

MONDAY, MARCH 28, 2022

ABB in Egypt

Complete portfolio and Capabilities

ABB in Egypt

Past and Present

Legal Identity: ABB for Electrical Industries (ABB Arab) S.A.E

Share Holders: 100% Asea Brown Boverie

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Share Holders: 100% Asea Brown Boverie

2021 Order received: 274 MUSD

2021 Revenues: 236.7 MUSD

Head Count 1200 employees

ABB in Egypt has been present since 1926, and started its investment in 1979, offering a wide range of products & services in Egypt, Central & North Africa with highly qualified expertise in power & automation engineering, providing solutions for secure, energy efficient generation, transmission and distribution. Efficiently increasing productivity of Industrial, commercial & utility operations.

Recent investments in Egypt include; New HQ in Cairo, the development of new production lines and expansion of existing ones, the first pilot solar plant is built on our new factory office building roof top and state of art showroom in the 10th of Ramadan City.



Training across the entire value chain

ABB University, Egypt -www.abb.com/abbUniversity-(<https://mylearning.abb.com/>)

Objectives



- Realize synergies across divisions
- Remain adaptive to local needs
- Optimize business processes and tools for products

Delivery Methods



- Classroom Training
- On-Site Training
- Virtual Classroom Training
- E-Learning Training

Portfolio



- ABB Products Training
- Process Industries and Application Training
- Training Contracts
- Assessments Programs

Audience Profile



- Managers
- First and Second Level Engineers
- Technicians
- Operators

Locations

- Egypt Map, Alex, suex, 10th of ramadan, obour, cairo



Electrification Business, Egypt

100,000 m2 of manufacturing facilities since 1979

About us

- **Workforce: 1200 employees**
- **15 assembly lines** in 10th of Ramadan City; **Primary Switchgear, secondary Switchgear, LV Switchgear, Compact Substation, Instrument transformer, Load Break Switch, Bus Bar line, 3 lines** for Distribution Enclosures , Ready made solutions, LV Breakers and LV Switches.
- Manufacturing unit at Nasr City -Free zone export in Nasr City , Cairo, Egypt.
- 8 Manufacturing workshops; Base frame workshop, 2 electrostatic Painting line , 2 Electroplating Line, Copper workshop, 4 +1 sheet metal workshops.
- 1 Feeding factory for Metals & Plastics Parts.
- Certificates; International quality certification ISO 9001: 2015,ISO 14001: 2015, ISO 50001: 2014 and OHS 18001: 2007, certified.
- Technology Center for Compact Substation and LV distribution enclosures, Leader factory for steel compact substations , leader factory for BS Enclosures.



State of Art Manufacturing Facilities

Assembly Lines

Primary Switchgear



- Applies the One Piece Flow Concept.
- Automatic handling/movement of the product.
- Using semi-automatic jigs in the assembly.
- Gated FAT area.

Secondary Switchgear



- One of the largest line products globally after Italy
- Applies the One Piece Flow Concept.
- Automatic handling/movement of the product.
- Using semi-automatic jigs in the assembly.

LV Switchgear



- The Sole Factory in Africa for MNS.
- Fully isolated Testing Area Zone.
- Copper & Skeleton Kanban Area
- Full Control Kanban Area

State of Art Manufacturing Facilities

Assembly Lines

Modular Systems



- The Global Lead Factory.
- Applies the One Piece Flow Concept.
- Innovative product's movement along the line.
- Using manipulators in handling heavy parts.



The Global Lead Factory.

- Responsible to develop existing products to match the special market requirements globally, and innovate new products line.
- Develop the manufacturing process globally

State of Art Manufacturing Facilities

Assembly Lines

Instrument Transformers



- Applies the One Piece Flow Concept.
- Latest technology of Epoxy Mixing and casting .
- Using post curing tunnel ovens.

Retrofit



- Replace phased out devices by current production breaker mechanically and electrically adapted for the existing engineering
- More than 200 solutions/designs studied for ABB and competitor's devices
- Upgrade installation need by new operational demands

Load Break Switches



- 2nd ABB largest assembly line globally.
- Applies the One Piece Flow Concept.
- Using semi-automatic jigs in the assembly.

State of Art Manufacturing Facilities

Assembly Lines

Bus Bar



- Applies the One Piece Flow Concept.
- Using jigs in the assembly.

Distribution Enclosure



- 3 Assembly lines “H1, H2 & Unikit/Mirage”
- Using customized design lines to fit the One Piece flow per each Product Family.

Ready Made Solution



- Fully isolated Testing Area Zone.

State of Art Manufacturing Facilities

Mechanical Workshops

Metal & Plastic Feeder Factory



Wide range of manufacturing capabilities:

- Automatic Plastic casting
- CNC machining.
- Metal and copper presses

Sheet Metal Workshop



Extraordinary machinery with great capacities and capabilities including:

- 7 CNC Punching machines.
- 1 CNC Press Machine.
- 11 CNC Bending Machines.
- 1 Automatic Bending Line with the latest technology of One Piece flow through its bending and stud welding stations.

Copper Workshop



- CNC Punching Machine, with latest technology available in this filed.
- CNC Bending machine, with latest technology available in this filed plus conventional Bending Machine.

State of Art Manufacturing Facilities

Mechanical Workshops

Electrostatic Painting



Strengthens:

- 2 Electrostatic Painting Lines
- Applies the One Piece Flow Concept.
- The line has two painting chambers, one for ABB's standard color, and the other for any customized or requested colors.

Electroplating Lines



Strengthens:

- Capable of plating zinc, tin and silver.
- Automatic handling of the material racks.

Welding and Base Frame Workshop



Strengthens:

- Latest technology of the CO2 and spot welding
- 1 CNC Stud welding Machine
- Using the latest technology in ventilation
- Using the highest and the most advanced welding tables with its fixtures.

State of Art Manufacturing Facilities

Mechanical Workshops

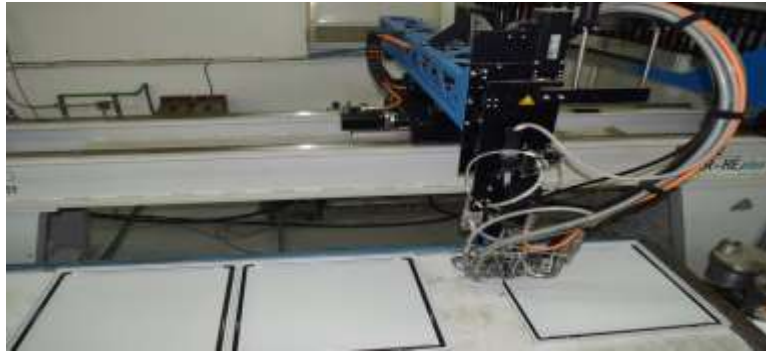
Cutting Machines



Strengthens:

- 1 Shear Cutting Machine

Gasket Machine



Strengthens:

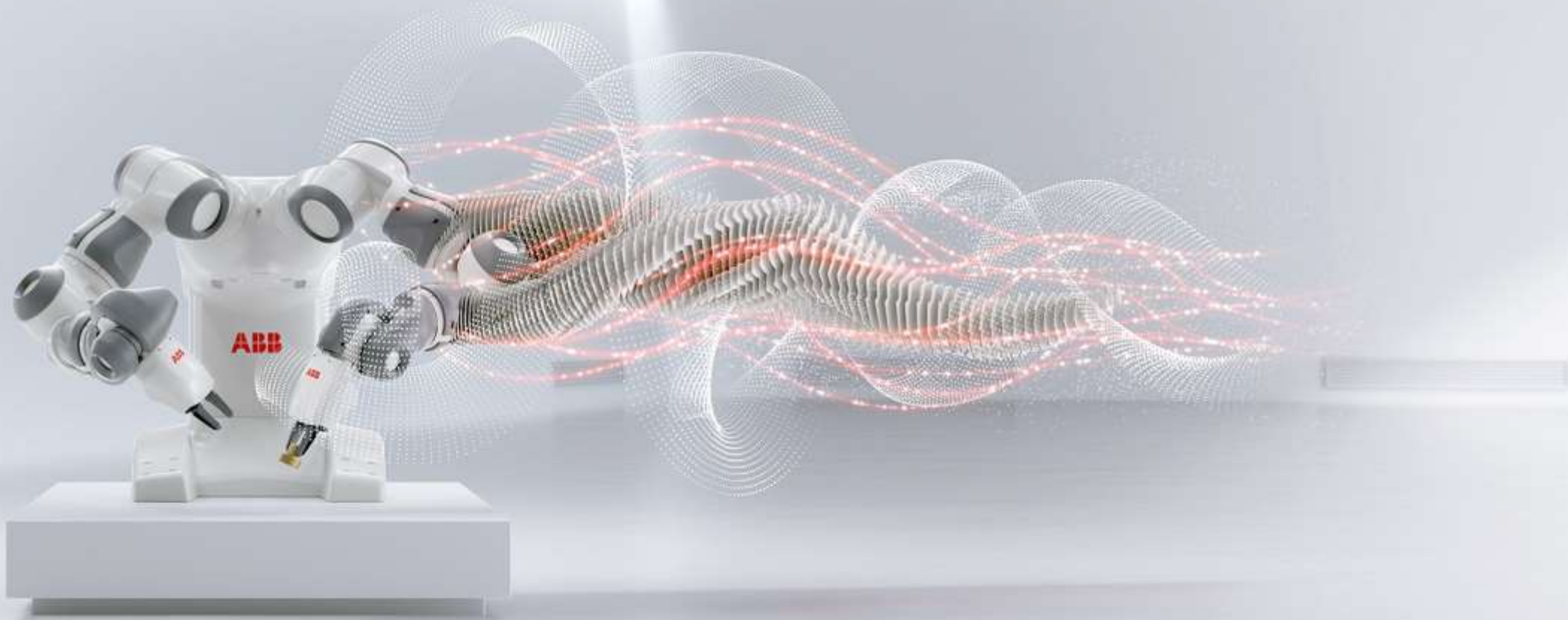
- Latest Technology of sealing foams
- Applies mass foam equally in all dimensions to form the gasket according to the required Panel's IP.

Packaging Machines



Strengthens:

- 1 Turntable stretch wrapper
- 1 Shrinking Machine



Two ABB Innovative Solutions

ABB Glass-Fiber Reinforced Polyester (GRP) CSS and UniGear Digital

Saher Behairy - Technical and Design Promotion Specialist





UniPack-G

Glass reinforced polyester (GRP) Compact secondary substation (CSS)

Introduction

What is ABB's Compact Secondary Substation (CSS)?

- CSS is a type-tested substation containing:
 - Medium voltage (MV) switchgear
 - Distribution transformers
 - Low voltage (LV) switchboard
 - Connections and auxiliary equipment to supply low voltage energy from medium voltage systems
- CSS is for energy transformation in secondary distribution network from MV to LV or LV to MV
- CSS is typically installed in locations accessible to the public and should ensure protection for all people according to specified service conditions
- All CSS components shall be type- and routine-tested per their relevant product standards





Customer benefits

Customer benefits



1. High safety

- Internal arc fault tested
- Fire retardant enclosure



2. Reliability

- Corrosion resistant enclosure material using UniPack-G
- Mechanically robust



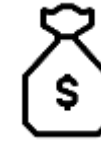
3. Long lifetime of internal components with minimal maintenance

- Thermal characteristics of enclosure



4. Easy and fast installation, commissioning and relocation

- Lightweight product allows for faster installation



5. Low cost of ownership

- Low maintenance cycle costs



6. Eco-friendly

- Low environmental impact

1. High safety

Features and benefits

Internal arc tested per IEC62271-202

- Highest safety in the CSS industry, both for general public and operator
- Arc-tested and low flammability in one material
- Internal arc safety is verified by the type tests per IEC62271-202 with RMU integrated inside CSS



Reliable and proven compartmented design

- CSS is divided in compartments based on the equipment and layout
- Walk-in CSS may have one common MV and LV compartment
- Compartments secure safe access to equipment during operation



Non-flammable

- Self-extinguishing
- Non-flammable (V0 according to UL94)
- Fire resistant for more than 60 mins, according to ISO834
- Protects equipment and investment over product life cycle



Non-toxic housing material

- Enclosure material does not generate harmful gases



Internal Arc Classification (IAC)

Safety



Internal Arc Classified per IEC 62271-202 Ed. 2.0

- Operator - A
- Public – B
- UniPack is rated IAC AB, 20 kA for 1 sec *

* Valid for Non walk in layouts. Please contact ABB for walk in layouts IAC rating

Arc-proof CSS



Non-arc-proof CSS



MV switchgear is tested when installed inside UniPack-G CSS

No test extrapolation from IEC62271-200

Test is valid only with the same brand and type of MV switchgear

Internal Arc Classification (IAC)

IAC Failed Test



IAC Passed Test



Non-flammable

Non-flammable

All UniPack-G housing panels have the following characteristics:

- Self-extinguishing
- Non-flammable
Classification V-0: UL94/GB8924-88
- Fire resistant
Tested under ISO 834 achieving a fire behaviour for more than 60min Integrity (furnace temperature at this time was 950 degrees C)
- Option to 120 minutes available upon request
- Non-toxic according to EN45545-2

Improved fire resistance from internal and external fire compared to steel and concrete CSS



UniPack-G fire resistance tested

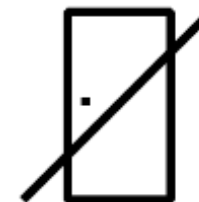


Non-fire resistant CSS

Mechanically robust

Protection against external elements

- ABB's GRP patented design: robust enclosure does not bend or deform
- Enclosure withstands a minimum wind load of 34m/s
- Heavy duty design: up to 2500N/m2 roof load
- ABB patented GRP design increases resistance to vandalism
 - Robust GRP doors of ABB's patented design provide necessary intruder security
 - All fastening is located inside the housing
 - Strong and reliable multi point door locking system
 - Anti-graffiti coating as an option
 - Padlock is protected by additional cover
- Robust GRP transformer cooling grilles
- Any damage on one enclosure module will not be carried over to the next
 - Best external object impact protection
 - Even if external layer is damaged, the internal surface's will keep its characteristics



Self supporting structure

Corrosion of steel and concrete CSS

- Even concrete CSS has steel parts that can be prone to corrosion
- Any scratch can initiate corrosion, including common transportation damage
- Environmental conditions may require special painting, not always sufficient in extreme conditions
- Doors and ventilation grilles are made of alternative materials, ie aluminum and stainless steel, have high cost
 - including the threat of robbery

Maintenance cycle and costs

- Constant painting required to maintain rust protection
- Painting on site more risky than controlled factory painting



ABB's patented GRP for full enclosure

Corrosion resistant GRP material

- ABB's patented GRP material provides the durability of concrete, with better corrosion resistant properties
- UniPack-G performs equal to C5M as for structured steel according to ISO 12944-6
- All external metal parts are stainless steel or hot dip galvanized
- All fastening is located inside
- Internal parts can be made of stainless steel as an option

GRP CSS can be installed in:

- Harbors and close to sea line
- Aggressive environments like chemical plants

Maintenance cycle and costs:

- Repainting not normally required
- Any dirt can simply be washed or wiped off



Superior thermal insulation from the sun's radiation

Thermal properties

- ABB's patented GRP provides superior thermal insulation from the sun's radiation
- UniPack-G maintains a lower temperature in the inner side of the substation wall, whereas steel CSS has no insulation effect
- UniPack-G extends the lifetime of the internal components

Hot climate

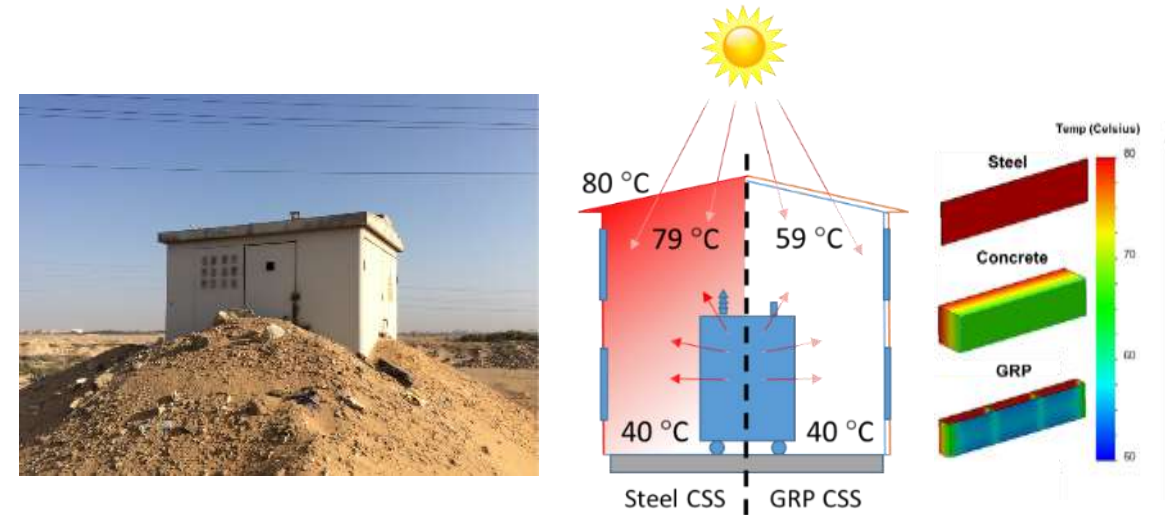


Figure describes simplified temperature gradient visualization based on computer simulations

Superior thermal insulation from cold environments

Thermal properties

- ABB's patented GRP provides thermal insulation for sensitive equipment from the cold climate
- As seen in the figure, UniPack-G maintains a higher temperature in the cold climate, whereas steel CSS has no insulation effect
- UniPack-G extends the lifetime of the internal components

Cold climate

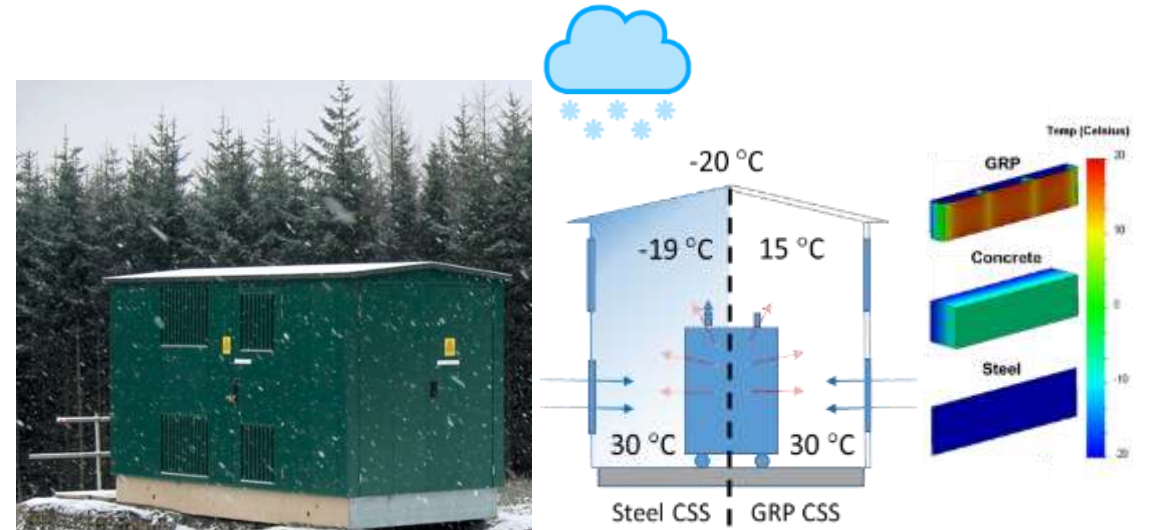


Figure describes simplified temperature gradient visualization based on computer simulations



UniGear Degital

UniGear Digital

Is an innovative solution in MV switchgear based on the UniGear family



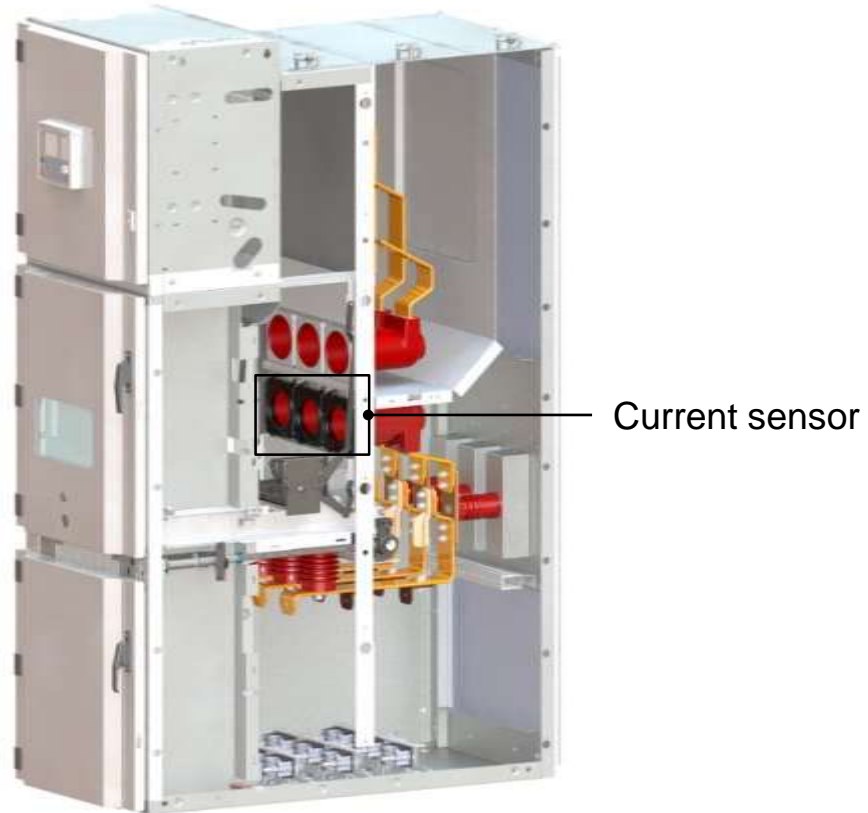
UniGear Digital

Has three key components



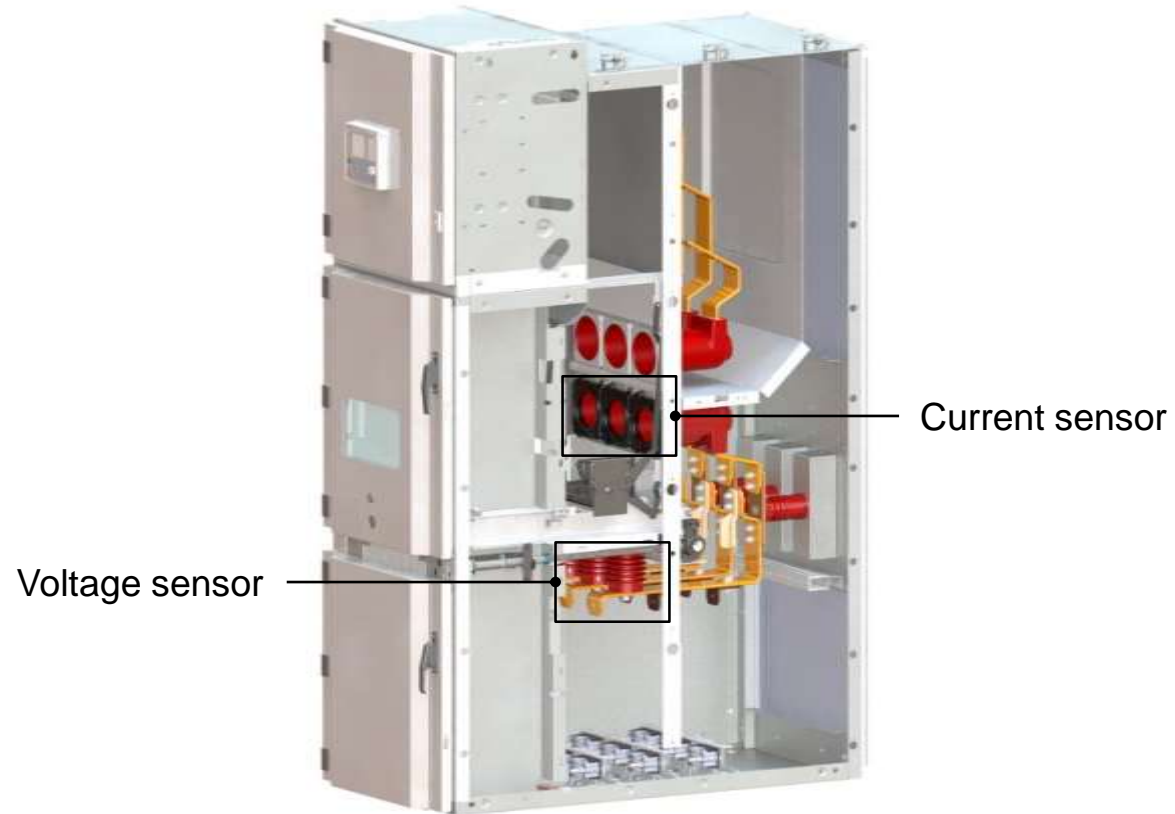
UniGear Digital

Has three key components



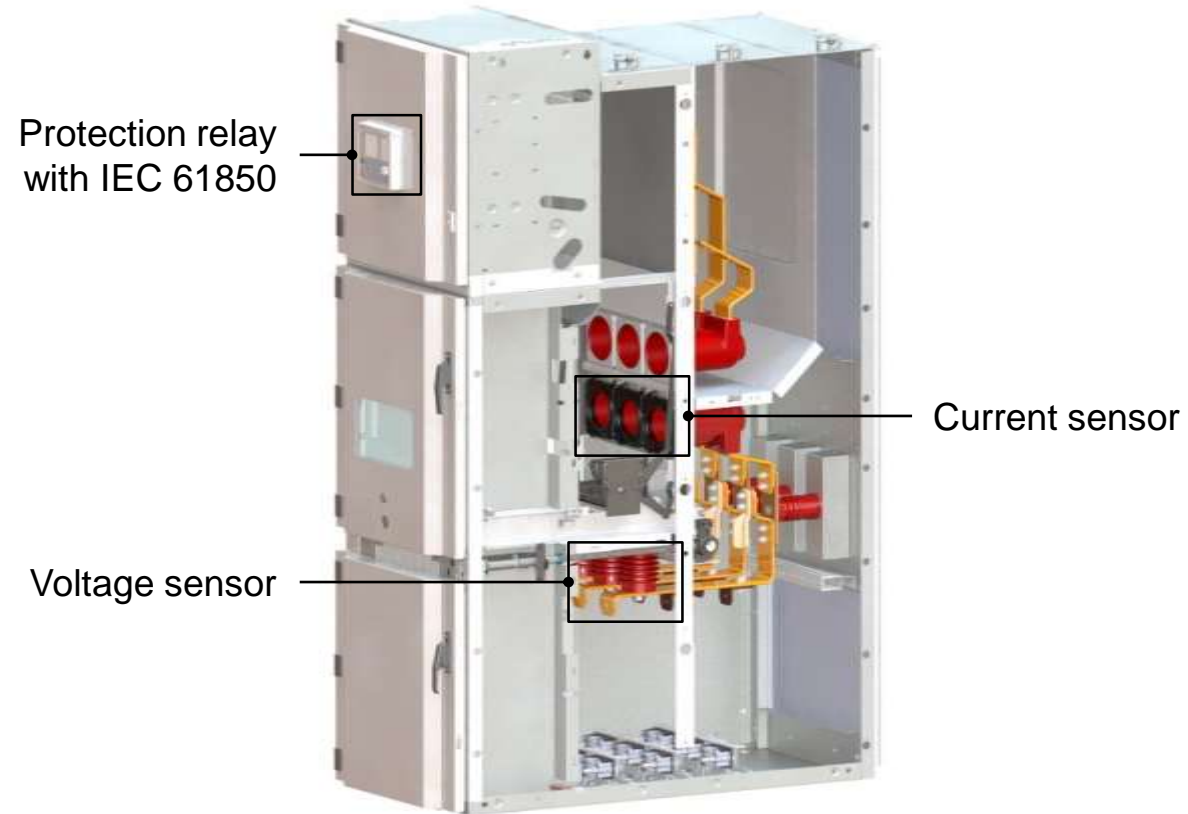
UniGear Digital

Has three key components



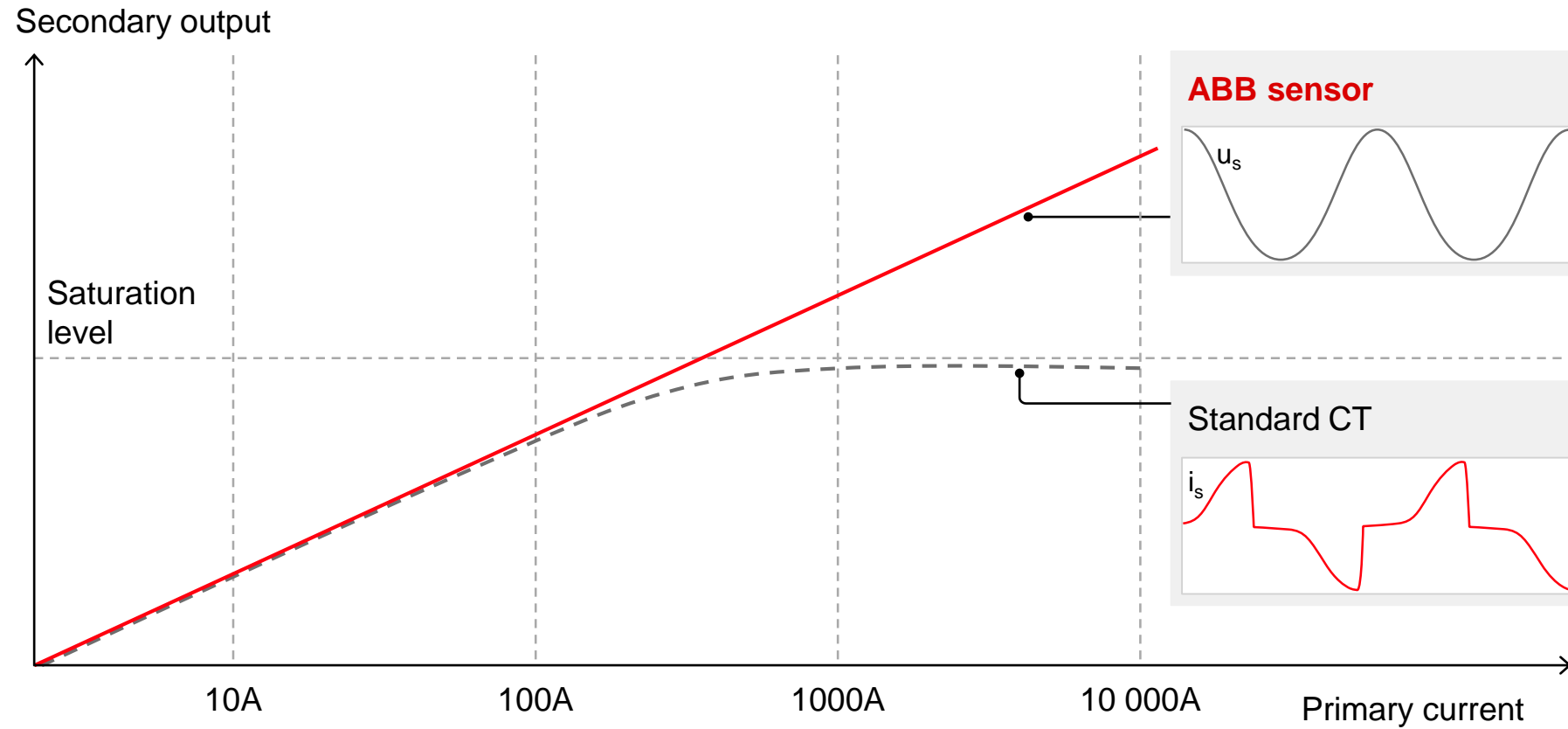
UniGear Digital

Has three key components



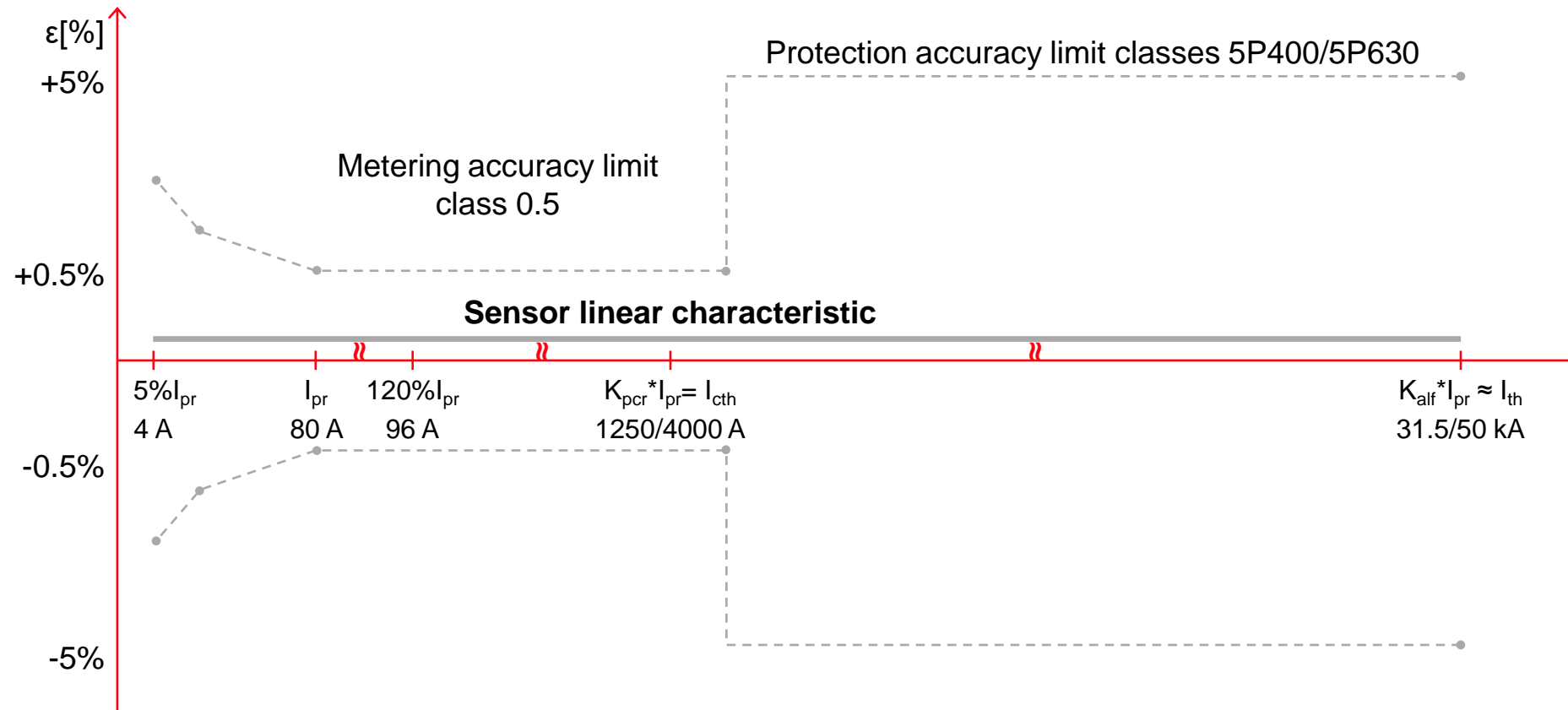
Sensors have linear characteristic

Current sensors = No saturation



MV Sensors are accurate in the whole operating range

Combined current accuracy class 0.5/5P



Sensors

Have smaller dimensions and are easy to handle

Instrument Transformers

Current transformer



1 piece = 18kg

Voltage transformer



1 piece = 27kg

$3 \times 18 + 3 \times 27 = 135\text{kg}$

Sensors

Current sensor



1 piece = 0.5kg

Voltage sensor



1 piece = 2kg

$3 \times 0.5 + 3 \times 2 = 7.5\text{kg}$

Sensors

Have negligible energy consumption, less energy is needed for switchgear operation

250 MWh¹ ≈ 13 000 EUR

1. Typical substation with 14 panel switchgear saves up to 250 MWh over 30 years of operation with UniGear Digital compared to traditional switchgear

UniGear Digital

Saves energy, thus it saves also CO₂ emissions

250 MWh \approx 150 tons of CO₂*

A typical substation with 14 panel switchgear saves up to 250 MWh over 30 years of operation with UniGear Digital compared to conventional switchgear

*) Emissions produced by mid-size European car driven for 1.25 million km



Sensors

Provide an error-free connection and have safe secondary signal

Current sensor



150mV at 50Hz
180mV at 60Hz

OR

Voltage sensor



Ratio 1:10000
e.g. 2V at 20kV

Shielded cable with RJ45



Protection relay





Marine & Ports – Onshore to ship supply

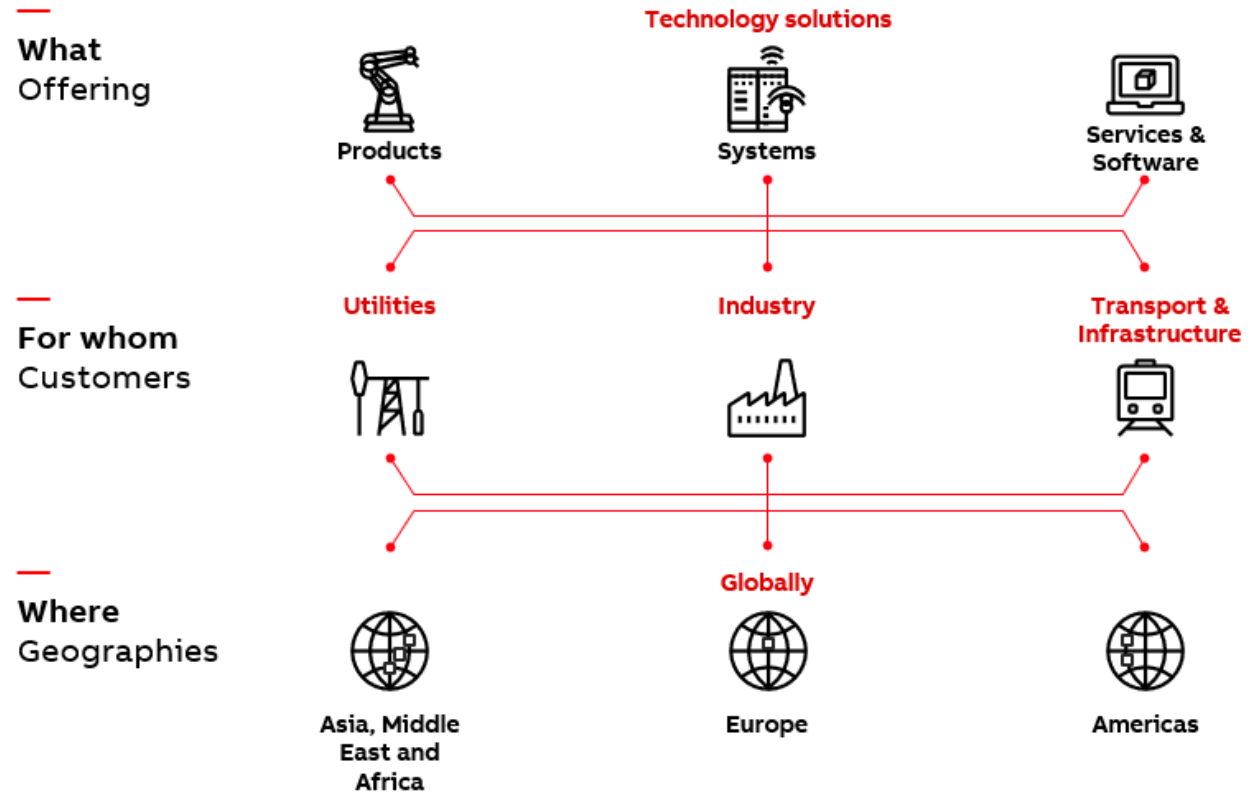
Electrical , Digital , Connected

Karim Zaghloul, Program Manger



This is what we do

ABB is a leading global technology company that energizes the transformation of society and industry to achieve a more productive, sustainable future. By connecting software to its electrification, robotics, automation and motion portfolio, ABB pushes the boundaries of technology to drive performance to new levels. With a history of excellence stretching back more than 130 years, ABB's success is driven by about 110,000* talented employees in over 100 countries.



Our purpose



We succeed by creating superior value.



We push the boundaries of technology to drive performance to new levels.



We energize the transformation of society and industry to achieve a more productive, sustainable future.

Marine & Ports at a glance

1800
professionals

International footprint:
26 countries



Five business lines:
Marine Systems
Marine Propulsion
Coastguard and Navy
Ports
Service

Our current focus markets

Our customers benefit from more than 100 years of experience in the industry

Ports



- » Helping container and bulk cargo terminal operators meet the challenge of larger ships, taller cranes and bigger volumes

Ice-going vessels



- » Independent and economically efficient operation in harsh ice environment
- » Safe operations for both people onboard and the sensitive arctic environment

Passenger vessels



- » Outstanding maneuverability and vessel control for increased passenger safety and comfort
- » Proven operational efficiency gains

Oil & gas vessels



- » Maximized asset availability with reliable operating systems
- » Immediate response time when required
- » Optimal operational performance under all operating conditions

Cargo vessels



- » Improved operational efficiency and reduced fuel consumption
- » Compliance with future regulations
- » Quality solutions at competitive prices for improved capex

Sustainable thinking redefines shipping

- The transition to a sustainable economy is one of the major undertakings in human history.
- Meeting the International Maritime Organization's goal of halving greenhouse gas emissions from ships by 2050 is a critical step toward sustainability. It will require a comprehensive and proactive response from the maritime community. Shipping is well positioned to take concrete action by choosing to implement technologies that provide reduced fuel consumption and lower emissions.
- The role of ABB Marine & Ports in ensuring vessel sustainability extends from bridge to propeller to include the power, propulsion, automation and control technologies underpinning greater ship efficiency, enhanced safety and environmental performance.
- ABB Marine & Ports is committed to pave the way to a zero-emission marine industry, providing greater efficiency and reliability to shipowners, and helping vessels meet the demands of today and tomorrow.





Future vessels are - Electric. Digital. Connected.

SAFE



Proven power and propulsion solutions combined with the latest digital technology enable safer vessel operations, protecting people and assets.

EFFICIENT



Pioneering solutions that optimize operational efficiency by enhancing productivity and reducing cost throughout the lifetime of the vessel.

SUSTAINABLE

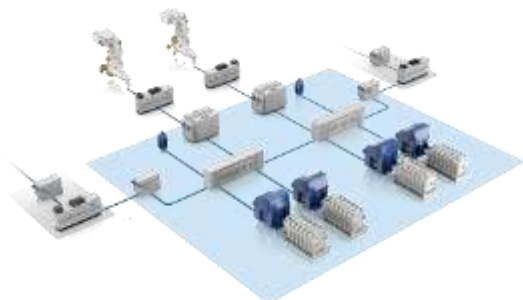


We are committed to supporting the shipping industry's low carbon future through technologies that power the world without consuming the earth.

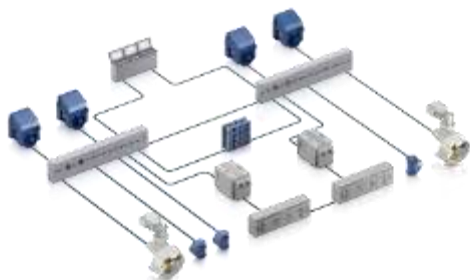
Electric propulsion is a future-proof concept

Path to improve energy efficiency and to decarbonize shipping

Electric power and propulsion systems as a backbone of electric and hybrid vessels



Up to 10% reduced fuel consumption with AC solutions



Up to 27% reduced fuel consumption with DC solutions

Azipod® electric propulsion



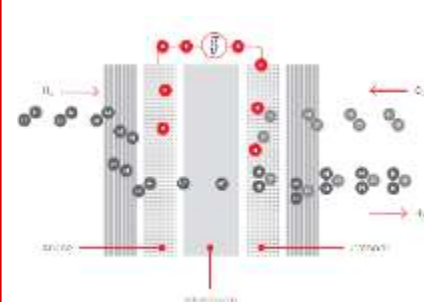
Additional 10% increased energy efficiency with Azipod® electric propulsion

Energy storage



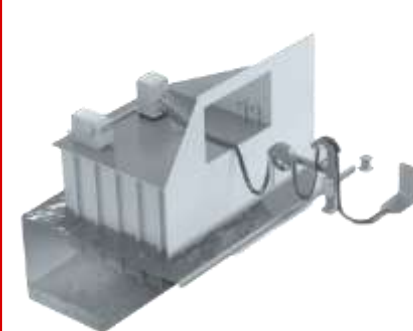
Hybrid or fully electric operation with stored energy and charging solutions

Fuel cells



Zero-emission operation with hydrogen fuel cell power system

Shore connection



98% greenhouse gas emissions eliminated in port call

Static Frequency Converter for Shore-to-Ship Power

A complete portfolio



Success Story



ABB in Egypt delivers its first customized shore to ship application to the Suez Canal Authority

ABB