



Bernhard Jucker and Claudio Facchin, Capital Markets Day, London, September 9, 2014

# ABB – Next Level

## Big shift in power – attractive opportunities

# Agenda

Profitably growing ABB's power business

Shifting the center of gravity in Power Systems

# Changing world in the power landscape – grid complexity is increasing

## New developments are accelerating the change

### Changes in the power market

#### Increased renewables

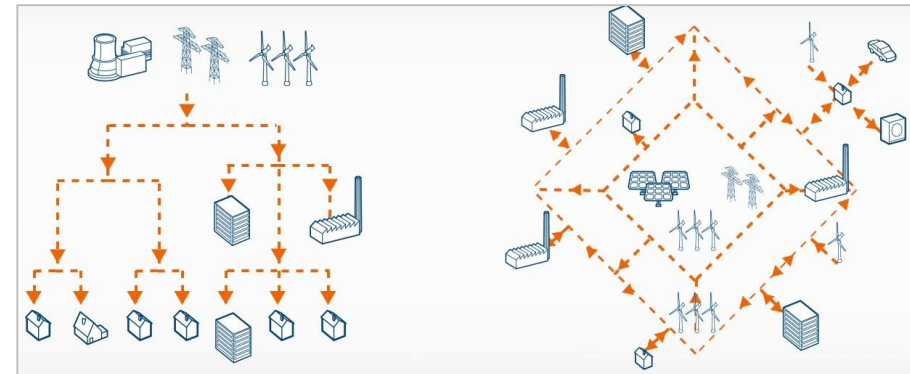
- More distributed power
- Greater grid instability
- Cost approaching grid parity

Longer distances at higher power

New demands (e.g., data centers)

More consumption points (e.g., e-vehicles)

Regulatory intervention, increasing social awareness



Traditional grid

New grid

### Implications

Managing multi-directional power flow

Increasing need for power quality and reliability

Need for more interconnected grids

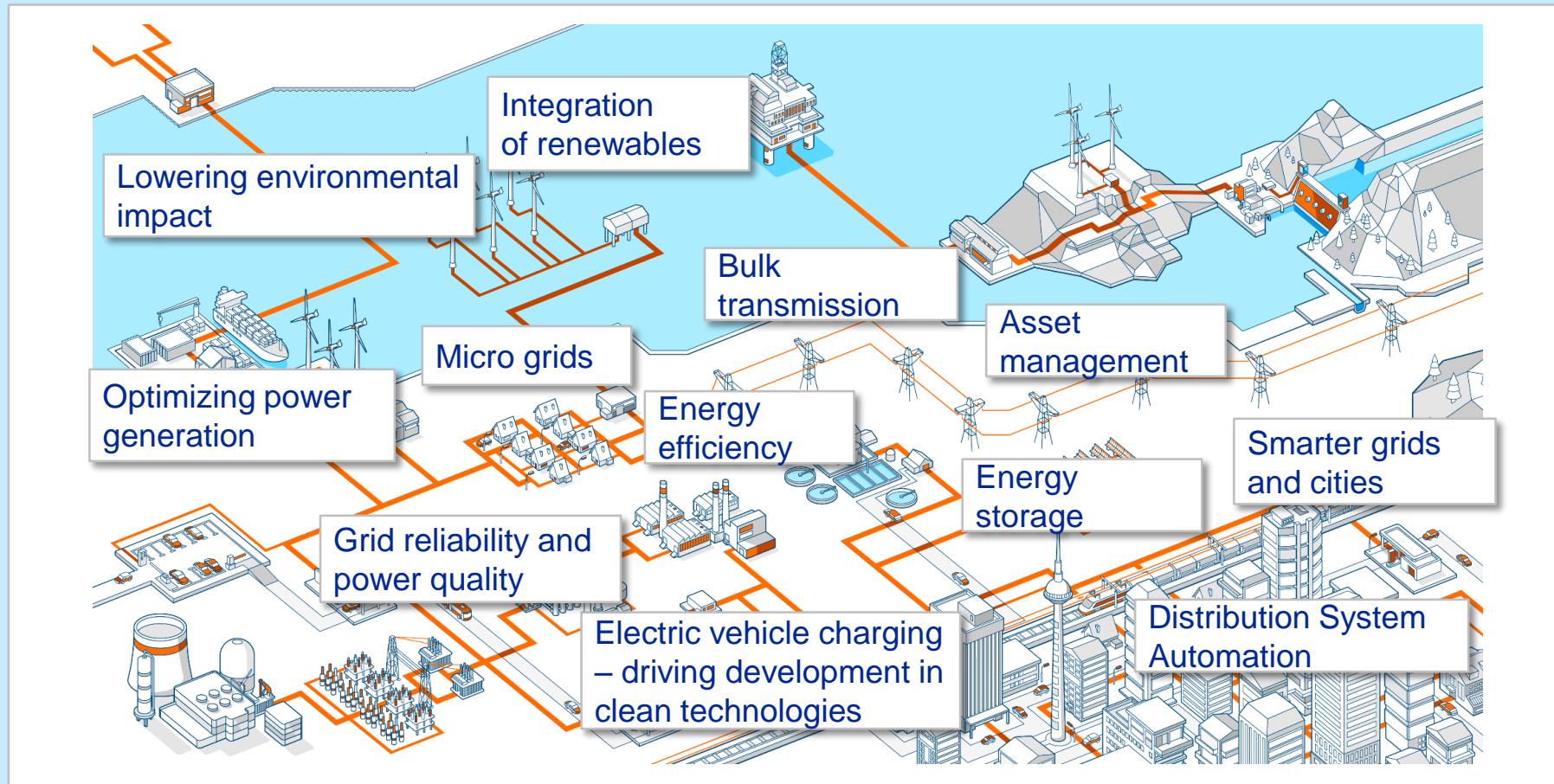
Energy storage needs

New private investors

Uncertainty in utility spend

# Well positioned in a changing world

## Growth opportunities to deliver value to our customers



# Solutions for a changing grid – Ultra High Voltage (UHV)

## Addressing emerging needs with innovation

### UHV: more power, longer distances, lower losses

Renewables are a key growth driver

Significant opportunities in China and India

AC<sup>1</sup> and DC<sup>2</sup> applications

- Bulk transmission
- Subsea links
- Connecting asynchronous grids
- Energy trading

Advanced control systems

### 1100 kV UHVDC<sup>3</sup> transformer



### 1100 kV DC components



### 1200 kV UHVAC<sup>4</sup> transformer



### 1100 kV AC GIS<sup>5</sup>



**Integrating power & automation technologies to deliver customer value**



# Solutions for a changing grid – digital substations

## Automating the grid

### A fundamental change in substation architecture

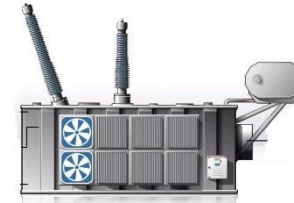
Products with integrated sensors, communication, control, and protection

New functions: overloading, monitoring, and diagnostics

Smaller footprint

Electronics as long-term service opportunity

### Smart transformer



### Circuit breaker with fiber optic sensor



### MV<sup>1</sup> digital switchgear



### HV<sup>2</sup> digital switchgear



**Power & automation solutions to enable a digital grid**

# Solutions for a changing grid – industry needs

## Smart electrification packages for light industries



Packaging



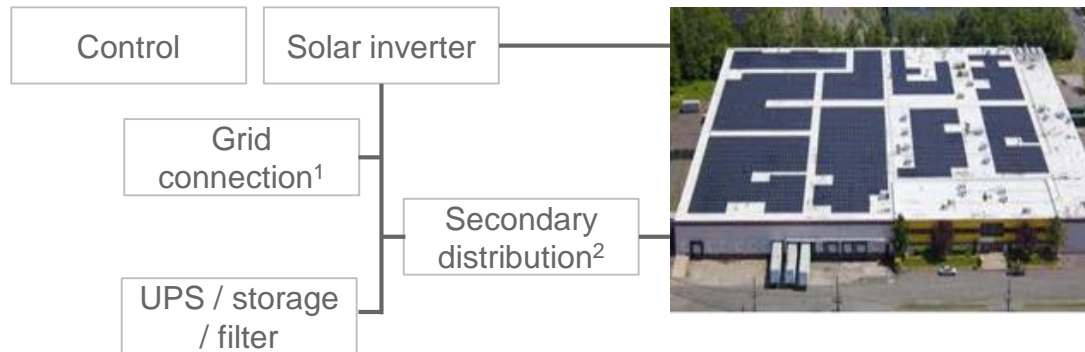
Pharma



Semi-  
conductors



Food &  
beverage



### The need

Power security, e.g., US hurricane zones  
Grid access, e.g., emerging markets

### ABB's packaged solution

Renewable energy supply	Control and protection
Grid connection	Monitoring and service package
Storage	Low-voltage distribution
Power quality / UPS³	

### ABB's advantage

Local presence everywhere, multiple channels to market  
Combined total power & automation offering

**Power & automation combined for greater customer value**

# Solutions for a changing grid – transportation and infrastructure

## Demand for electricity in transportation is increasing rapidly

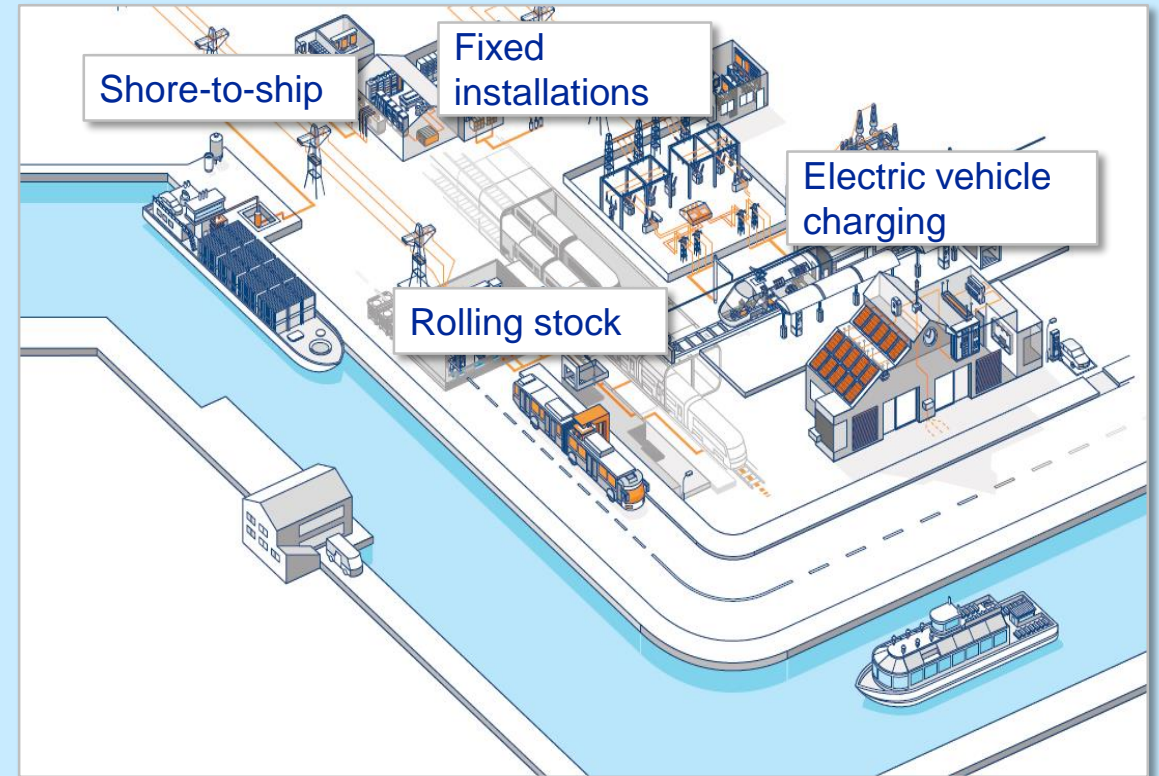
### Opportunities for traditional and new applications

Automation and power equipment for fixed rail installations and rolling stock

Electrical vehicle charging

Shore-to-ship power supply

Automation and control systems – software and services



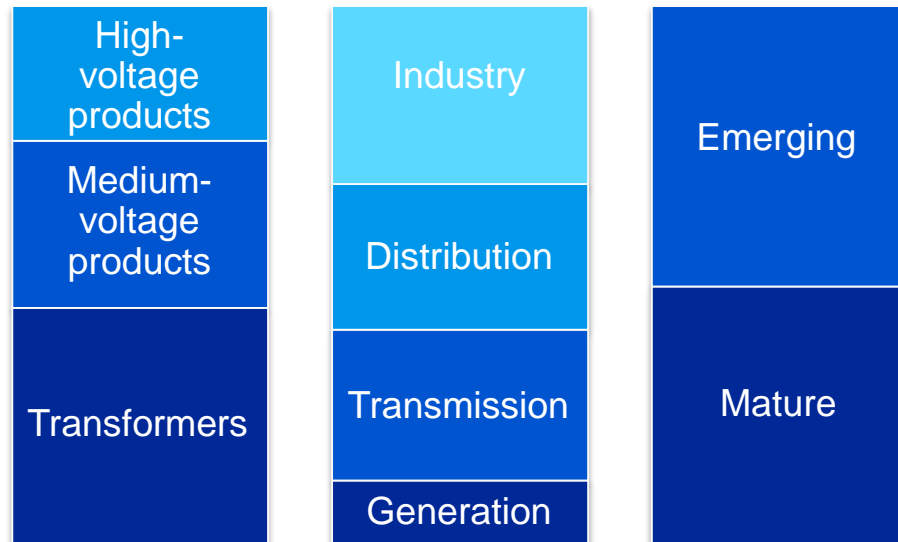
**We provide the offering to meet these growing challenges**



# Power Products well positioned in a changing world

## Proven competitiveness, broadest offering, and geographic scope

### Balanced business<sup>1</sup>



### Key differentiators

Most comprehensive product and service offering  
Penetration: diversified end market exposure  
~80% visibility on market opportunities  
Innovation: steady pipeline of innovation, e.g.,

- Digital switchgear
- New range of high-voltage GIS
- Environmentally-friendly insulation gas
- Ultra high-voltage AC and DC products

Expansion: globally-dispersed footprint close to customers

**A leading position: technology and financial performance**

# Agenda

Profitably growing ABB's power business

Shifting the center of gravity in Power Systems

# Power Systems

## Well positioned to address customer and market opportunities



Power automation



IT/OT integration and asset management



Grid integration and transmission



Consulting and Service

### Well positioned

New customer challenges play to our strengths

A leader in transmission technologies, distributed control systems, and power grid automation

Technology pioneer (e.g., grid automation, FACTS<sup>1</sup>, HVDC)

Vast installed base

Leading engineering and service capabilities

Market coverage and global footprint

### Growth opportunities

Renewables and distributed generation

Power quality for industry and infrastructure

Power grid automation

Longer transmission distances

New grids in emerging markets

Aging grids in developed markets

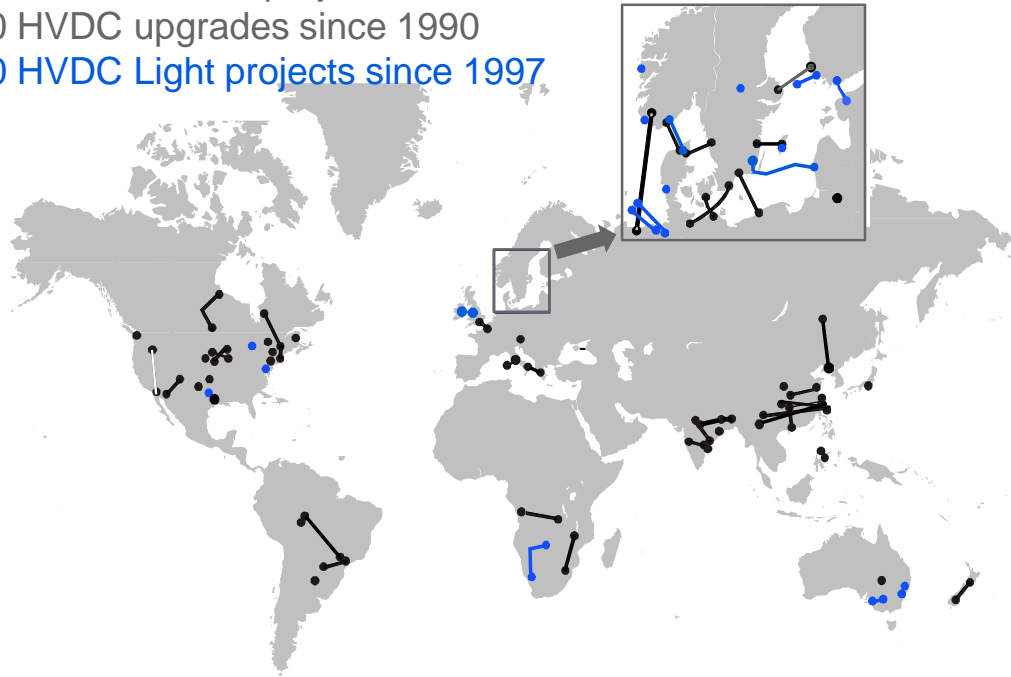
Servicing the large installed base

**Attractive opportunities in grid – we continue at the forefront**

# Power Systems: #1 in HVDC

## Delivered more than half of the world's projects

- 60 HVDC Classic projects since 1954
- 20 HVDC upgrades since 1990
- 20 HVDC Light projects since 1997



A leading player in high-growth segments  
Long-term leadership result of continuous innovation  
Unique end-to-end in-house offering for HVDC  
Growing refurbishment and upgrade opportunities

### Continuous innovation in HVDC Classic

	1954	Today
Voltage (kV)	50	1,100
Capacity (MW)	10	10,000
Distance (km)	90	3,000

### Continuous innovation in HVDC Light

	1999	Today
Voltage (kV)	80	525
Capacity (MW)	50	1,200
Distance (km)	70	1,500

**We are well positioned in high-growth segments – technology, capabilities, execution**

# Power Systems: “step change”

## Process overview

### Status of critical projects

#### Milestones achieved

- Offshore wind: Dolwin 1 energization initiated, Dolwin 2 platform being commissioned in Norway
- Solar EPC: 7 of 10 projects closed – on track to close 90% by end 2014

Offshore wind: resources and expertise enhanced

Much better grip and understand risks, actions in place

### Other actions

#### Improving risk return

- Selectivity: offshore wind contracts
- Strengthening contract management
- Review of large projects completed

#### Lowering cost

- Capacity rationalization
- Cost out measures on target
- Standardizing engineering solutions

### Driving sustainable change

#### Adapting the business model

- De-risk EPC, change business model
- Remain turnkey provider with right risk-return profile
- New model: system integrator

#### Growing the profitable base business

- Using market visibility and channels
- Consulting and services
- Capitalize on our strong presence in emerging and mature markets

**Future business with lower risk and sustainably higher returns**



# Power Systems

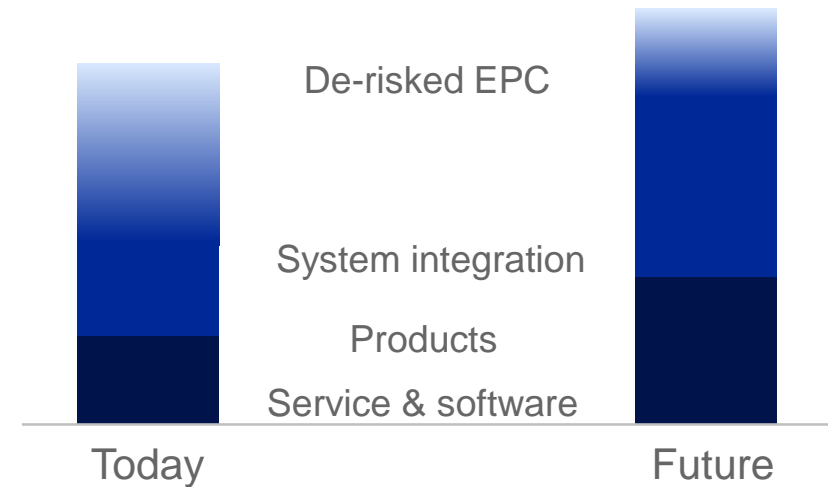
## Shifting the center of gravity: better risk-return profile

Consolidate EPC and build partnerships to strengthen project execution and market coverage

Drive growth and expand system integration with new business models including partnerships / alliances

Accelerate penetration of installed base with service offering combined with software capabilities and consulting

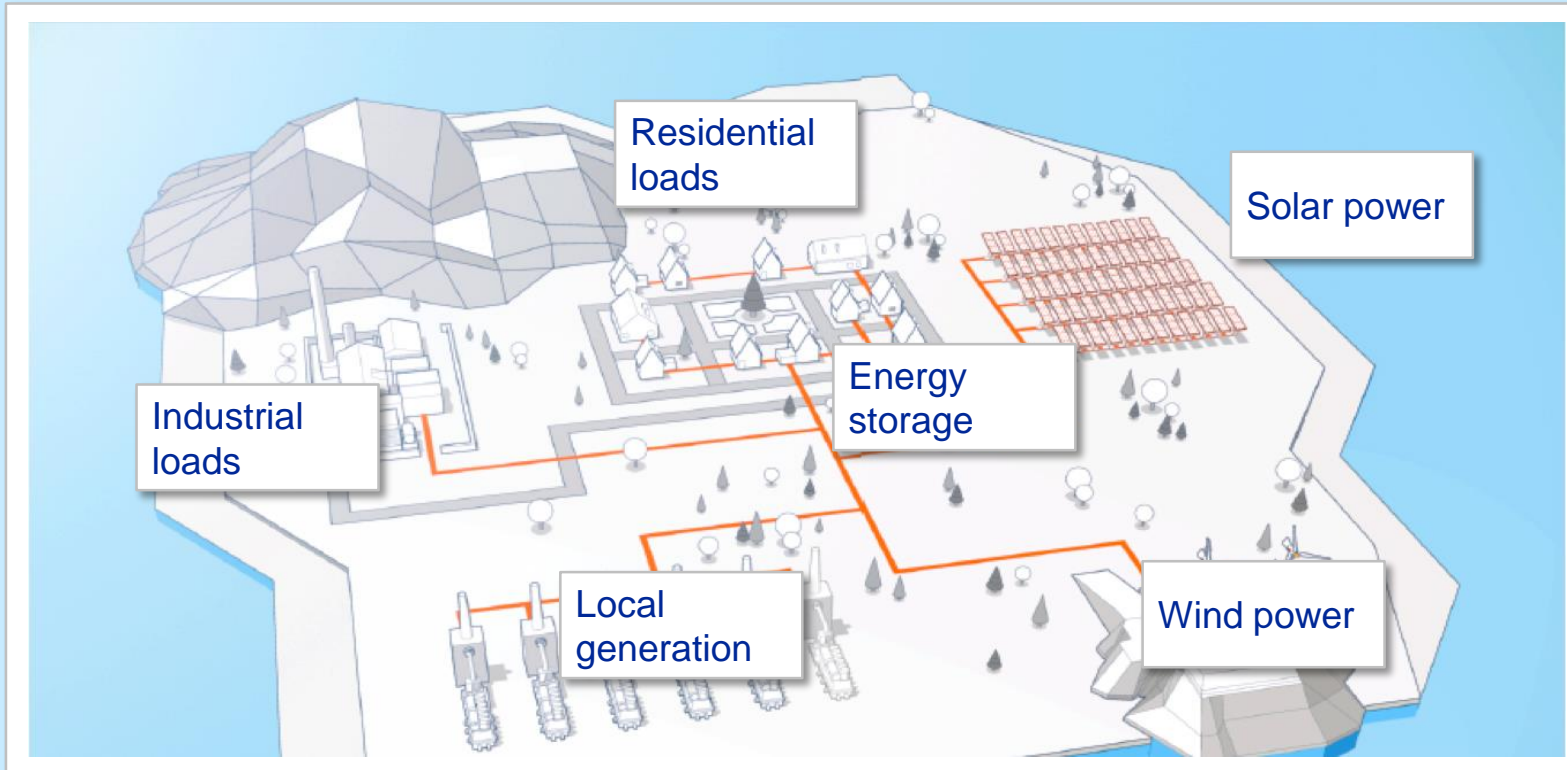
Shift in business mix in % of divisional revenues, illustrative



**Better growth, less risk, greater predictability in results**

# Power Systems

## Shifting the center of gravity: high-growth opportunity micro-grids



### Micro-grids

For independent, reliable and affordable access to distributed power

Increased penetration of renewable resources lowering environmental impact

Combine energy storage and power technologies with smarter automation

**Use our system integration capability – help integrate renewables**

# Power Systems

## Shifting the center of gravity: consulting, service, and software

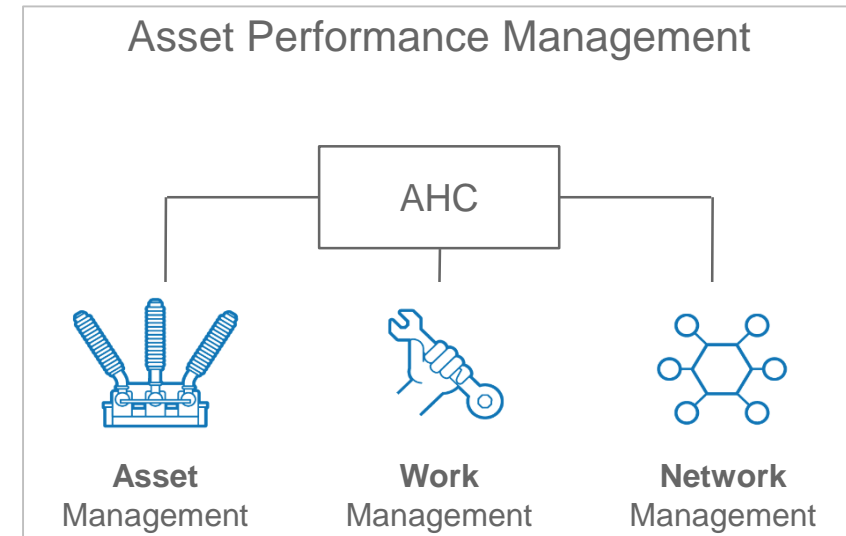
Tap ABB's deep grid and plant expertise for consulting services across the power value chain

Build on sector's largest installed base to grow service revenues towards 25% of total by 2020

Examples of service opportunities

- Power plant optimization and energy efficiency
- HVDC upgrades / modernization and power quality
- Asset Health Center (AHC)

ABB is a leader in utility asset management software solutions



**Enhancing our growth and return profile by driving consulting, service, and software**

# Power Systems

## Shifting the center of gravity for profitable and sustainable growth

### Technology

Increased R&D focus  
525 kV HVDC cable – more than doubles DC transmission capacity  
Full 1100 kV HVDC system  
Hybrid HVDC breaker – 100 year puzzle  
New generation HVDC Light  
New generation SVC Light

### Position

Broadest presence – unmatched view of opportunities  
Leading capabilities – in technology, engineering, system integration  
Supply base – competitive, flexible, reliable  
Largest installed base – a great service opportunity

### Offering

Across the power value chain: electrification, automation, control  
Breadth of offering – products, systems, services, software  
Turnkey solution capability

### Risk-return profile

New business model for de-risked EPC, project selectivity, accelerated growth in attractive base business

**A technology leader well positioned to capture high-growth opportunities with reliable returns**

Power and productivity  
for a better world™

