



Capital Markets Day, London, September 12, 2012

# Opportunities in ABB's automation business



Joe Hogan, Capital Markets Day, London, September 12, 2012

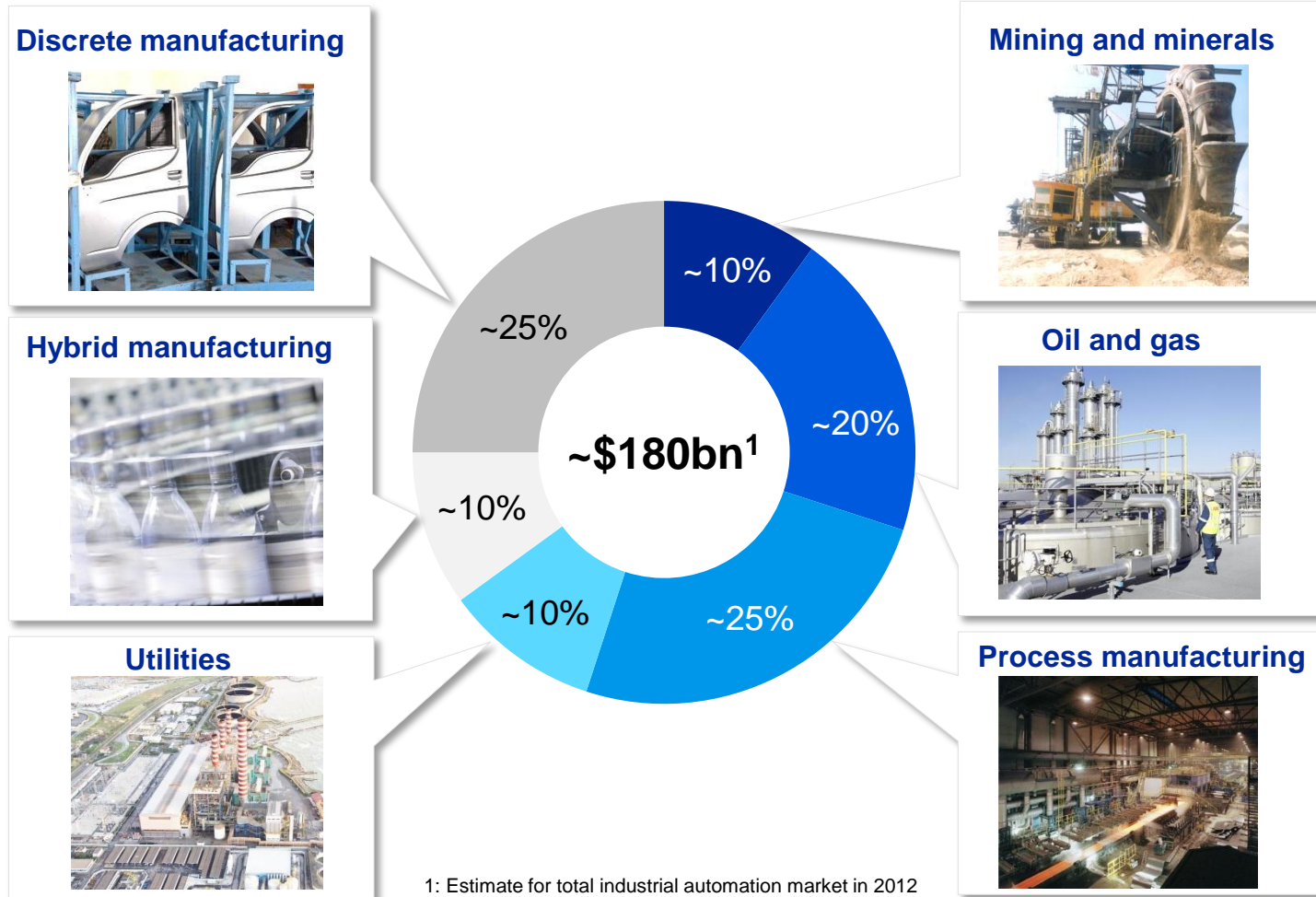
# Introduction to afternoon session

## Joe Hogan, CEO



# Industrial automation

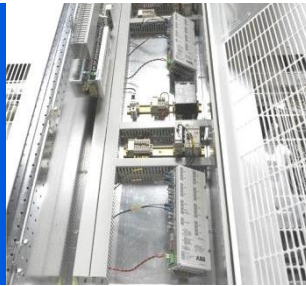
## A \$180bn market opportunity



# End-user trends

## Leading to sustainable growth

### Energy efficiency



- Rising awareness of energy cost in P&L
- Increasing commodity prices
- Environmental concerns and regulations

### Next level of productivity



- End-to-end optimization of manufacturing process
- Shorter product life cycles and greater variety
- Holistic performance management

### Automation penetration in emerging markets

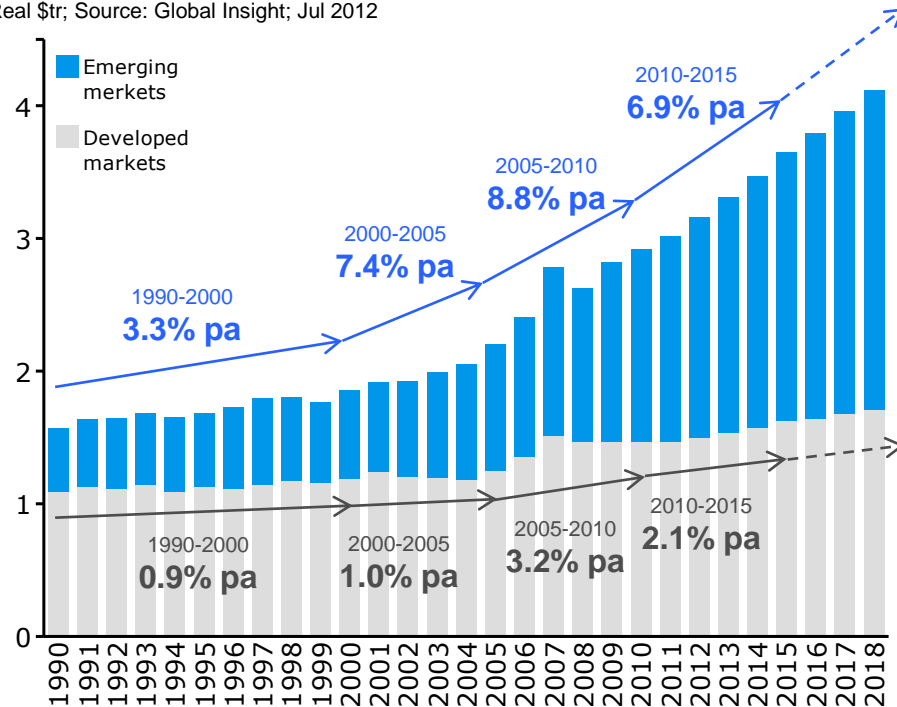


- Rapid industrialization in emerging markets, shift of manufacturing base
- Shortage of skilled workforce
- Need to improve quality, productivity and operational health and safety

# Demand for productivity and energy efficiency are driving the automation sector's growth

## Automation sector spend\*

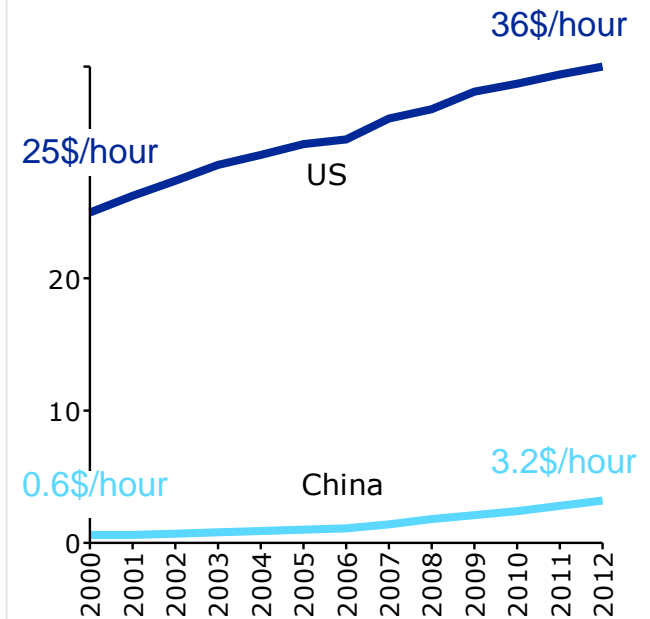
Real \$tr; Source: Global Insight; Jul 2012



\*Oil and gas, mining, Iron and steel, electricity, gas and steam, basic industrial chemicals, pulp and paper, infrastructure construction sectors

## Labor cost per hour

\$; Source: EIU

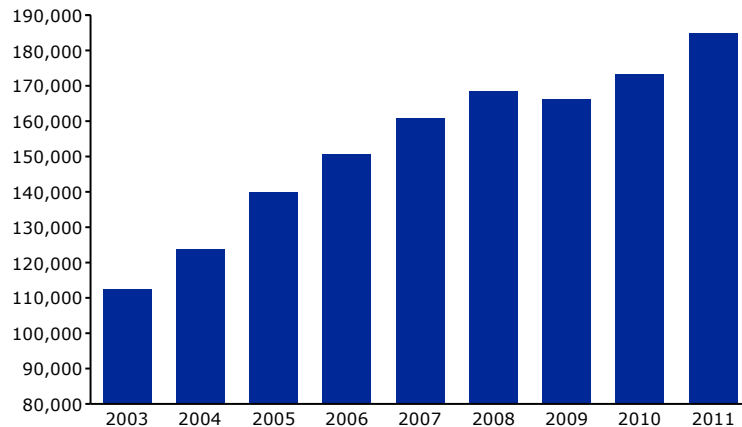


Automation will benefit from rising wages across the globe

# Perspectives are bright in both developed and emerging markets

## Developed countries

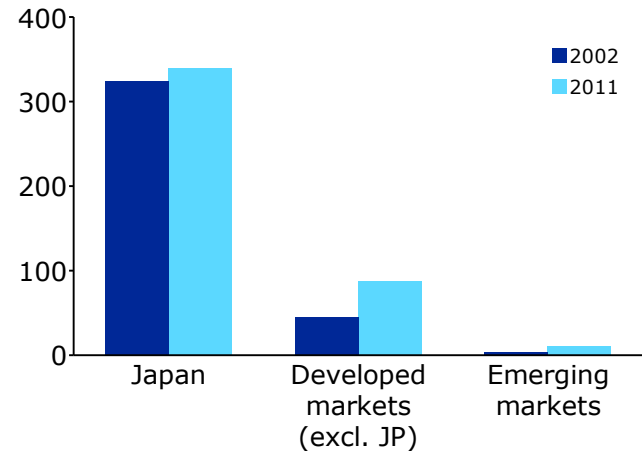
North America operational stock of robots; Source: IFR  
Number of units



Developed markets to maintain output growth through increased automation

## Worldwide opportunities

Robots per 10,000 manufacturing employees; Source: IFR, Credit Suisse

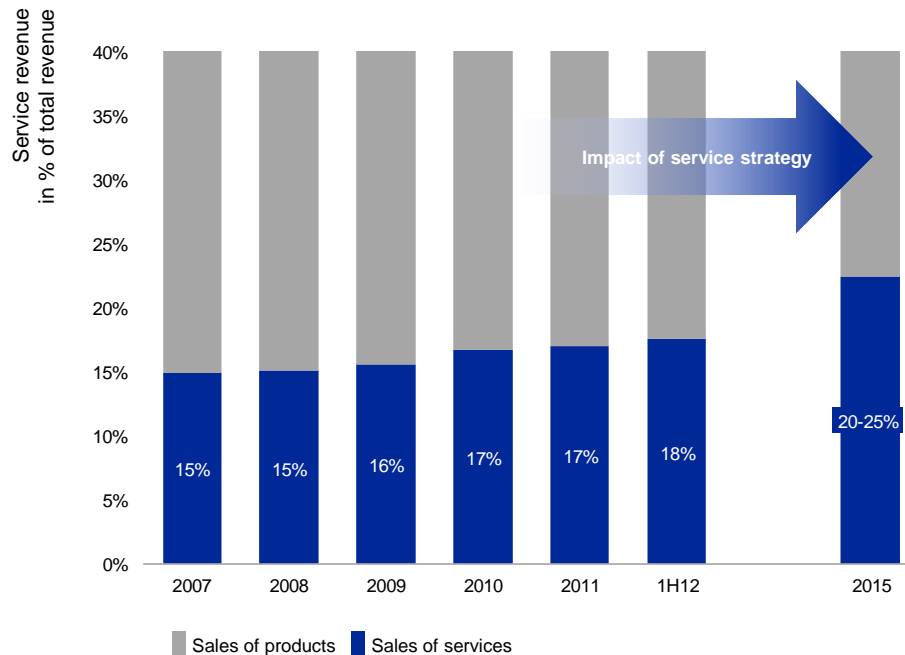


Enormous potential in emerging markets

# Executing on the service strategy

## Successful strategy roll-out and steady progression

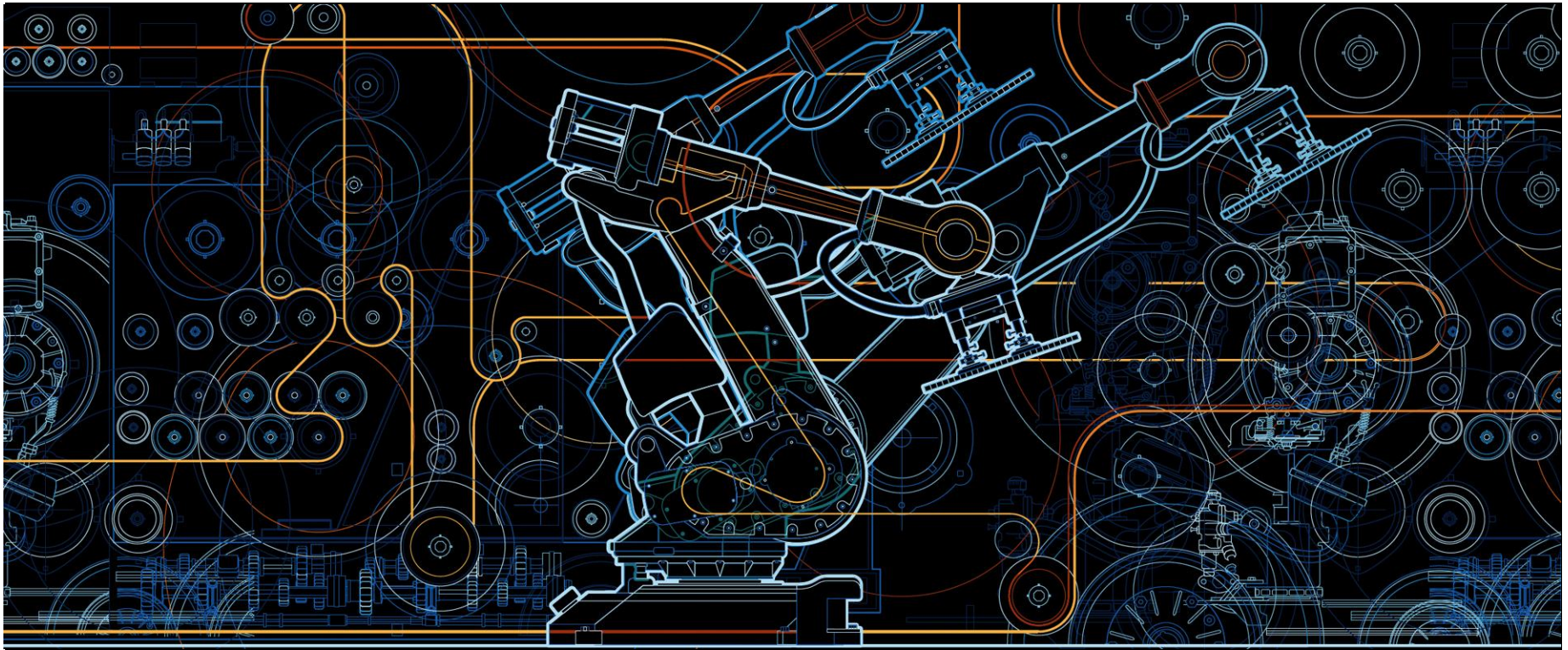
Service as % of total revenue, history and ambition<sup>1</sup>



1) excl. Baldor and T&B revenues in 2011 and 2012

- Systematic service strategy driving growth
  - 'Do more' (Product attached life cycle services)
  - 'Do new' (Location based and capability based services)
  - 'Do better' (How-to-win initiatives for service excellence)
- Increase installed base penetration
- Leverage service product portfolio
- Improve execution and geographic coverage





Ulrich Spiesshofer, Capital Markets Day, London, September 12, 2012

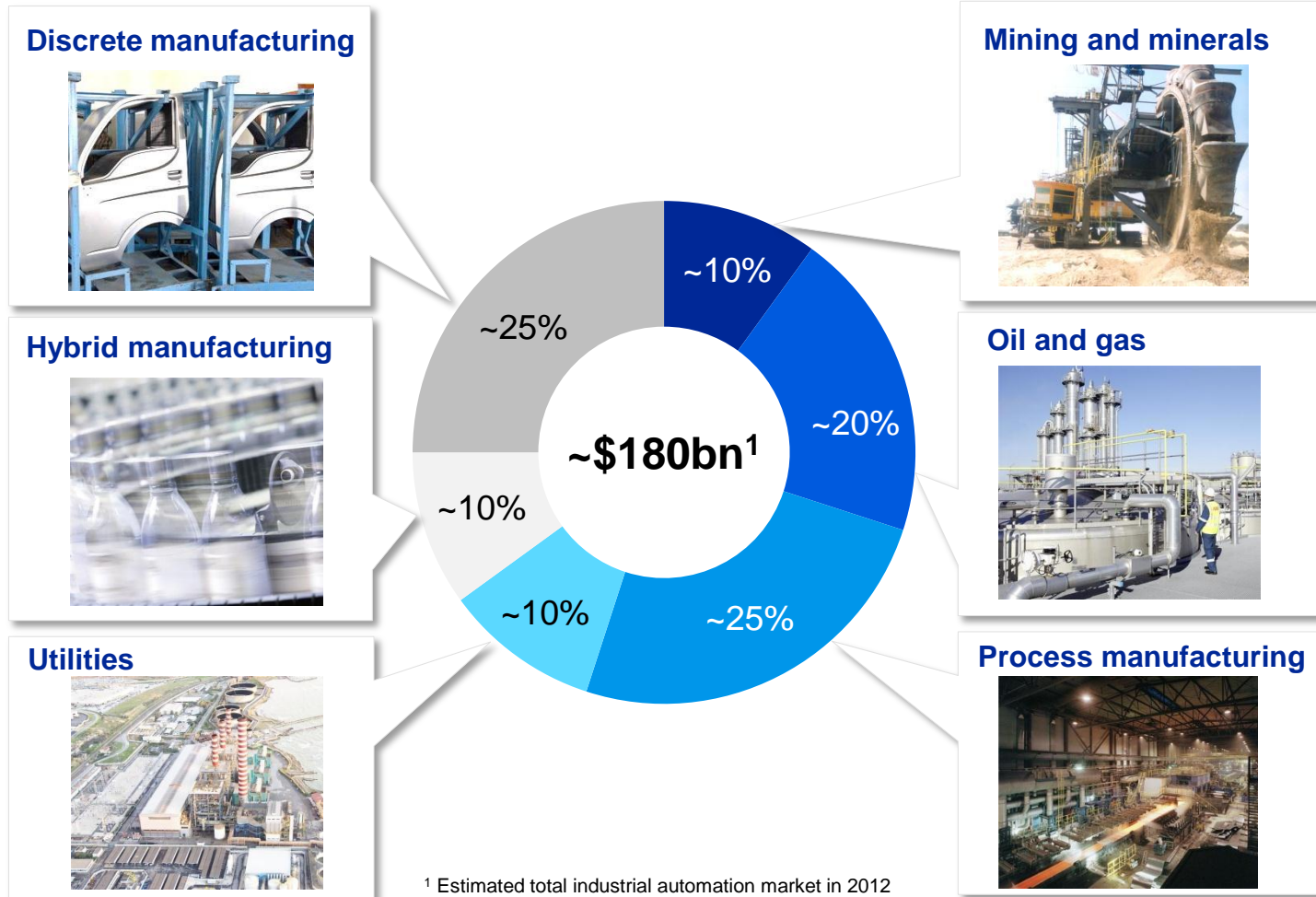
# Discrete Automation and Motion

## Driving profitable growth with unique, expanding offering



# Industrial automation

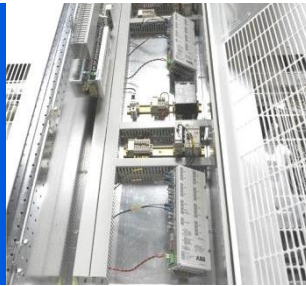
## A \$180 billion market opportunity



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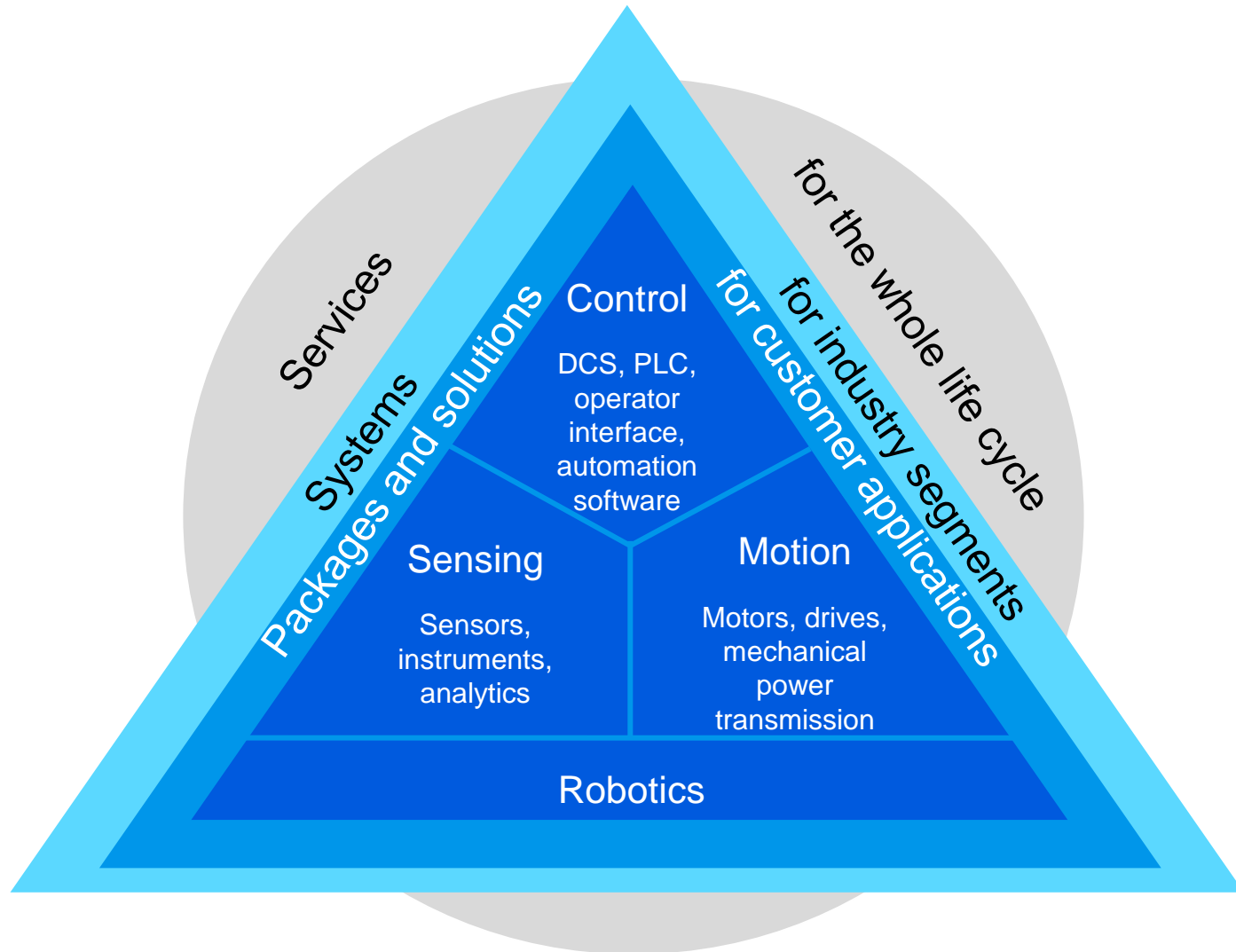
- End-to-end optimization of manufacturing process
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- Holistic performance management

### Automation penetration in emerging markets



- Rapid industrialization in emerging markets, shift of manufacturing base
- Shortage of skilled workforce
- Need to improve quality, productivity and operational health and safety

# ABB: unique customer value through broad offering Products, packages/solutions, systems and services





# Discrete automation, industrial motion

## Products and packages/solutions, service



# Discrete Automation and Motion division

## Products and packages for industrial automation

### Focus today: DM's industrial automation business

#### Discrete automation



Products and integrated automation solutions, incl. PLC, robots, drives and motors for discrete automation in industry and infrastructure

#### Industrial motion



Products and packages for movement and control in industrial applications  
Motors, drives, generators, and mechanical power transmission for industry, utilities, infrastructure

#### Renewables



Generators, converters, inverters, drives, motors, controls, packages, and solutions for renewable power generation

#### Power control and quality



Control of power supply and ensuring power quality for industrial, utility, and infrastructure applications

#### Transport



Components for rail rolling stock and rail infrastructure  
Fast charging infrastructure for electric vehicles, drives and motors for heavy electric vehicles

Service

Application-specific packages and solutions

World-class operations

# Discrete automation



# Discrete automation

## Broad and integrated portfolio, open architecture



### Leading robotics player – turn-around completed, strong base

- Comprehensive portfolio
- Product, package, system and service offering
- Good market access
- On-going fast growth after successful turn-around



### Broad portfolio – integrating with robotics into growth platform

- Drives + motors + control + robotics = unique offering
- Grown organically, complemented by Baldor motion control
- Single-source opportunity, integrated packages and solutions for our customers
- Strong service capabilities and innovative service concepts



### Further developing an integrated offering – easy to use, open architecture

- Expanding packages and solutions
- Common engineering platform
- Open connectivity and communication



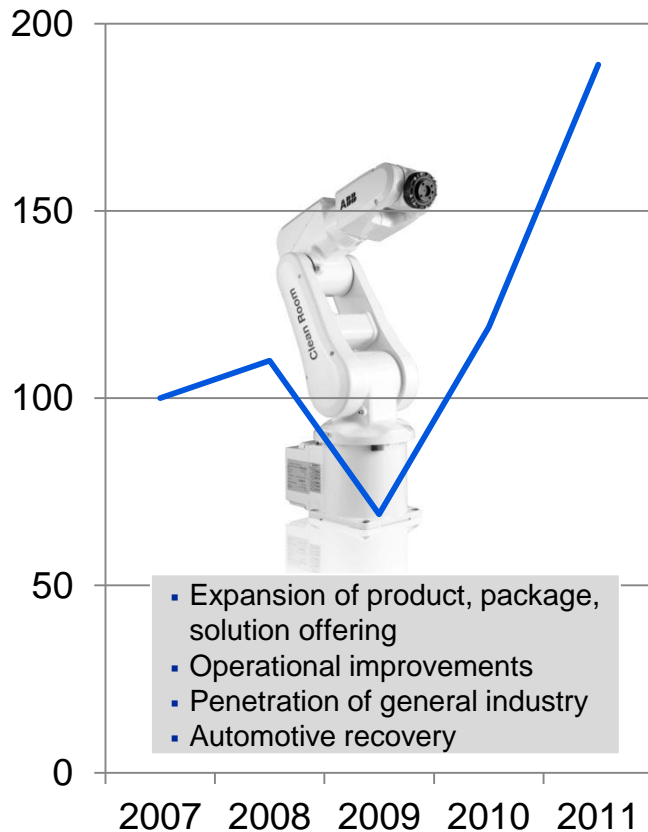
**A unique offering for a ~\$60 bn market<sup>1</sup>**

1: Estimate for total relevant discrete automation market in 2012

# Strong robotics performance in fast growing market

## Overview

### ABB robot shipments (units, index)

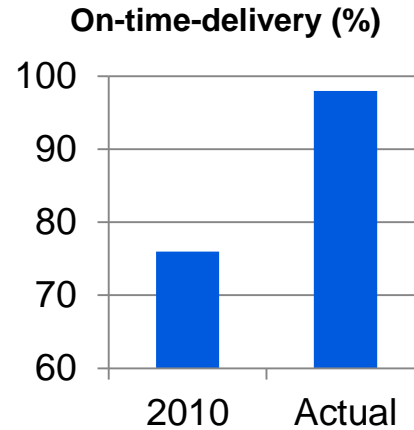


- Turnaround completed – growing, healthy business
- Comprehensive portfolio
  - Robot range with capacity from 1 kg to 650 kg
  - New modular specialized robots, eg, for picking or painting
  - Application-specific packages and solutions, incl. application equipment, e.g. sealing, picking etc.
  - Automotive systems
  - User-friendly software for the entire life-cycle
  - Innovative on-site and remote services (eg, >3,000 robots connected via GPRS)
- Wide global presence
  - Sales and service operations in 53 countries, more than 100 locations
  - Manufacturing in China and Europe
- Bringing robotics solutions to new applications/industries
  - E.g. early mover for electronics in China
- Constantly improving operations to increase customer satisfaction

# Significant operational improvements in robotics

## To better serve our customers

- Systematic identification and realization of opportunities
  - Supply chain optimization
  - Reduction of variants
  - Process improvements across the whole value chain
- Significant improvements in factories in Sweden and China
  - Throughput times reduced by up to 60%
  - Fewer labor hours per unit
- Enabler for rapid growth while improving customer service



1: For standard products

**Improved design: Lighter, more compact, fewer parts**



Previous generation: IRB140



Present generation: IRB120



# Growth through constant expansion of robot portfolio

## Innovation examples

### Products

#### New clean room robot (semicon)



- Fast and compact robot
- Able to work in stringent cleanroom environment

#### New lean arc welding robot (manufacturing)



- Integrated process dressing
- Lower maintenance
- Higher accuracy and flexibility

#### New laser cutting solutions (manufacturing)



- User-friendly off-line programming
- Rapid optimization and changeovers

### Applications

#### Electrical plug assembly at ABB plant in Czech Republic (electronics)



- Boosting production
- Raising quality

#### Packaging tubes of hair color for L'Oréal (cosmetics)



- Robot with small footprint
- Fast set-up

#### Automated luggage storage and retrieval (hospitality)



- Installed at YOTEL in New York

# Motion control from Baldor acquisition a good fit

## Example: AE00N - very fast textile printing machine

### ABB scope

- PLC
- Motion control drives
- Safety devices from Jokab Safety (ABB LP division)



### Benefits for customers

- Single supplier of a combined automation package
- Easy commissioning of PLC and motion control/drives
- Functional safety
- Open connectivity and communication protocol

# ABB solutions building on unique own PLC and robot offering

## Unique integration opportunity

### Pick-and-place

- Cooperation of PLC-controlled actuators and robots



### Palletizing

- PLC-robot cooperation for immediate exchange of pallets after filling



### Material handling

- PLC-controlled activation of assembly mechanisms synchronized with robot positioning



### Machine tending

- Reduced cycle-time due to optimal synchronization of tending and machine operation





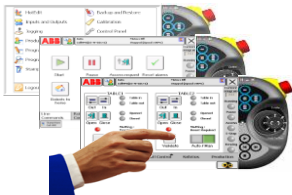
# Integrating wider portfolio

## Example: value adding stamping cell solution<sup>1</sup>

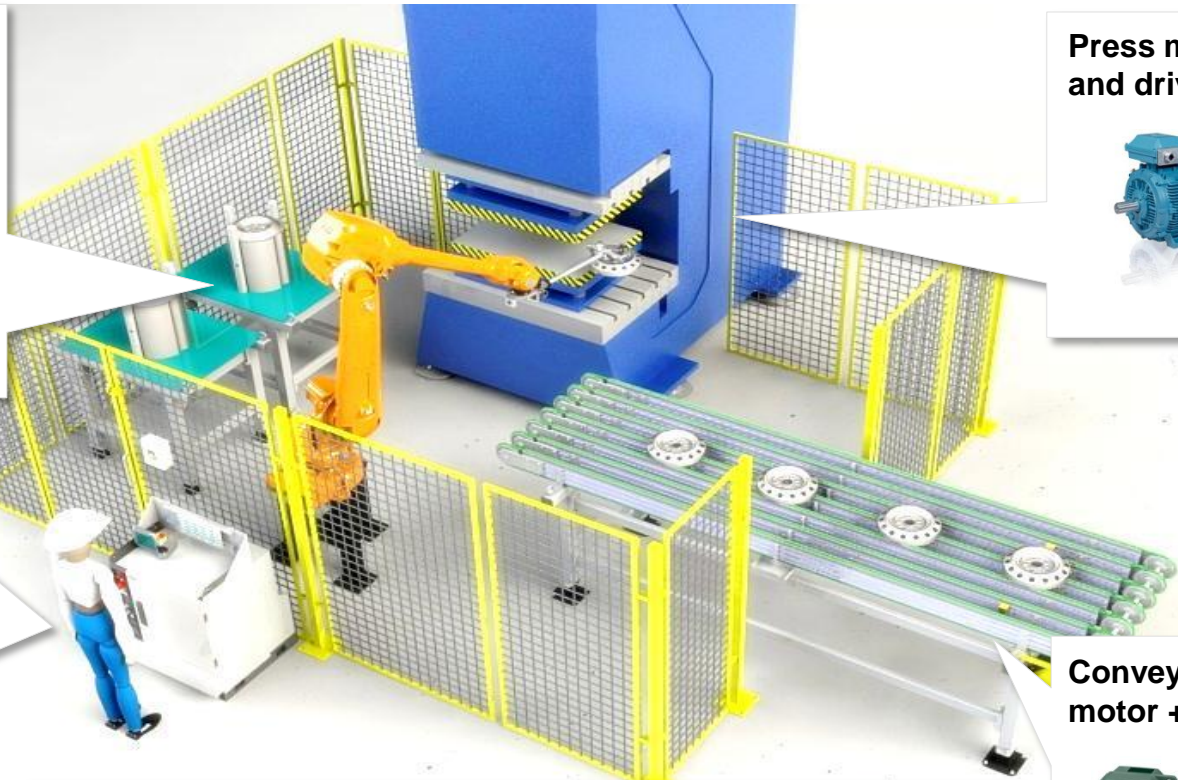
**Robot incl.  
integrated AC500 PLC  
to control the cell**



**Special software with  
HMI and wizard for  
easy programming**



<sup>1</sup> Value per solution ~\$100k  
<sup>2</sup> Less than 300 tons per meter



**Press motion motor  
and drive**



**Conveyors motion:  
motor + gearbox + drive**



- Addressing “small stamping<sup>2</sup>” segment of ~\$500 million
- ABB value proposition: 60% lower engineering and commissioning costs
  - Pre-engineered solution
  - Easy-to-use software wizard

# ABB well positioned with integrated, open offering

## Outlook

### Advanced services

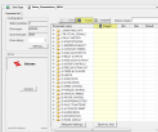
### Packages and solutions

### Common engineering environment

#### PLC



#### Drives



#### HMI



#### Safety



#### Motors



#### Motion Control



#### Robots



#### 3<sup>rd</sup> party products



### Open connectivity and communication



# Industrial motion

# Industrial motion

## Comprehensive offering, true global presence



### Most comprehensive industrial motion portfolio

- Leadership in drives and motors
- Complemented by strong mechanical power transmission offering
- Industrial motion portfolio broadened by power control and quality offering

### Constantly upgrading portfolio

- True innovations, eg, synchronous reluctance motor-drive packages
- Market-specific offering, eg, MV drives for US, India and China

### Strong channel network in all key markets

- Baldor acquisition closed last major gap

### Globally balanced presence

- ~1/3 of DM revenues in America, Europe and Asia, respectively
- Increasingly serving regions through regional factories

### Highly competitive service business

- Large installed base
- Global presence through own resources and partners in more than 50 countries
- Innovative service concepts

**Leading player in a ~\$50 bn market<sup>1</sup>**

1: Estimate for total relevant industrial motion market in 2012

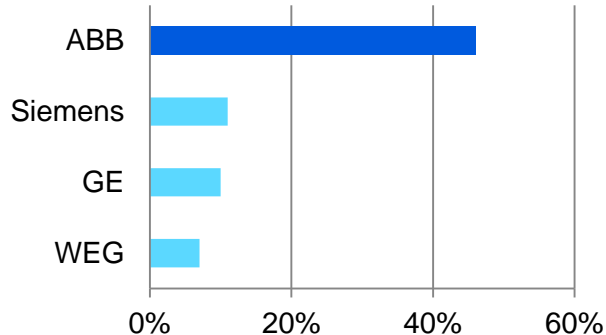
# Customer perspective: Leading drives and motors player

**ChemicalProcessing.com**

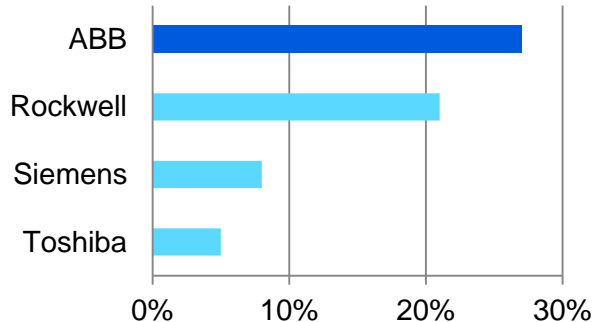
Leadership • Expertise • Innovation • Interactive

## 2012 Readers' Choice Award

### Motors



### Drives



## Unique position

- Recognized by customers as supplier of choice for motors and drives
  - Eg, won “Readers’ Choice Award” for motors **and** drives by Chemical Processing magazine in US
- Good NPS scores (most recent)
  - LV drives: 54%
  - MV drives: 47%
  - Motors and generators: 38%
- Largest global supplier of drives and motors
- Comprehensive portfolio
- Global sales, distribution and service presence
- Ability to offer value adding motor-drive packages
- Baldor integration bears fruit, eg,
  - Wider access, better channels, faster growth of drives in North America
  - Ability to serve customers globally with comprehensive portfolio, eg, Shell frame agreement



# Winning in fast growth segments

## Example oil & gas: Shell Enterprise Framework Agreement



- **Scope of the agreement**

- Global sales, distribution and service of electrical motors
- For electrical rotating equipment up to 4,000 kW
- For all upstream and downstream operations



- **ABB selection based on**

- Health, safety, security and environment
- Technology and efficiency
- Performance and service track record
- Total cost of ownership

# New, value creating offering

## Sample: synchronous reluctance motor-drive package

**Customer value: smaller size, higher efficiency**

**Permanent magnet motor performance without magnets**

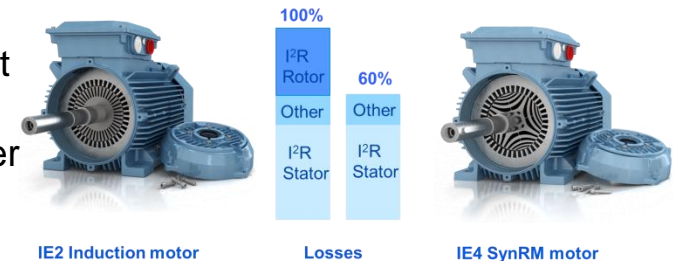
**Smaller than a traditional motor**



**Two motor-drive package types with dedicated software**

- High output for space constraint applications<sup>1</sup>
  - Compact size – for smaller machinery
  - Less weight

**High efficiency**



**Innovative motor-drive technology**



- Super premium efficiency (IE4) for continuous duty applications<sup>2</sup>
  - Up to 4 percentage-points package efficiency gains
  - Higher reliability/less downtime

**Award winning concept**



**On-going trials at OEM and end-user customers**

**High interest and positive feedback**

1: Application example: borehole pump in a water utility which typically runs 24x365

2: Application example: fan mounted inside an airduct

# Success with market specific offering

## Developed and made in country for country

### Requirements

- Fit with local standards and expectations
- Fast delivery time
- Price competitiveness

**Example: Low power<sup>1</sup> medium voltage drives  
(Global market ~\$1.2 bn<sup>2</sup>)**



China



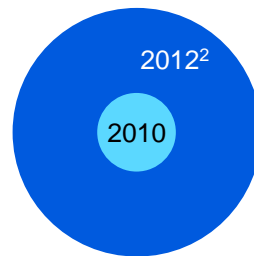
India



USA

### Concept

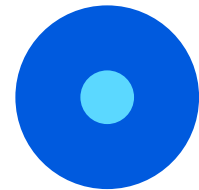
- Local R&D for full local design or adaptations
- Local production for fast delivery time and lower costs (transport, tax etc.)



+216%



+61%



+242%

Note: Bubble size proportional to number of ordered units in 2010 and 2012<sup>1</sup> respectively

<sup>1</sup> 0-3 MW  
<sup>2</sup> Estimated  
<sup>3</sup> Orders target for 2012

# Energy efficient motor-drive packages

## ABB advantages

### Advantages

- Leading motor and drive portfolios
- Long experience in key industries
- Deep application know-how
- Packaging capabilities, eg,
  - Dedicated team of ~30 for high-power motor-drive packages in Finland
  - Regional motor-drive teams in Europe, Asia and Americas
- Complemented by energy audit offering

### Example: MV motor-drive packages for Ichthys LNG project, Australia

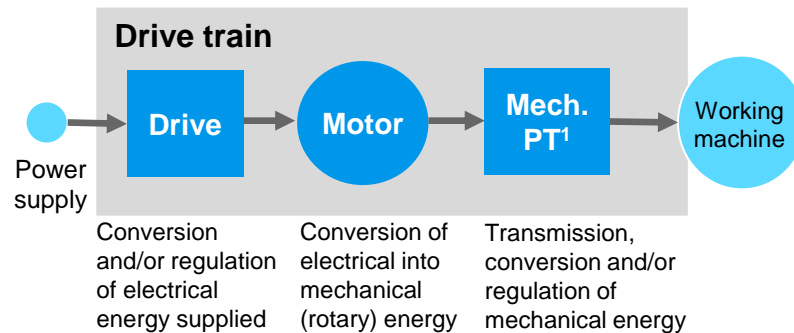
- \$80 mln order to supply power technologies and medium voltage motor-drive packages
- 6x drive packages, incl. 20 MW synchronous 2-pole motors
- 2x drive packages, incl. 3.2 MW induction motors
- Supply includes converter transformers

### Example: Halmstadverket, Höganäs Sweden AB

- Application: Smoke gas purification
- Scope: 4 LV drive packages of 355 kW and 2 LV motors of 355 kW
- Yearly energy consumption reduced by approx. 15% (1,300 MWh ≈ energy consumption of 90 cars p.a.)
- Savings 130,000 €/year, payback time of less than two years

# Mechanical power transmission: a good extension

## We can offer the full drivetrain for motor applications



### Customer benefits offered by ABB

- One-stop shop
  - Optimized packages
  - Able to supply variable speed at electrical and/or mechanical level
  - Design support during early stages
- ### Attractiveness of MPT<sup>1</sup> for ABB
- Opens additional market of ~\$10 bn
  - Closer and earlier involvement in projects



### Example: crushing plant expansion

- Design assistance for all conveyors
- 21 complete torque arm and pulley packages
  - Fully assembled, ready to install
- 3 x 500 hp special design crusher duty motors
- 6 x 50 hp special design crusher duty motors

“By working with Baldor’s System-1 group and getting them to do this as a complete package, it really helped me with the costs”

Albert Frei, Jr. – President of Albert Frei & Sons

1: Mechanical Power Transmission

2: Eg, in bulk material handling conveyors, MPT value = 2-3 x motor value



# DM: ideally positioned for strong service growth

## Global presence and innovative concepts

Americas: ~800 empl.

Europe: ~2,500 empl.

Asia/MEA: ~1,700 empl.

### Differentiator

#### Global presence

#### Proactive services

### ABB offering

#### Truly global service network

- >50 countries
- >150 locations (incl. partners)

#### Constantly expanding

- ~450 people added in 2012

#### Large and fast growing installed base

- ~\$50 bn
- Growing at ~10% p.a.

#### Predictive maintenance

- Eg, LEAP

#### Remote monitoring

- Eg, MACHsense

#### Configurable and customized service packages

- Eg, ABB Drive Care

● Discrete Automation and Motion: service location

# Discrete Automation and Motion

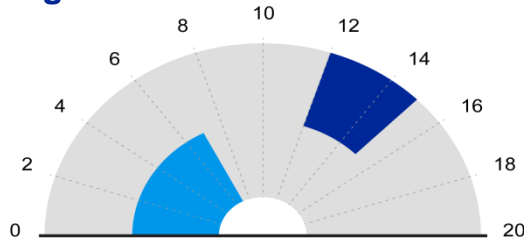
## The way forward

### Target revenue growth vs market 2011-15

CAGR base year 2010, % change in local currencies

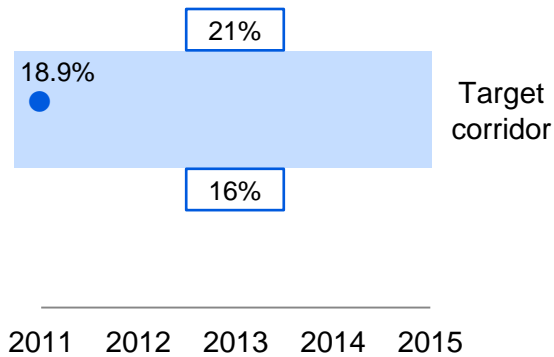
**Discrete Automation  
target revenue growth  
12 – 15%<sup>1</sup>**

**Discrete  
Automation  
market 7%**



### Op. EBITDA margin target corridor 2011-15

% of operational revenues



### Execution plan for top-line growth

- Expand discrete automation offering
- Industrial motion: Further expand presence and portfolio
- Drive renewables component and package growth
- Power electronics strength for new applications
- Continue growth in traction, early-mover EV infrastructure
- Tap large installed base with advanced service concepts
- Grow package/solution business based on broad portfolio

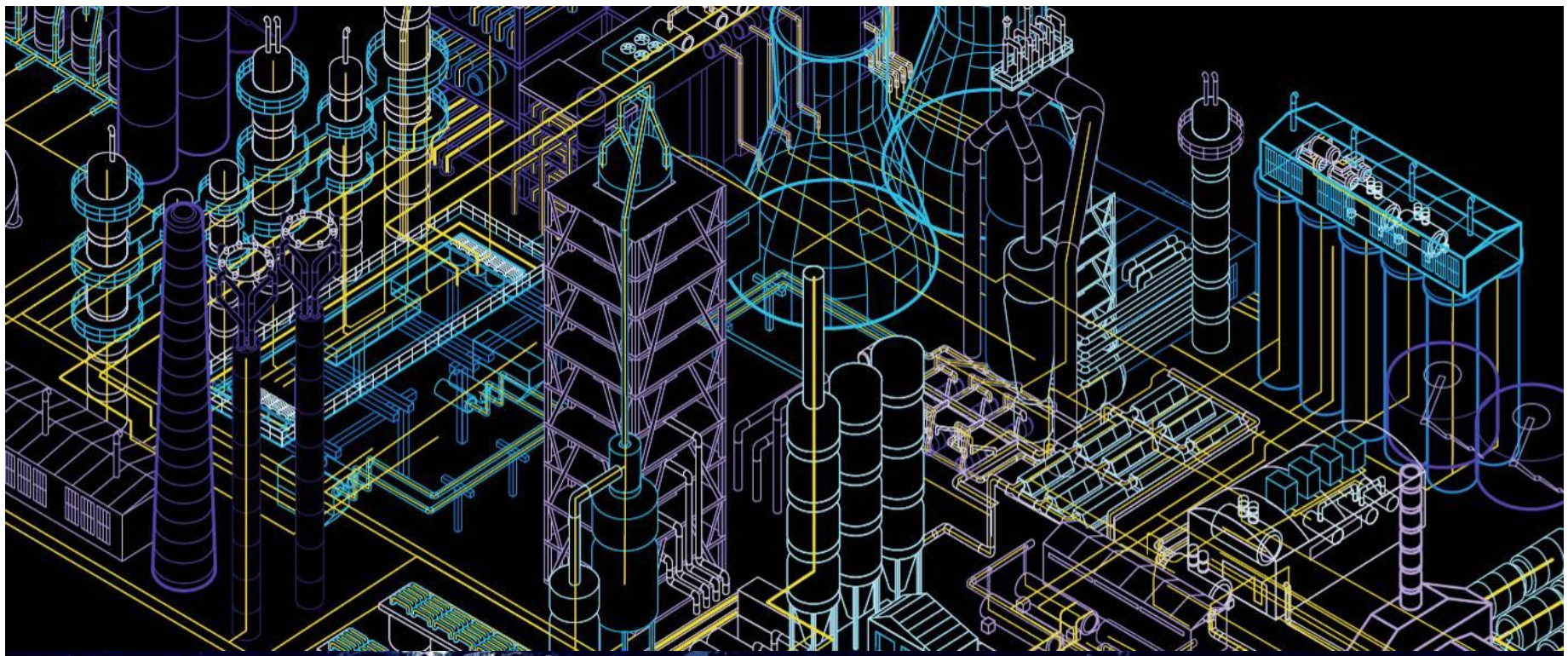
### Execution plan for profitability

- Drive pricing excellence
- Aim for world-class operations supporting growth and profitability
- Enhance target costing/design-to-cost
- Continue successful footprint and sourcing optimization

Together, we drive our  
customers' industrial  
productivity and energy  
efficiency

# To find out more information please refer to the following links

- [Programmable Logic Controller \(PLC\) success stories for different industries](#)
- [Enterprise Framework Agreement with Shell \(Press release\)](#)
- [10 reasons to invest in robots \(Infographic\)](#)
- [Steve Ruddell, head of marketing motors and drives, talks about winning the Motor Automation Award \(video\)](#)
- [The 10 most popular applications for ABB robots \(video\)](#)
- [ABB Glossary](#)



Veli-Matti Reinikkala, Capital Markets Day, London, September 12, 2012

# Process Automation

## Capturing opportunities in key growth markets



# Process Automation business overview

## Key deliverables / systems and solutions

Fully engineered solutions and products for process control, safety, instrumentation, plant electrification and energy management

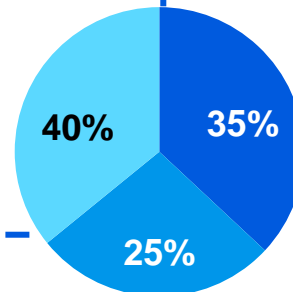
## Key industries served

Oil, gas and petrochemicals, marine, mining and minerals, metals, pulp and paper, others

## Service



## Systems



Estimated breakdown based on a 2-year average of orders received

## Domain generic products

### Control systems



### Measurement products



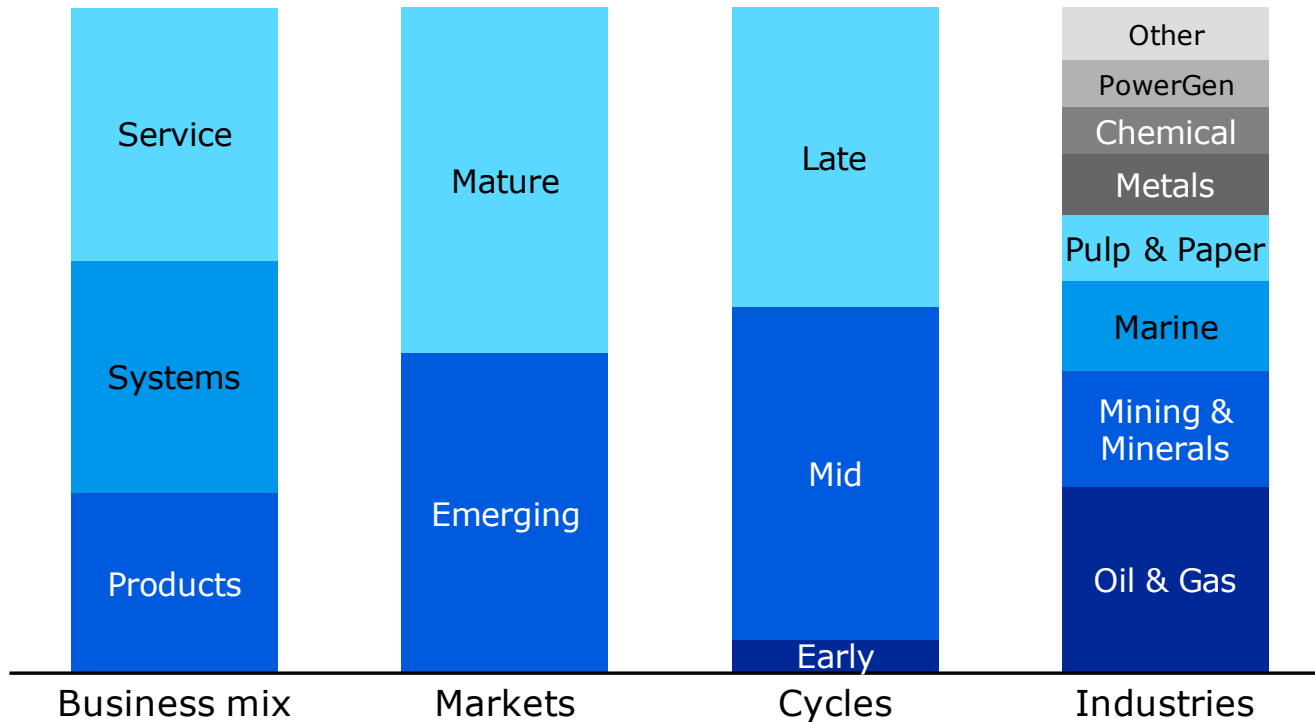
## Domain specific products



# Balanced business across regions, cycles, sectors

## Diverse business with many growth opportunities

Estimated  
split based  
on typical  
mix of  
orders  
received



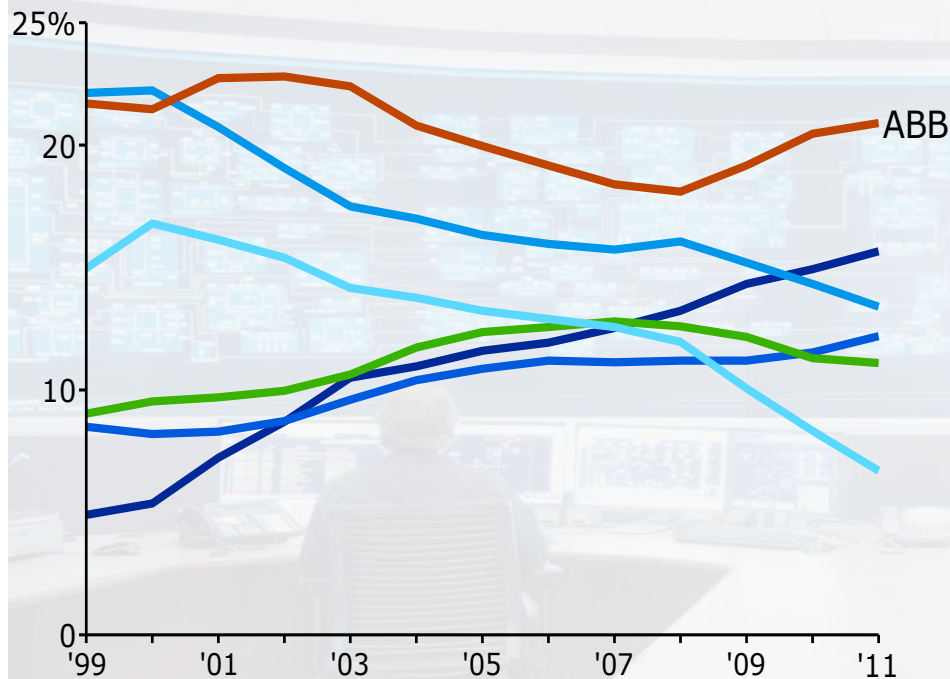
<sup>1</sup> Estimated

Market opportunity of ~\$120 bn<sup>1</sup> for Process Automation division

# Leading DCS player in process industries

## Value proposition with sustainable differentiators

### Leader in Distributed Control Systems (DCS)



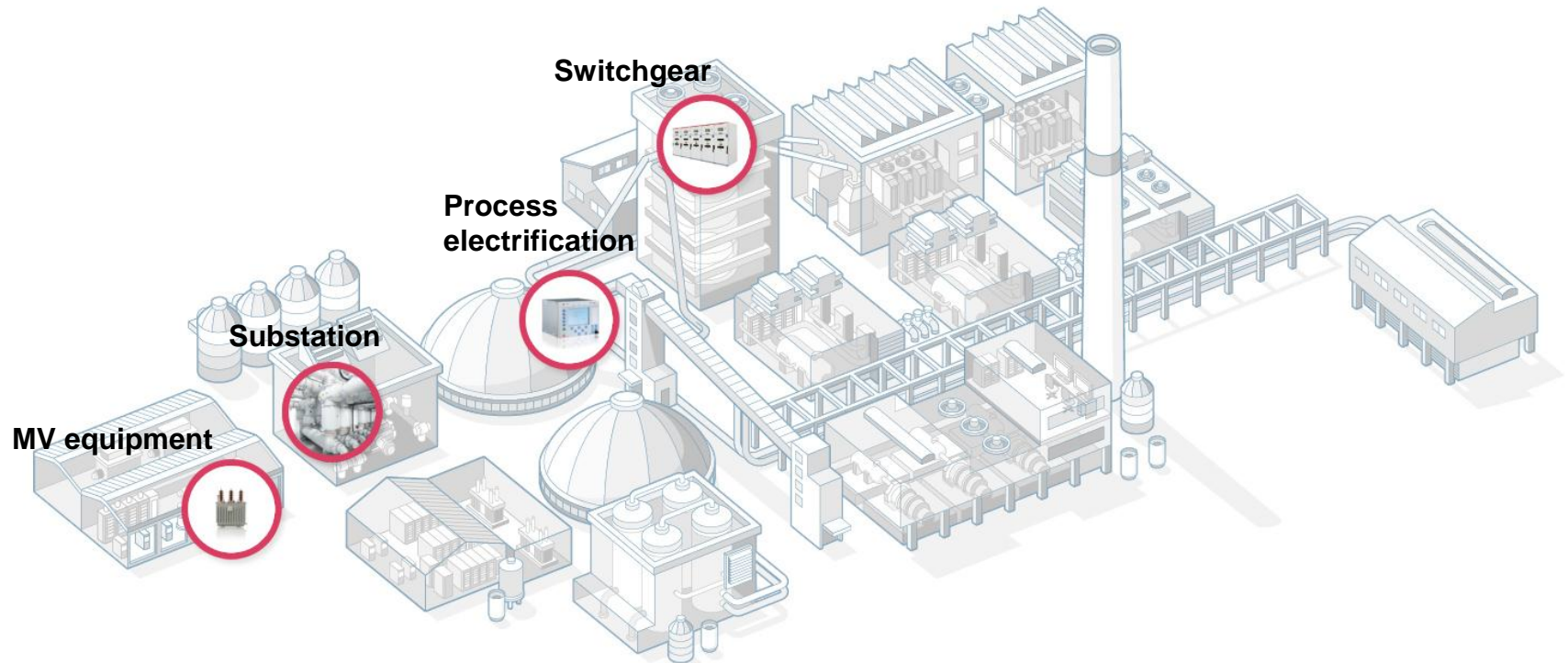
### Value proposition

- Broad portfolio across power and automation
- Combine safety, automation and electrification
- Domain specific knowledge and offering
- Global reach, local delivery
- Leading technology
- Leading industrial motion portfolio
- Total life cycle commitment to customer
- Expertise in asset management

Source: ARC DCS Worldwide Outlook , 3-yr rolling average

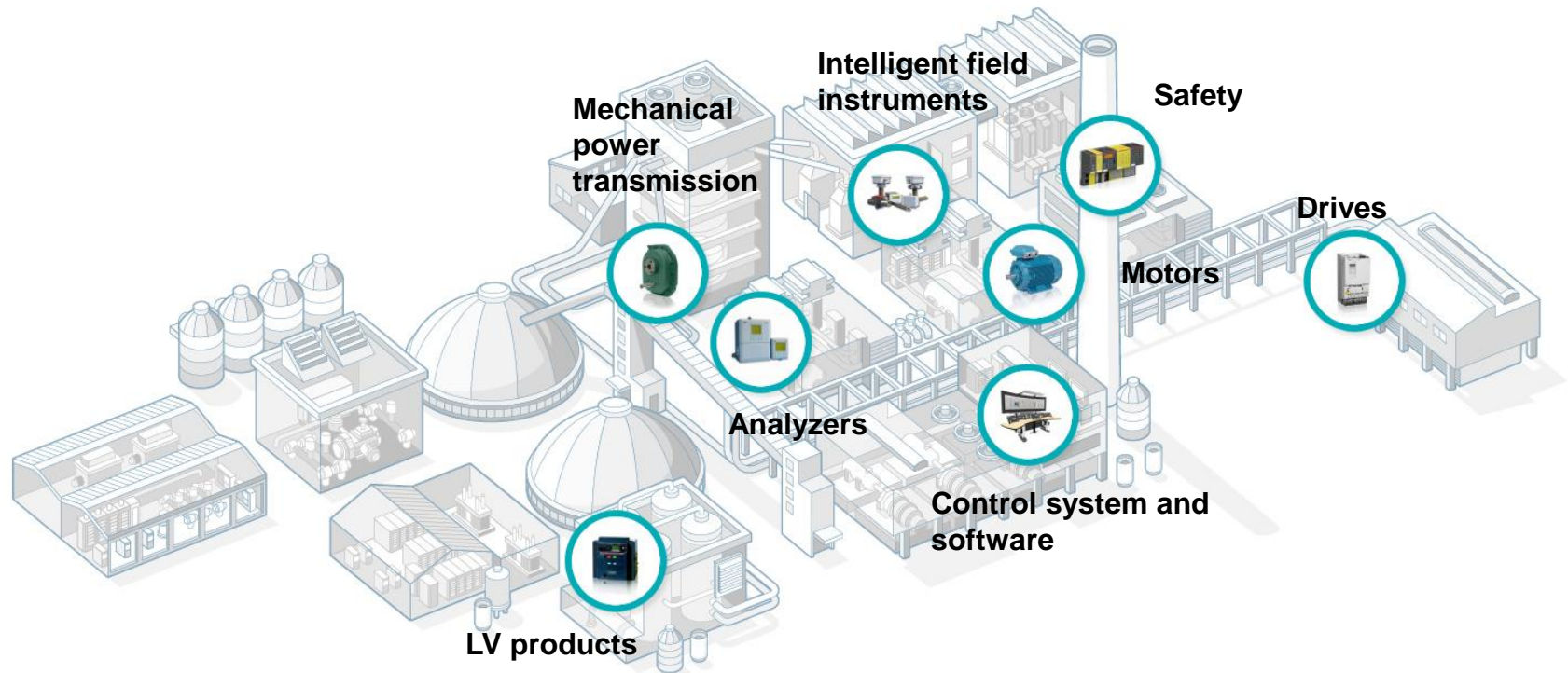
Main competitors : Emerson, Honeywell, Invensys, Siemens, Yokogawa (alphabetical order)

# Every process plant requires power....



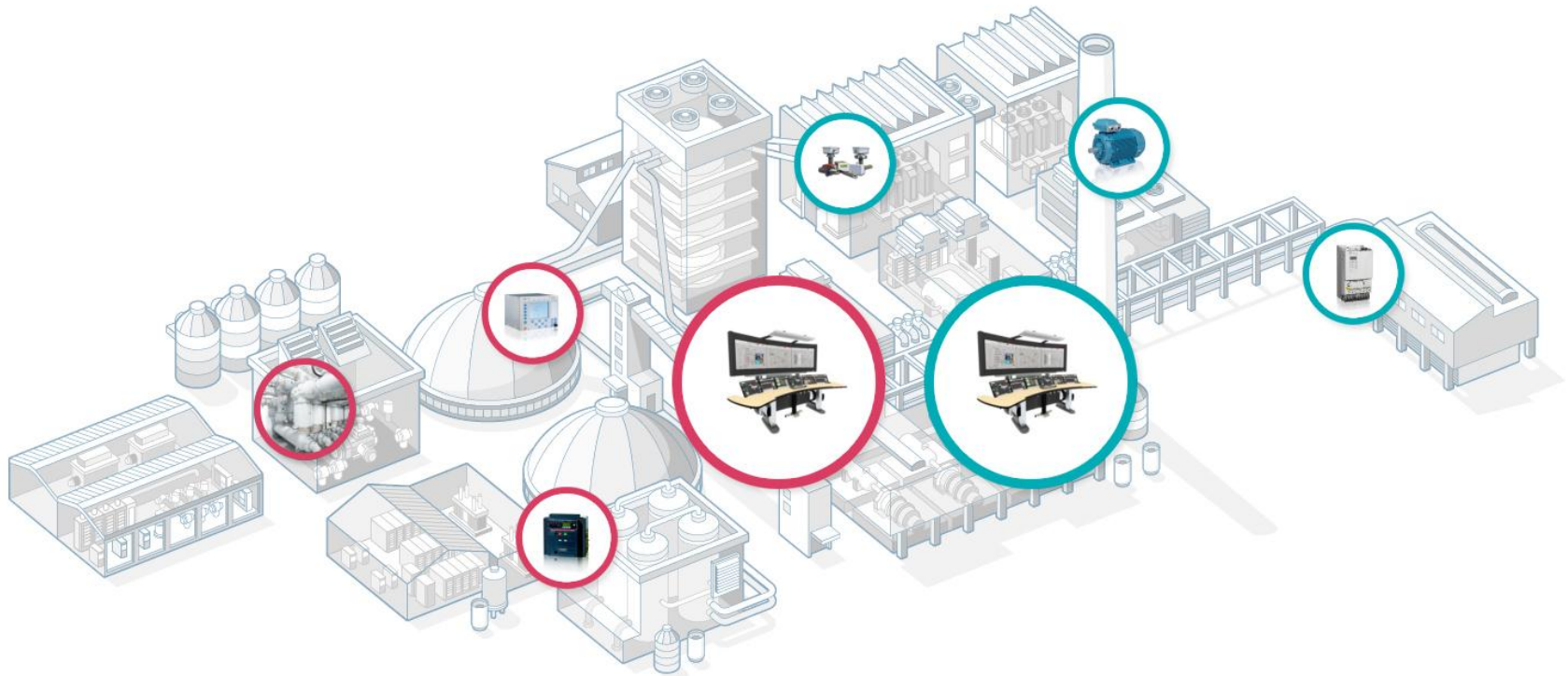


... and automation.





# Traditional customer approach: Separate systems for power and automation



# Integrated process and power automation

## Our value proposition: total ABB portfolio advantage

### Project benefits

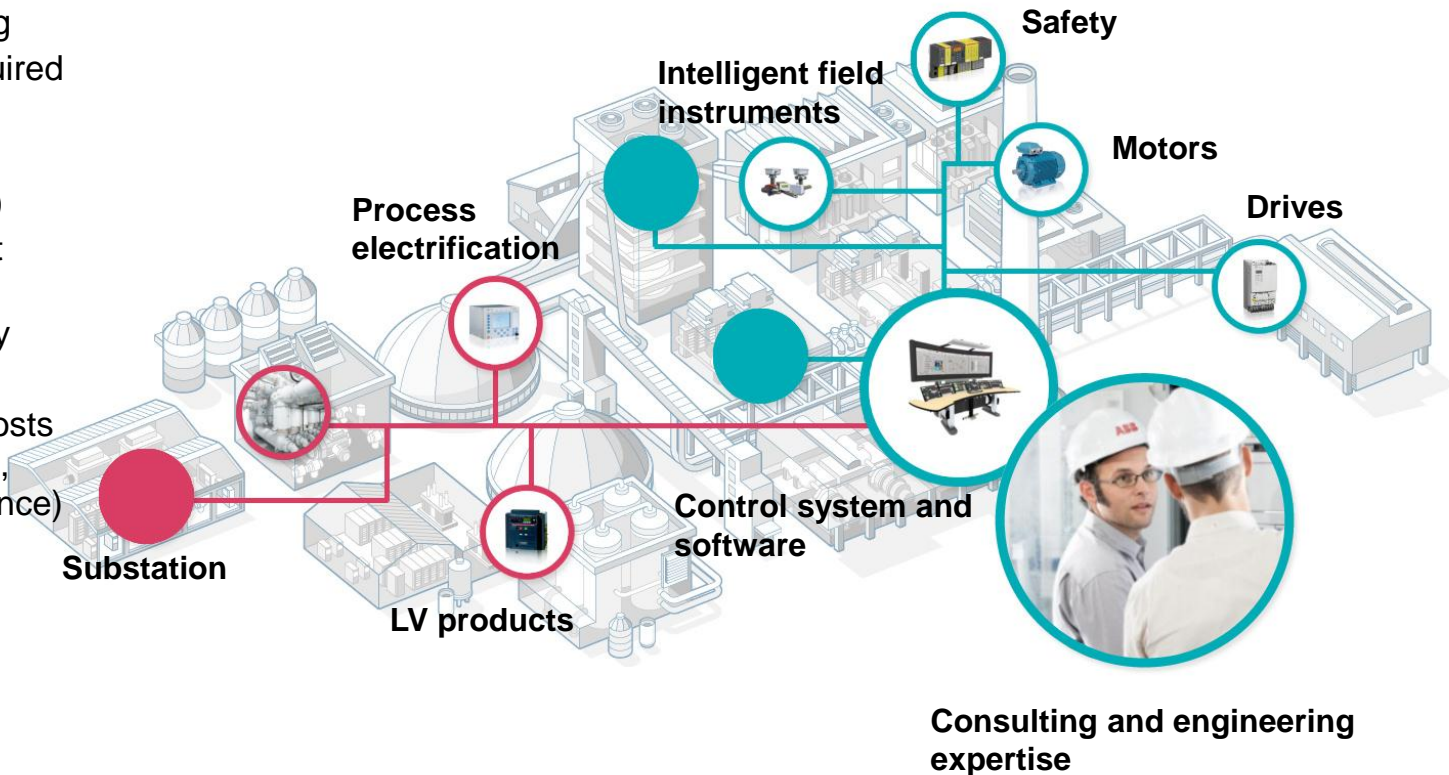
Reduced CAPEX (15-20%)

- Faster project startups
- Reduced engineering
- Less equipment required

### Operational benefits

Reduced OPEX (15-20%)

- Energy management
- Operator efficiency/productivity
- Increased safety
- Reduced life cycle costs (training, spare parts, personnel, maintenance)



# Process Automation division

## Priority areas as a platform for growth

**Leadership in industrial automation**



Continue market and technology leadership in control platform (DCS) and Instrumentation  
Leading safety and cyber security offering

**Market maker for MEC (main electrical contractor)**



Shift customer buying behavior to broader scope including value-add engineering integrating multiple electrical systems

**Increase relevance in oil and gas**



Become preferred partner for oil and gas industry  
Expand leadership in a large, growing market  
Increase relevance by expanding product portfolio

**Expand domain specific products**



Increase domain specific products in portfolio to complement automation and electrical offering to solve customer specific needs

**Capture energy efficiency market**



Develop and capture energy efficiency/emission reduction business across industries

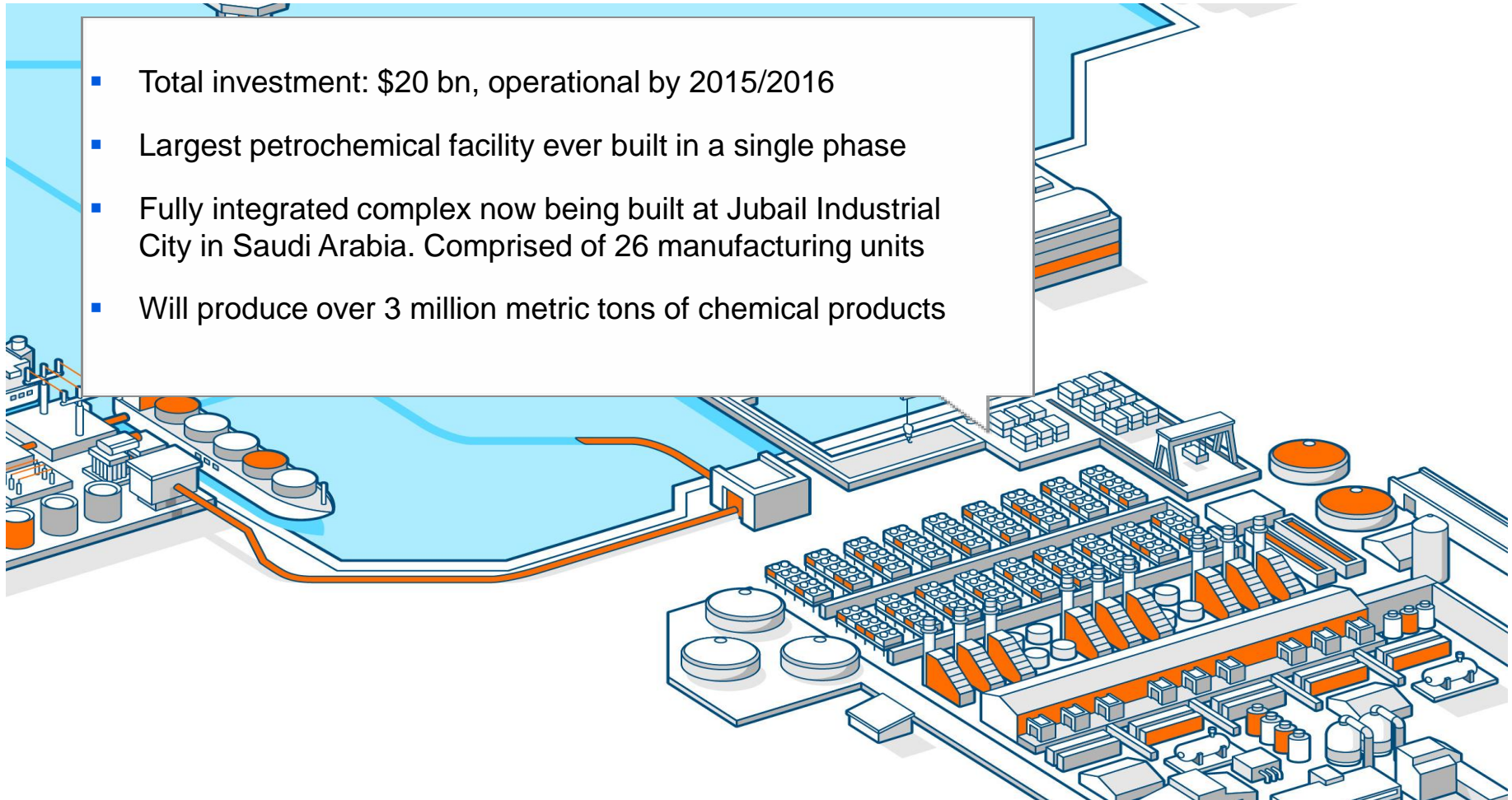
Reach next level in service and software

Flawless project execution

# Leadership in industrial automation

## Sadara: largest greenfield petrochemical facility

- Total investment: \$20 bn, operational by 2015/2016
- Largest petrochemical facility ever built in a single phase
- Fully integrated complex now being built at Jubail Industrial City in Saudi Arabia. Comprised of 26 manufacturing units
- Will produce over 3 million metric tons of chemical products





# Sadara project – Saudi Arabia

## ABB winning with unique value proposition

Full ABB portfolio: extended automation, instrumentation, electrical and industrial motion

### Main Automation Contractor

- Front End Engineering and Design (FEED) for automation of entire complex
  - Completed 1Q 2012, at over 100,000 man hrs
  - Standardized project designs used by 10 EPCs in 6 countries
- Delivery of 19 Independent Automation Systems supporting over 50 separate plants
  - 800xA Extended Automation
- Nearly 100,000 I/O, with approx 800 cabinets and 40 Enhanced Operator Work Stations

### Process analytics

- FEED for process analytics system design and specification
- Analytical design, engineering and system delivery for several Sadara plants

“Code Validation and Operator Training”; Simulation of all plants and entire Sadara complex insure safe operation of the facility and operator training



# Increasing relevance in oil and gas

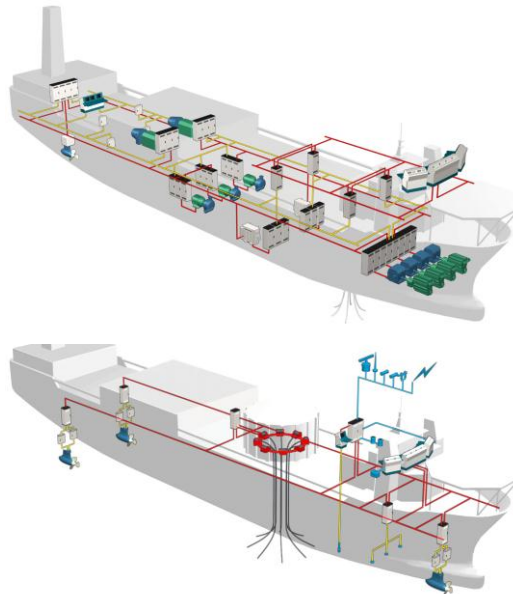
## Extensive offering for FPSO\*

### Unique ABB offering

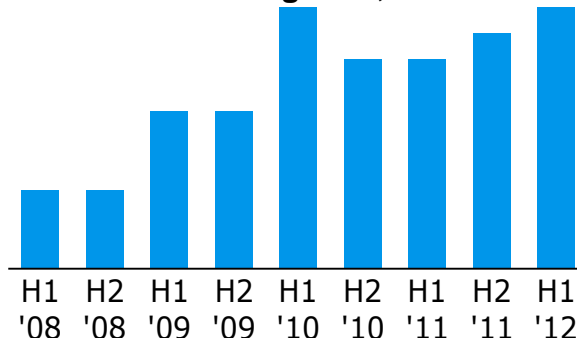
#### Automation, telecom and electrical

- Integrated safety and control
- Instrumentation
- Integrated operations
- Power management
- Telecom systems
- Electrification and drives
- E-houses
- Propulsion systems
- Subsea control system

Avg. project scope  
= \$20 mln  
(from \$5-300 mln)



No. orders in segment, indexed



### Value proposition and differentiators

- Proven track record: >60 FPSO projects delivered worldwide
- Reliable, fast, on-time delivery
  - 20-30% cost savings
  - Faster delivery (~2 mos.)
- Industry leading expertise
  - Integrated operations
  - Enhanced safety and security
- Life cycle offering
  - Maximized production
  - Increased uptime
  - Lower operating costs

\*Floating Production Storage and Offloading

# Complete integrated power and control system

## Example: Peregrino FPSO, Brazil

2011 Top 5 offshore  
project award  
(Offshore magazine)



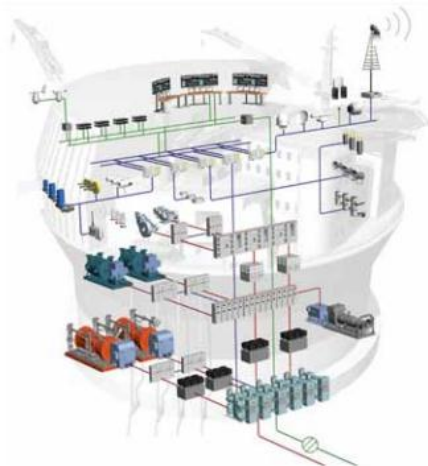
- Extended automation
  - FEED for electrical, automation, telecom
  - Integrated process and safety system
  - 800xA with Extended Operator Workplace
  - Field instrumentation
  - Process simulation
- Electrical / power
  - Power management system
  - Low and medium voltage products, (eg, drives, transformers, switchgear)
  - Generators

# Integrated power and control system plus subsea link

## Example: sustainable arctic oil and gas production



Goliat oil field,  
Barents Sea,  
Norway



### Extended automation

- Complete safety and automation system based on 800xA
- Low/medium voltage products
- Telecom: fiber, network, radio, phone and TV
- Instrumentation
- Integrated operations

### Power from shore

- Subsea cable ~100 km, 75 MW capacity

### Benefits to customer

One supplier with complete system knowledge

- Reduced maintenance over life cycle
- Safer operations with fewer ignition sources
- High level of energy efficiency
  - Projected to reduce CO<sub>2</sub> emissions by 50%

# Differentiating with domain specific products

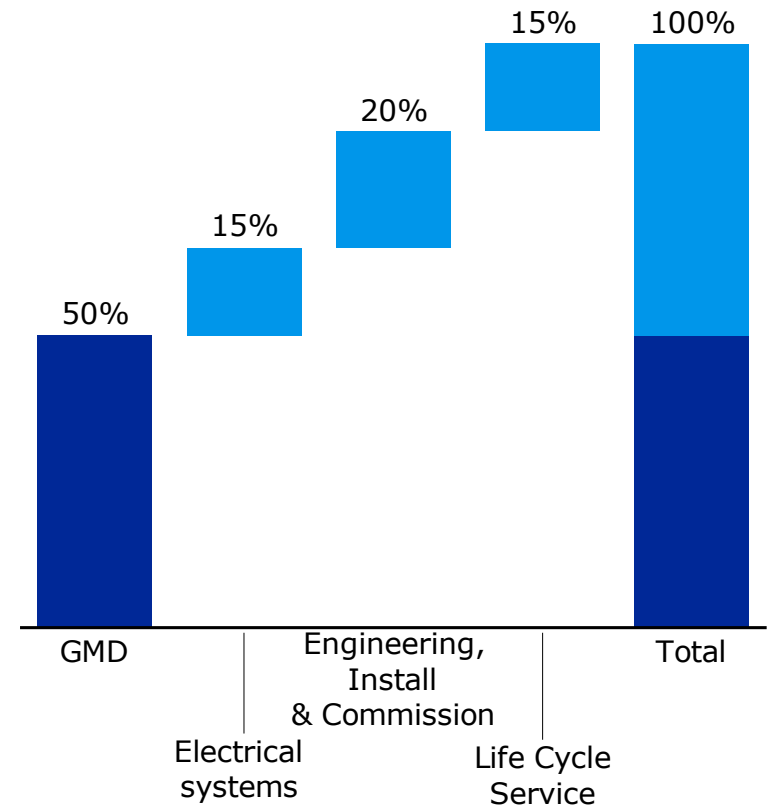
## Example: gearless mill drives (GMD) in minerals

### Gearless mill drive solution and benefits



- Solution with highest availability and efficiency
- Eliminates mechanical elements = lower operating and service costs
- Variable speed drive = higher electrical efficiency
- Power ranges to meet varying customer needs (5 to 36 MW)
- Sensorless speed control
- Full torque through the whole speed range

### High pull-through potential – enabled by GMD

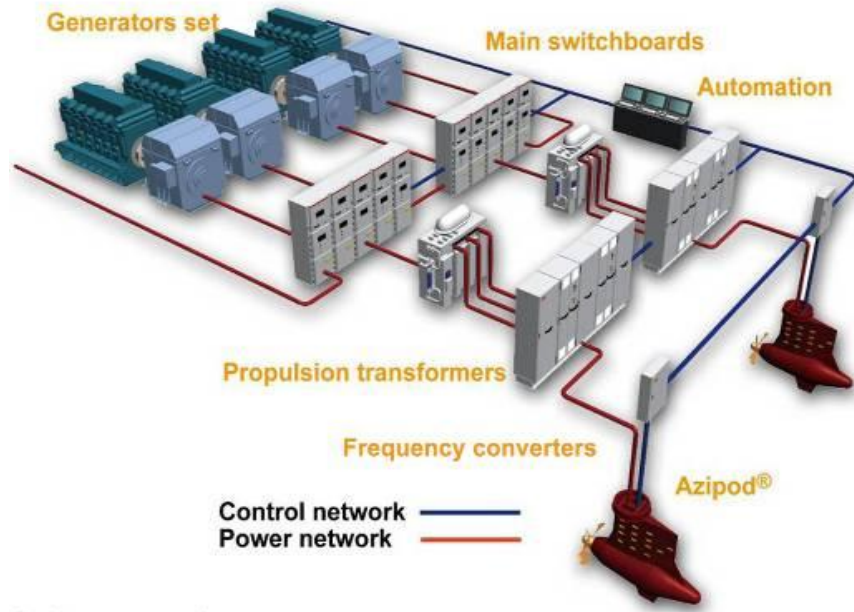


Source: ABB estimates

# Domain-specific products drive value across ABB

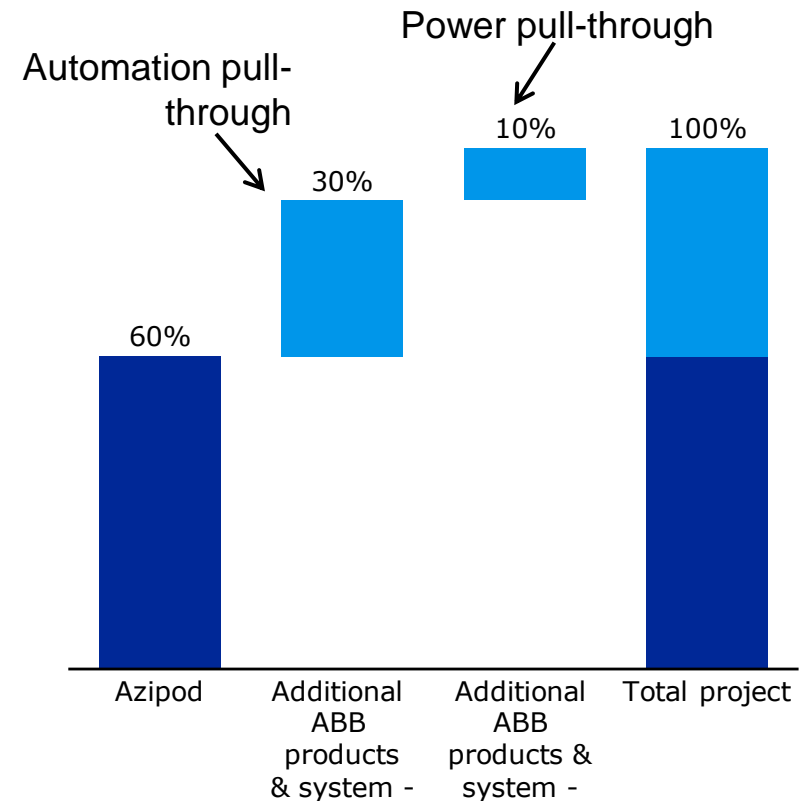
## Example: ABB potential on marine project with Azipod

### ABB scope potential: Azipod electric propulsion



### Azipod as spearhead to larger scope

Opportunity as % of total project value



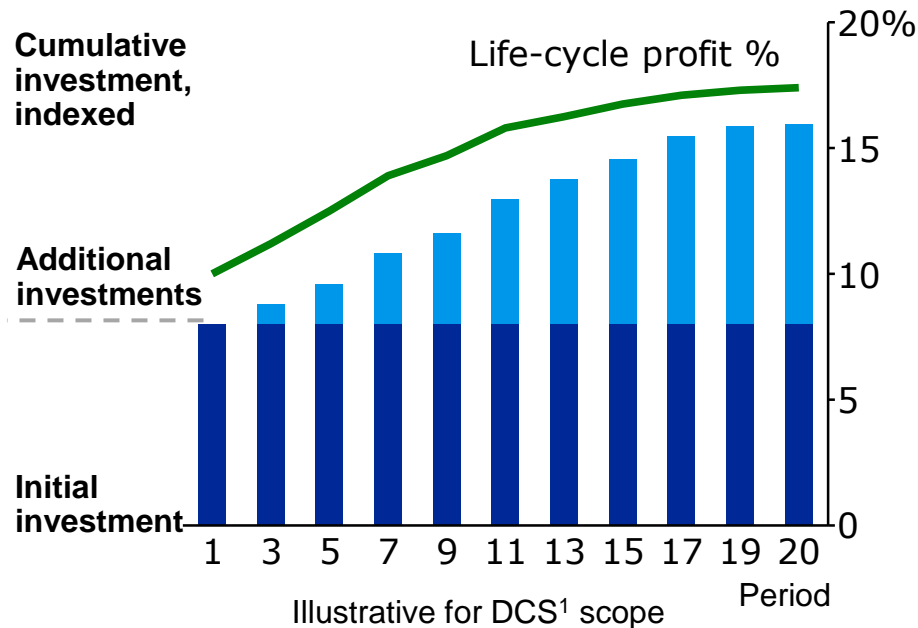
Source: ABB estimates



# Reaching the next level in service and software

## Every year of plant life adds to profitability

### Selling the second plant over the asset lifetime



**~40% of division revenue from service**

<sup>1</sup> Distributed Control System

### Value proposition and differentiators

- Global reach, local execution
- Leverages cross-industry expertise
- Industry's most comprehensive offering
  - Life cycle services
  - Consulting and performance audits
  - Full Service®
- Productized service offering
- Advanced services

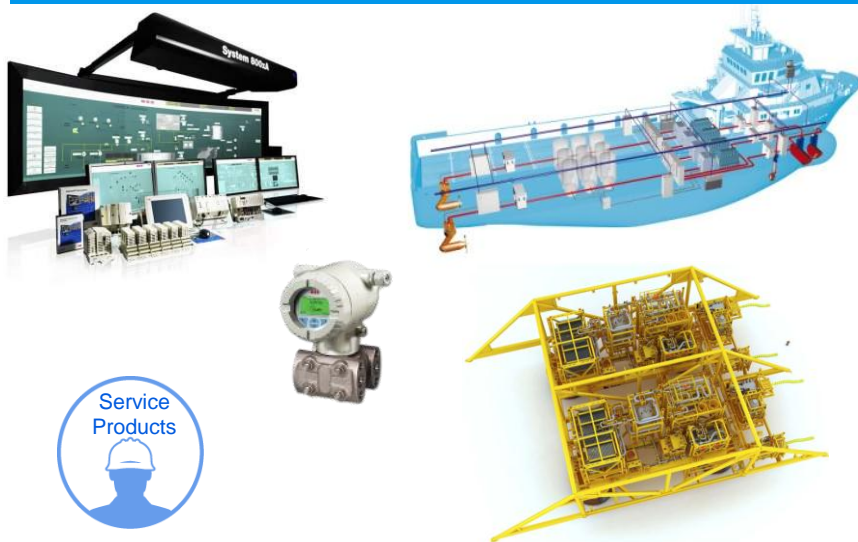
### Benefits to customer

- More productive asset: more uptime, improved throughput
- Extend life of asset
- Lower total cost of ownership

# Investing for the future of process automation

## Pursuing multiple modes of growth

### R&D



### Disciplined M&A

- Domain specific products
  - Automation bolt-ons
  - Electro-mechanical
  - Measurements, flow control
- High potential market segments
  - Oil and gas
  - Mining
  - Data centers

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**K-TEK**  
A MEMBER OF THE ABB GROUP

**BER-MAC**  
ELECTRICAL INSTRUMENTATION  
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**MINCOM**

### Geographic

- Balance domain expertise with market demand
- Close to customers
- Optimized engineering and supply chain

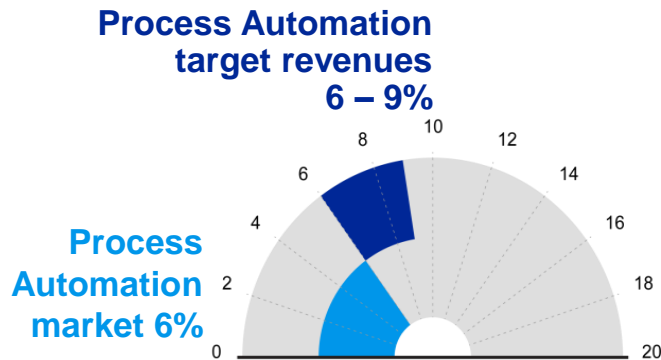
### Multi-channel approach

- Own system integration in focus industries
- Partner network: covering geographies, market segments, additional industries
- Building installed base for service opportunities

# Process Automation: balanced portfolio with set of sustainable differentiators well positioned for growth

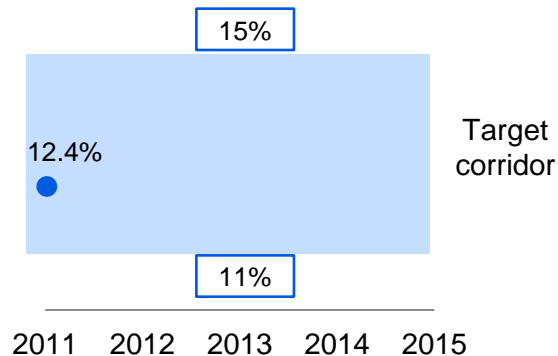
## Target revenue growth vs. market growth 2011-15

CAGR base year 2010, % change in local currencies



## Op. EBITDA margin target corridor 2011-15

% of operational revenues



## Diversified, differentiated business

- Diversified business with products, systems and services to increase customer value
- Convergence of power and automation a differentiator in the market
- Focus on oil and gas for strong revenue growth
- Unique portfolio of domain-specific products drives pull-through sales
- Service increases profitability of foundation automation offering
- Pursuing diversified paths of growth

# To find out more information please refer to the following links

- [Gearless Mill Drives portal including brochures and articles](#)
- [Gearless mill drives offering and advantages \(brochure\)](#)
- [Azipod ® portal including brochures, video and presentations](#)
- [FPSO Peregrino \(Press release and informational video\)](#)
- [Subsea electrification for oil and gas \(infographic\)](#)
- [ABB Glossary](#)

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