

5th Black Sea Ports & Shipping 2016, 25 - 27 May Constanta, Romania



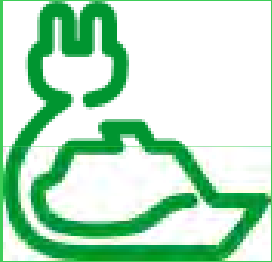
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Shore to Ship Connection a step ahead to reach European Directives before 2025

Agenda Proposal



Shore Connection
0 Emission
0 noise
0 Vibration

- 1 International Regulation, CE Directives
- 2 HV Shore Connection Standard
- 3 Tests in lab to Perform a Global Solution
- 4 Worldwide Return of Experiences



1 International Regulation, CE Directives

2 HV Shore Connection Standard

3 Tests in lab to Perform a Global Solution

4 Worldwide Return of Experiences



Life Is On



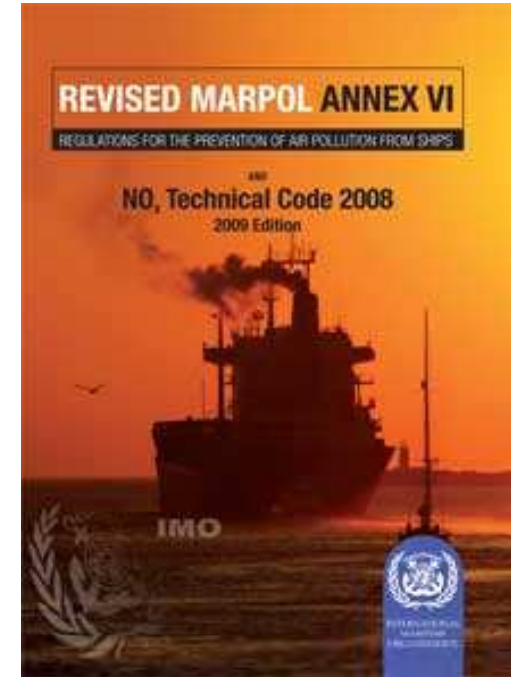
International Regulation MARPOL Annex VI

What is it ?

Regulations to limit air pollution from ships including:

- Limitation of NOx and SOx emissions in fuel oil of all ships

Date	SOx Limit in Fuel (% m/m)			Average Nox Limit in Fuel (g/kWh)
	MARPOL ANNEXE VI		EU maritime fuel sulphur directive (2005/33/EC)	MARPOL ANNEXE VI
	High sea & berth	SECA	Berth	High sea & berth
2009	4,5%	1,5%	1,5%	11,8
2010			0,1%	
2010, Juny				
2011	3,5%	1,0%	0,1%	9,6
2012				
2015				
2016	0,1%			2,3
2020				



IMO and EU encourages implementation of new technologies to cut emission: SC viewed as one

*SECA = Sulphur Emission Control Area: Baltic Sea + North sea + English Channel



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IMO, MARPOL Annexe 6 EU Directive , 2005/33/EC , 2003/96/EC , 2014/34/EU

0,1% Soufre

Tax Reduction

DAFI : Deployment Alternative
Fuels Infrastructures

River

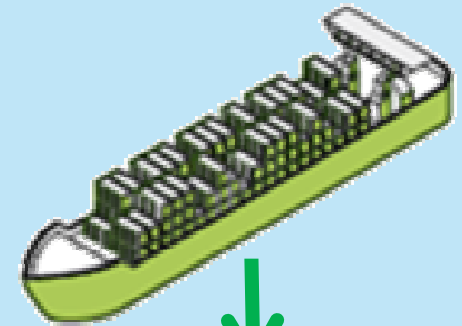
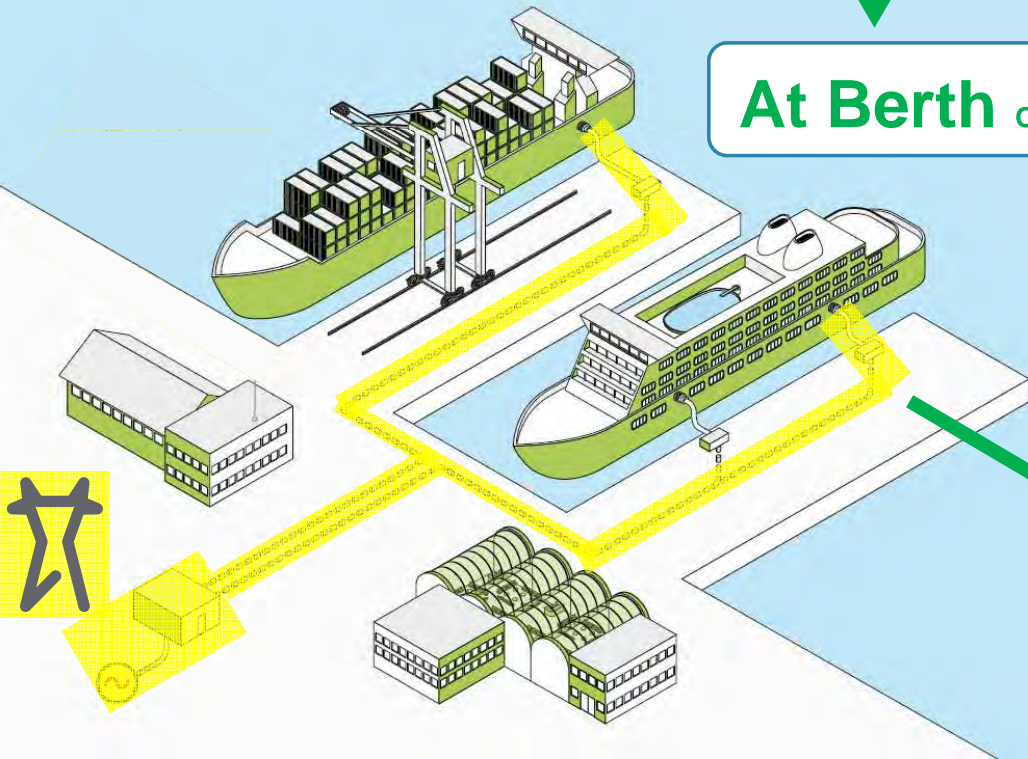
Ships must be compliant

At Berth Over 2h00

At sea inside ECA zone

By using
Low Sulfur Diesel

By using Shore Connection
Standard : IEC 80005





Such as airports,
there are several
years, Ports are
currently their
revolution to limit
pollution and the
impact on the
environment



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18/1472/CD

COMMITTEE DRAFT (CD)

IEC/TC or SC: 18	Project number IEC/IEEE 80005-1 Ed. 2.0	
Title of TC/SC: Electrical installations of ships and of mobile and fixed offshore units	Date of circulation 2015-08-14	Closing date for comments 2015-10-16
Also of interest to the following committees IEC: TC 8, 20, 22, 57, IEC SC 18A, SC 23H ISO TC 8/SC 3, IMO, IACS, IEEE PCIC 1713	Supersedes document 18/1386/CD & 18/1431B/CC	
Proposed horizontal standard <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CD to the TC/SC secretary		
Functions concerned: <input checked="" type="checkbox"/> Safety <input type="checkbox"/> EMC <input type="checkbox"/> Environment <input type="checkbox"/> Quality assurance		
Secretary: Arild Røed, Norway	THIS DOCUMENT IS STILL UNDER STUDY AND SUBJECT TO CHANGE. IT SHOULD NOT BE USED FOR REFERENCE PURPOSES. RECIPIENTS OF THIS DOCUMENT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.	

Title:
IEC/IEEE 80005-1: Utility connections in port - Part 1: High Voltage Shore Connection (HVSC) Systems - General requirements

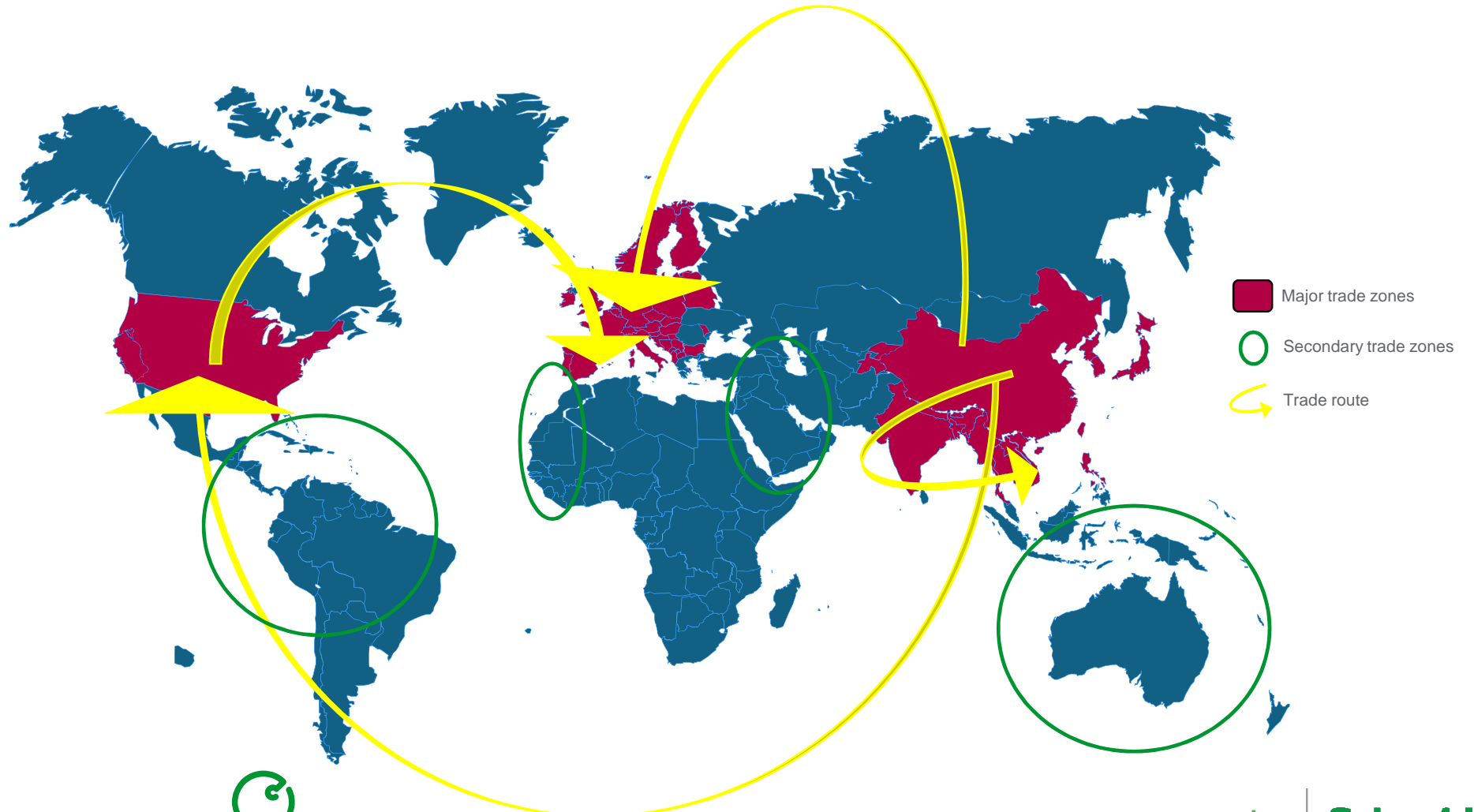
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Main International trade routes



An unique world wide standard is requested

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Standard HVSC IEC/ISO/IEEE 80005-1

Sum up

- Max power demand shore to ship

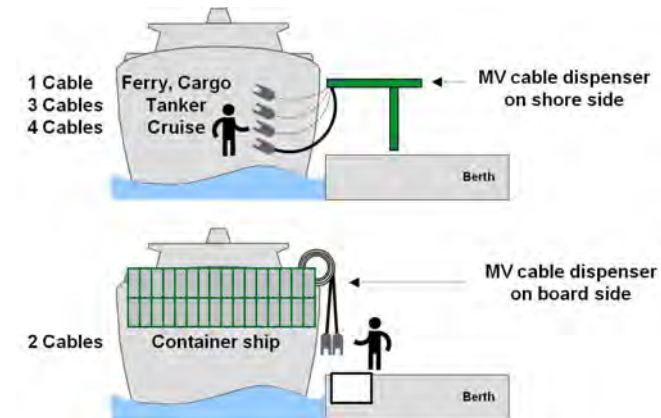


- 6,5MVA / 11kV for Ferry ship, 1 cable
- 7,5MVA / 6,6kV for container ship, 2 cables
- 11MVA / 6,6kV for LNG, 3 cables
- 20MVA / 11 & or 6,6kV for cruise ship (at least 16MVA), 4 cables

- Cables are systematically on shore side except for container ships
- Standardized socket & plugs for ships IEC 62 613, Plugs & Sockets Outlets
- Neutral resistance grounding (value for continuous rated)
- No requirement to guaranty the continuity of service, Trip at the first fault
- Ship power restoration (failure of shore system or ship failure)
- Interlockings are done by pilot wires and handwires, keys are not requested
- Galvanic insulation transformer have to be used for each ship

Next step : The standard tomorrow

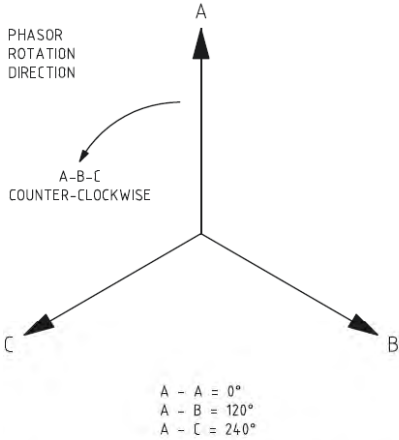
- Communication protocol between shore and ship
- Low Voltage Shore to Ship Connection;



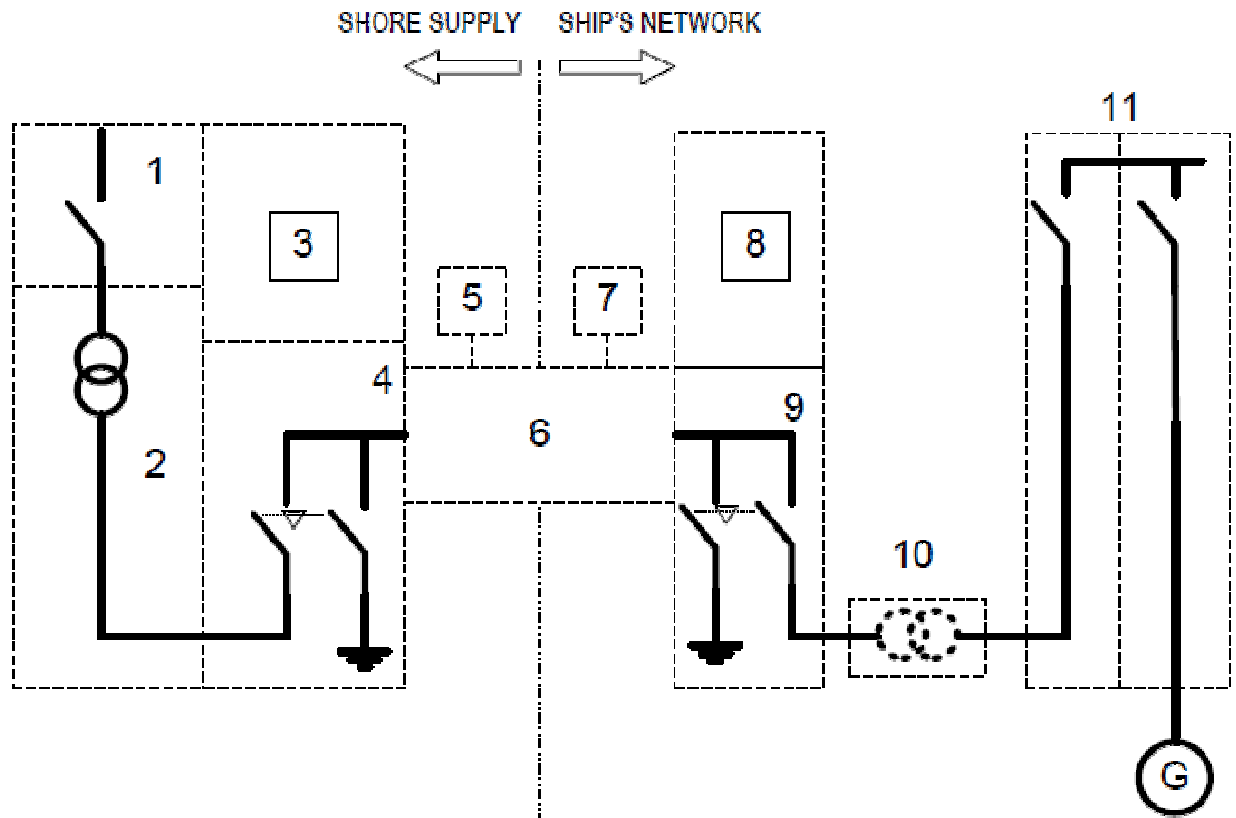
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Standard CEI 80 005-1 Diagram



- Phase sequence rotation – Positive direction



- | | |
|---|---|
| <ul style="list-style-type: none"> 1. SHORE SUPPLY SYSTEM 2. SHORE-SIDE TRANSFORMER 3. SHORE-SIDE PROTECTION RELAYING 4. SHORE-SIDE CIRCUIT-BREAKER AND EARTH SWITCH 5. CONTROL SHORE 6. SHORE-TO-SHIP CONNECTION AND INTERFACE EQUIPMENT | <ul style="list-style-type: none"> 7. CONTROL SHIP 8. SHIP PROTECTION RELAYING 9. ON-BOARD SHORE CONNECTION SWITCHBOARD 10. ON – BOARD TRANSFORMER (WHERE APPLICABLE) 11. ON-BOARD RECEIVING SWITCHBOARD |
|---|---|



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-
-
-
-



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3 Years of tests to learn the behaviour of a global Solution in 3 test platforms

1 Montbonnot

Platform GFC

- 10 GFC //, 5 MVA
- Genset 1 MVA
- Network Synchronization
- General behaviour

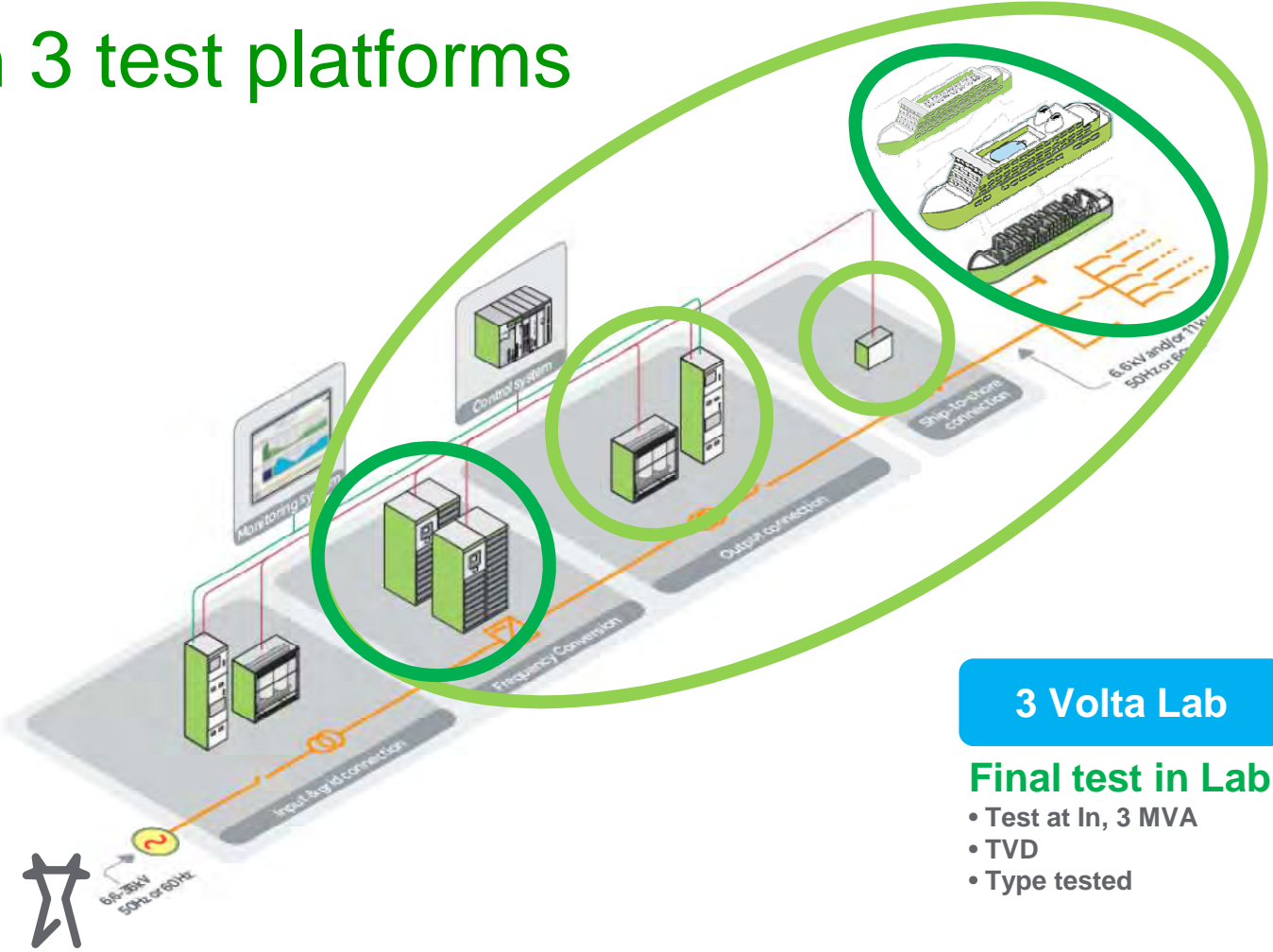
2 Eybens

Simulation Platform

- HVAC
- Fans
- LV Automation

Control Command

- Safety loop
- Interface Shore / Ship
- Adaptation to Ship

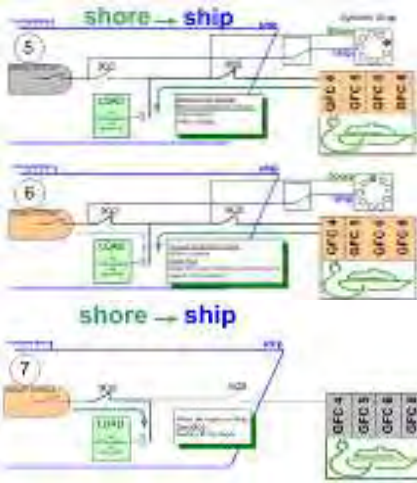
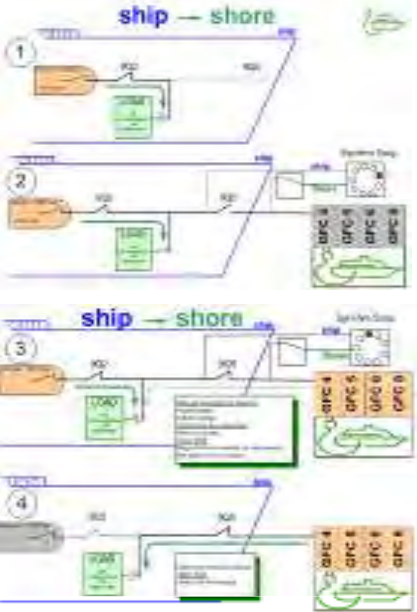


3 Volta Lab

Final test in Lab

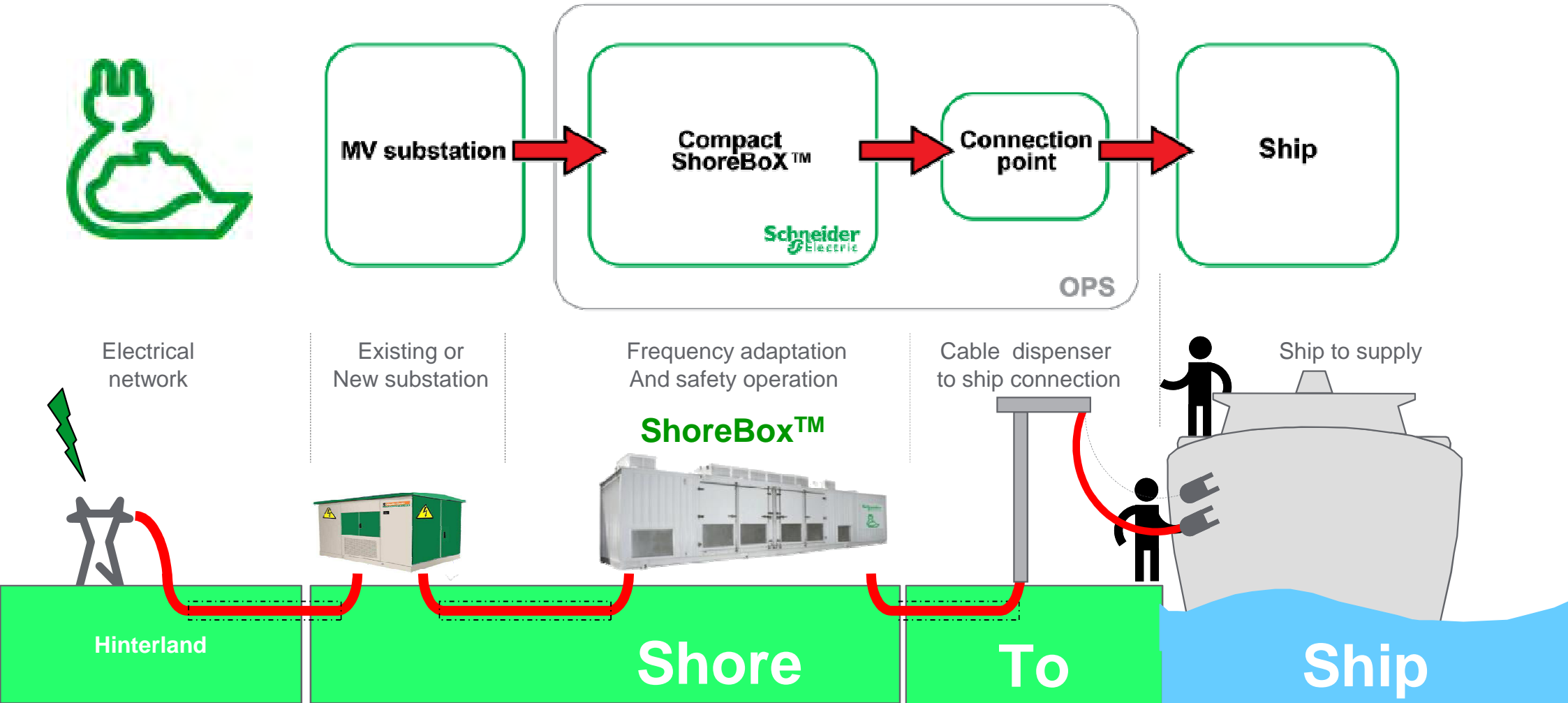
- Test at In, 3 MVA
- TVD
- Type tested

A complete platform to test & simulate



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Shore Connection General Overview



An Integrated System is prefabricated & industrialized



**This is not a car
But spare parts**



**This is a car
performed entirely
by a manufacturer**

**with a guarantee of performances
over the duration of its life cycle
due to tests done in lab**



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ShipYard at Port of Ancona in Italy, ShoreBoX 2MVA



Schneider Electric Italy has successfully installed and commissioned a 2-MVA ShoreBoX™ to power the Viking Sea cruise ship during its construction period in Fincantieri Ancona shipyard.

July 2015

OSV connection at Port of Bergen

- All in one ShoreBoX, 1 MVA
- Supply electricity to OSV Offshore Supply Vessels at berth
- Operational middle of 2015



OSV connection at Port of Bergen



9th March 2015

16th June 2015
Commissioning
Ship & Shore Side



Containership terminal at Port of Riga



Berth under construction



ShoreBoX shipped from France

<https://www.youtube.com/watch?v=XmVkmj2UowM&feature=youtu.be>



- Port: Riga, Latvia
- Ship type: Containership
- Offer: 2x2MVA ShoreBoX with frequency conversion



Moroccan Navy Port



The ShoreBoX leaving the factory beginning of January 2014

During the commissioning, end of January 2014



The 2 ShoreBoX 2MVA installed and fully operational

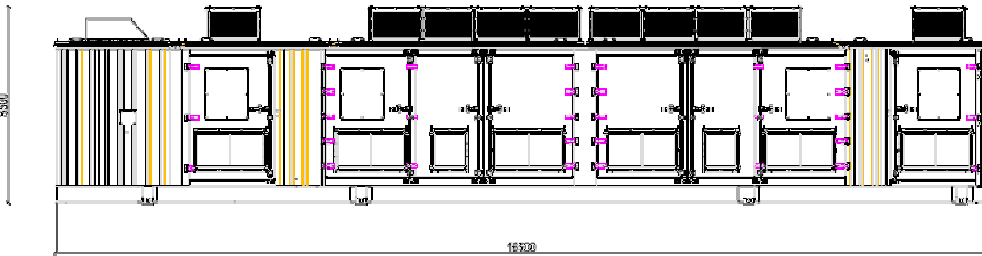
The customer has passed another order for an equivalent system for another Moroccan Navy Port



FREMM French Frigate



Navy ship connection Port of Toulon



Facility to provide 60hz to the base network, First installation to be operational in 2015.

2x ShoreBoX MV-> MV 4MVA with frequency conversion 2 types of ships connected, BPC 2,2MVA & FREMM 1,2MVA



ShoreBoX™ Life Is On



Strategic USA's largest container port

The California-based port is the 3rd largest in the world



Project location

- USA
- Port of Los Angeles
- Container vessel
- Access covers, AMP Fix, AMP Mobile, AMP Container



Site pictures



Project definition

Introduction

- **2004:** In June, **Berth 100** was the first berth in **the world container terminal using AMP** (Port of LA & China Shipping Container), while in August the Port welcomed the world's first container vessel to be built with AMP specifications
- 2006: Yusen Terminal at berth 214
- 2010: Evergreen's Sea Side Terminal at berth 230
- 2011: Cruise Terminal at berths 92 and 93A

Port's strategy

- **The California Air Resources Board (CARB)** adopted a regulation in December **2007** to **reduce emissions** from diesel auxiliary engines on ships while at-berth for container, cruise and reefer vessels.
- The regulation **requires that auxiliary diesel engines be shut down** (i.e., use grid-based power) for specified percentages of fleet visits.
- By **2014**, vessel operators relying on shore power are required to shut down their auxiliary engines at-berth for **50 %** of the fleet's vessel visits and also reduce their on-board auxiliary engine power generation **50% by 2014, 70% by 2017 and 80% by 2020**.

Solutions

- Schneider Electric's shore connection systems
- Cavotec's equipment for connection points



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Shore Connection Ship & Shore Side retrofit

Example of realization – France - Marseille

- Shipowner: CMN (Compagnie Méridionale de Navigation)
- Port : GPMM (Grand Port Marseille Méditerranée),
- Ship type: Ferries operating between France & Corsica island.
- Scope: 3 ships (Piana, Girolata, Kaliste) + 3 berths (Poste 68, 70 & 74)
- Model: SE in partnership with STX Service.
- Port Voltage: 20kV in substation
- Ship Power: 1,8MVA, 11kV, 50hz (no frequency conversion)
- **Ships modification First quarter 2015, Port modification Last quarter 2015**



Piana

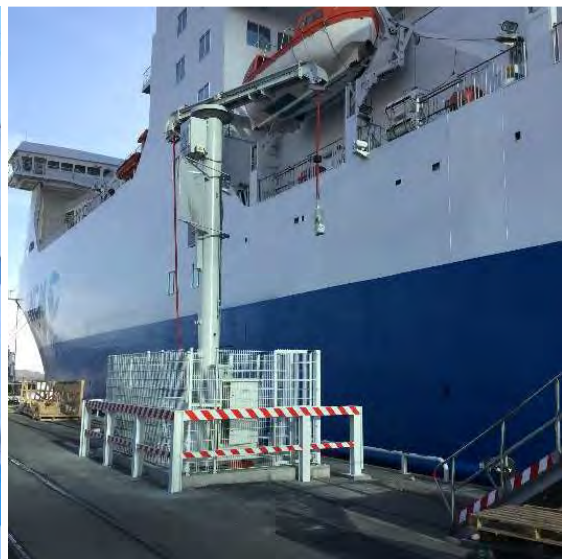


Girolata



Kalliste

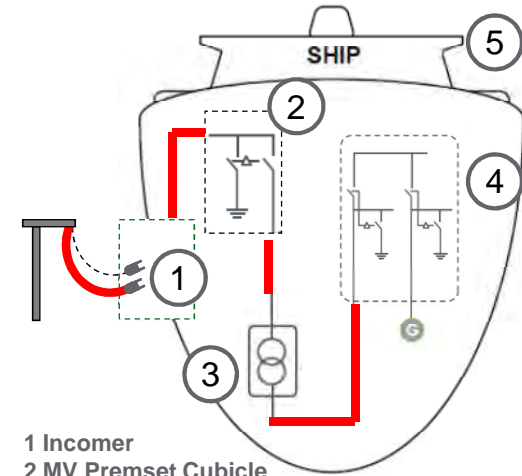
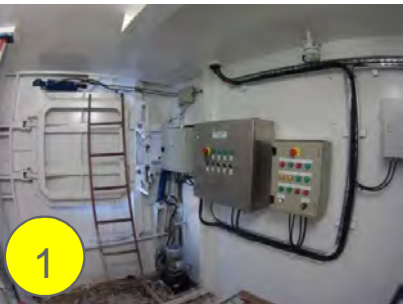




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CMN Ship modification in Marseille France January 2015



- 1 Incomer
- 2 MV Premset Cubicle
- 3 Transformer if required
- 4 Main Switchboard
- 5 Bridge



Ship retrofit for Shore Connection

Gothenburg, Sweden

- Shipowner: Stena Line
- Ship type: Ferry
- Scope: 5 ships
- Model: Schneider Electric products
EPC by Marine Global
Implemented in 2011



Watertight door

Ship Junction Box
Control cde cabinet

MV Cubicle
Interlocking system

MV / LV
Transformer

LV Cables

Shore in-come CB
Synchro module
Switch board adaptation

Supervision adaptation

Future Kalibaru Container Terminal

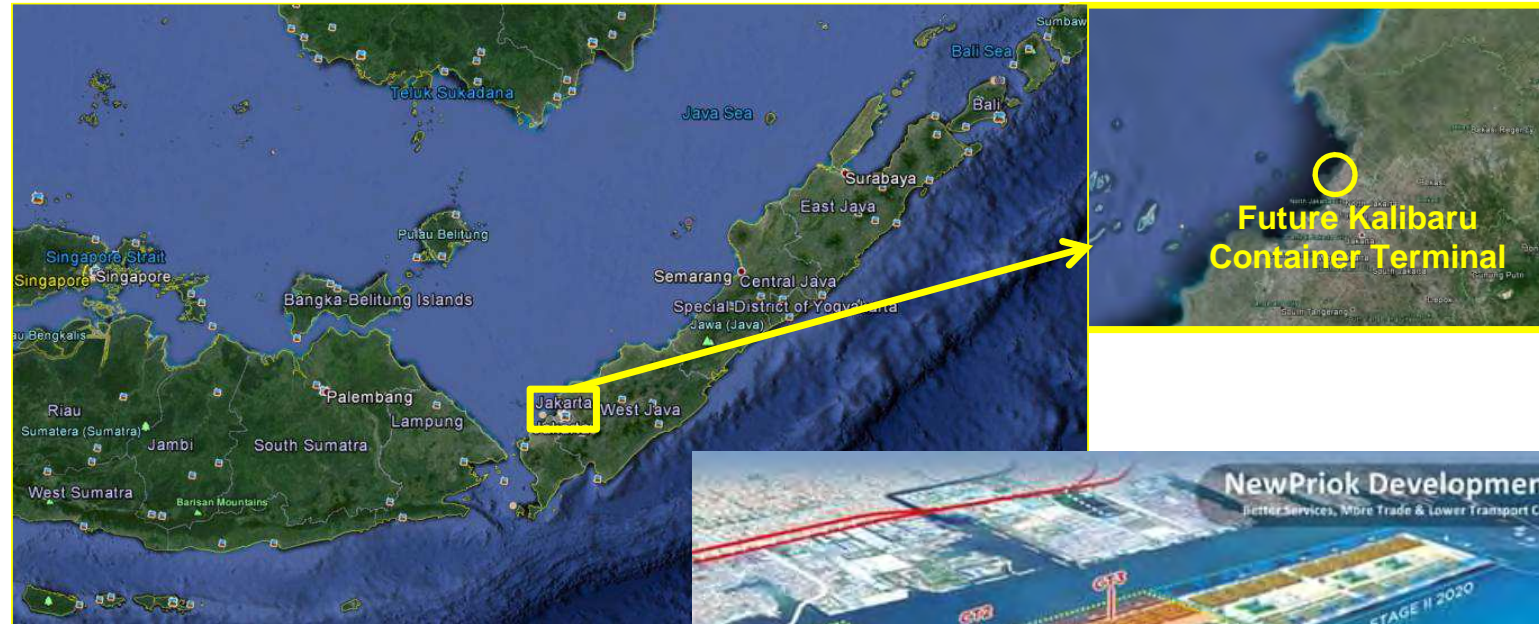
Existing port does not have the capacity to host the increasing sea freight volumes

Development of the new KCT (Kalibaru Container Terminal) **started in March 2013**

Future capacity **13 M 20-foot containers / year**

First phase is scheduled for **completion in late 2017**

When fully operational, it will be the **country's largest industrial port** and the 3rd in South East Asia



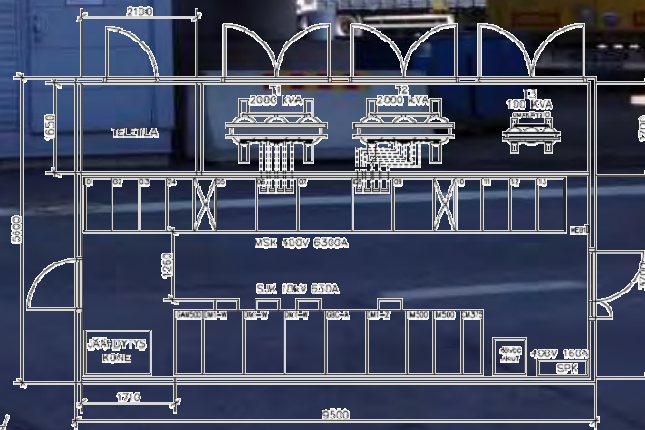
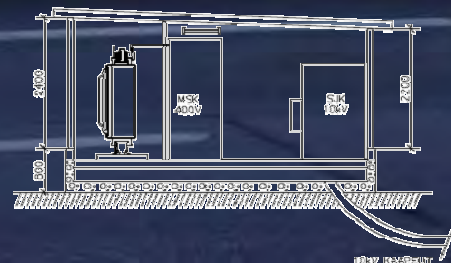
- **New green, modern port in South Asia**
- **First phase includes 9 berths equipped with Schneider Electric 5-MVA shore connection systems**
- **2nd and 3rd phases will equip berths with shore connection as well**



Future Kalibaru Container Terminal April 2016



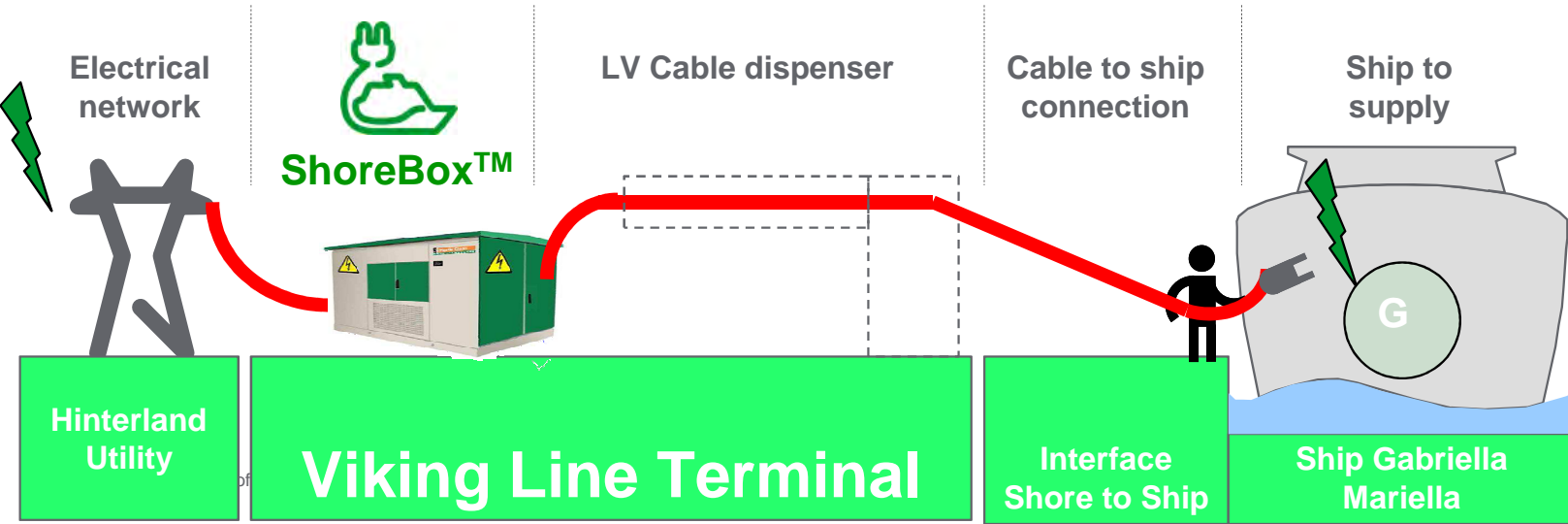
Helsinki Viking Line LV Shore Connection overview



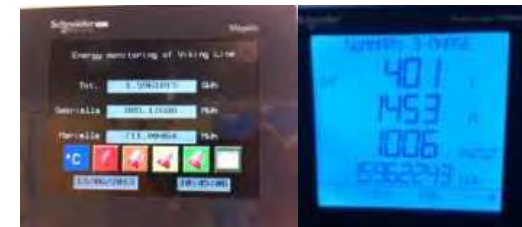
Helsinki Viking Line LV Shore Connection overview



Helsinki Viking Line ShoreBoX



Safety operation & Energy Management



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Fraserburg Scotland

Commissioning November 2015



- 19 shore to ship LV supply boxes, connected to the port LV ring.
- IP 65 environmental protection (Stainless steel casing).
- Multiple power outlets for 32 /64/125 amp (230/440) volt.
- SMART metering (billing and energy management).



Smart Port Antwerp River Cruise Solution March 2016



4 connexions

River Cruise quays

Customized solution for city environments

The demand for luxury river cruises is growing constantly. As a result there is an increase of these vessels navigating the rivers. The destinations of these vessels are often in urban environments closer to the city center than the usual industrial environment. To provide a more attractive solution for onshore power, the **Shoreconnection Bench** was created.



140 connexions

Shorebox LV

Inland Power solution



Waterbox

Inland Water solution

The **Shorebox LV** and the **Waterbox** are specifically developed for the inland vessels. These 2 boxes are controlled and used via the same system, which is an advantage for both end user as port technicians. The end user needs to register at 1 system only to get electricity as well as drinking water. The port technician can monitor both systems at the same time.



Platforms

Technical & Web

Web-platform:

- Complete user management
- Automatic consumption reporting
- Activation through website, SMS, IVR

Technical platform:

- Automatic error reporting
- Continuous system monitoring
- Remote controlled rearming
- Activation through website, SMS, IVR, App



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Port actors will be able to :



Have now **an answer to reduce pollution** when ships at berth



Provide electricity to the ships and be compliant with WW standards



Manage the energy with efficiency to reduce electricity bill for customer



Sell energy & make able the ports to make business with the ships

Plug in to Green Power

Shore Connection Solution



Thank you for your attention

At your disposal

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