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Providing ports worldwide with sustainable and efficient solutions From Shore-to-ship power to Smart Ports

Shore-to-ship power and Smart port solutions

Overview

1. A Smart Port requires a Smart Grid
2. Smart Ports Solutions
3. Shore-to-ship power: a key element into a smart port
4. Conclusions

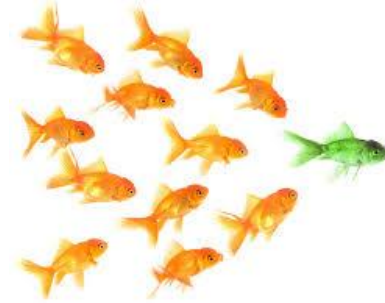
A Smart Port requires a Smart Grid

A Smart Port requires a Smart Grid

Ports must be ...

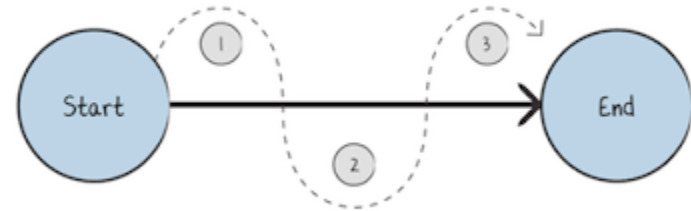
...Competitive

- Become market leaders
- Maximize return on investments



...Efficient

- Add additional capacity
- Ensure smooth operations



... Green

- Minimize energy consumption
- Achieve highest level of pollution reduction



A Smart Port requires a Smart Grid

From traditional to smart grid

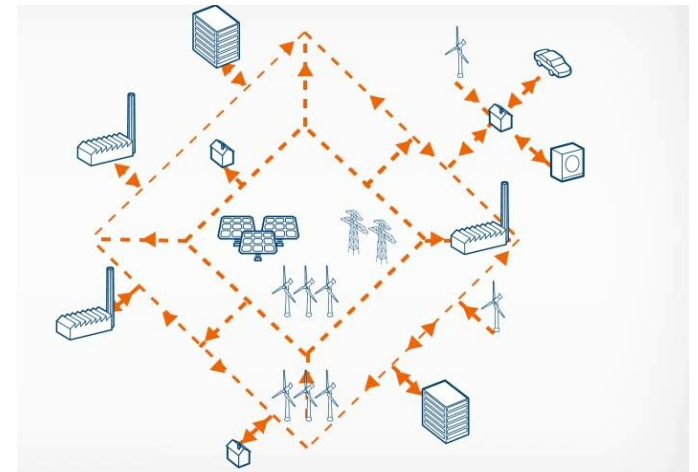
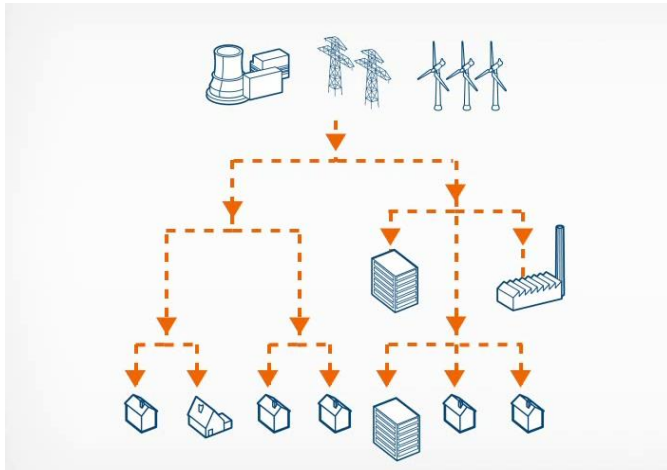
Traditional grid

- Centralized power generation
- One-directional power flow
- Generation follows load
- Top-down operations planning
- Operation based on historical experience



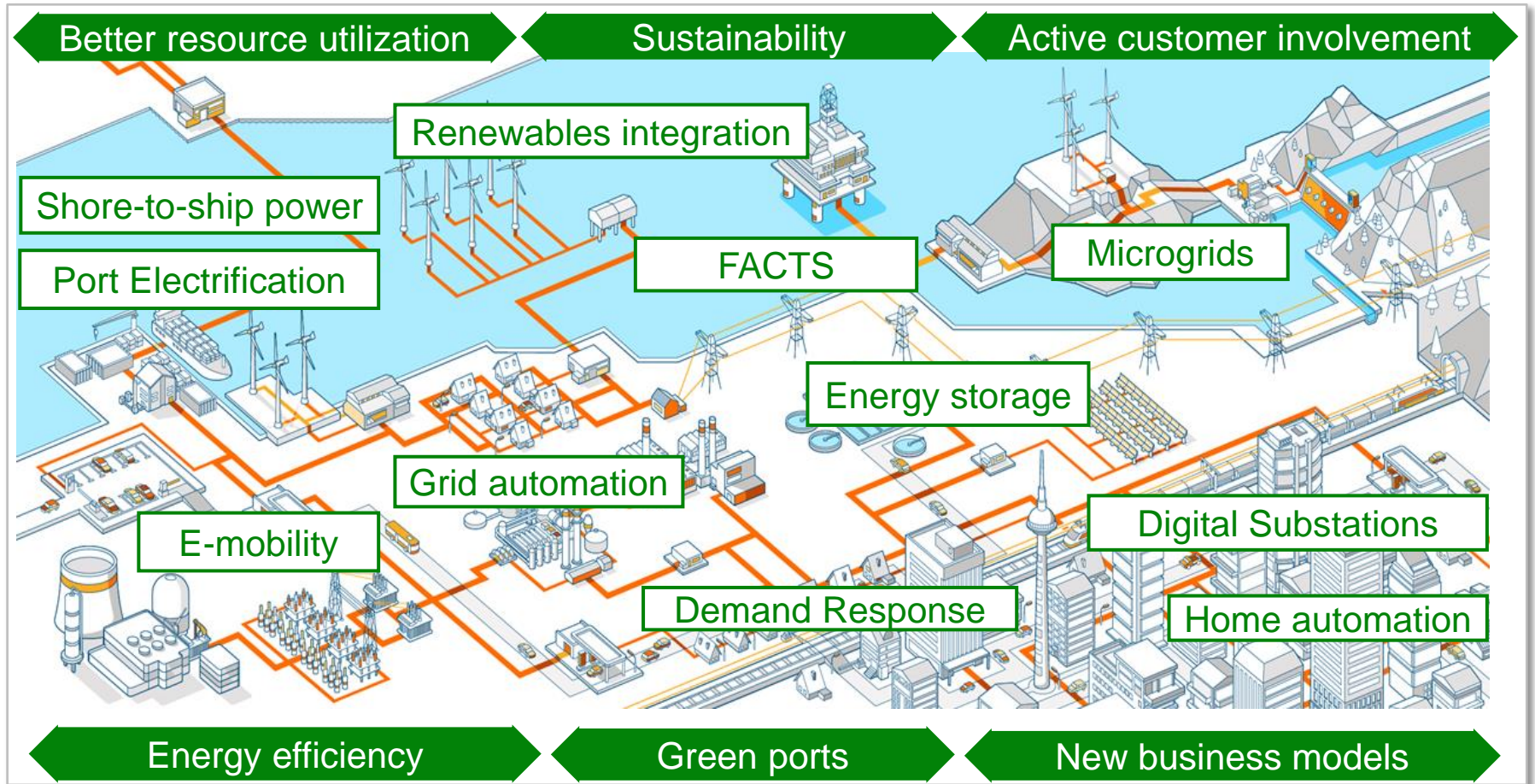
Smart grid

- Centralized and distributed generation
- Multi-directional power flow
- Intermittent renewable generation
- Consumption integrated in system operation
- Operation based on real-time data



A Smart Port requires a Smart Grid

Key technologies driving towards Smart Grids



A Smart Port requires a Smart Grid

European ports' environmental priorities

ESPO environmental review ranking

1. Air quality
2. Energy Consumption
3. Noise



IMO MEPC 70

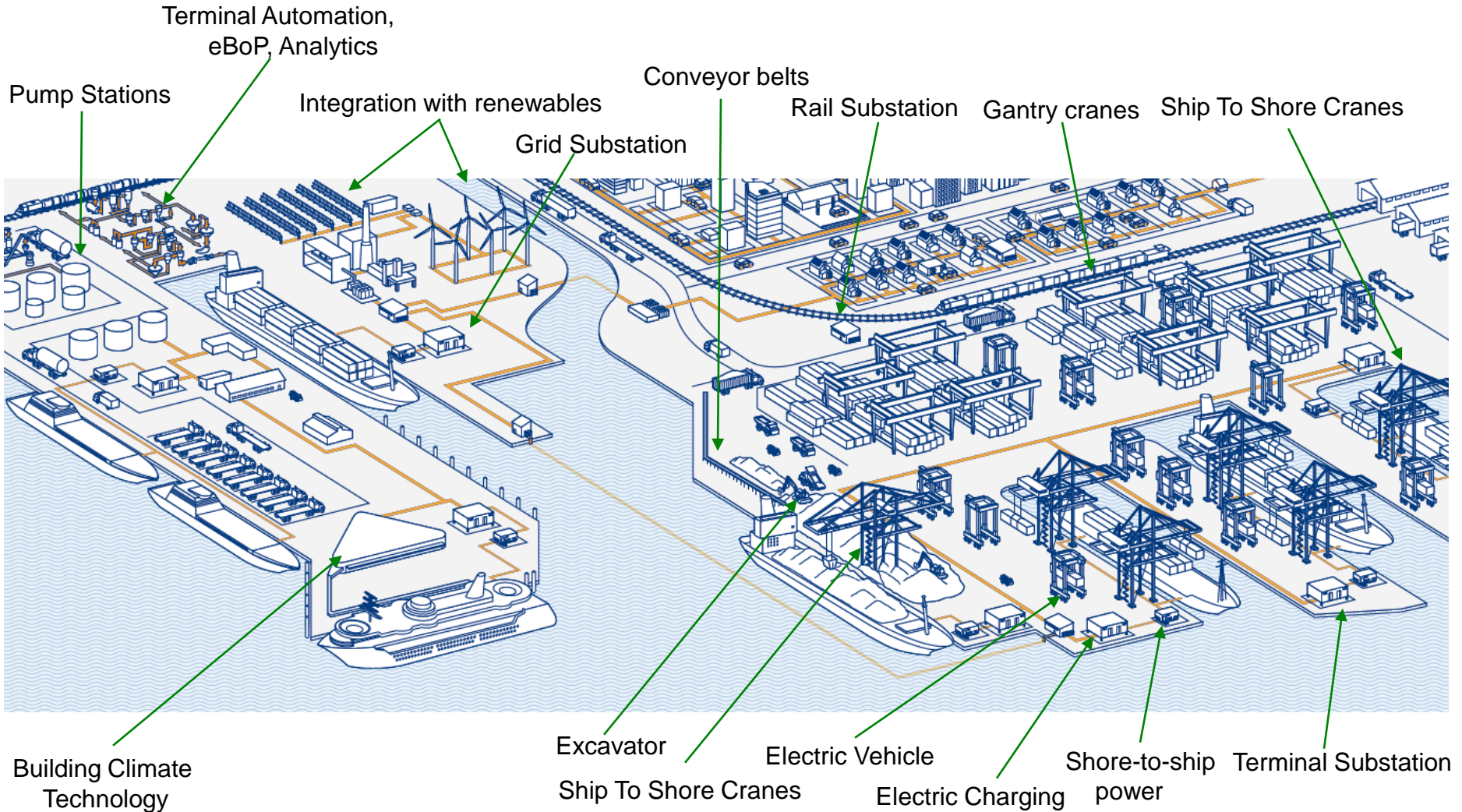
1. Global data collection system
2. Shipping sector's strategy on reduction of GHG emissions from ships.
3. January 2020: entry-into-force of the 0,5% global sulphur cap



Smart ports solution

Smart Ports Solutions

Ports complexity drives efficiency and sustainability



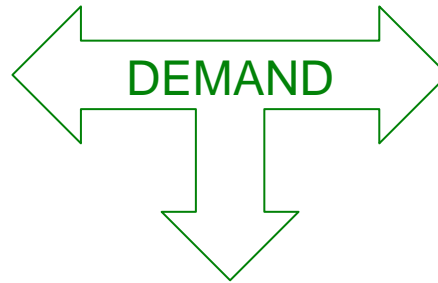
Smart Ports Solutions

New consumers are entering ports

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



Renewables integration launch ports toward a green here



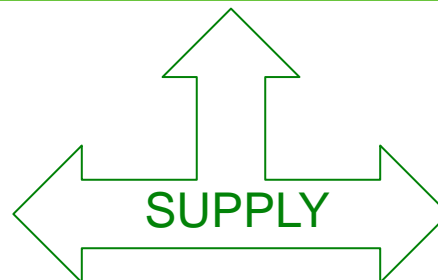
Hybrid and full electrical ferries are now reality



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



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



Smart Ports Solutions

Smart Ports need lean Grid Integration

Power & Automation for ...

Shore-to-Ship
Power



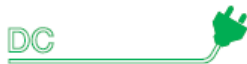
Port
Electrification



Port
Grid Integration



E-Mobility
solutions



Service/retrofit



Overview

- Infrastructure to power ships with electricity from the shore when staying at berth

- HV Substation
- MV/LV Electrification
- Power Transformers

- Port distribution grid automation
- Renewables integration
- Communication Networks

- Battery-hybrid ferries charging infrastructure
- EV-chargers

- Consulting for optimal solution
- Retrofit of existing installation
- Maintenance contracts / spares

Benefits

- Eliminate 98% of emissions and all noise and vibration
- Improve quality of life near port

- ABB as a single interface for whole port electrification
- High reliability HV products

- Improved reliability of supply
- Self-sufficient port Microgrid
- Secure/powerful communication

- Zero emission port calls
- Integrated transportation (from railway to e-vehicles)

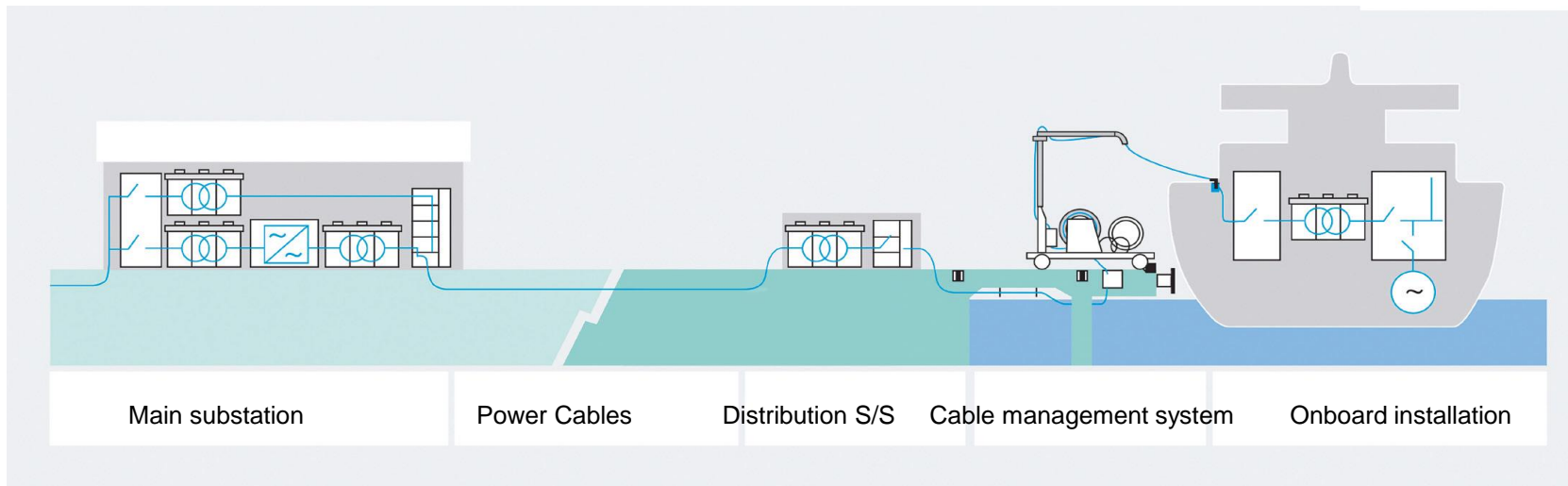
- Major improvement in reliability, safety and performance
- Extended system lifecycle

Shore-to-ship power landscapes and uses

Shore-to-ship power

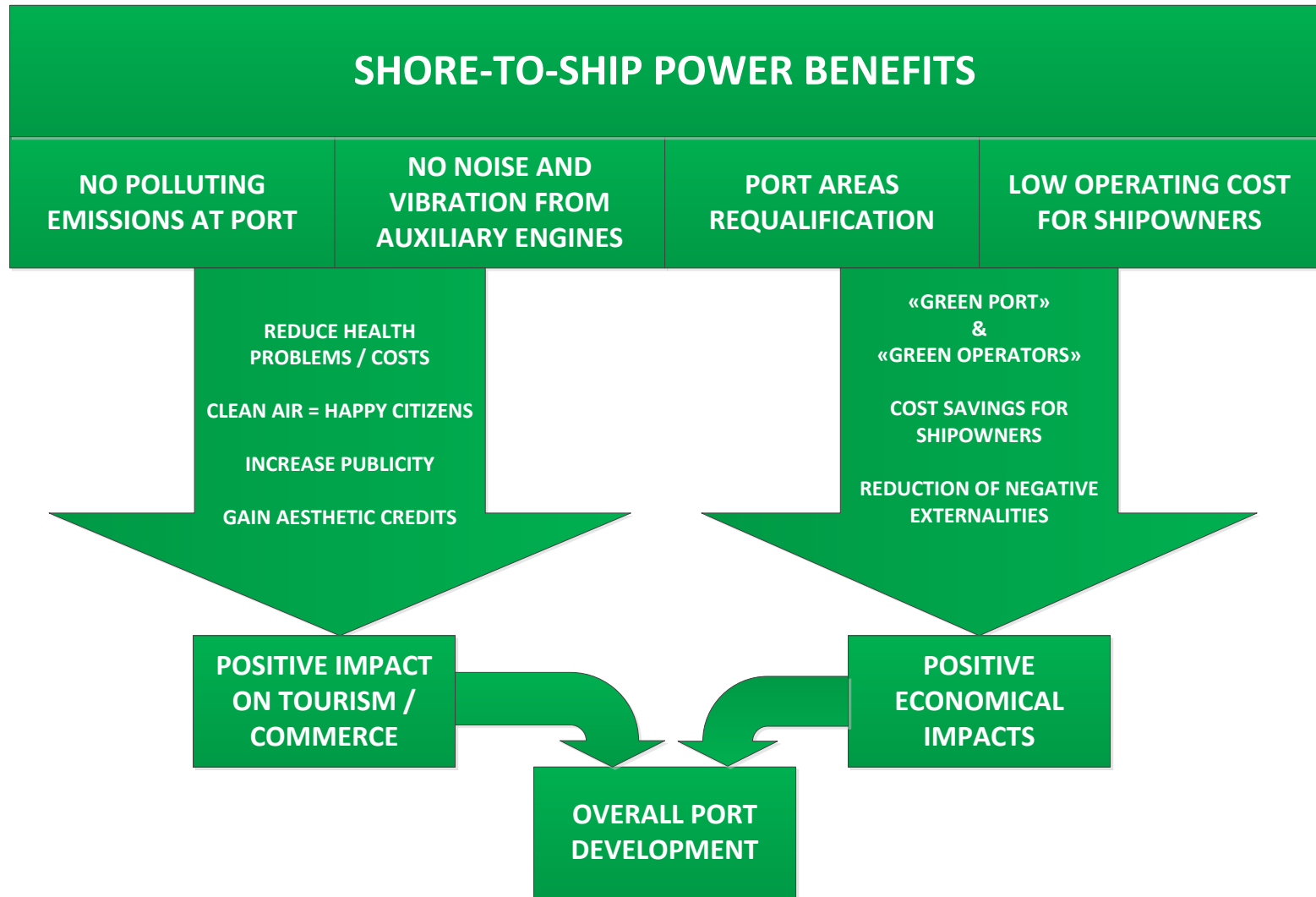
What is shore-to-ship power supply ?

- Ships can shut down their engines while berthed and plug into an onshore power source
- The ship's power load is transferred to the shoreside power supply without disruption to onboard services
- Emissions to the local surroundings are eliminated
- Tip: Shore connection is also known as Cold ironing, Onshore power supply, Alternative Maritime Power supply (AMP), etc.



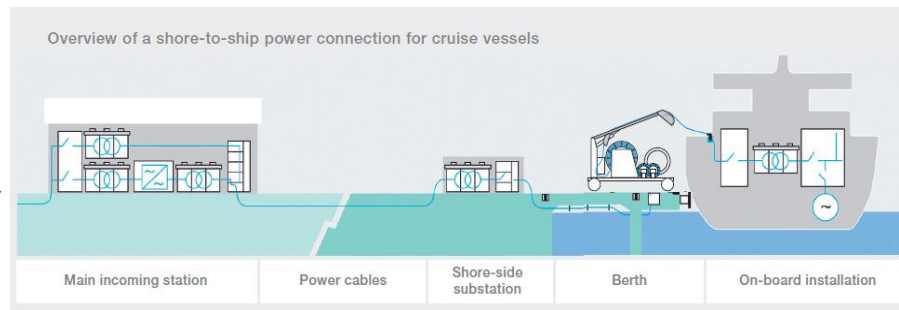
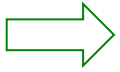
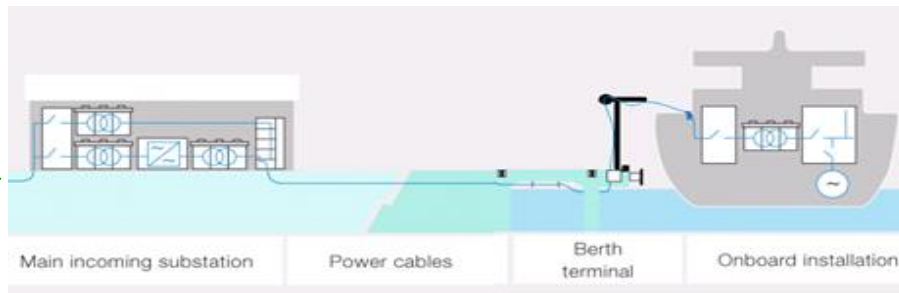
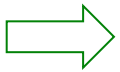
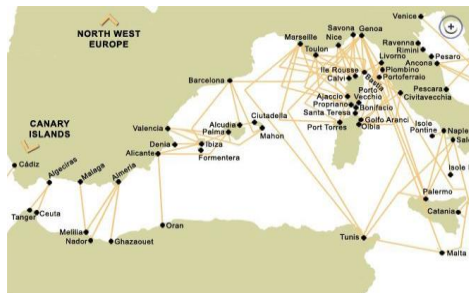
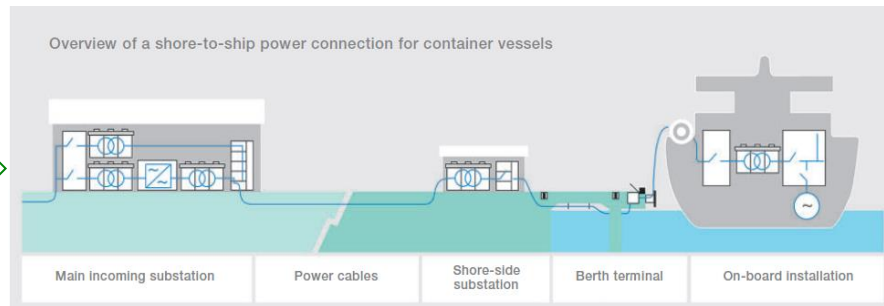
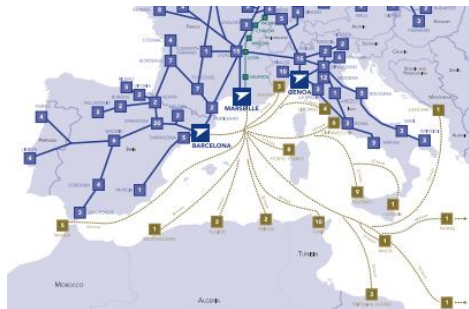
Shore-to-ship power

Economical and environmental benefits



Shore-to-ship power

A regional strategy in Mediterranean ports



Conclusions

Conclusions

Smart and green ports

Rotterdam



Göteborg



Ystad



Who's next?



ABB