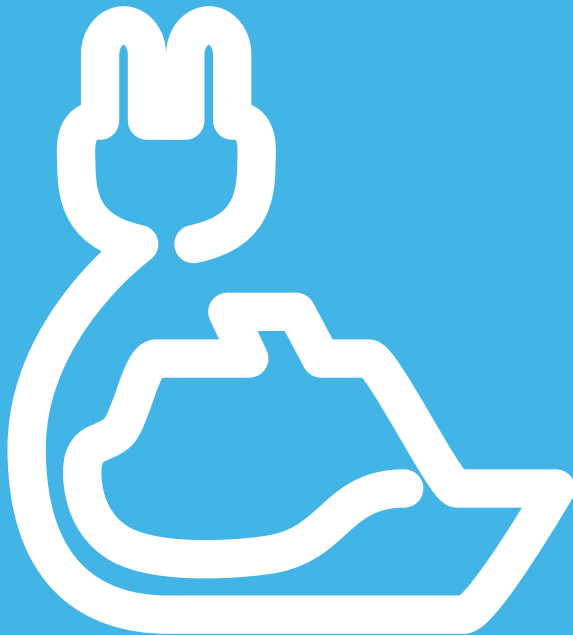


Shore Connection Solution

Schneider Electric

**State of art and best practices for
implementing shore connection**



April 9th 2014

Schneider Electric at a glance

24

billion € sales in 2013

41%

of sales in new economies

140 000+

people in 100+ countries

4-5%

of sales devoted to R&D

The global specialist in
Energy management

Making energy:

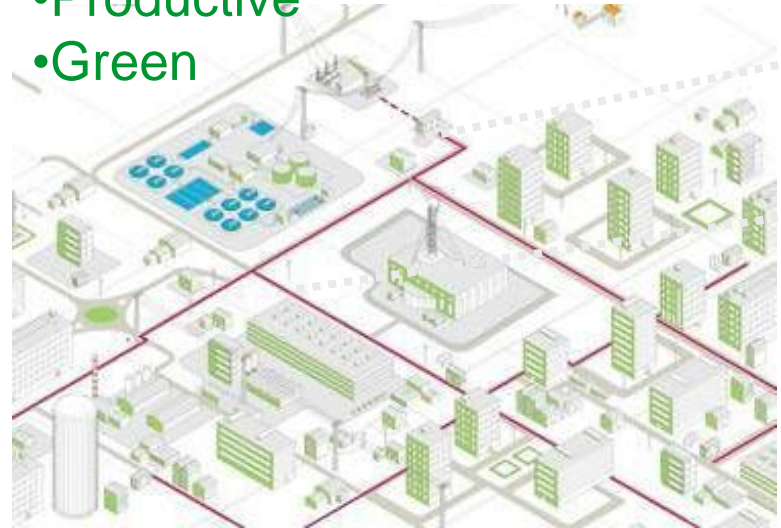
- Safe
- Reliable
- Efficient
- Productive
- Green

Covering

72%

of world final energy
consumption

Energy production
& transmission




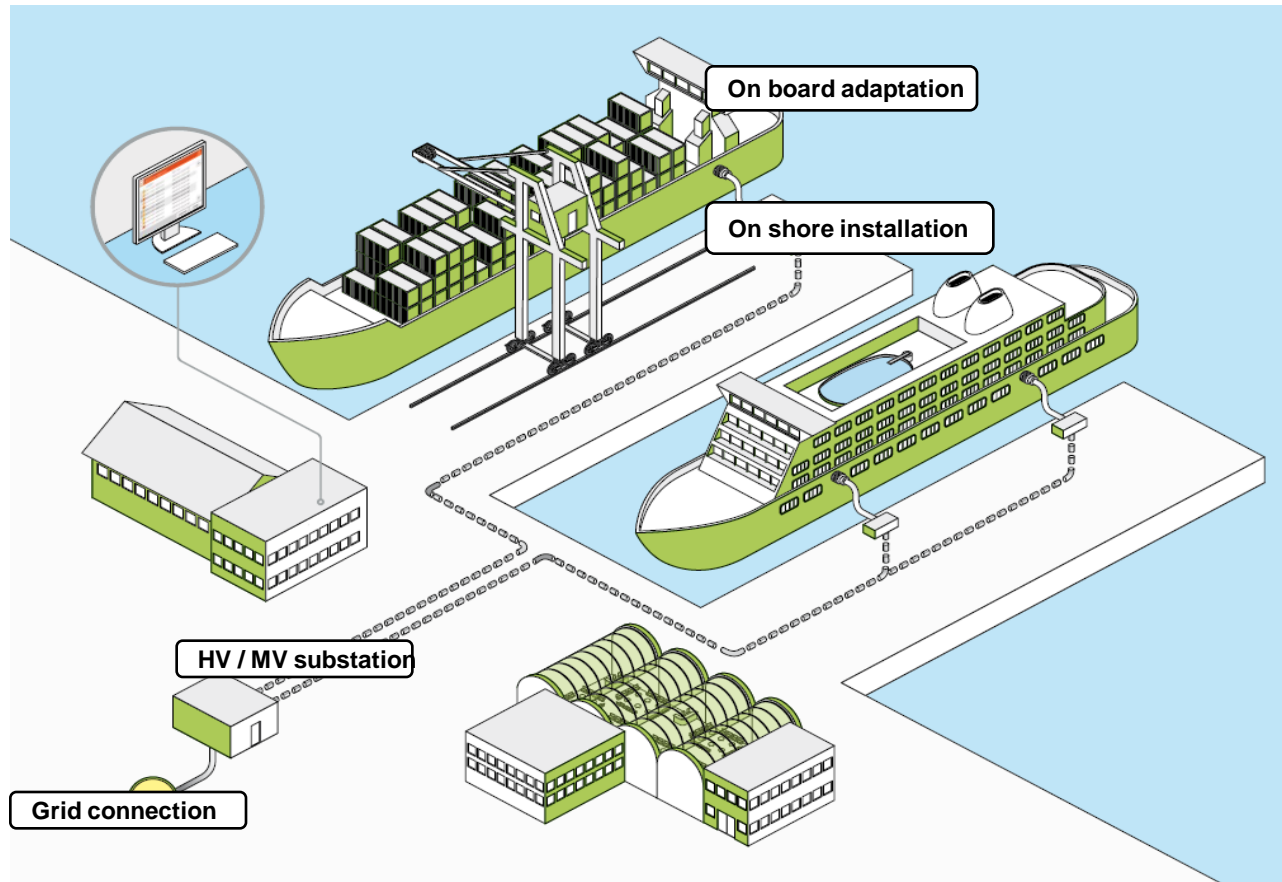
Energy usage

A Recognised
Sustainable commitment



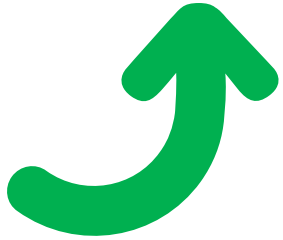
Shore connection principle

 Plug ships at berth into the national grid
to cut ships emissions, noise & vibrations



Shore Connection = Cold Ironing + Shore Power

Summary



What are the reasons of development of Shore Connection technology ?



What have been the various development steps ?

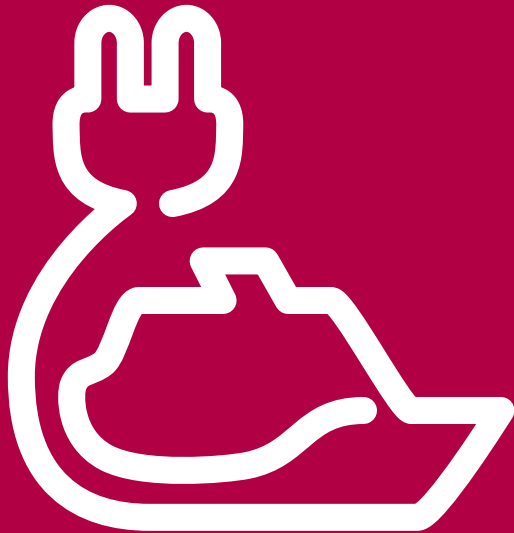


How to implement a shore connection system successfully

Drivers & Status

Plug in to Green Power

Shore Connection Solution



Key drivers & market trends

Green port community pressure



Stricter global pollution regulation (MARPOL 6)

Year	IMO		EU	
	MARPOL Annex 6		EU maritime fuel sulphur directive (2005/33/EC)	
	Average NO _x limit in fuel (g/kWh)		SO ₂ limit in fuel (% m/m)	
	High sea and berth		SECA	Berth (1)
2009			1.5%	1.5%
2010	11.8	4.5%		
2010, July			1.0%	
2011				0.1%

High fuel prices



Standardization underway



Growth of port traffic and interconnection



How much does a ship at berth pollute?



A cruise vessel
(12 MW)
emits
during
8 hours



1.2 t NO_x

equivalent to

10 000 cars

30 kg Particulate Matter

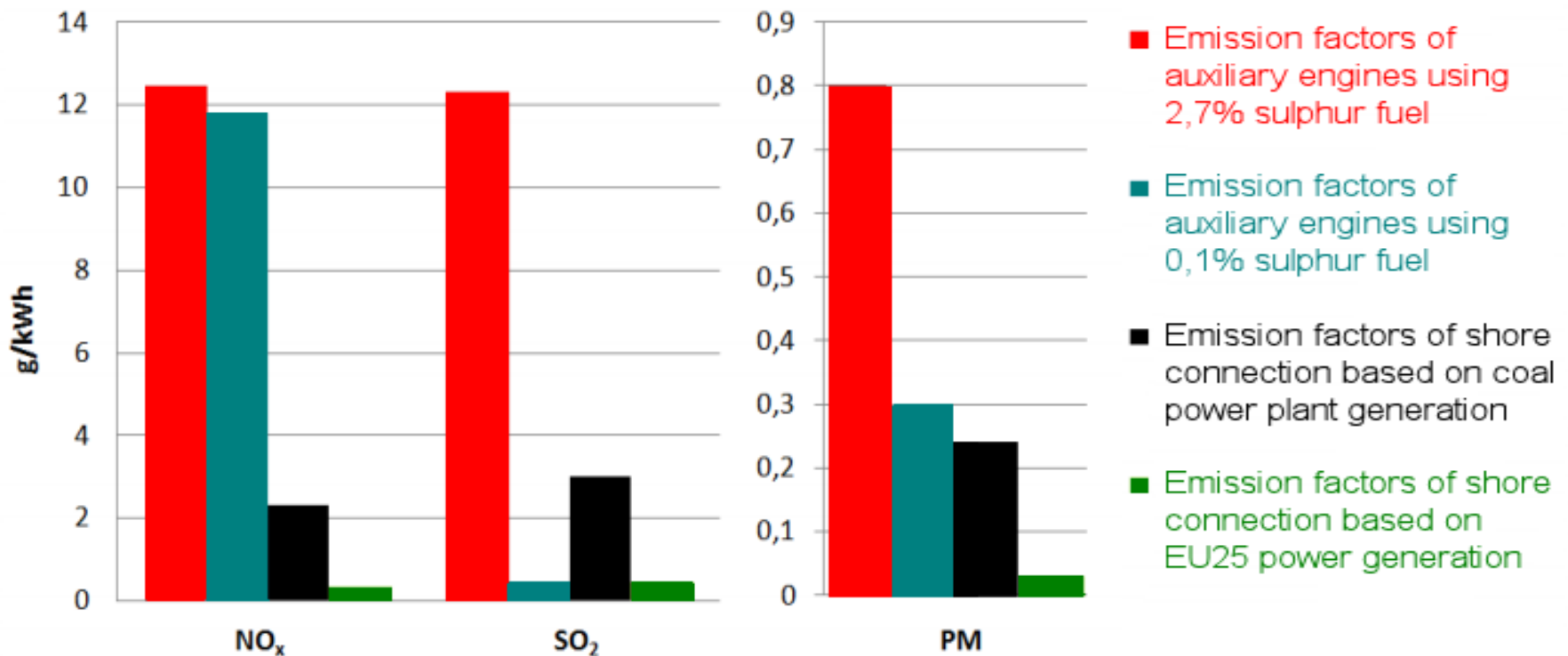
equivalent to

6 000 cars

in transit Paris - Berlin

Shore Connection cuts ships pollution

- Locally : zero emission - noise - vibration in the port
- Globally



Source: ENTEC Study 2005 / Schneider

Local regulations pushes development



Californian Regulation

« **from 2014**, all cruises, containers and reefer cargos required to be equipped for berthing in Californian port
80% of the power used by berthed ships will have to come from shore-side electricity **by 2020** »



European Parliament last week vote:

« Shore side electricity for ports of the TEN-T Core Network (80 most importants seaports in Europe), by 31 December **2025** »

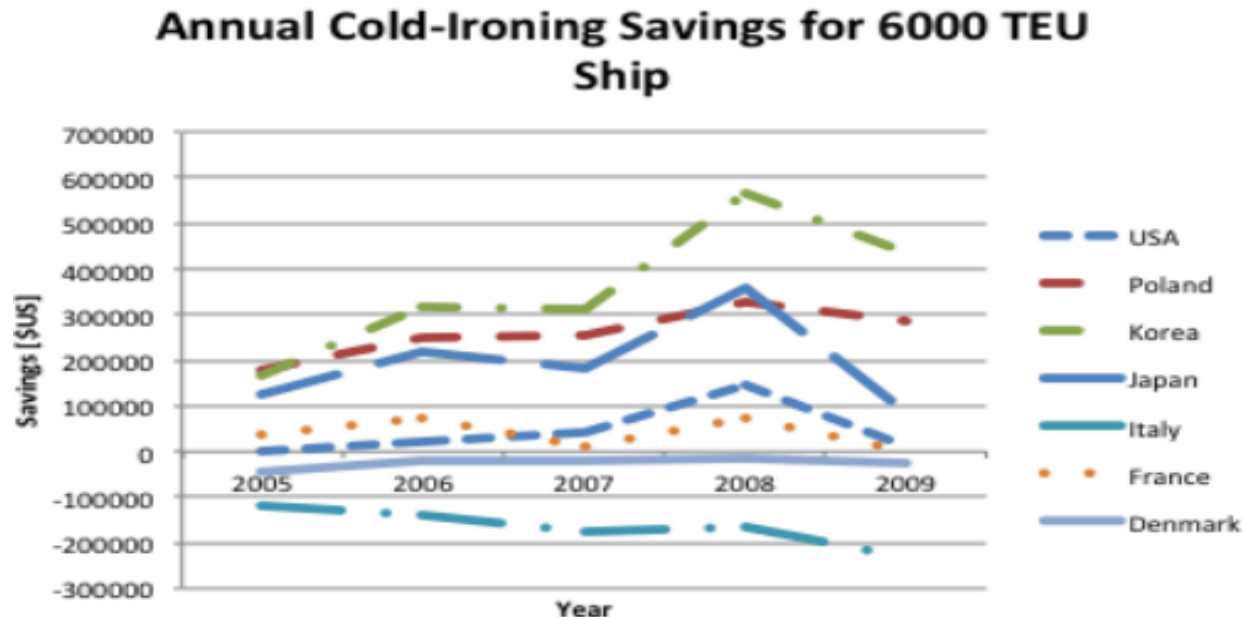


China MOT Technical code JTS155-2012

« Shore Connection should be included in project planification, design and construction for new container, bulk, cruise and ropax terminal »

Financial benefits

April 2012, University study from P.H Weiner on Shore Connection profitability:



> In most countries, price of **electricity is cheaper** than price of marine fuels

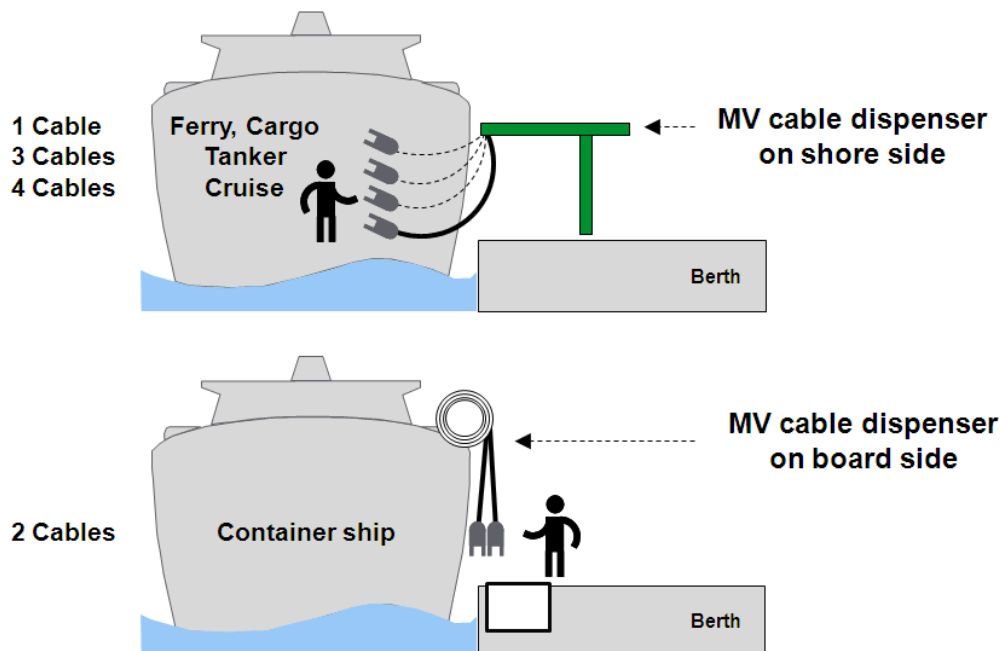
> While using shore connection, ships at berth can switch off their auxiliary engines, and so **save costly fuels**.

International standard validated

High Voltage Shore connection
standard: **IEC/ISO/IEEE 80005-1**
Validated since August 2012

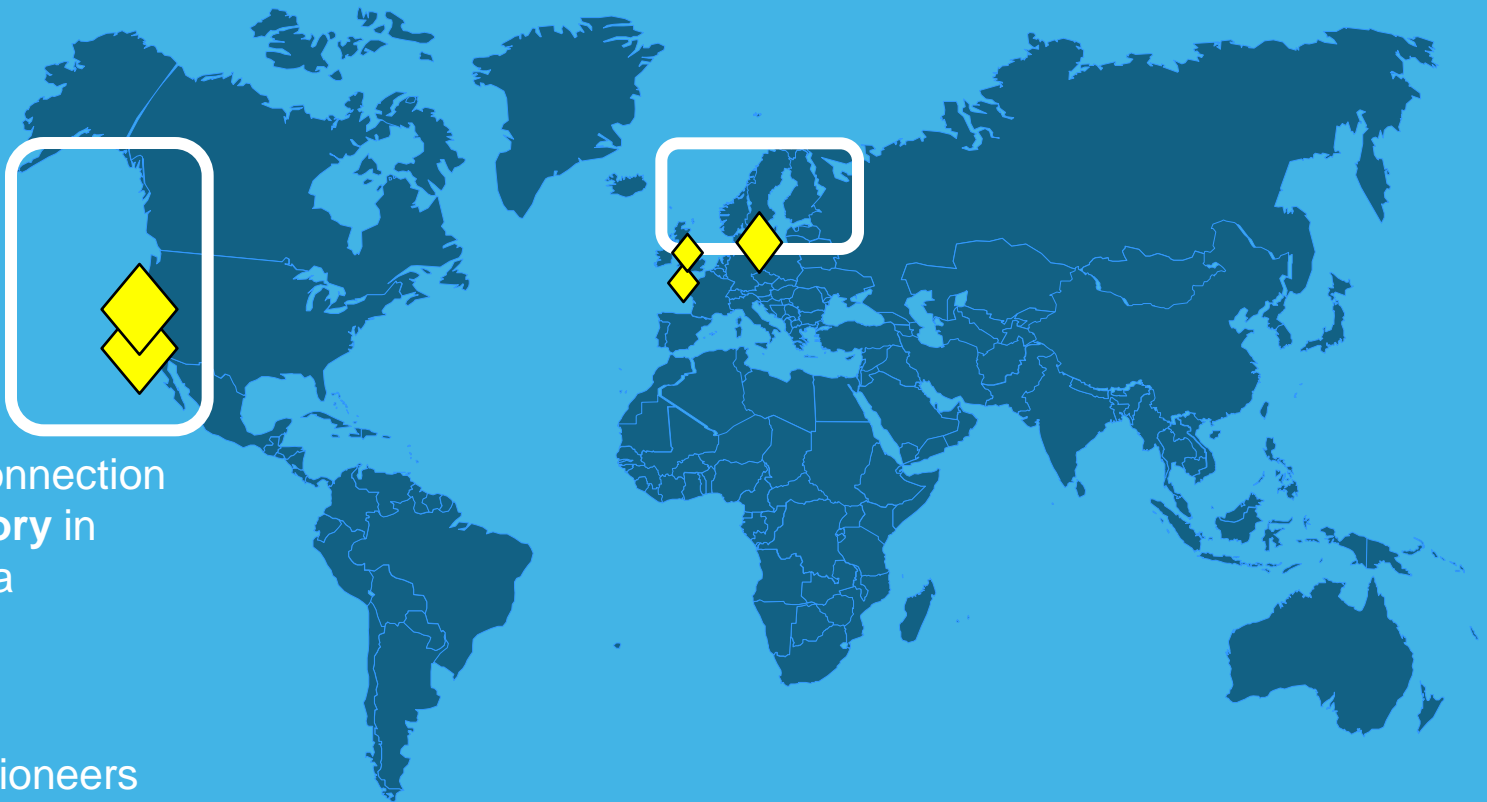


2 Cable interface positions standardized



Development steps

Electricity detaxed for Shore Connection
Strong financial and regulation incentives



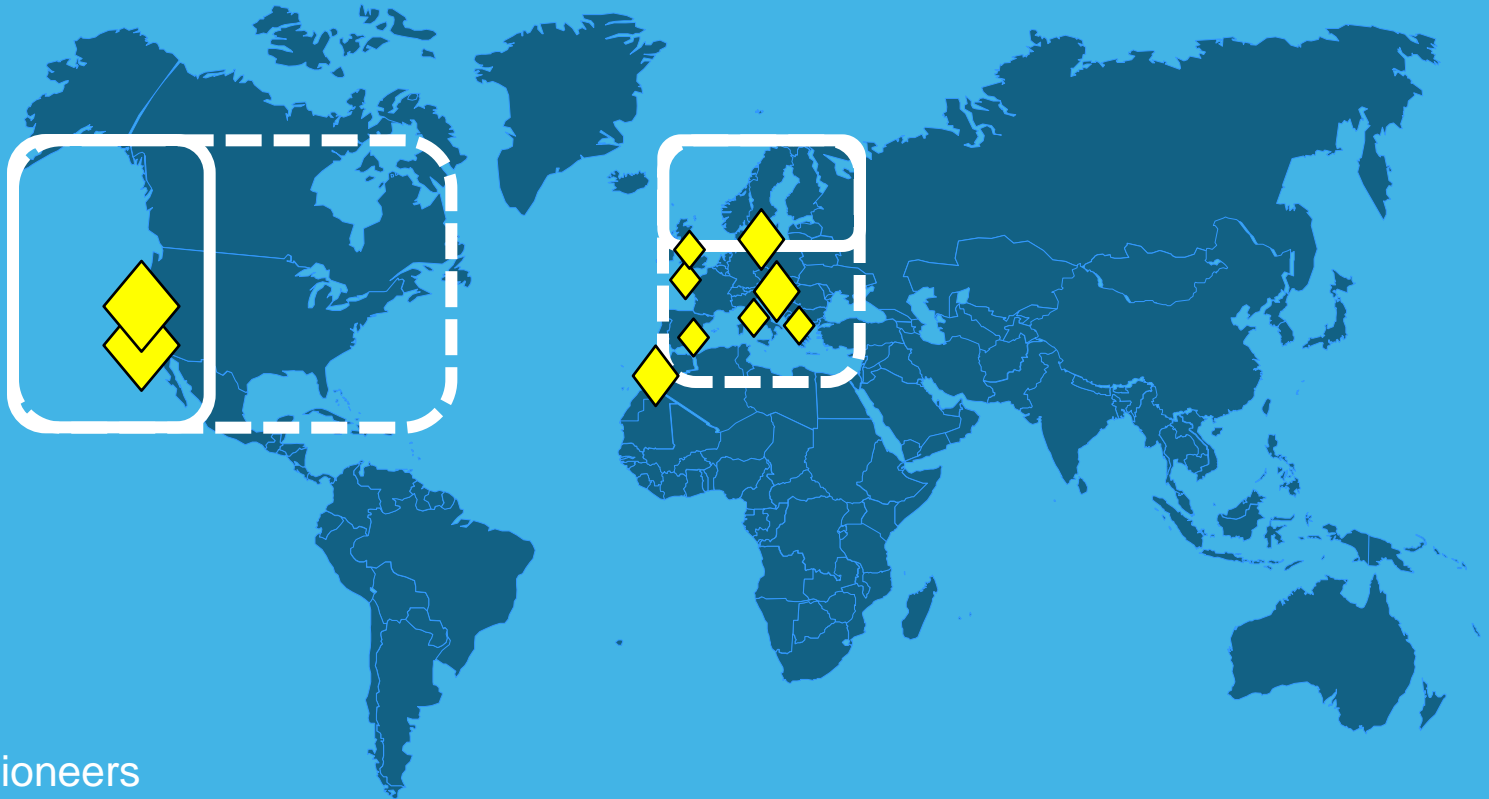
Shore connection
mandatory in
California

 Pioneers

 Current

 SE major references

Development steps



 Pioneers

 Current

 SE major references

Development steps



Implement a shore connection system successfully

Plug in to
Green Power

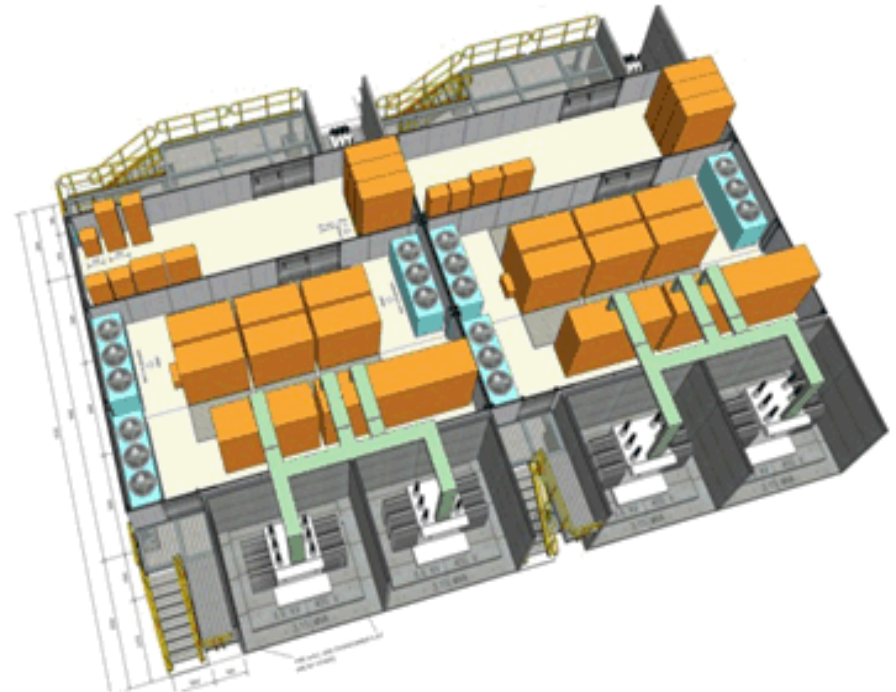
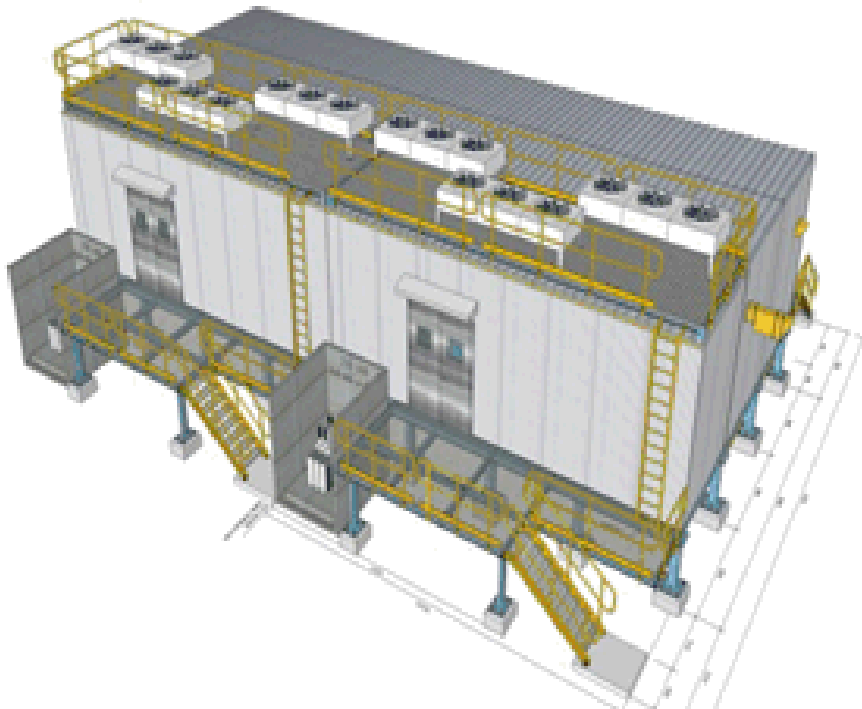
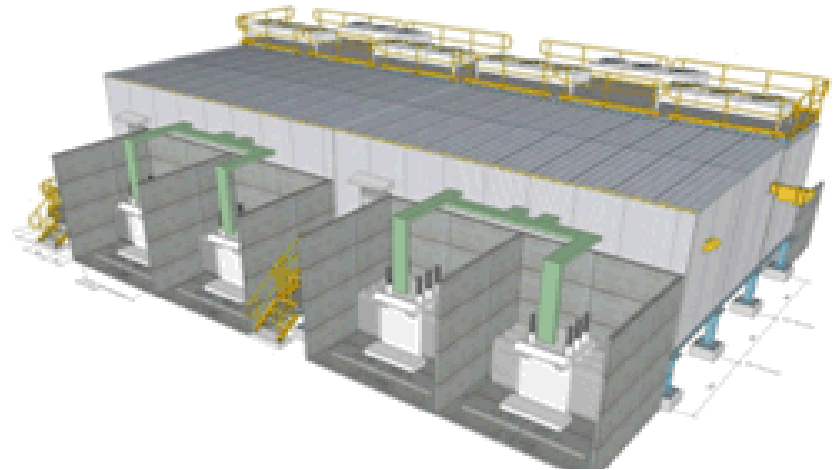
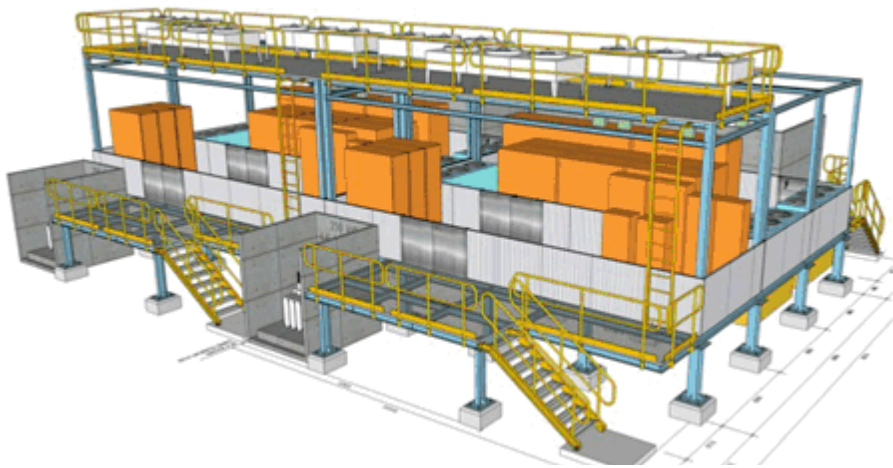
Shore Connection Solution



Californian port



Project in Asia: 10x5MVA (Container)



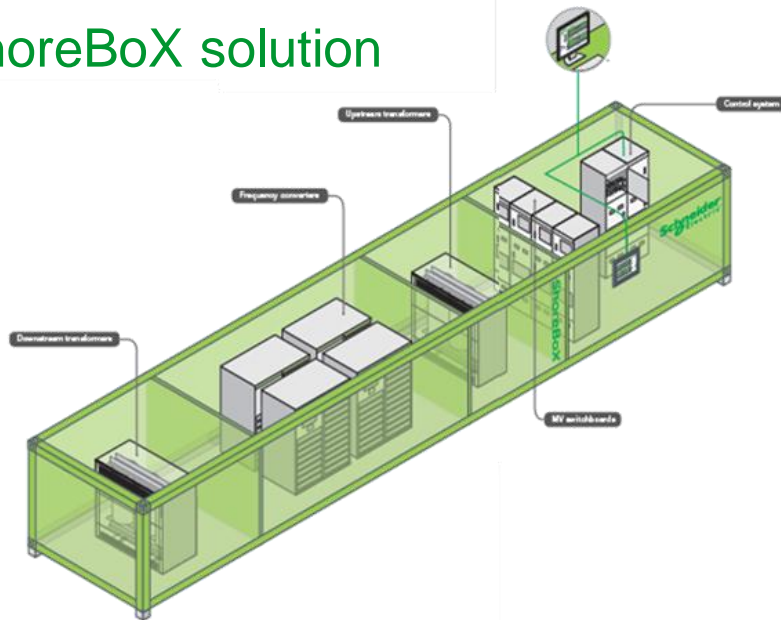
LV solution for OSV in Norway



Turnkey project design and build
LV ShoreBox™, cable system, civil work

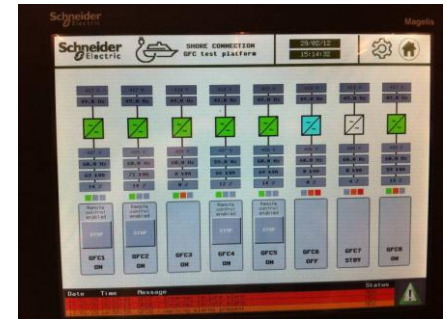
Integrated systems

- ShoreBoX solution



- Engineering reduced
- Civil work reduced
- Flexibility and modularity increased
- Energy management

- Tested & validated in factory



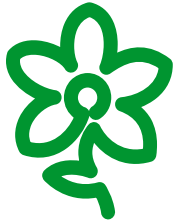
ShoreBox solution



Navy solution for frigates



Conclusions



Key benefits of Shore Connection

- Cutting ships **emissions**
- Fuel **savings**
- **Proven** and standard technology



Key success factors to implement Shore Connection:

- Ship and shore compatibility: follow **International Standard**
- **Standard, predesigned** solutions to reduce onsite engineering, costs and lead time

Make the most of your energySM



Hervé Lours

Direct Phone : +33.677 790 091

E mail: herve.lours@schneider-electric.com

