



Introduction to a real case in Europe

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OPS DEVELOPMENTS IN THE PORT OF HAMBURG

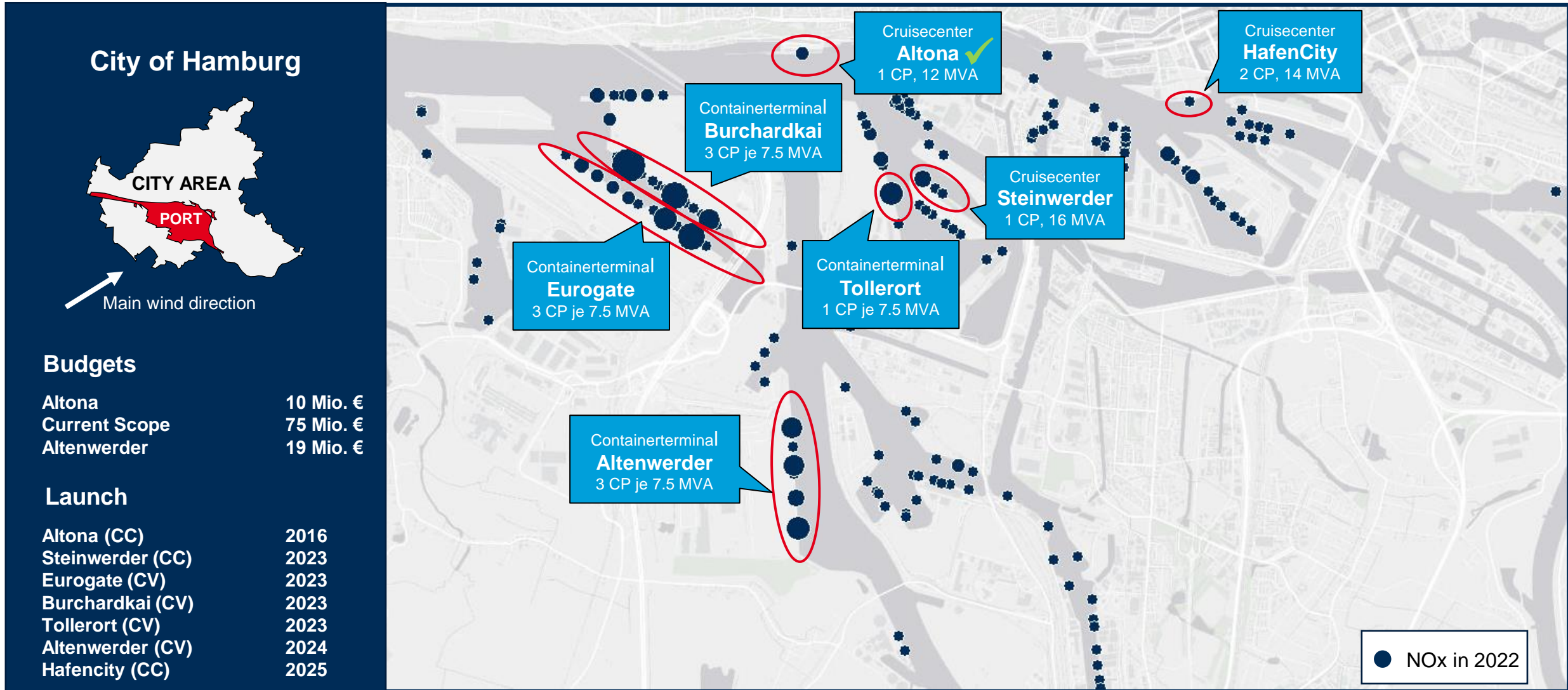
Electrificación de los puertos: Proyectos en desarrollo

Why does Hamburg invest in shore power supply?

- Crucial to reach targets set by **clean air action plan**
- A cornerstone of City of Hamburg's strategy to become a **carbon neutral port by 2040**
- To comply with upcoming **EU regulation** for shore power (Alternative Fuel Infrastructure Regulation)
- Significantly reduce noise pollution for terminal neighbourhoods (**social licence to operate**)



Overview of OPS developments in the Port of Hamburg



CV = Container vessels CC = Cruise vessels CP = connection point; MVA = Mega Volt Ampere

Cruise



Technical overview shore power solution – CC2 (since 2016)

Key facts Altona shore power facility (CC2):

- Single connection point with max supply of 12 MVA
- Supply by connection vehicle operating along a 300 m cable chain. Automation of vehicle and flood level adjustments in progress
- 10 kV connection from public grid
- Shore power converter station on site

Indication of service areas (full terminal length)



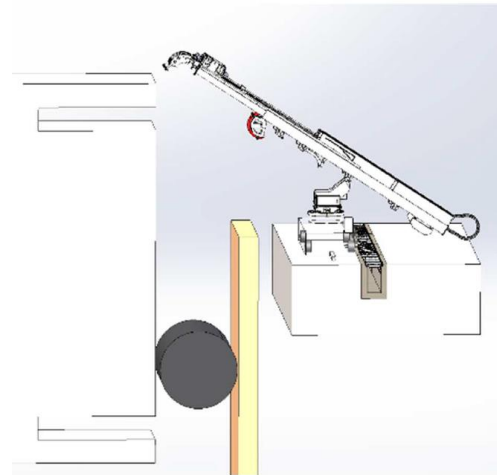
Connection System (connection vehicle moving along cable chain)



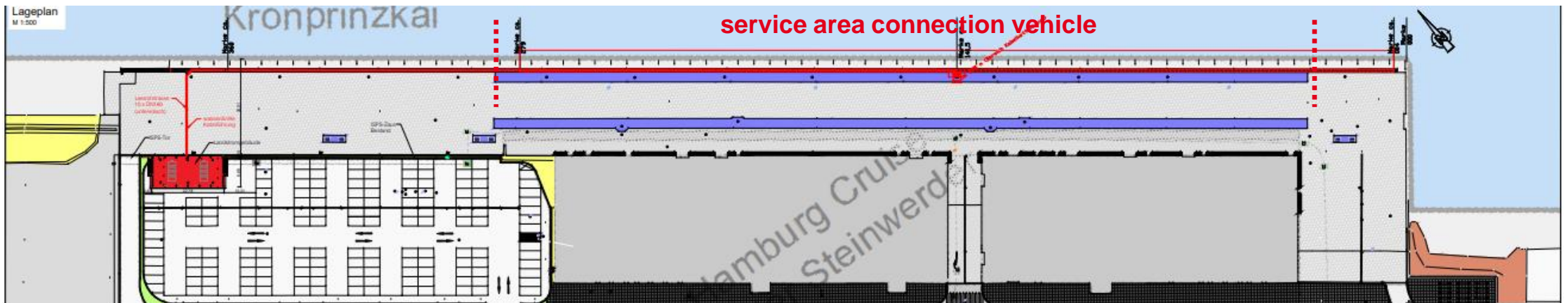
Technical overview shore power solution – CC3 (2023)

Key facts Steinwerder shore power facility (CC3):

- Single connection point with max supply of 16 MVA
- Supply by autonomous connection vehicle operating along a 275 m cable chain
- 10 kV connection from public grid
- Shore power converter station on site



Indication of service area



Converter station and connection system installation CC3

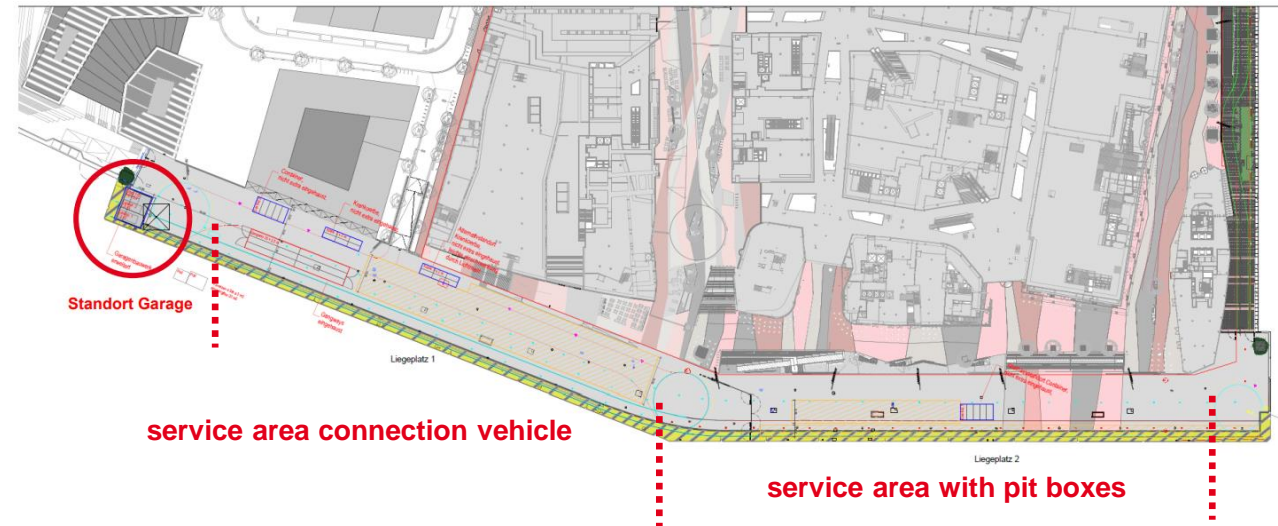


Technical overview shore power solution – CC1 (2025)

Key facts HafenCity shore power facility (CC1):

- Multiple connection points with max supply of 14 MVA
- Main berth is supplied by autonomous connection vehicle operating along a 180 m cable chain. Along the eastern side of quay further connection points via pit boxes available should two smaller vessels be services
- 10 kV connection from public grid
- Shore power converter station off-site

Indication of service areas



Converter station in basement of office new-build



Connection System (comparable to Altona shown below, tender in process)



Overview on key technical specs

Cruise Terminal	Altona (CC2)	Steinwerder (CC3)	HafenCity (CC1)
Connection points (CP)	1	1	2
Service range (MM)	MM10 - MM290	MM04 - MM279	MM10 - MM200 + pit boxes
Typical service side	up to vessel	port	up to vessel
Simultaneous use at start	1	1	2
Connection type	IEC80005-1 Annex C		
Max power per CP	12 MVA	16 MVA	14 MVA
Voltage/frequency	11 and 6.6 KV at 60 and 50 Hz		
Transformer technology	Siemens	PowerCon	tbd.
Connection system	Stemmann	Stemmann	tbd.
Facility commissioning period	2016	08 2023	Q4 2024
Testphase service from	2016	09 2023	Q1 2025

Container

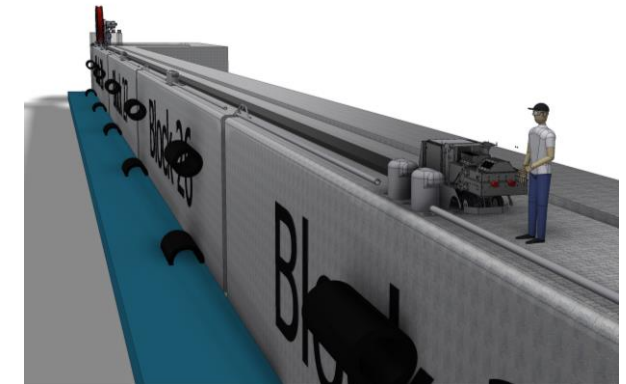
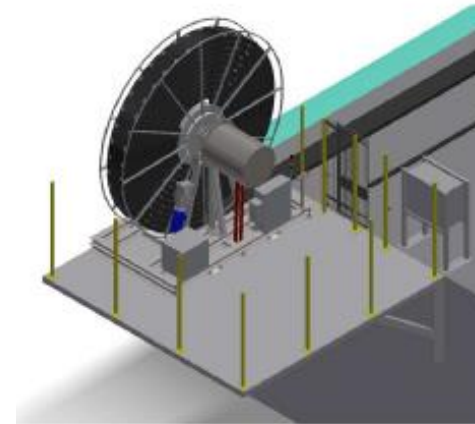


Technical overview shore power solution – CTT (04/2023)

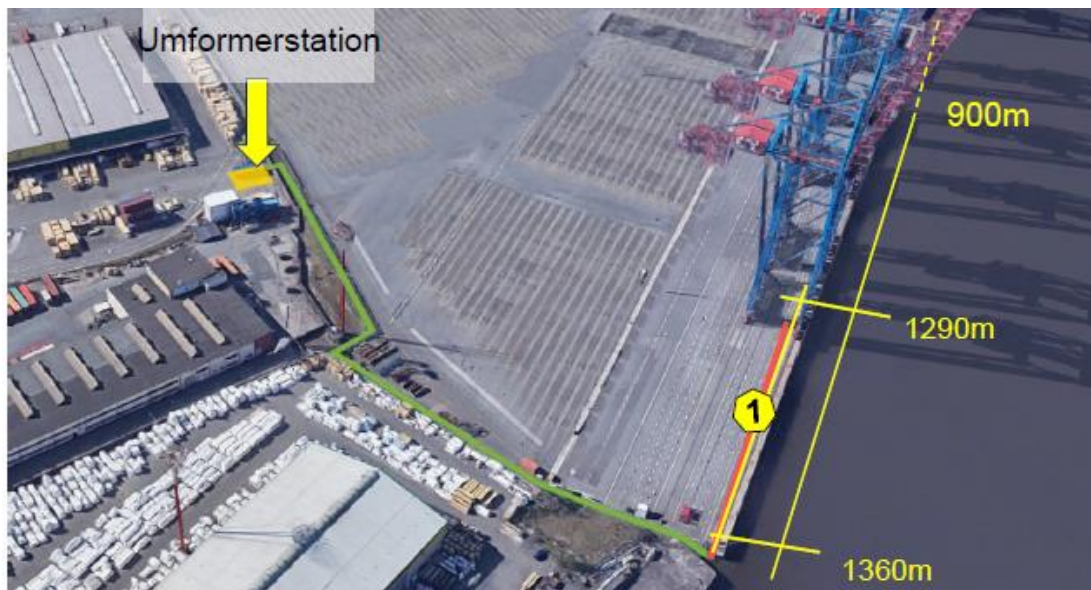
Key facts CTT shore power facility:

- 1 connection system, service range of 100m
- Cable drum with pulling system
- Maximum supply of 7.5 MVA to per vessel
- Power sourced from the public grid

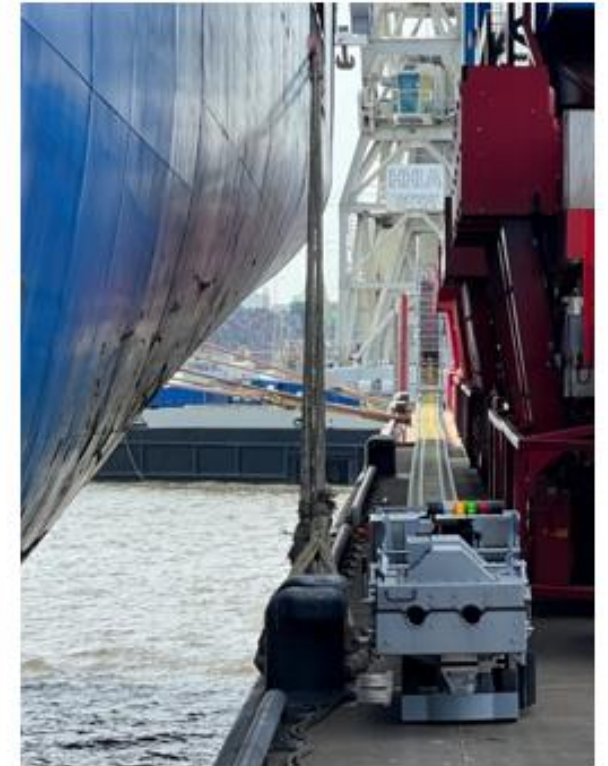
Connection System (pulling system with cable drum on platform next to quay)



Indication of service areas



Connection system CTT



Connection test CTT



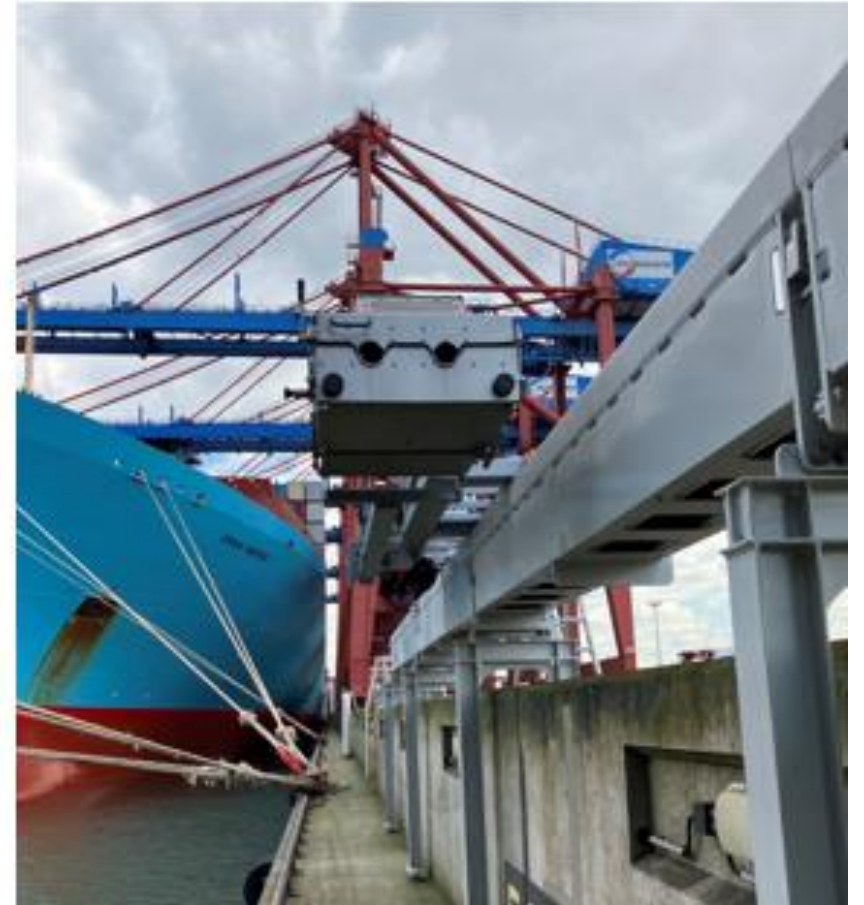
Converter station CTH



Connections system installation CTH



CTH connection system

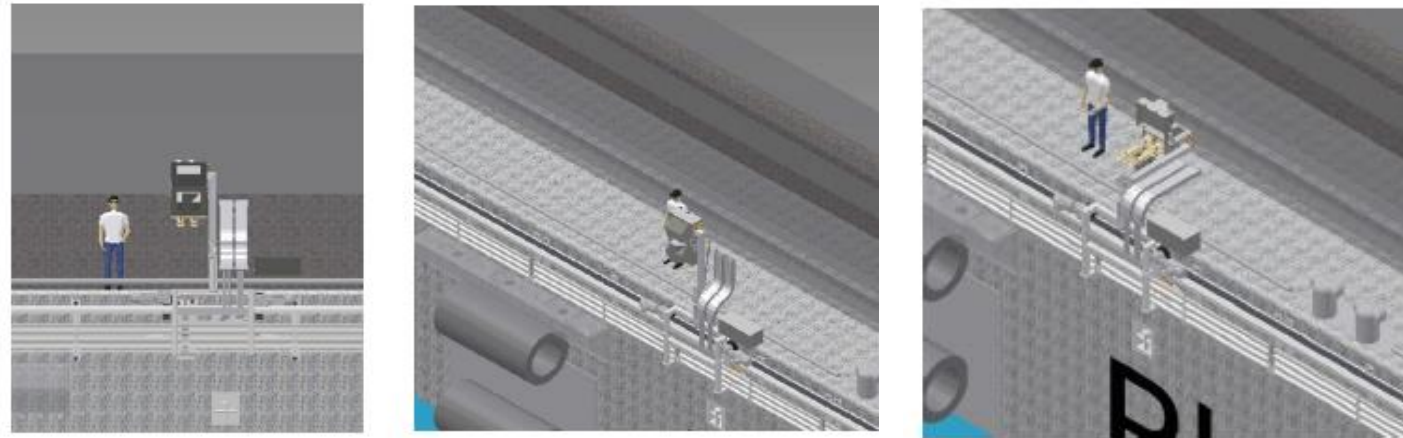


Technical overview shore power solution – CTB (05/2023)

Key facts CTB shore power facility:

- 3 connection systems with a service range of 100m each.
- Movement along a cable chain attached to the quay within the limits of the maximum fender compression
- Maximum supply of 7,5 MVA per vessel
- Power sourced from the public grid

Connection System (moveable socket on cable chain attached to quay wall)



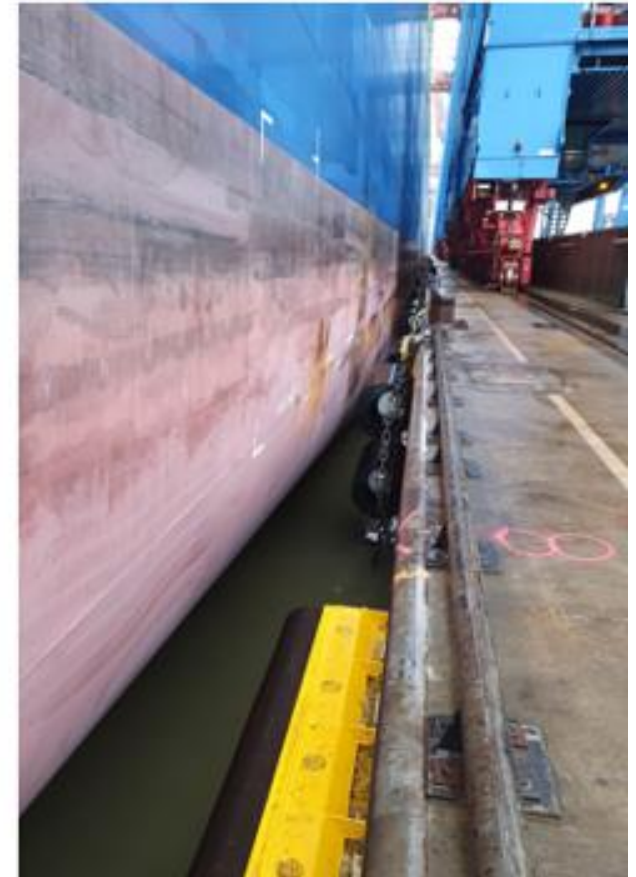
Indication of service areas



Converter station CTB



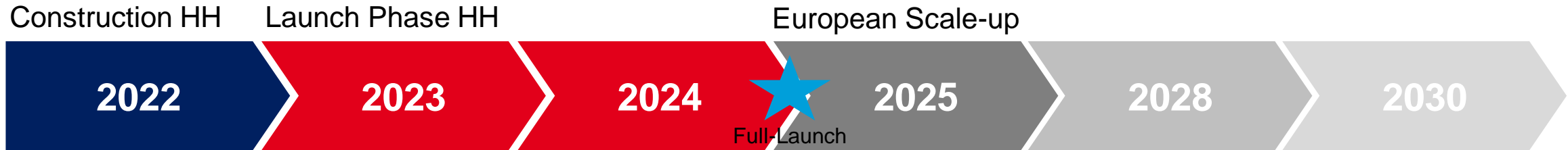
CTB connection system / fender



Overview on key technical specs, 2023 commissionings

Key facts shorepower	CTT	CTH	CTB
Connection points (CP)	1	3	3
Service range (MM)	1290-1360	50-200 500-650 1620-1730	70-170 520-620 1010-1110
Typical service side	port	port	starbord
Simultaneous use at start	1	2	2
Connection type	IEC80005-1		
Max power per CP	7,5 MVA		
Voltage/frequency	6.6 KV/60Hz		
Transformer technology	Siemens	PowerCon	Siemens
Connection system	Igus		
Facility commissioning period	02/03 2023	03/04 2023	03/04 & 06/07 2023
Testphase service from	04 2023	05 2023	05 & 08 2023

Launch and scale-up process



Main construction period

Commissioning of CTT, CTH, CTB, CC3

Commissioning of CTA

Commissioning of CC1

Development of solutions for other terminals (depending on final EU regulation)

Development of solutions for other segments and terminals (depending on final EU regulation)

Adjusting legal frameworks

Operational live tests of facilities

Scale up of operations

Roll-out of final operating concept

Developing operating concept

Special focus on prequalification and commissioning of container fleets

Integration of learnings from first supplies

Full market supply

Dialogue with shipping companies with regards to commissioning of fleets

Learning and shaping of product

Sales dialogues with focus on full launch

Differentiated energy procurement models

Commissioning of container fleets

European context:
Launch Rotterdam
EU Emission trading
EU Carbon Intensity
Reduktion targets

European context:
Launch of OPS in all North-Western
European Ports

European context:
Europe-wide shorepower offerings (Fit for 55) widening for climate regulation

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