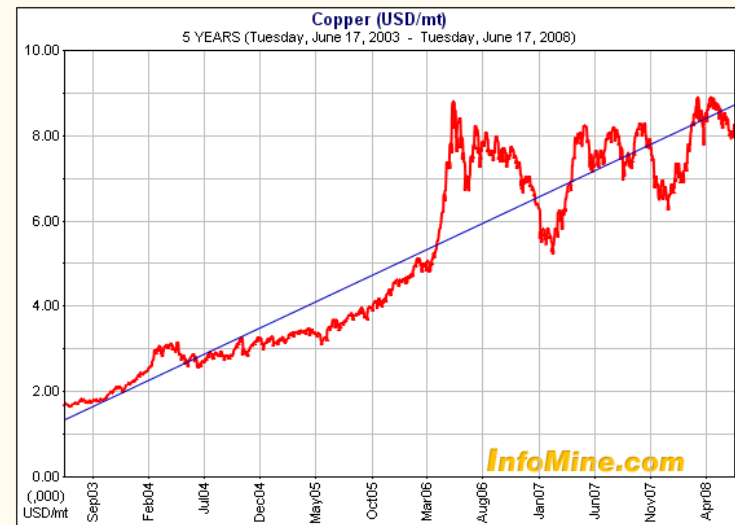


- Continuing boom in the global **Mining** industry due to global demand, particularly China and India, and increasing commodity prices*
 - Total sum of investment in global mining industry project pipeline is \$308bn*
 - Investment costs increasing due to development of more complex ore bodies, deeper, lower grade deposits and more remote locations*
 - Major % of investment in Latin America followed by Australia*
- **Aluminum** consumption forecast to increase from 32mton in 2005 to 60mton in 2020.
- China **Steel** capacity to grow 45% to 600 mill. tons by 2015
- India **Steel** output to grow 3.5x to >140 mill. tons by 2015
- Average **Steel** prices up from \$181/t from 1995-2003 to above \$650/tonne in early 2008

* Source: E&MJ / Raw Materials Group Annual Survey



Metals - price development 2003-2008



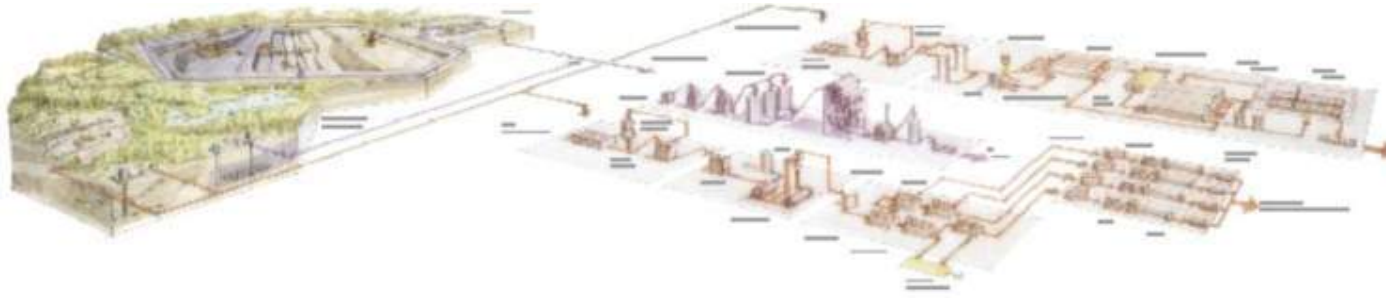
Business Unit Minerals



● Local Business Units



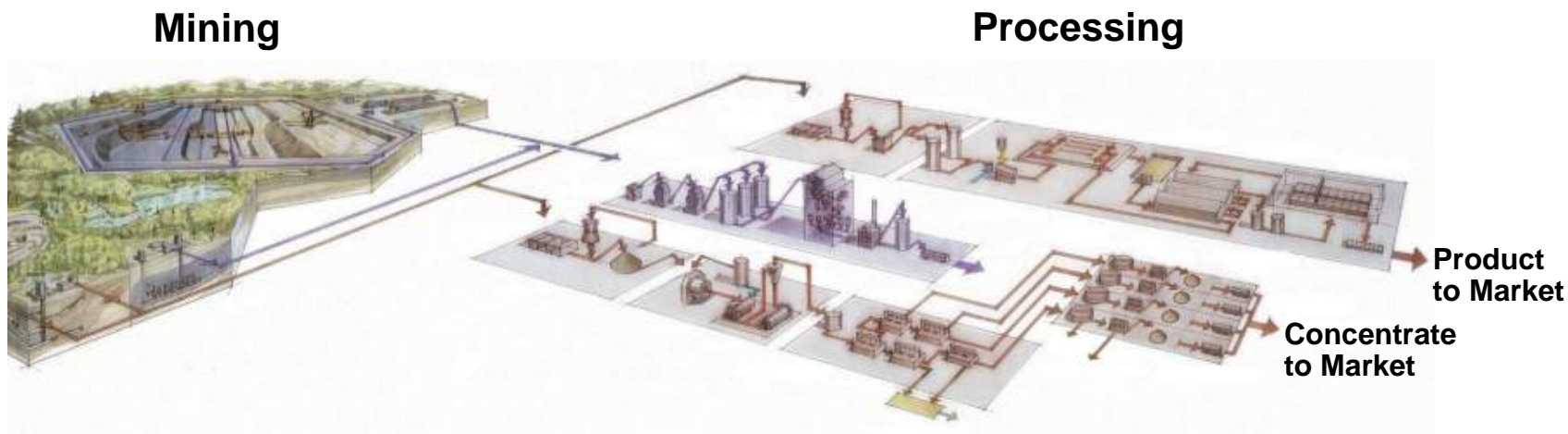
Mining and Minerals Value Chain



	Mining	Preparation	Processing	Refining	
	Underground, Hoisting, Ventilation, Continuous Open Pit, Shovel Excavators, Draglines	Crushing, Grinding, Screening	Beneficiation, Blending, Calcining, Concentration, Agglomeration	Leaching, Electrolysis, Smelting	
MINE	Iron		Concentrate, Pellets, HBI		TRADED BULK COMMODITY
	Aluminium			Ingots, Billets	
	Copper		Concentrate	Cathodes	
	Nickel			Billets, Bars	
	Zinc			Cathodes, Ingots	
	Precious Metals			Ingots, Bars	
	Limestone			Lime, Clinker, Cement	
	Coal				
	Precious Stones				

From Mine to Market

For all steps of the production process, ABB has solutions:



Underground Mining

- Complete mine hoists, both mechanical and electrical
- Leading edge control and drive systems
- Electric trucks, vehicle automation and electrification

Open Pit Mining

- Electrification and automation of mining, conveying and stockpiling
- Conveying and Stockpiling Machinery
- Data management

Minerals Processing / Cement Production

- Total Electrification
- Automation and Instrumentation
- Drives and Motors
- Collaborative Production Management Solutions



Mining and Minerals Value proposition

Integrated Solutions

Resulting in:

- + Totally integrated systems (automation, drives, power distribution)
- + Total project coordination
- + Reduced lead times
- + Reduced erection and commissioning time
- + Faster trouble-shooting
- = Faster time to complete
- = Reduced risks (procurement, scheduling, etc.)
- = Increased productivity, energy efficiency and product quality
- = Higher availability



Lower investment and operating costs



Mine Hoist systems for underground mining

- Underground mines often use hoisting system for the vertical transport of ore, material and people.
- ABB is the leading supplier in the world and the only supplier capable of delivering both mechanical and electrical equipment
- ABB can offer complete hoisting systems which offer the customers following features:
 - Safest possible operation
 - High productivity
 - Energy efficient drive systems



ABB - The only complete hoist supplier

- Design and manufacture complete hoists since 1937
- Totally about 600 hoists delivered to > 30 countries
- Only supplier of complete hoist systems
 - Shaft equipment: skip, cage, rope att's, guidance etc
 - Mechanical
 - Electrical



ABB

Potash production hoist in Canada

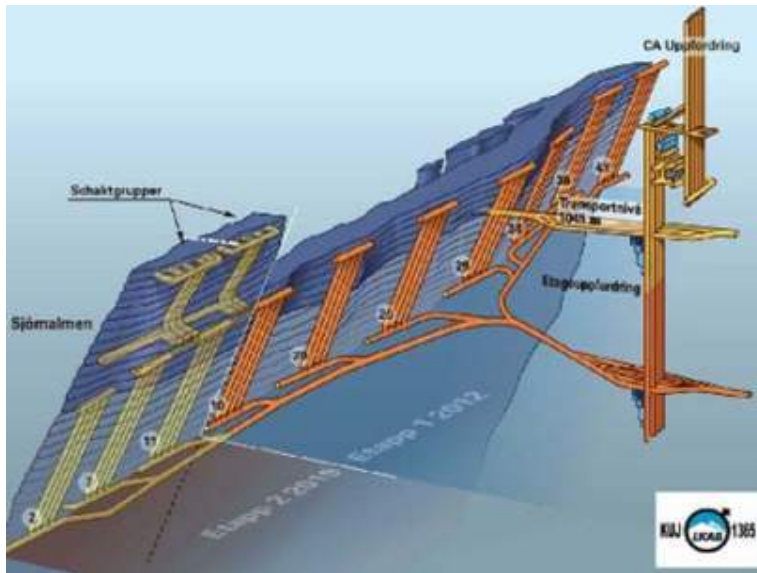
Project data

- Pulley diameter of 5.95 m
- Very large 8.6 MW motor
 - Equivalent to 12'000 HP or 120 VW Golf
- Reaches depth of 1328 metres underground
- Payload of 90 tons
 - 1760 tons per hour at a speed of 18 meters per second



LKAB Kiruna, Sweden

New transport level at 1345 m underground with ABB equipment.
Production increase from 26.5M to 33M tons per year



Scope of ABB

- 2-stage hoisting 705m + 804m
- Four new 5.6 MW drives – power
 - Equivalent to ca. 30,000 HP
- One new hoist
- Totally 12 production hoists
- Fully automatic production from train loading pocket to unloading pocket in the head frame

Key technology: Gearless Mill Drive

- In Minerals Processing, grinding low-grade ores calls for high volume mills with high power, huge capacity and brute strength. Today there is only one motor type capable of meeting the demands of high- throughput:

The Gearless Mill Drive (GMD)

- The rotor poles of the motor are installed on site to the mill.
- The ringmotor or wrap-around-motor is wrapped on site around the mill.
- The motor is controlled with ABB power electronics (cyclo converter)
- The Ringmotor has no bearings. The mill (not ABB scope) is the rotor. Develops huge torques (20 – 30.000 Nm). Dimensions of the motor are extremely large (top to bottom over 20 meter)
- Today, units of up to 26 MW are installed, design up to 35 MW, equivalent to 48.000 HP
- The power is controlled by a cyclo converter
- Very efficient technology, gearboxes and pinions are not needed → less losses.

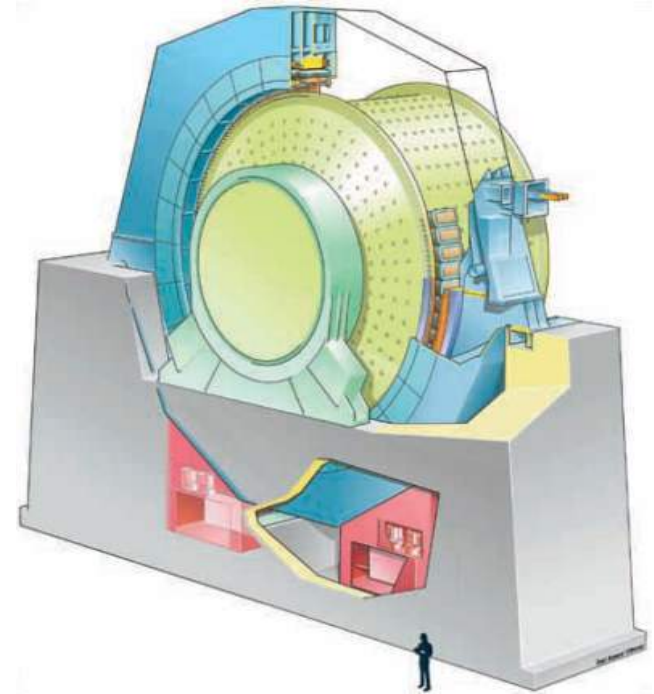


ABB is number one in Gearless Mill Drives



Copper ore processing in Chile

World largest Gearless Mill Drive System (GMD) in operation.
Minera Doña Ines de Collahuasi, Chile
Production: 80.000 t copper ore / day

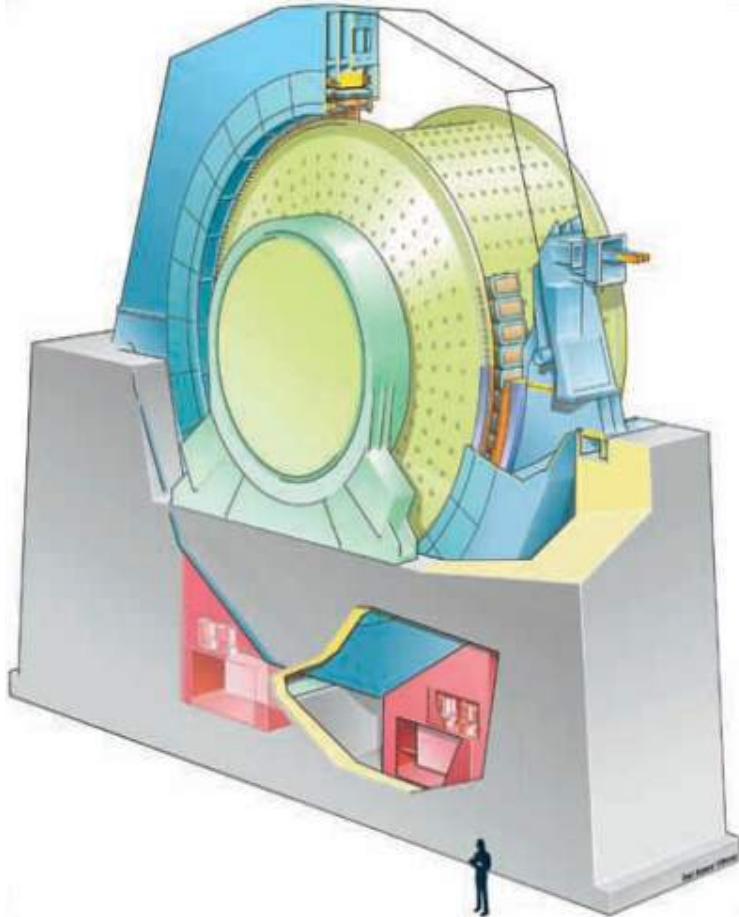


ABB: One Single Source and responsibility for

- One SAG mill drive, 40 feet (12.2 m) in diameter
Two Ball mill drives, 26 feet (7.9 m) in diameter
 - Equivalent to performance of 150.000 HP
or 1500 VW Golf
- Downhill conveyor and overland conveyor drives from ABB Switzerland
- Process control system

Malartic, latest Order from Canada

September 2007: Gearless Mill Drive (GMD) System for Malartic Gold Exploration Field for grinding 40.000 tons of gold ore per day



Scope of ABB

- One GMD system to drive grinding mill with 38 feet (11.6 m) diameter
- Mill drive with 19 Megawatt or
 - Equivalent to 26,000 HP or 2600 VW Golf
- High performance ringmotor
- Power technology
- Control system
- Engineering

Summary

- Mining and mineral industries continue to benefit from strong demand for metals, mainly from emerging countries
- Strong investments in power and automation equipment and services for new capacity, increase productivity and energy efficiency
- ABB supports the Mining and Mineral Industry through:
 - Integrated offer of leading automation and power technologies to increase productivity and energy efficiency backed by strong R&D investments
 - Global ABB footprint for global customers
 - Industry specific expertise for key mining technologies such as hoist drives, control systems, power distribution
 - Mitigation of project risks
 - Full portfolio of services throughout an asset's life cycle based on industry knowledge
- Long standing customer partnerships and long-term industry relationships





Power and productivity
for a better world™