ABB Group Overview
ABB Perú - Introduction
A global leader in power and automation technologies
Leading market positions in main businesses

- 124,000 employees in about 100 countries
- More than 400 employees in Peru
- $32 billion in revenue (2010)
- Formed in 1988 merger of Swiss and Swedish engineering companies
- Predecessors founded in 1883 and 1891
- Publicly owned company with head office in Switzerland
- More than 50 years of operations in Peruvian market
As one of the world’s leading engineering companies, we help our customers to use electrical power efficiently, to increase industrial productivity and to lower environmental impact in a sustainable way.
How ABB is organized
Five global divisions

- **Power Products**
  - $10 billion
  - 32,500 employees

- **Power Systems**
  - $6.8 billion
  - 17,500 employees

- **Discrete Automation and Motion**
  - $5.6 billion
  - 25,500 employees

- **Low Voltage Products**
  - $4.5 billion
  - 20,000 employees

- **Process Automation**
  - $7.4 billion
  - 26,500 employees

2010 revenues (non-consolidated) and Dec. 31, 2010, employee numbers (except Discrete Automation and Motion division, which includes employees from January acquisition of Baldor)

- ABB’s portfolio covers:
  - Electricals, automation, controls and instrumentation for power generation and industrial processes
  - Power transmission
  - Distribution solutions
  - Low-voltage products
  - Motors and drives
  - Intelligent building systems
  - Robots and robot systems
Power and automation are all around us
You will find ABB technology...

orbiting the earth and working beneath it,
crossing oceans and on the sea bed,
in the fields that grow our crops and packing the food we eat,
on the trains we ride and in the facilities that process our water,
in the plants that generate our power and in our homes, offices and factories
PEABB
Since 1952, ABB Peru is a leader in Power and Automation Technologies for the Energy and Industry Market

INDUSTRIAL AREA - SERVICE AREA

FACILITIES
- Transformers repair
- Engineering
- PP Testing labs
- Protection systems assembly
- LCC for Unigear and Unimix
- Modular systems assembly
  Rotating machine shop
  Non-rotating machine shop
  Breakers retrofit and repair
  Turbogenerators service
  Oil testing lab
  Drive services

TOTAL AREA: 20,000 m²

SERVICE AREA

FACILITIES
- Automation / Drives services
- Rotating machine shop
- Breakers retrofit and repair
- Transformers repair

ACTUAL AREA: 1,000 m²
Next future area: 5,000 m²

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PEABB Capabilities

Power Technologies

- **ELECTRICAL SYSTEMS**
  - Engineering, Assembling and testing
  - Medium Voltage Switchgears up to 36 Kv
  - Low voltage distribution 480 V
  - Electrical Unit Substations for indoor, outdoor and compact mounting.
  - Control and signaling panels
- **Equipment and Spares**
  - Indoor and outdoor Breakers SF6 and Vacuum
  - Fuses switches
  - Arresters
  - Outdoor switches

Automation Technologies

- **AUTOMATION ENGINEERING SERVICES**
  - Automation
  - Control Strategy Development
  - Automation System Architecture Definition
  - System Data Base Configuration
  - System Engineering
  - Information Management System Support
  - Control Cabinets integration & testing
- **Drives**
  - Application engineering for MV/LV drives
- **Project Services**
  - Project Management
  - Site Management
  - System Installation & Commissioning

- **PP SERVICES**
  - Transformers / MV / HV Services
  - Revamping / Retrofit / Overhauls
  - General Maintenance
  - Diagnostics / Tests
  - Installation
  - Inspections / Supervision
  - Commissioning
  - Configuration
  - Training
  - Spare parts management

Switchgear GIS 22.9 KV
FM Cerro Verde - 2007

Substation 23 KV
Collahuasi - Chile: 2003

Mobil Substation
Southern Peru – Cuajone -August 2001

Skid Pass Substation
60 KV : 4 / 5 MVA , 60 / 10 KV
Shougang Hierro Peru-Oct 2003

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Machines Service Workshop: Where are we?

- **Main Workshop in Lima**
- **Workshop in Arequipa**

![Certificate of Authority Level](image)

**ISO 9001**

**ISO 14001**

**ISO 18001**
PEABB Decentralization plan

PEABB actual capabilities include the Services and engineering capabilities in Lima and Arequipa particularly focused to minerals customers.

Service Workshop in the Northern location of Peru will consider the next following stages:

**1st Stage:**
- Running by the middle of 2012 latest
- Primary scope of services to be considered are the next:
  - Preventive and predictive maintenance and repairing of:
    - LV and MV motors and machines / Distribution transformers
  - Specialized service such as:
    - HV/MV Breakers & Switches, retrofit
    - Protection relays upgrades and configuration
    - LV/MV Drives field services
  - Testing Area:
    - For the repaired machines and equipments

**2nd Stage:**
- Expanding its capacity in 2013
- To provide additional services such as:
  - Automation & Instrumentation Field and Diagnostic, Services, Upgrades, retrofit
  - LV/MV Drives Systems service support
    - Field Services
    - Diagnostic
    - Upgrades & Retrofit
  - Gearless Mill Drives
    - Field Services
    - Upgrades & Retrofit
    - Diagnostic
    - Training
    - Spare parts management

**Aim of this approach:**
- Skilled people and facilities close to customer sites running by the middle of 2012 latest
- Improving the speed of response
- Decentralization of ABB operations and focus on regional needs
- Taking full care of installed base
- Establishing long term service contracts with assured resources for execution
- Assure peace on mind for the customers
How ABB is organized
Five global divisions

- Power Products
- Power Systems
- Discrete Automation and Motion
- Low Voltage Products
- Process Automation
ABB Power Products division
Business unit structure

- High Voltage Products
- Medium Voltage Products
- Transformers

- Global presence: 32,500 employees and 110 plants in more than 35 countries
- Main customers: Utilities, industries, EPCs, OEMs and distributors
- ABB is the world’s No. 1 in Power products
ABB Power Products division
Key deliverables and markets

- Key deliverables
  - Power technology products for ultra-high, high and medium-voltage applications
    - Transformers: power, distribution, traction, others
    - UHV, HV and MV products, including switchgear
    - Range of power capacitors
    - Distribution automation products, eg. electronic relays
- Power products services
  - Transformer repair, refurbishment, spare parts, maintenance
- Markets served
  - Utilities, industries, OEMs, EPCs, distributors
ABB Power Products division
The world of ABB in power

- Marine Application
- HVDC light / Windpark Connection
- Plant Automation & Electrical Systems
- Utility communication
- Network Management

- Compact Substations (CSS)
- Gas-insulated Switchgear (GIS) Industrial Electrification
- Hydro automation & electrical systems
- GIS Substations
- Railway Power Supply (16.7 Hz)

- MV Switch-gear (GIS / AIS)
- AIS Substations
- Automation of Gas and Water Plants & Networks
- Transformers
- Rural Electrification
- Urban Electrification
ABB High Voltage Product
One stop shop
ABB High Voltage Product offering

- Gas insulated switchgear
- Dead tank circuit breakers
- Live tank circuit breakers
- Hybrid modules
- Generator circuit breakers
- Instrument transformers
- Power capacitors and filters
- Power quality products
- Surge arresters
- Operating mechanisms
- Cable accessories
- Service portfolio
Gas Insulated Switchgear

- 3-ph Design up to 245 kV
- 1-ph Design up to 1100 kV

Applications
Protection and switching in HV substations with:
- Low space requirements e.g. inner-city substations and power plants
- Heavily polluted areas e.g. coastal regions and industrial substations
- High safety and power availability requirements

Special features
- Designed for indoor and outdoor use
- Hydro-mechanical drive
Hybrid modules – PASS (Plug and Switch System)

- Hybrid technology of air and gas
- Available up to 550 kV

Applications
Protection and switching in HV outdoor substations
- Remote substations
- Industrial substations
- Substation retrofits

Special features
- Plug And Switch System (PASS)
- Pre-assembled and factory-tested
- Motor Drive
Mobile Substation - MoSS

- Mobile substation based on PASS up to 252 kV

Applications

Protection and switching in HV outdoor substations
- Periodical peak load coverage
- Industrial substations (e.g. mining etc.)
- Supply recovery in short time in case of emergency
- Power supply in remote areas

Special features
- Fully pre-assembled and factory-tested
- Available on one trailer
Dead Tank Breakers

- Available up to 800 kV, and up to 80 kA breaking capacity

**Applications**

Protection and switching in HV outdoor substations

**Special features**

- Polymer insulators available
- Circuit Breaker Sentinel monitors breaker conditions, supports “Smart Grid” initiative
- Switching Control Sentinel mitigates switching transients

© ABB Group
Live Tank Circuit Breakers

- Available up to 800 kV and up to 80 kA breaking current

**Applications**
Protection and switching in HV outdoor and indoor substations

**Special features**
- Excellent performance and high reliability in all climate conditions
- Highly reliable operating mechanisms
- Polymeric insulators available
- Controlled switching with Switchsync™
Disconnecting Circuit Breaker - DCB

- Available up to 550 kV and up to 63 kA breaking current

**Applications**

Protection and switching in HV outdoor and indoor substations with:
- Minimized maintenance and less space
- Low failure rate, increased safety and low Life Cycle Cost (LCC)

**Special features**
- Polymeric insulators
- No conventional disconnectors needed
Generator Circuit Breakers

- Generator Circuit-Breakers with rated short-circuit current up to 210kA for application in the largest power plants

**Applications**

Protection of generator and step-up transformers in:
- New Power Plants
- Existing Power Plants

**Special features**

- Special solutions also for Pumped Storage Power Plants
- Up to 20’000 mechanical close-open operations without overhaul
Outdoor Instrument Transformers

- Current and voltage transformers available up to 800 kV
- Oil insulated, SF₆ gas insulated and optical solutions

**Applications**

Voltage, current or combined measurement in HV outdoor substations

**Special features**

- Polymeric insulators available
Power Capacitors and Filters

- Capacitor and harmonic filtering solutions up to 800 kV to improve the efficiency and reliability of utility and industrial networks.

Applications
- Reactive power compensation
- Improvement of asset utilization
- Reduction of network losses
- Compliance with grid regulations
- FACTS/HVDC

Special features
- Quality and technology leadership
- Products supported by application know-how
- Extensive portfolio coverage
Surge Arresters

- Available up to 800 kV for surge protection in LV, MV and HV networks
- All voltage classes and surge ratings

Applications
- Indoor and outdoor substations and transmission lines
- High energy applications

Special features
- Polymeric housing for improved performance
Cable accessories 52 – 420 kV

- Outdoor cable terminations – Porcelain and Composite
- Dry flexible cable terminations
- Cable connectors for GIS and transformer
- Premoulded cable joints
- Tools and accessories

Extensive training courses – world renowned
Cable accessories 12 – 36 kV

- Cable terminations for indoor and outdoor applications - for XLPE and oil-paper insulated cables
- Cable connectors
- Cable joints - for XLPE and oil-paper insulated cables
- Cable distribution cabinets
- Tools and accessories

Extensive training courses – world renowned
High voltage products service portfolio

Diagnosis
- On-site diagnostics, on-line monitoring

Environmental services
- SF₆ gas management and SF₆ recovery training and certification

Installation and commissioning
- Certified staff and on-site testing

Spare parts
- Current and legacy products

Support and remote service
- Telephone support, remote monitoring

Maintenance and field services
- Asset updates and remote service
High voltage products service portfolio

**Extension**
- Extension of legacy assets with state-of-the-art components

**Retrofit**
- Upgrade of switchgear components with cutting-edge technology

**Repair and refurbishment**
- On-site or factory repair, 24/7 hotline

**Migration and upgrades**
- Entire range of cutting-edge technologies for upgrading SA and controls

**Training and certification**
- In factories, on-site, on-line

**Engineering and consulting**
- Assessment of high voltage assets
- Upgrade to synchronized switching
ABB Transformers

Our transformers support the systems that keep our world running
Transformers are all around us in different segments
You will find ABB transformers…

- in buildings and in airports we use when traveling,
- crossing oceans and on the sea bed,
- in substations that power our industrial areas,
- on the trains we ride and in the facilities that process our water,
- in windmills, solar fields, urban areas and households.
Transformers are all around us in different applications. Wherever you are, transformers are near by.

1. Traction and distribution transformers
2. Distribution transformers
3. Power and distribution transformers
4. Power transformers
5. Low sound emitting transformers
6. Dry type distribution transformers
7. Subsea transformers
8. Dry type distribution transformers
9. Power and distribution transformers
10. Power transformers

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ABB Transformers product range
Product marketing set up for your support

- Large power transformers – Pieralvise Fedrigo
- Medium power transformers – Pieralvise Fedrigo
- Small power transformers – Markus Winkler
- Distribution transformers – Peter Rehnström
- Dry type transformers – Johannes Clausen
- Insulation and components – David Stockton
- Service – Thomas Westman
Transformers
Complete portfolio – product offering

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large medium small power</td>
<td>Generator step-up, network coupling, shell, shunt reactors, phase-shifting, HVDC, etc.</td>
</tr>
<tr>
<td>Large medium small distribution</td>
<td>1ph, 3ph, mineral, silicon, midel, BIOTEMP®, pole, pad, ground, sub-sea, cooling, etc.</td>
</tr>
<tr>
<td>Dry type distribution</td>
<td>Cast Coil, open wound, RESIBLOC®, vacuum pressure impregnated, Ecodry® family, VP encapsulated, etc.</td>
</tr>
<tr>
<td>Industrial and special</td>
<td>AC furnace, DC furnaces, DC electrolysis process (Al, Cl), AC series reactors, etc.</td>
</tr>
</tbody>
</table>

IEC, ANSI and IEEE standards
Transformers
Complete portfolio – product offering cont’d

What ever you need from our broad portfolio -> ABB is your "one-stop shop" supplier

**Traction transformers**
AC/DC operations, multi-systems, ground installations, rolling operations, etc.

**Insulation and components**
Bushings, tap changers, mechanical components, pressboard, Natural ester fluids, Insulation materials, etc.

**Transformer Remanufacturing and Engineering Services**
Engineering solutions, assessment, remanufacturing, TrafoSiteRepair™, advanced field services, TEC®, installation and commissioning, etc.

IEC, ANSI and IEEE standards
Transformers for special applications
We are experienced also beyond standard applications

- Generator Step up
- Excitation
- Substation T&D Phase Shifter
- HVDC converters
- Reactors
- Step down
- Solar energy
- Arc furnaces
- Rectifiers
- Boosters
- Marine
- Offshore distribution
- Traction
- Variable speed drives
- Windmills

ABB is your competent partner!
Four common technology platforms guaranteeing highest quality
One common global design standard

- Liquid filled distribution transformers (CDS)
- Dry type distribution transformers (CDS)
- Power transformers (TrafoStar™)
- Special transformers for HVDC, industry and traction
Transformer service
Intelligent service portfolio

Born healthy
- Safety
- Environmental consciousness
- Asset at performance level
- On time delivery
- Smooth handover

Live healthy
- Trouble-free operation
- Maximized asset utilization
- Low Life Cycle Cost (LCC)
- Optimized investment planning

New lease of life
- Reduced outage
- Extended asset life
- Get more out of aged assets
- Optimize capital expenditure

Customer need
- Transport / Hauling
- Installation
- Commissioning
- Start-up training
- Service contract

ABB solutions
- Diagnostics
- Control / Monitoring
- MTMP™ - Condition /Life/ Risk assessment
- Transformer consultancy
- Transformer management training

- Spare Parts
- Preventive Maintenance
- Refurbishment / Enhancement
- Factory Remanufacturing
- TrafoSiteRepair™
- Upgrade
- End of life management

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Product highlights
New transformer concepts (1)

- EcoDry – highest efficiency dry type transformer family
  - EcoDry\textsuperscript{Basic}, EcoDry\textsuperscript{Ultra} and EcoDry\textsuperscript{99plus}
- Hi-T\textsuperscript{180}
  - Based on the cast coil technology with upgraded insulation
- Dry small power transformer
  - 72,5 kV up 63 MVA small power transformer with or without on-load tap changer
- Dry type Ex-proof
  - Ex-e approved Dry type transformer for operation in the most sensitive environments

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Product highlights
New transformer concepts (2)

- Generator step up transformer – 2 in 1
  - The 3 windings generator step up for CCPP
- Polytransformer
  - Designed to be connected to different transmission systems
- Variable shunt reactor
  - Increased transmitted power in long AC cable or overhead lines reducing losses in power systems and adjustable compensation of reactive power with load variation giving improved voltage stability
- Green-R-Trafo
  - Low-loss amorphous core liquid filled distribution transformers
- 800 kV UHVDC - ultra high voltage DC transformer
ABB Medium Voltage Product
One stop shop
ABB Medium Voltage Products
Where our products are used

- Utility substations
- Distribution lines
- Industrial plants
- Ships

- Utility generation
- Utility transmission
- Utility distribution
- Transportation
- Heavy industrial process plants (Mining, Oil & Gas and Cement)
- Light industrial parks
- Hospitals
ABB Medium Voltage Products
Outdoor apparatus – reclosers and breakers

Live tank substation breakers
- Ratings: up to 41.5 kV
- Manufactured in: India and China
- Features: Magnetic actuation reduces maintenance

Dead tank substation breakers
- Ratings: up to 38 kV
- Manufactured in: US
- Features: Magnetic actuation reduces maintenance

Reclosers – single and three phase
- Ratings: up to 38 kV
- Manufactured in: US and China
- Features
  - Magnetic actuation reduces maintenance
  - Solid dielectric to eliminate maintenance and dielectric concerns
  - Special controls available – loop schemes, distribution automation schemes, automatic setting changes to improve reliability
ABB Medium Voltage Products
Outdoor instrument transformers

IEC current & voltage transformers
- Ratings
  - 12 … 40.5 kV
  - 10 … 2500 A
- Types
  - TPO : current transformer
  - TJO, TDO : voltage transformer
- Manufactured in
  - Czech Republic, Poland

ANSI current & voltage transformers
- Ratings
  - 0.6 … 34.5 kV
- Versions
  - Metering; Bushing
- Manufactured in
  - USA
ABB Medium Voltage Products
Distribution automation - various applications

- Full family of protective relays for various protection applications
  - Arc protection
    - REA 10_ family
  - Feeder protection
    - REF 541/3/5 and REF 542plus
    - REF615, REX 521 and DPU 1500/2000 R
    - REJ 52_ , REU 52_ , MicroShield
  - Machine & transformer protection
    - REM 543
    - REM 610
  - Multi purpose protection
    - SPACOM product family
• Committed to protect
• The best fit for every need
• Seeing things in a new light
• Full support from start to finish

- **Relion®** - a strong family name as an identifier for the new generation of Protection and Control IEDs from ABB
- From interconnected transmission grids to secondary distribution kiosks
- 670 series for transmission
- 650 series for sub-transmission
- **630 series** for advanced distribution
- **615 series** for distribution - compact and powerful
- **610 series** for distribution - dedicated protection
- **60_ series** for basic distribution
ABB Medium Voltage Products
Distribution automation - advantages

The Distribution Automation product range includes:

- Support for several de-facto communication protocols enabling seamless integration to control systems (including IEC 61850)
- A suitable relay for every application. From a single stand-alone relay to complex protection and control systems
- Newest technology and user-friendly design for an easy installation.
- World-wide service and support network
ABB Medium Voltage Products
Air-insulated primary switchgear, IEC type

Air-insulated primary switchgear - UniGear

- Types and Ratings
  - Type ZS1, up to 4000 A / 50 kA at 12 kV and 2500 A / 31.5 kA at 24 kV
  - Type ZVC, compact motor control panel for ZS1 up to 50 kA and 7,2 kV
  - Type ZS2, 36 kV panel for 2500 A and 25 kA
  - Type ZS3, 36/40,5 kV up to 3150A and 31,5 kA
- Manufactured in
  - IT, CZ, ZA, TR, EG, SA, IN, MY, CN, KR, AU, VE, AR, BR
- Features
  - Cassette type, fixed or floor rolling breakers
  - SF6 or vacuum interruption
  - Standard or compact panels
  - Double level (2 high CB panels)
  - Double busbar panels
  - Integrated sensors and controls as required
  - Fully arc tested
ABB Medium Voltage Products
Air-insulated primary switchgear, ANSI type

- Types and Ratings
  - Advance - metal enclosed switchgear
  - SafeGear - arc-resistant switchgear
  - Advance MCC - metal enclosed motor control
  - SafeGear MCC - arc-resistant motor control

- Manufactured in
  - US, Mexico

- Features
  - Full ANSI compliance
  - Classic and arc resistant solutions
  - Single and double level panels
  - Integrated sensors and controls as required
ABB Medium Voltage Products
Gas-insulated primary switchgear

Gas-insulated primary switchgear – ZX

- Types and Ratings
  - Single busbar
    - ZX0 (…24kV, …1250A, …25 kA)
    - ZX1.2 (…40.5kV, …2500A, …31.5 kA)
    - ZX1.5 (as ZX1.2, 95 kV –1 min)
  - Single or Double busbar
    - ZX2 (…40.5kV, …4000A, …40 kA)
    - ZX2.2 (as ZX2, ANSI)

- Manufactured in
  - Germany, China

- Features
  - Medium voltage area shielded from surrounding
  - Independent of environmental conditions
  - Increased lifetime & safety
  - Reduced dimensions
  - Busbar-Plug technology for quick and safe installation
ABB Medium Voltage Products
Gas-insulated secondary switchgear

- Ratings
  - up to 36kV
- Types
  - Safering and Safeplus
- Versions
  - With fuses or vacuum CB
  - Optional built-in sensor technology
- Manufactured in
  - Norway, China
- Features
  - Flexible connections for quick installation
  - Completely insulated design
  - Compact
  - “Maintenance free”
ABB Medium Voltage Products
Air-insulated secondary switchgear

- Ratings
  - up to 24kV
- Types
  - UniSwitch, UniMix
- Manufactured in
  - Italy, Finland, China, Egypt, Argentina
- Features
  - Broad product portfolio, both functionally & accessories-wise
  - Broad application range, industrial, utility & infrastructure applications
  - Easy installation & maintenance
  - Flexible protection
ABB Medium Voltage Products
Modular systems – compact secondary substations

Main line types: CSS-S and CSS-C
- Metal or concrete housings
- Walk in or non-walk in enclosures
- In ground or above ground
- Medium voltage primary or secondary switchgear with circuit breaker or switch disconnector
- Low Voltage Switchgear types: Fuse lists, Load break switches, or Circuit breakers
- Dry or Oil type Transformer
- Manufactured in: Estonia, Hungary, India, Switzerland, China, Egypt, Norway, Saudi Arabia and Peru

- Customer specific or standard designs
- ABB designed, assembled and tested for quality
- Highly corrosion resistant design
- Operates in a radial or loop system
- SCADA ready or remote controlled available
- High Aesthetic Value
- Several layouts to provide flexibility in the operation and low cost maintenance
- Available layouts to accommodate up to two transformers
- Bolt reinforced in lifting points
- Integrated oil collecting pit below transformer
- Top lifting for easy handling including equipment
ABB Medium Voltage Products
Modular systems – application modules

Pre-fabricated units (eHouses)
- Primary and Secondary Switchgear
- Provided with Low Voltage Switchgear and Automation Equipment if needed
- Climate controlled
- ANSI, GOST, CSA, ASA or IEC Designs
- Oil and Gas, Mining, Infrastructure or Utility Applications
- Manufactured in: Canada, Australia, Saudi Arabia, Switzerland, Hungary, USA, South Korea

Mobile units
- Types: Outdoor
- Up to 20 MVA, 36 kV
- Type tested equipment
- Factory engineering & assembled
- Emergency power expansion
- Manufactured worldwide
ABB Medium Voltage Products
Service and replacement opportunities (1)

- Global network of service centers to support our installed base
- Trained and certified service technicians providing local field service and repairs
- Wide range of after sales service offerings covering full product lifecycle on existing and legacy brands
- Service offerings to maintain reliability over full product lifetime
  - Installation and commissioning of our product range by trained technicians
  - Spare parts covering current and legacy brands
  - Time and condition based maintenance including customer specific long term maintenance contracts
  - Product training covering safe operation and routine maintenance
Service offerings to extend product life
- More than 200 circuit breaker retrofit designs enabling simple upgrade to latest breaker technology
- Repair and full refurbishment of switchgear
- Upgrade from electro-mechanical relays to modern electronic protection and control devices
- Extension of existing switchboards to cater for additional circuit requirements

Service offerings to improve product performance
- Safety improvement on through retrofit of arc detection relays for switchgear arc flash mitigation
- System fault level management through supply of fault limiting devices
- Diagnostics and fleet assessment of switchgear
How ABB is organized
Five global divisions

- Power Products
- Power Systems
- Discrete Automation and Motion
- Low Voltage Products
- Process Automation
2010 revenues: $7.5 billion

Employees: 17,500

Main customers: Utilities, industries, OEMs (Original Equipment Manufacturers) and EPCs (Engineering Procurement, Construction contractors)

ABB is a global leader in power systems with leading market shares in its core businesses
Power Systems Division
Key deliverables

- Electrical, automation, control and instrumentation for power generation
- AC and DC power transmission grid systems for traditional and renewable energy integration (HVDC, HVDC Light, FACTS)
- Turnkey substations (incl. substation automation)
- Network management and market systems
- Power systems services
  - Consulting and system studies
  - Repair, retrofit, refurbishment
  - Software and hardware upgrades
  - Asset management and diagnostics
Power Systems Division

Competitive advantages

- Leading edge technologies and innovation track record
- Offering portfolio across the energy value chain
- Strong local presence facilitates customer focus
- Global manufacturing and engineering footprint ensures competitiveness
- Global installed base and proven track record
- Significant service presence to support installed base throughout the life cycle
- Experienced and skilled workforce
Substations Overview

- Power Transmission & Distribution Substations
- Substation Automation Systems
- Substation Automation Products
- Service

© ABB Group
Substations Offering

- **Transmission & distribution substations**
  - Air and gas insulated substations
  - Mobile and underground substations
  - Power distribution systems including substations for Industrial plant electrification, Railway power supply, Wind farms

- **Substation Automation Systems**
  - Bay-control and protection solutions
  - Generator protection systems
  - Small SCADA systems and wide area protection solutions

- **Substation automation products**
  - IEC 61850-compliant product portfolio
  - Station-level products including gateways for remote control and data access
  - Transmission and sub-transmission protection and control IEDs

- **Service and support**
  - Power system studies; consulting, upgrades and retrofit, diagnosis troubleshooting and support, remote services, maintenance, training
Grid Systems
Overview

- Turnkey solutions and special products for
  - Power transmission
  - Power quality
  - Railway
  - Renewable energy
  - Offshore platforms (power from shore)
  - Cable systems
Grid Systems Offering

- **HVDC**
  - Bulk power transmission
  - Long sea transmission
  - Asynchronous connections

- **HVDC Light**
  - Underground cable transmissions
  - Power from shore to platforms and islands
  - Connecting wind and solar energy to grid

- **FACTS - Series Compensation**
  - Increased transmission capacity

- **FACTS - Shunt Compensation**
  - Power Quality

- **High voltage cables**
  - Underground and submarine AC and DC cables

- **Power semiconductors**
  - T&D, industrial drives and traction applications with Bipolar and BiMOS technique

- **Consulting and service**
  - Transmission system consulting
Integration solutions for:

- Power plant electricals
- Power plant automation
- Plant management and optimization
- Turnkey instrumentation, control and electrical packages
- Service, rehabilitation and upgrade
Power Generation Offering

- **Plant Automation Systems**
  - Instrumentation and valves
  - Distributed control systems
  - Boiler- and turbine control

- **Plant Electrical Systems**
  - MV and LV electrical systems
  - Excitation, protection and synchronization
  - Motors and drives

- **Plant Management and Optimization of**
  - Plant operations and maintenance
  - Environmental monitoring and control
  - Asset lifecycle

- **System Integration**
  - Project development
  - Engineering and consulting
  - Erection, commissioning

- **Life Cycle Management**
  - Service, modernization

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Network Management Overview

- Network Control
- Network Manager SCADA/EMS/DMS/GMS/OMS
- Central Markets
- Network Manager MMS
- Utility communication
- Services
Network Management Offering

- **Energy systems operation**
  - SCADA - Supervisory Control and Data Acquisition
  - SCADA - EMS - Energy Management Systems
  - SCADA - DMS - Distribution Management Systems
  - SCADA - GMS - Generation Management System
  - OMS - Outage Management Systems
  - RTUs - Remote Terminal Units

- **Central markets**
  - SCADA MMS – Market Management Systems (ISO, TSO, RTO, power pool)

- **Utility Communications**
  - Fibre Optic Networks
  - Microwave Radio Networks
  - Power Line Carriers (PLC)
  - Broadband Network Management
  - Teleprotection

- **Professional Service**
  Upgrade of system, expansion, rebuilding, rehabilitation, support agreements, spare parts, training.
ABB power systems offer complete lifecycle services for all products to support installations throughout their entire lifetime.
Main Power Generation Projects

Main Power Generation
Hydro Projects 2010-2012

CHAGLLA ; ODERBRECHT
HPP 4x100 Mw

SANTA RITA ; ANDINA
HPP 3 x90 Mw

QUITARACSA ; SUEZ
HPP 2x47 Mw

MACHU PICCHU ; EGEMSA
HPP 1x100 Mw

ABB 2009

CHILCA GAS POWER PLANTS :
ENDESA ,  KALLPA , Others
1200 Mw

CERRO DEL AGUILA ;
KALLPA ; 3X 134 Mw

PUCARA ; EGECUSCO
HPP 2x60 Mw

ABB 2010

CHEVES ; SN POWER
HPP 2x85 Mw ;  MUSD 35
Modernization of Excitation System in Mantaro HPP

Project 2010-2011: MUSD 6,0

<table>
<thead>
<tr>
<th>Description</th>
<th>BRABB Part A</th>
<th>PEABB Part B</th>
<th>Remarks:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CIF supply of Excitation Systems</td>
<td>X</td>
<td></td>
<td>Delivered CIF Port of Callao</td>
</tr>
<tr>
<td>2. Overall Technical responsibility</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Overall Project Management.</td>
<td>X</td>
<td></td>
<td>With the assistance of PEABB Local Project Coordinator.</td>
</tr>
<tr>
<td>4. Supervision of installation of Item 1.</td>
<td>X</td>
<td>X</td>
<td>With the supervision of installation of BRABB</td>
</tr>
<tr>
<td>5. Installation of the Excitation Systems.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>6. Commissioning of Item 1.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Other Local supply.</td>
<td>X</td>
<td></td>
<td>Materials indicated in pre-engineing</td>
</tr>
<tr>
<td>8. Supervision of removing of Existent Rotating Exciter for 3 groups</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Removing of Existent Rotating Exciter for 3 groups</td>
<td>X</td>
<td></td>
<td>With the supervision of BRABB</td>
</tr>
<tr>
<td>10. Local co-ordination for the Project</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Overall Project Management.</td>
<td></td>
<td>X</td>
<td>With assistance of PEABB</td>
</tr>
<tr>
<td>12. Inland transport, handling and insurance of goods from port of import to site.</td>
<td>X</td>
<td></td>
<td>For the project.</td>
</tr>
<tr>
<td>13. Custom clearance</td>
<td>X</td>
<td></td>
<td>For the Project.</td>
</tr>
<tr>
<td>14. Duties, Taxes and other local fees</td>
<td>Customer</td>
<td>Customer</td>
<td>For the Project.</td>
</tr>
<tr>
<td>15. Bank guarantees for the project</td>
<td>X</td>
<td></td>
<td>PEABB the bid bond</td>
</tr>
<tr>
<td>16. Permits</td>
<td>Customer</td>
<td>Customer</td>
<td>For the Project.</td>
</tr>
<tr>
<td>17. Local Insurances</td>
<td>X</td>
<td></td>
<td>Except Civil Responsibility and Professional Insurances</td>
</tr>
<tr>
<td>18. Civil Responsibility Insurance</td>
<td>X</td>
<td></td>
<td>To be clarified later if Electroperú or law allow</td>
</tr>
<tr>
<td>19. Professional Insurance</td>
<td>X</td>
<td></td>
<td>To be clarified later (No cost included by BRABB or PEABB) PEABB to support BRABB to issue this insurance if necessary</td>
</tr>
<tr>
<td>20. Consultancy Fee</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Financing of pre-paid costs (e.g. duties, taxes)</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Transmission Systems in Peru

Expansion
2010-2015

- 500 KV
- 220 KV
- 138 KV

Source: Ministry of Energy and Mines

© ABB Group
Large project in Transmission sector

Project 2009-2010: MUSD 30,0

- **PSS Project: Sierra North Client: Abengoa Peru**
  
  **Description** - SVC Cajamarca - 60 / +100 MVAR, 220 KV Enlargement of Carhuamayo, Paragsha, Cajamarca Norte, Cerro Corona, and Carhuaquero Substations. Implementation of Conocoha and New Huallanca Substations. Supply, engineering, installation, supervision and commissioning.
FACTS project: Cotaruse SCs and Socabaya SVC

Project in execution 2010-2011: MUSD 50,0

- Four 220 kV SCs, 2x380Mvar + 2x414Mvar
- One 220 kV SVC, +300/-100 Mvar
- Customer: REP / CTM

Customer
- REP / Consorcio Transmantaro (ISA)

Scope: Turnkey project
- SE COTARUSE
  - Two 220kV SC 386,75MVar
  - Two 220kV SC 414,62MVar
- SE SOCABAYA
  - One 220kV SVC +300/-100MVar
  - Turnkey delivery

Background
- The SVCs and SCs are needed for the increased power through the transmission system, and to reinforce the system stability.
- Project is the concession of the line Mantaro-Cotaruse-Socabaya.
- ABB signed this contract in March 2010

Background
- The SVCs and SCs are needed for the increased power through the transmission system, and to reinforce the system stability.
- Project is the concession of the line Mantaro-Cotaruse-Socabaya.
- ABB signed this contract in March 2010
**KNOW-HOW**

- Substation development projects from 10 kV to 500 kV.
- Staff with extensive experience in electromechanical engineering and civil works in the energy sector in the Peruvian market

<table>
<thead>
<tr>
<th>Nº</th>
<th>Proyecto</th>
<th>Cliente</th>
<th>Monto de Obra</th>
<th>Actividades</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ampliación de la S.E. Condorococha en 138 y 72,5 kV con celdas compactas PASS</td>
<td>Cemento Andino</td>
<td>1,50 M US$</td>
<td>Ingeniería de Detalle</td>
</tr>
<tr>
<td>2</td>
<td>Implementación de la nueva SET Sudamericana de Fibras en 60 kV con celdas compactas PASS</td>
<td>S.D.F</td>
<td>1,90 M US$</td>
<td>Ingeniería de Detalle</td>
</tr>
<tr>
<td>3</td>
<td>Ampliación de las SS.EE. Ares, Arcata, Selene y Chacapuente en 60 kV</td>
<td>Minera Ares</td>
<td>1,05 M US$</td>
<td>Ingeniería de Detalle</td>
</tr>
<tr>
<td>4</td>
<td>Suministro, Montaje y Puesta en Servicio de un rele de Protección Diferencial de barra 60 kV para la Central Callahuanca</td>
<td>Edegel</td>
<td>0,35 M US$</td>
<td>Ingeniería de Detalle</td>
</tr>
<tr>
<td>5</td>
<td>Adquisición e Instalación de cinco Interruptores de Potencia de 245 kV</td>
<td>Electroperu</td>
<td>0,50 M US$</td>
<td>Ingeniería de Detalle</td>
</tr>
<tr>
<td>6</td>
<td>Ingeniería, Suministro, Montaje y Puesta en servicio para alimentación en 220 kV - SE Aceros Arequipa</td>
<td>Aceros Arequipa</td>
<td>1,80 M US$</td>
<td>Ingeniería de Detalle</td>
</tr>
<tr>
<td>7</td>
<td>Construcción de una celda de conexión del reactor en la S.E. Tayabamba e Integración de la S.E. Tayabamba al Sistema Scada de Hidrandina S.A.</td>
<td>MARSA</td>
<td>0,50 M US$</td>
<td>Ingeniería de Detalle</td>
</tr>
<tr>
<td>8</td>
<td>Ampliación de la Capacidad de Transformación en 220/60 kV para la S.E.T Balnearios, con ampliación de la subestación</td>
<td>Luz del Sur</td>
<td>2,50 M US$</td>
<td>Ingeniería de Detalle</td>
</tr>
<tr>
<td>9</td>
<td>Ampliación de la S.E. Tierra Colorada en 60 kV y la Nueva S.E. Paña 60/13,8 kV de generación</td>
<td>S.D.F</td>
<td>1,50 M US$</td>
<td>Ingeniería Básica e Ingeniería de Detalle</td>
</tr>
<tr>
<td>10</td>
<td>Adquisición e Instalación, pruebas y Puesta en servicio de equipos de 60 kV para la Central Callahuanca</td>
<td>Edegel</td>
<td>0,50 M US$</td>
<td>Ingeniería de Detalle</td>
</tr>
<tr>
<td>11</td>
<td>Ampliación en 220 kV de las SS.EE. Carhuamayo, Paragsha, Cajamarca Norte, Cerro Corona y Carhuaquero; e implementación de las SS.EE. Conococha y Huallanca Nueva</td>
<td>Abengoa Perú</td>
<td>30,0 M US$</td>
<td>Ingeniería Básica e Ingeniería de Detalle</td>
</tr>
</tbody>
</table>
Substations / Protection & Control projects 2008-2010: PS Peru in South America

**Dominican Republic**
1. SE. Rincon 220kV (Commissioning)

**Panama**
1. SE. Changinola 220kV (Commissioning)
2. SE. Fortuna 220kV (Commissioning)

**Ecuador**
1. SE. Conocoto 138kV (Project SAS)
2. SE. Tababela 138kV (Project SAS)

**Colombia**
1. ISA (Training PCM600)

**Chile**
1. Peibe – Codelco (Training RTU560)

**Venezuela**
1. SE. Yaracuy 800kV (Commissioning)
2. SE. Arenosa 800kV (Commissioning)
Substation Automation Certification : Training Center

ABB Training Center
Lima, Peru

Has successfully been certified as Training center for the below-listed 670 series courses

- SEP-601, IED Protection and Control Manager, PCM600
- SEP 604A, Bay Control with REC870
- SEP-804B, Product Integration with REC870
- SEP-802A, Line Distance Protection with REL870
- SEP-902B, Line Differential Protection with REL670
- SEP-803B, Transformer Protection with RET670

The certification was held in Lima, Peru during the period 2009-06-01 -- 2009-06-24

The training centre has proven to be sufficiently designed to give both theoretical and practical training for the above-mentioned courses.

ABB AB
Substation Automation and Products Training
Västerås, Sweden  2009-06-30

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TRAINING CENTER – PROTECTION
New Service Area

PS  Power Generation service

PS Substation service

PS Facts  service
How ABB is organized
Five global divisions
## Discrete Automation and Motion division
### Markets served

<table>
<thead>
<tr>
<th>Discrete manufacturing</th>
<th>Hybrid/batch manufacturing</th>
<th>Process industries</th>
<th>Utilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Discrete manufacturing" /></td>
<td><img src="image2.png" alt="Hybrid/batch manufacturing" /></td>
<td><img src="image3.png" alt="Process industries" /></td>
<td><img src="image4.png" alt="Utilities" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transportation equipment</th>
<th>Infrastructure, buildings</th>
<th>E-mobility</th>
<th>Renewable energy</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5.png" alt="Transportation equipment" /></td>
<td><img src="image6.png" alt="Infrastructure, buildings" /></td>
<td><img src="image7.png" alt="E-mobility" /></td>
<td><img src="image8.png" alt="Renewable energy" /></td>
</tr>
</tbody>
</table>
# Discrete Automation and Motion division

## Business units

<table>
<thead>
<tr>
<th><strong>LV Drives</strong></th>
<th><strong>Motors and Generators</strong></th>
<th><strong>Power Electronics and MV Drives</strong></th>
<th><strong>Robotics</strong></th>
</tr>
</thead>
</table>
| • Low voltage AC drives  
• Machinery drives  
• Standard drives  
• Industrial drives  
• Wind turbine drives  
• DC Drives  
• Solar converters  
• PLCs, HMs, and wireless sensors and actuators  
• Software tools  
• Energy saving tools  
• Service | • Synchronous motors  
• Modular induction motors  
• Slip-ring motors  
• Large exd motors  
• High speed motors  
• Process performance motors  
• Special motors (exd, marine, etc.)  
• General performance motors  
• Industrial performance motors  
• Traction motors  
• DC motors  
• Wind power generators  
• Diesel generators  
• Gas and steam turbine generators  
• Hydro generators, tidal waves, etc  
• Service | • Power Electronics  
• Advanced power electronics  
• Converter products  
• Excitation systems  
• High power rectifiers  
• Power quality products  
• Traction converters  
• Propulsion and auxiliary converters  
• Medium voltage drives  
• Service | • Industrial robots  
• Robot controllers and software  
• Industrial software products  
• Application equipment and accessories  
• Robot automation systems for automotive, foundry, packaging, metal, solar, wood, plastics, etc. industries  
• Service |

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## Discrete Automation and Motion division

### Areas of activity

<table>
<thead>
<tr>
<th>I. Discrete automation</th>
<th>II. Motion in industries</th>
<th>III. Renewables</th>
<th>IV. Power control and quality</th>
<th>V. E-mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Automation and control of discrete processes in industry, infrastructure and transport equipment</td>
<td>- Electric actuation for continuous processes</td>
<td>- Conversion of replenishable energy into electricity</td>
<td>- Control of power supply and insuring power quality for industrial and traction applications</td>
<td>- Electrical propulsion of vehicles</td>
</tr>
<tr>
<td>- Making things you can count, pieces, items; controlling discrete steps</td>
<td>- Applications in process industries, utilities, infrastructure and transport equipment</td>
<td>- Remote, harsh environments</td>
<td>- Energy storage and grid stabilization</td>
<td>- Enabling e-mobility</td>
</tr>
<tr>
<td>- Speed, safety, efficiency, reliability</td>
<td>- Safety, energy efficiency, reliability</td>
<td>- Efficiency, grid codes</td>
<td>- Reliability, energy efficiency</td>
<td>- Charging of batteries</td>
</tr>
<tr>
<td>- Platform products: PLC, general motion control</td>
<td>- Low voltage and large motors</td>
<td>- Wind generators, converters</td>
<td>- Rectifiers, excitation systems, advanced power electronics</td>
<td>- Assembly and testing of batteries</td>
</tr>
<tr>
<td>- Complementing products, e.g. drives, motors, sensors</td>
<td>- Low and medium voltage drives</td>
<td>- Solar inverters for central and distributed solar power generation</td>
<td>- Power quality products</td>
<td>- Energy efficiency, harsh operating conditions</td>
</tr>
<tr>
<td>- Modules, e.g. robots, machine safeguarding</td>
<td>- Generators</td>
<td>- Drives, motors and PLCs for solar power plants (e.g. trackers)</td>
<td>- UPS</td>
<td></td>
</tr>
</tbody>
</table>
Discrete Automation and Motion division
Making products work together
Factory automation solution based on PLCs, robots, drives, wireless sensors, LV products and instruments.

- AC500 CPU
- AC500 as DeviceNet Slave
- Connected to IRC5 robot controller
- Modbus on AC500 COM2
- AC500-eCo CPU
- HMI
- Profibus on AC500
- WISA®
- Level
- Pressure
- Flow
- ACS1M
- ACS550
- ACS800
- Tmax MCB
- UMC Motor Controller
- Softstarter

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Discrete Automation and Motion division Footprint

1. LV Drives
2. PLCs
3. Power Electronics and MV Drives
4. Machines
5. LV Motors
6. Robotics
7. R&D centers
Discrete Automation and Motion division
Well positioned for growth

- Four global BUs with sound offerings
  - LV Drives (including PLCs)
  - Motors and Generators
  - Power Electronics and MV Drives
  - Robotics
- Strong market positions in key product lines
- Applications in various industries providing good pull-through and cross-BU bundling opportunities
- Worldwide “local presence” supported by a geographically well-balanced footprint for speed and quality in customer service
- Experienced and diverse management team
How ABB is organized
Five global divisions

- Power Products
- Power Systems
- Discrete Automation and Motion
- Low Voltage Products
- Process Automation
Low Voltage Products division
Service organization

- Low Voltage Products division has more than 600 employees dedicated to service, and activities in more than 50 countries
- This organization is strengthened by external companies, channel partners, that are authorized to service ABB products
- ABB’s service offering is based on a lifecycle management model that maximizes the uptime of equipment and optimizes the investment in our automation products
Low Voltage Products division
Manufacturing footprint 2010

- LV Systems
- Breakers & Switches
- Control Products
- Enclosures & DIN-Rail Products
- Wiring Accessories
Low Voltage Products division
Product offering

- **Incoming electrical energy**

- **Power distribution**
  - Breakers, switches, fusegear and switchgear, cable distribution cabinets

- **Man-machine communication**
  - Pushbuttons, Switches, Dimmers, Pilot lamps

- **Collecting and processing info**
  - Interface modules, Fieldbus systems, Electronic timers, Monitoring relays, EIB Home automation products, DIN-rail components, Energy meters

- **Protection and Control**
  - Circuit breakers, MCB's, RCD's, Surge arresters, Contactors, Motor starters, MCC's, Arc guard systems, Overload (thermal and electronic)
  - Data acquisition
  - Limit switches, EPR

- **Execution**
  - Discrete Automation and Motion Division

- **Material for installation**
  - Enclosures, trunking systems, terminal blocks, device adapters, etc.
Low Voltage Products division
Sales structure

- Industrial
- End-users and commercial
- Residential

- EPC / Project OEMs
- Consultant

- OEM
- Projects
- Serial
- Panel Builder

- Installer

- Consultant
- Promoter

- LVP
- Sales force / Front-end
- Promoter

- Machinery
- Panel Builder

- Installer
- Others
- Wholesaler

- Wholesale

- Marketing: Product Marketing, Specialist, Training, Communication

- Market
- Market initiatives
- Segments opportunities

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Low Voltage Products division
Business Units

<table>
<thead>
<tr>
<th>LV Systems</th>
<th>Breakers and Switches</th>
<th>Enclosures and DIN-Rail Products</th>
<th>Control Products</th>
<th>Wiring Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNS Conventional Switchgear</td>
<td>Circuit Breakers</td>
<td>Modular DIN-Rail Products</td>
<td>Control and Protection</td>
<td>Wiring Accessories</td>
</tr>
<tr>
<td>MNS Intelligent Switchgear</td>
<td>Switches</td>
<td>Intelligent Building Control KNX</td>
<td>Electronic Products and Relays</td>
<td>Industrial Plugs and Sockets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enclosures and Cable Systems</td>
<td>Connection</td>
<td>Door Entry Systems</td>
</tr>
</tbody>
</table>
Low Voltage Products division
Low Voltage Systems

- MNS® Platform
  - MNS Conventional Switchgear
    - MNS
    - MNS R
  - MNS Intelligent Switchgear
    - MNS iS
    - MNS Insum
    - MNS UMC

High flexibility for Power Distribution and Motor Control applications
Low Voltage Products division
Breakers and Switches

- **Circuit Breakers**
  - Moulded Case Circuit Breakers (MCCB)
  - Air Circuit Breakers (ACB)

- **Switches**
  - Load Break Switches, Fusible Switches, CAM Switches, Change-Over Switches
  - Enclosed / Safety Switches

- **Fusegear and Cable Distribution Cabinets**
  - Switch fuses, Fuse switch disconnectors, Fuse links, Fuse monitors and Enclosures with busbar system and apparatus

- Safely break and switch power
- All over the world
Low Voltage Products division
Enclosures and DIN-Rail Products

- Modular DIN-Rail Products
- Intelligent Building Control KNX
- Enclosures and Cable Systems

A wide range of different functions which can be integrated in the operations of an installation
Low Voltage Products division
Control Products

- Control and Protection
- Electronic Products and Relays
- Connection

Quality and reliability are built into every device to ensure total performance satisfaction
Low Voltage Products division
Wiring Accessories

- Wiring Accessories
- Industrial Plugs and Sockets
- Door Entry Systems

Comfort, functionality and design in a complete range of integrated solutions
Low Voltage Products division
Channels and Markets served

- Distributors
- Panel Builders
- OEMs
- System Integrators and Contractors
- End-users and Utilities

- Industry
- Buildings and infrastructures
- Renewable energy
- E-mobility
- Building Automation and Energy Efficiency
Low Voltage Products division
Market initiatives: energy efficiency in buildings

Smart home and intelligent building control with ABB i-bus® KNX

- A complete system for all energy reducing building application areas like:
  - Lighting control and regulation
  - Control of heating, ventilation, cooling
  - Shutter and blinds control
  - Energy and load management
  - Visualization and operation
  - Movement detection

- ABB i-bus® KNX is standardized according to ISO/IEC 14543-3 (Home and Building Control)

- With ABB i-bus® KNX energy savings up to 40% can be achieved
Low Voltage Products division
Market initiatives: e-Mobility (AC charging)

- Residential charging:
  - Home chargers deliver efficient, low power vehicle charging that can refill a battery during the night.
  - Charging overnight ensures that the load on the grid is low, and the car is refilled economically using low cost night-rate power.

- Public chargers:
  - Semi-fast charging solutions that can charge a battery in a few hours.
  - These charging poles will be found throughout the town or city at company parking, public buildings, stores and large car parks.
Low Voltage Products division
Market initiatives: Solar power (Distributors, OEMs)

- OT Series switches
- S284 UC Z and S800 PV-S MCBs
- S800 PV-M MCB disconnectors
- OVR and OVR PV surge protective devices
- S200 MCBs and DDA RCDs
- F200 PV-B RCDs
- E200 switch disconnectors
- S200 MCBs
- E90 PV Fuse disconnectors
- Switchgears, switchboards and enclosures
- Tmax and Tmax PV MCCBs
- A Series contactors
- Energy meters

LP products offering
Installation up to 1MW
Low Voltage Products division
Market initiatives: Solar power (Residential application)

- Field cabinets
- OT series switches
- S284 UC Z and S800 PV-S MCBs
- S800 PV-M MCB disconnectors
- OVR PV surge protective devices
- S 200 MCBs and DDA RCDs
- F200 PV-B RCDs
- E200 switch disconnectors
- S200 MCBs
- E90 PV fuse disconnectors
- Switchboards, consumer units and junction boxes

LP products offering
Installation up to 6KWP
Low Voltage Products division
OEM Channel: GenSet and UPS segment

Products for Generator set
- Low voltage generators
- Air, moulded case and modular circuit breakers
- Switch-disconnectors/Change-over switches
- Contactors
- PLC
- Process instrumentation

Products for UPS
- Air, moulded case and modular circuit breakers
- Switch-disconnectors
- Contactors
- Harmonic filter systems
- Surge arresters and overvoltage limiters
- Current sensors
- IGBT

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Low Voltage Products division
OEM Channel: HVAC segment

Compressor / centrifugal
- LV & HV motors
- LV & MV drives
- LV products

Compressor / screw
- LV motors
- LV drives
- LV products

Compressor / scroll (hermetic with in-built motor)
- LV products
- LV drives

Supply fan
- LV motors
- LV drives
- LV products

Return fan
- LV motors
- LV drives
- LV products

Duct heaters
- Switch-disconnectors

Liquid cooler fans (condenser fans)
- LV motors (pad mounted)
- LV drives
- LV products
- Enclosed safety switches

Cooling water pump
- LV motors
- LV drives
- LV products

Chilled water pump
- LV motors
- LV drives
- LV products
How ABB is organized
Five global divisions

Power Products
Power Systems
Discrete Automation and Motion
Low Voltage Products
Process Automation
ABB Process Automation

- 2010 Orders: $7.4 Billion
- 26,500 employees in over 50 countries
- Centers of Excellence for project execution and R&D in Europe, Americas, Asia
- Market leadership in major industries and major product portfolio
- Over $20 billion installed base worldwide

**Key deliverables**

- Fully engineered solutions and products for process control, safety, energy and information management systems
- Industrial Plant Electrification Systems
- Industry-specific process solutions
- Process industry Services for Maintenance Consulting and Full Service
Minerals

Markets served
- Open pit & underground mining
- Cement manufacturing
- Primary aluminum production
- Minerals processing
- Market size:~$2.0 billion

Market drivers
- Globalization of customers and competitors
- GDP growth, commodity demand for primary metals and building materials
- Technology solution portfolios

Key deliverables
- Automation and drives solutions
- Plant electrification
- Analytical Products and Systems
- Optimization solutions
- Project management
- Engineering
ABB for Mining

- Gearless Mill Drives (GMDs)

- Electrical and Automation portfolio for Integrated Solutions

- ABB Performance Services (Maintenance Contracts)

- Full Service and Life Cycle Management
  - Main Electrical Contractor (MEC)
  - Main Automatic Contractor (MAC)

ABB Integrated Solutions
Drive Systems - GMDs

- Gearless Mill Drives.
  - Largest installed base in Peru (13)
- Drive Systems for Mills.
- Drive Systems for HPGR.
- Drive Systems for Conveyors.
- Application Drives
  - Pumps, Fans, etc.
Oil, Gas & Petrochemicals

Markets served
- Offshore and onshore oil & gas production
- Refining
- Oil and Gas Transportation and Distribution
- Liquefied Natural Gas
- Chemical and Petrochemical Production
- Market size: $10.8 billion

Market drivers
- Health, safety and environment
- Oil and gas demand
- Chemical and petrochemical demand
- Productivity and energy efficiency

Key deliverables
- Instrument and analytical products/systems
- Automation systems
- Electrification systems
- Telecommunications systems
- Lifecycle services
ABB Oil, Gas & Petrochemicals

- EPC Plants (Turn key projects)

- Electrical and Automation portfolio for Integrated Solutions

- ABB Performance Services (Maintenance Contracts)

- OEE Improvement
- Maintenance cost reduction

- Before ABB
- With ABB managing maintenance

- System functionality and performance
- Bundling Products: Quality, price for several products from one supplier
- Quality and price for single products

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ABB EPC Plants for OGP - ITABB

- **UPSTREAM:** Gas, Oil Separation Plants (onshore/offshore), Gas treatment plants, Gas/Water injection plants
- **MIDSTREAM:** Compressor & Pumping Stations, Terminals & Storage, Flowstations
- **DOWNSTREAM:** Refinery Process Units licensed by others, Plant utilities including power distribution & oily water treatment
- **POWER PLANTS:** All types as complete EPC or BOP.
- 15 – 500 MUSD project range.

**PB-KU-H Platform**

Realization of the PB-KU-H Production Platform - 100,000 BBLD oil and 90 MMscfd gas

Client/Country: Pemex E&P/ Mexico

Value: 120 MUSD (Total 260 MUSD)

Duration: 2005 – 2009

Scope of Work: Engineering, Procurement and Supply, and Commissioning of process packages
Drive Systems for OGP

- Artificial Lift Pumps Drives
  - ESP/PCP
  - AIB
- AC Drilling Drives
- Subsea Drives
- Multidrives
- Compressor Drives
- Injection Pump Drives
ABB Integrated Solutions for OGP and Mining

Full Service and Life Cycle Management

- HV/MV Power Dist.
- LV Power Dist.
- Intelligent Switch Gear
- Drives
- Motors
- Automation Solutions
- Safety Systems
- Telecom Systems
- Intelligent Field Inst.
- Consulting HAZOP/SIL/HSE/HCO/RAM/RCM
- Analyzers

Main Electrical Contractor (MEC)  Main Automatic Contractor (MAC)

ABB Integrated Solutions
Automation Systems (MAC)

- Oil & Gas SCADA
- Control Systems
- Instrumentation & Analytical Systems
- Safety Systems
Electrical Systems (MEC)

- Substations: MV/HV
  - Compact - GIS
  - Compact Hybrid – PASS
  - Compact Skid
- Electrical Rooms (MV/LV).
- Switchgears, MCC, Drives (MV/LV)
- Engineering, Commissioning & Start Up
ABB Performance Services
Our Service portfolio

- 110,000 ABB employees
- 13,000 Maintenance employees
- 22,000 Service employees
- 200 Service employees in Perú
ABB Performance Services
Offered independent of client’s installed base

ABB Full Service®
- Long-term, globally supported performance-based agreements in which ABB commits to maintain and improve the production and equipment performance and reliability for an entire facility

EPM - Equipment Performance Management
- Agreements where ABB takes over the responsibility for maintenance of a defined group of assets such as all the rotating machines, electrical components, process instrumentation, analytical equipment or all plant control systems

Reliability Engineering & Consulting
- Reliability management services in the areas of maintenance, reliability, materials, spare parts and contractor management
- Consultancy Solution in Energy Effectiveness & Operational Excellence
EPM - Equipment Performance Management
Focus on performance: family of specific assets

- Drives & Motors
- Power Distribution
- Analyzers
- Process Control Systems
- Instrumentation
- Other non-ABB products

- ABB guarantees availability of specific assets based on performance-based contract
- Objective is to accelerate performance improvement in selected asset classes measured against Key Performance Indicators (KPIs)
- Lowers capital & operational expenditures
- Raises productivity
- Reduces environmental Impact
- Includes services such as:
  - Condition monitoring
  - Inventory, logistics, procurement
  - Maintenance planning and execution
  - Lubrication, alignment, repair

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Control Systems References

- 800xA (AC800M) Petrobras Lote X
- 800xA CT (AC800M) Petroperú Talara
- 800xA (Procon) Endesa – CT Malacas
- 800xA (AC800M) Duke - Carhuaquero
- 800xA (AC800M) Gloria - Casagrande
- 800xA (Harmony) Minera Antamina
- 800xA (Harmony) Minera San Juan
- 800xA (Advant, AC800M) Votorantim - Cajamarquilla
- 800xA (AC800M) Milpo - Cerro Lindo
- 800xA (AC800M) Cerro Verde
- 800xA CT (AC800M) GMP – C. Terminales
- Infi90 SPCC Cuajone
- 800xA (infi90) SPCC Toquepala
- 800xA (AC800M) Pluspetrol Lote 8
- 800xA (AC800M) Duke Cañón del Pato
- Mod300 Aguaytía Termoselva
- 800xA (Slmphony) Barrick - Miskichilca
- 800xA (AC800M) Volcan
- 800xA (AC800M) Condestable
- 800xA (Simphony) Xtrata - Tintaya
- 800xA (AC800M) Milpo - Pampa de Cobre
Main Installed Base ABB Perú – Drives & GMD’s

- 01 GMD SAG 32 Mw, 42 feet
  Newmont Conga
- 01 GMD SAG 16.5 Mw, 32 feet
  Newmont Yanacocha GOLD MILL
- 01 ACS1000 MV Drive 550 KA
  Newmont Yanacocha GOLD MILL
- 01 ACS1000 i
  EEPSA - Malacas
- 1 Drive LCI
- 03 GMD’s BM 14.4 Mw, 26 feet.
  (engineering)
  Newmont Yanacocha GOLD MILL
- 01 GMD SAG 32 Mw, 42 feet
  Newmont Conga
- 1 LV Drive 1800 Kw, 660 V
  Cemento Andino
- 1 LCI MV Drive
  Duke CT Aguaytia
- 01 LV Drive 200 Kw, 440V
  Cementos Yura
- 04 Gearless Mill Drives 12 Mw
  Freeport Cerro Verde
- 26 ACS1000 MV Drive
  110 Low Voltage Drives ACS800
  Freeport Cerro Verde

01 GMD SAG 16.5 Mw, 32 feet
Newmont Yanacocha GOLD MILL

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  550 KA
- 1 Drive LCI
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- 03 GMD’s BM 14.4 Mw, 26 feet.
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  Freeport Cerro Verde
- 26 ACS1000 MV Drive
  110 Low Voltage Drives ACS800
  Freeport Cerro Verde

01 GMD SAG 16.5 Mw, 32 feet
Newmont Yanacocha GOLD MILL

- 01 ACS1000 MV Drive 550 KA
- 1 Drive LCI
- EEPSA - Malacas
- 1 ACS1000 i
  GMP

09 LV Drives from 90 to 250 Kw, 440 V
Cementos Pacasmayo

10 LV Drives from 90 to 150 Kw, 440 V
Empresa Siderurgica del Peru

01 GMD SAG 27000 HP, 38 feet
03 GMD’s BM 15000 HP, 24 feet.
Cia. Minera Antamina

50 LV Drive ACS600 from 10 to 350 HP
17 LV Drives, ACS800 from 25 to 150 HP,  460-500 V
Cia. Minera Antamina

01 GMD SAG 28 Mw, 40 feet
02 GMD BM 22 Mw, 22 feet
Chinalco Peru (Toromocho)

15 LV Drives from 216 to 1985 Kw, 440 V
Cementos Lima

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Electrification and Drives Systems References

- 1 LCI MV Drive
  Endesa - Malacas

- 1 ACS100
  30KV - 4.16 KV Unigear GMP

- 1 Gearless Mill Drives
  1 ACS1000 MV Drive
  20 Unigear Arc Proof
  Newmont Yanacocha

- 3 ACS800
  12 Unigear Arc Proof
  Cementos Pacasmayo

- 4 Gearless Mill Drives
  1 ACS100 MV VFD
  Minera Antamina

- 2 ACS800
  7 Unigear Arc Proof
  Cementos Lima

- 4 Gearless Mill Drives
  24 ACS1000 MV Drive
  43 Unigear Arc Proof
  Cerro Verde

- Electrification Lote 1AB
  Minicentral Corrientes
  Pluspetrol Norte

- 1 LCI MV Drive
  Duke CT Aguaytia

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