



## Shore-to-ship power

# The ABB way to green cruise terminals

**Roberto Bernacchi**, Shore-to-ship power & Smart Ports Global Product Manager, ABB

Workshop “Sustainable Energy Supply & Innovative Solutions for Emission Reduction Improved Ports – Cruise Line Collaboration”, Bergen/Norway

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# Agenda

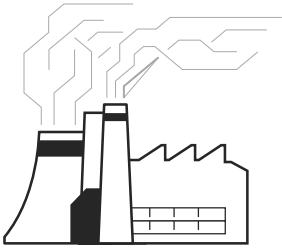
Smart Ports towards decarbonisation: balancing demand and supply

Shore-to-ship power solutions for cruise terminals

Conclusions

# Smart Ports towards decarbonisation

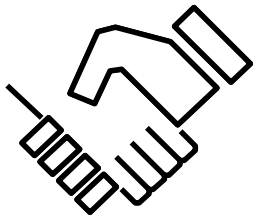
## Ports decarbonisation and green vision



Port infrastructure is a small contributor to GHG versus the whole maritime industry

- BUT...

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Ports do not exist in isolation:

- Coordination amongst all stakeholders to enable port sustainability
  - Need of optimal combination of incentives, regulation and tools for maritime sector
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Ports are the entry point for goods and people into a nation/region

- Ensure positive impact/green image
- Minimizing impact on city air quality

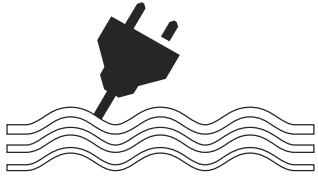
# Smart Ports towards decarbonisation

## Ports decarbonisation and green vision



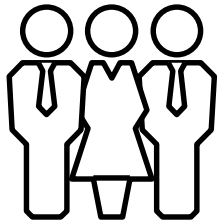
Climate change is (unfortunately) not for free

- Look for measures that minimize costs and maximize benefits is key
  - New business models: «thinking out of the box»
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The technical way

- Enhance Renewable penetration in ports
  - Promote shore-to-ship power solutions
  - Electrify handling equipment and vehicles
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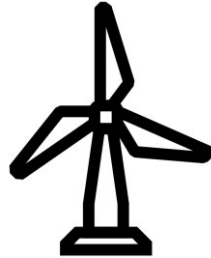
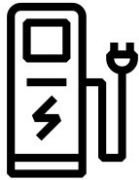
The strategical way

- Partnerships: collaboration to share best practices, costs and benefits
- Incentives plans: reducing carbon demand/intensity

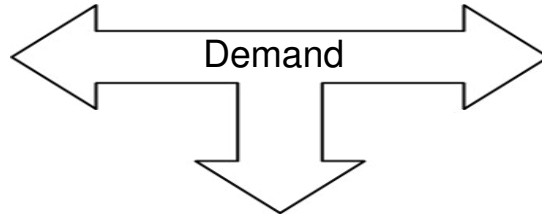
# Smart Ports towards decarbonisation

## Balancing Demand and Supply

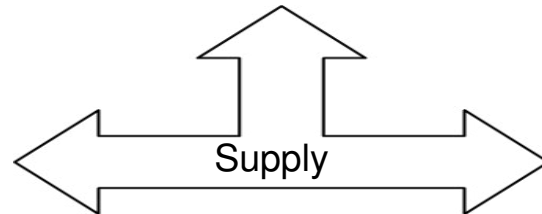
E-mobility market (E-vehicles and E-buses) is growing extremely fast



Renewables integration launch ports toward a green era



A state-of-the-art Port Electrification infrastructure can simultaneously supply shore power to vessels and to e-mobility recharging solution



Shore-to-ship power, hybrid and full electrical ferries are now reality



Producing electricity on-shore is more efficient than on-board generation

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# Agenda

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# Why ABB?



## 60 years+

Electrification experience



## Sustainability

Comprehensive portfolio for green ports



## Safety

Design to the highest HSE standard



## Global Footprint

Ensuring worldwide coverage



## 360° approach

From preliminary design to service



## Technology

State-of-the art shore-to-ship power solutions



# Optimizing Capital Expenditures in Shore-to-ship power systems

Customization is key for CAPEX – OPEX optimization

## Needs assessment

Clarify your needs together with ABB experts:

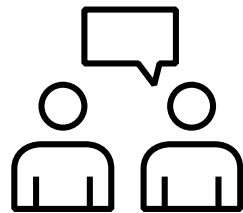
- Power @ HV S/S
- Average power per vessel (utilization)
- No. of vessels (contemporaneity)



## Project inception phase

ABB supports customers in:

- Consulting for OPEX-CAPEX optimization
- Developing a tailored engineering solution



## Project execution

ABB performs:

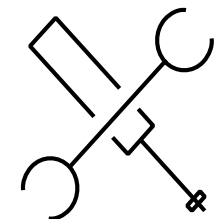
- Turnkey implementation
  - Engineered package supply
- According to customer requirements



## Service

ABB grants:

- Reliable system operation
- Structured maintenance planning
- System lifecycle extension



Defining a custom solution according to any port needs !




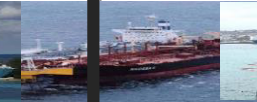

# Shore-to-ship power: a step forward for a greener port

Specific requirement for each vessel segment

HV or LVSC – Low Power

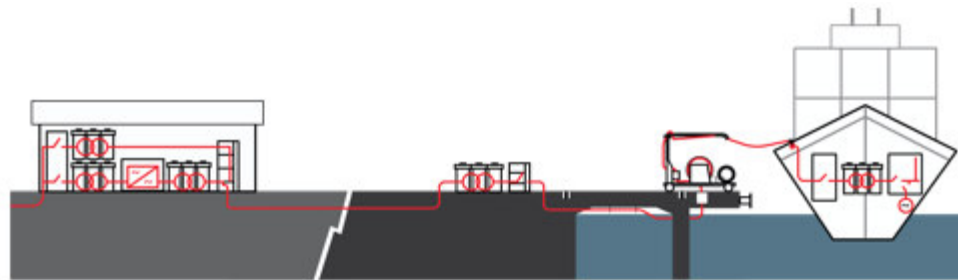
HVSC – High Power

Special Application

Characteristics	Vessel Type				
	RORO/Ferry	Container	Cruise	LNG / Tanker FSU / FPSO	Shipyards / Navy
					
Voltage	11 kV or low voltage	6,6 kV	6,6 & 11 kV	6,6 kV	6,6 kV, 11 kV or low voltage
Max Power consumption	6,5 MVA	7,5 MVA	16/20 MVA	Approx. 10 MVA	Case by Case
Frequency	60 & 50 Hz	60 mainly	60 mainly	60 Hz	50 & 60 Hz
Plugs/cables (per connection)	1	2	4+1	2/3	Case by case
Transformer	onboard	onshore	onshore	onshore	Case by case
Layout	Not critical	critical	critical	critical	Not critical
Load profile	Partially controlled	Partially controlled	Flat profile	Not controlled	Case by case
Protect selectivity	critical	Not critical (If P=7,5 MVA)	critical	Case by case	Case by case
Cable management system	mid cost	low cost	high cost	Mid cost	Case by case

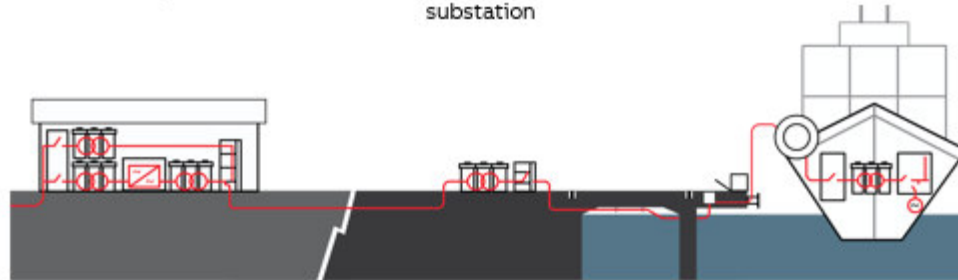
# Shore-to-ship power: a step forward for a greener port

Custom solutions for each vessel segment



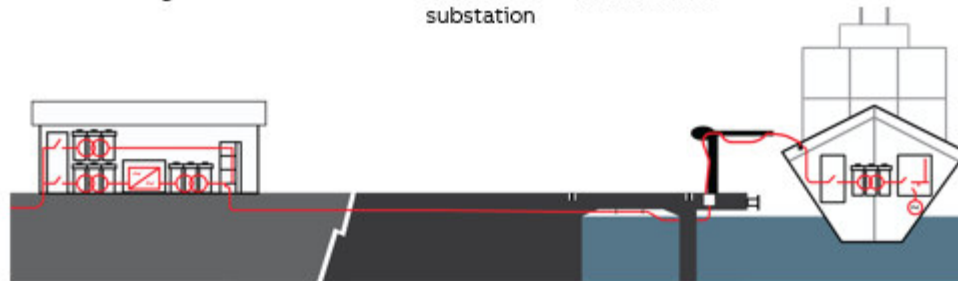
Main incoming station Power cables Shore-side substation Berth terminal On-board installation

Cruise vessels



Main incoming station Power cables Shore-side substation Berth terminal On-board installation

Container vessels

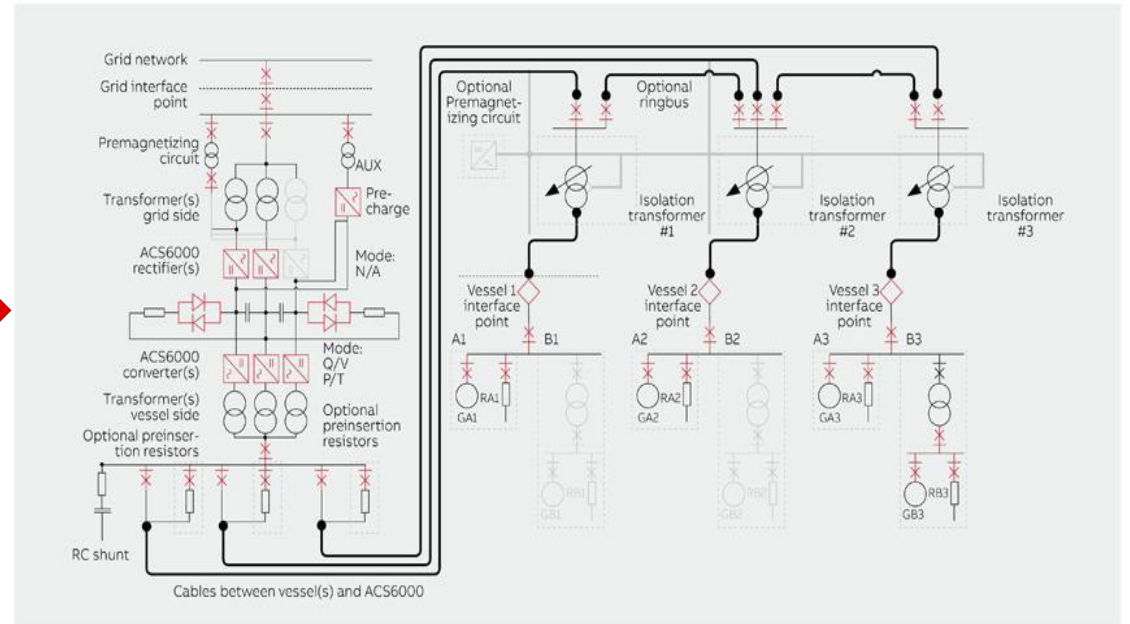


Main incoming station Power cables Berth terminal On-board installation

Ro/ro – Ferry Navy

# Optimizing Capital Expenditures in Shore-to-ship power systems

Developing specific solutions for Shore-to-ship power



High power conversion platforms enters into the S2SP market: delivering power up to 24 MVA !

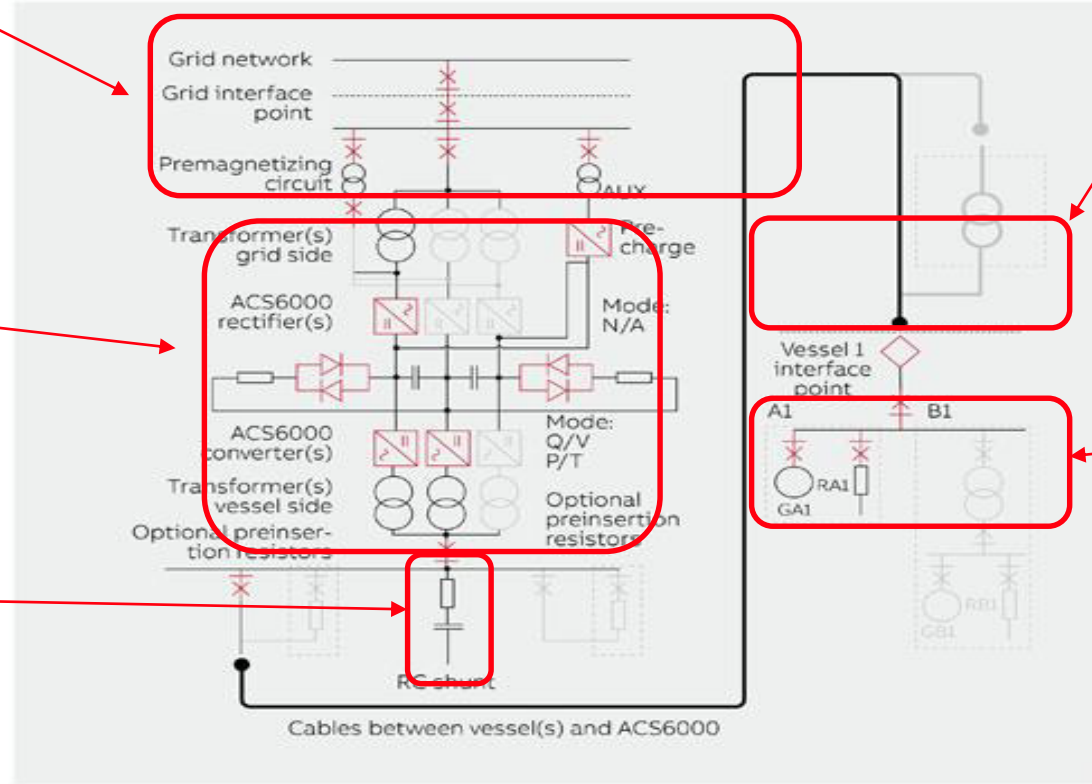
# Innovative solutions for Shore-to-ship power

One-to-one converter for cruise terminals

Incoming MV supply

20MVA Static Frequency Conversion System (ACS6000 SFC) to supply No.1 cruise vessel

Harmonic filters



Cable Management System

On-board vessel retrofit: S2SP switchgear and PMS upgrade

One single converter can supply a cruise vessel ensuring full compliance with IEC/ISO/IEE 80005-1

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# From shore-to-ship power to smart ports

## Conclusion



Optimized cost/benefit ratio is key for sustainable development in ports

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Specific assessment needs ensures CAPEX / OPEX optimization through customized solution design (one size does not fit all)

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Technology providers play a key role in removing barriers towards the large-scale implementation of shore-to-ship power

**ABB**