



The Zero Emission Terminal – How to connect the green future

Electrification & data communication solutions for port equipment



845 employees worldwide

100 %

Family owned since 1912



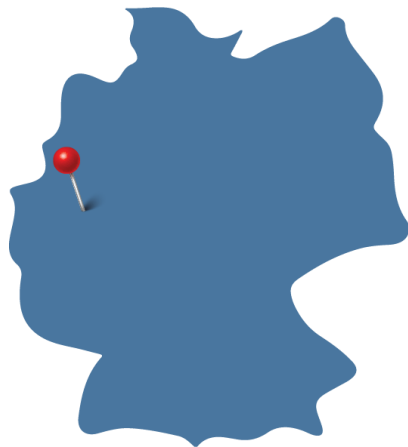
12 VAHLE subsidiaries worldwide and representations in 52 countries



€ 150 mil. in sales

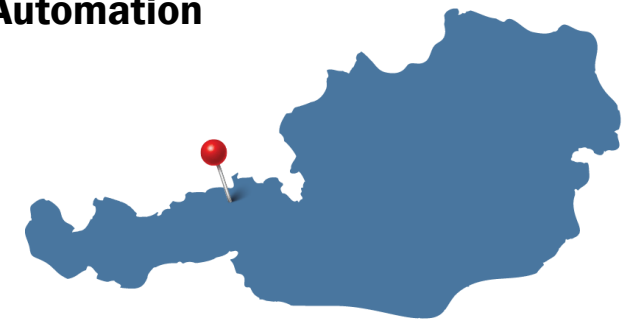
Headquarter Kamen, Germany

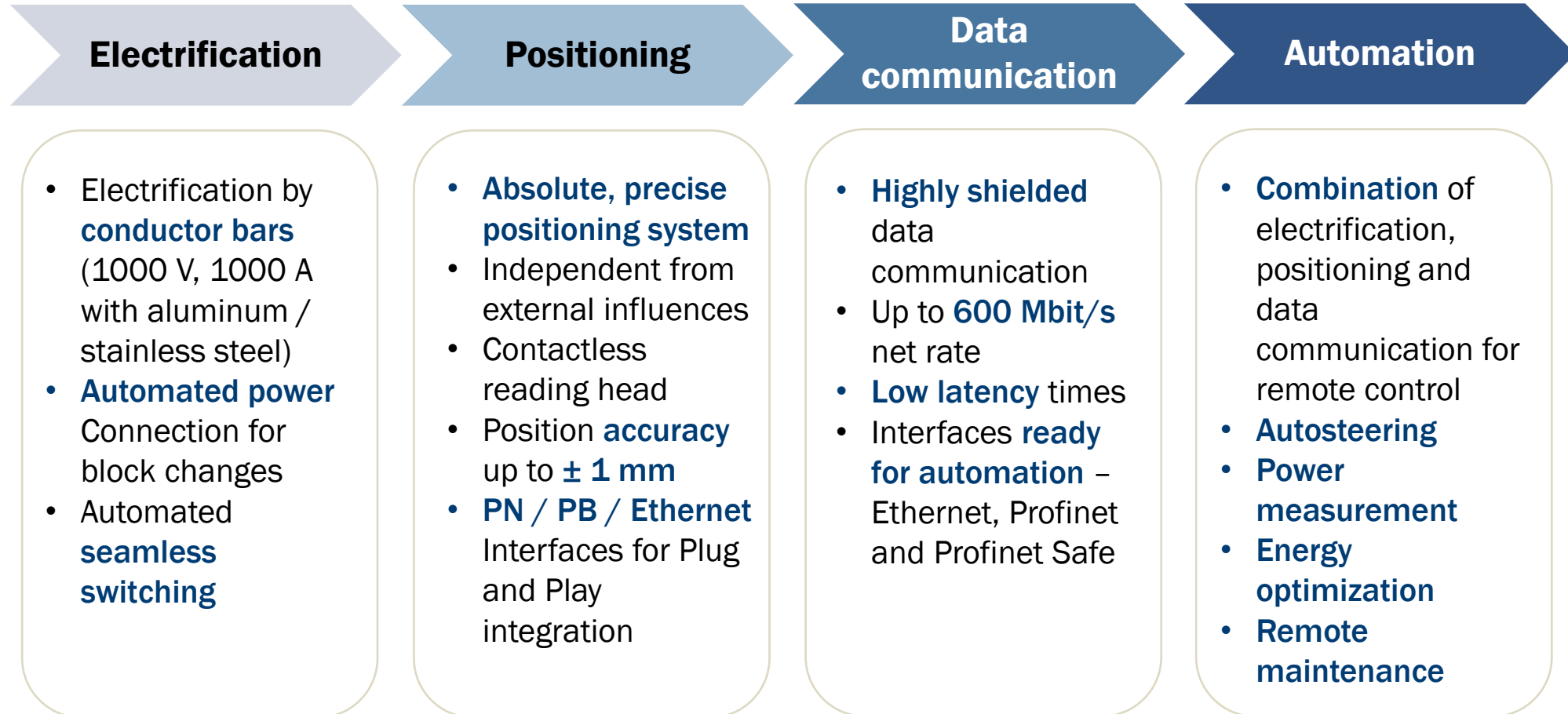
- Engineering
- Production
- Sales



Technology Center Automation Schwoich, Austria

- Engineering
- Trend Scouting
- Training

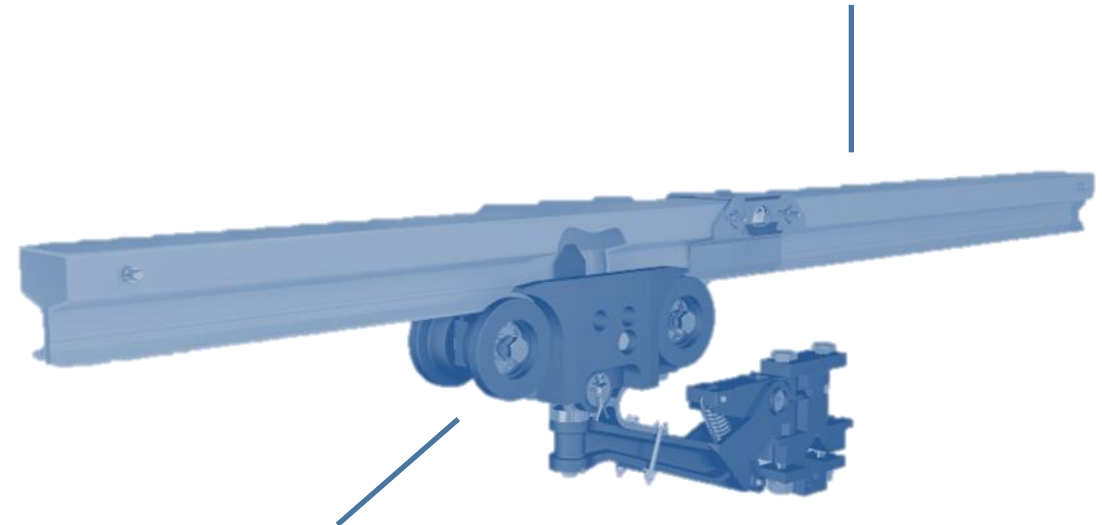




Characteristics

- EN55022 Class A certified: **no radio frequency device**
- Lowest emission for safe and reliable operation
- Simultaneously video and data transmission with one device
- Coexistent with other radio systems
 - Antenna driving in/out of the rail without influencing the remaining devices
- Frequency band 2,4 or 5 to 5.8 Ghz
- Flexible for different application and travel length

SMGX data communication waveguide
installed at the steel support structure

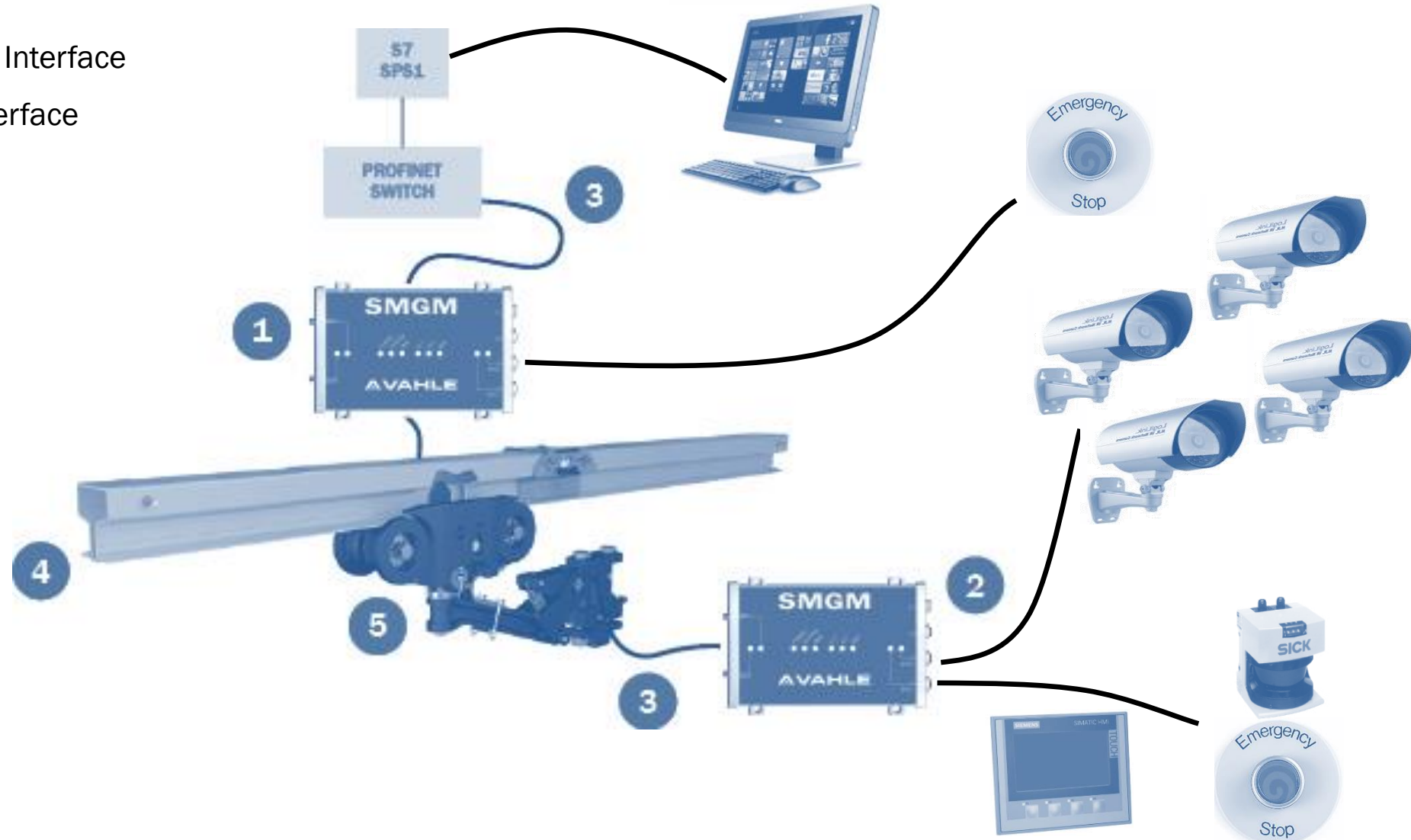


SMGX antenna
installed at the current collector trolley

SMGX Data Communication

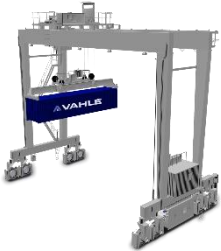
Overview

- 1 SMGM Stationary Segment Interface
- 2 SMGM Mobile Segment Interface
- 3 SMGM HF Cable
- 4 SMGX Profile
- 5 SMGX Mobile Coupler

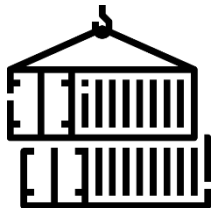




2013 - today



12 Ultra post panamax crane

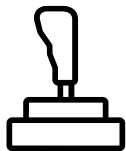


Movable Parts weight: 20KG
compare to festoon system and
cable chain

Less noise

No cable for wear

Easy maintenance

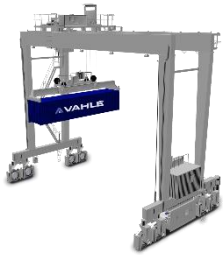


SMG data communication system

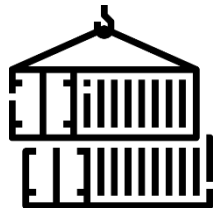




2011 - 2013



104 RTGs (retrofit & new cranes)



Electrification of 66 container blocks



Electricity-powered Rubber-tyred Gantry Cranes (E-RTGs) Conversion

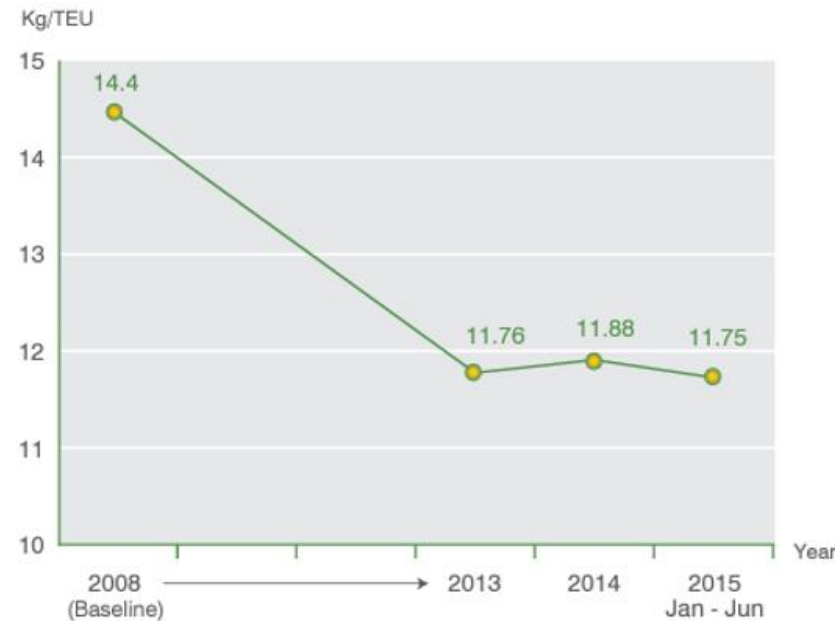
By the end of June 2015, there were some 200 Rubber-tyred Gantry Cranes (RTGs) across our business units in Hong Kong and mainland China. To reduce associated emissions, the Group has been progressively replacing traditional diesel-fuel powered RTGs with hybrid RTGs and E-RTGs. All of our 94 RTGs in HKBU were converted to E-RTGs with engines compliant with EU Stage IIIA emission standards by the end of 2014; DCB has already been using a full fleet of E-RTGs since it commenced operations in 2007; in TIG P2, E-RTG conversion has taken place in 2008, covering 95% of all RTGs. In 2014, the replacement of eight E-RTGs in HKBU contributed to the reduction of over 850 tonnes of CO_{2e} emission.



New environmental targets for our operations

Operations	Unit	Baseline year	Reduction target
Container operations	CO _{2e} kg/ TEU	2008	10 kg/TEU in 2018, 30% reduction from base year
Break-bulk cargo operations	CO _{2e} kg/ ton	2013	1.7 kg/ton in 2018, 11% reduction from base year

CO_{2e}
Emission
per TEU



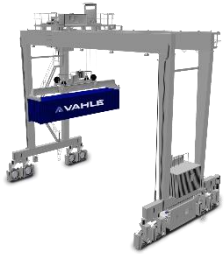
*Only data of container terminal operations is included in the calculation.

Total savings 2011-2018:

298.130.000,00 kg CO₂ *₁



2015 – today



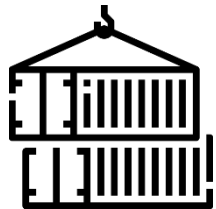
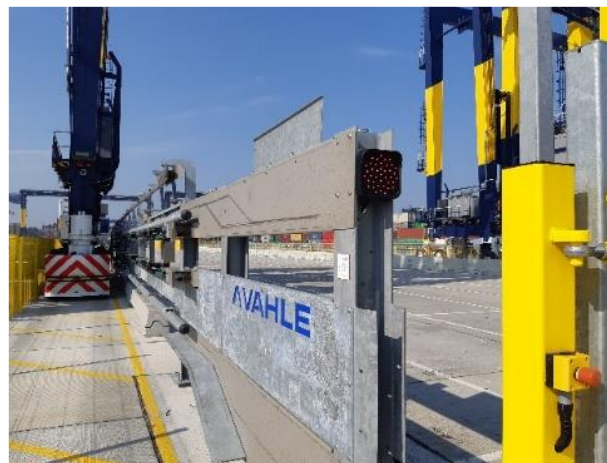
Retrofit

66 ZPMC RTGs

Greenfield

Berth 9: 8 new remote ZPMC eRTGCs

17 new Konecranes aeRTGCs



Retrofit

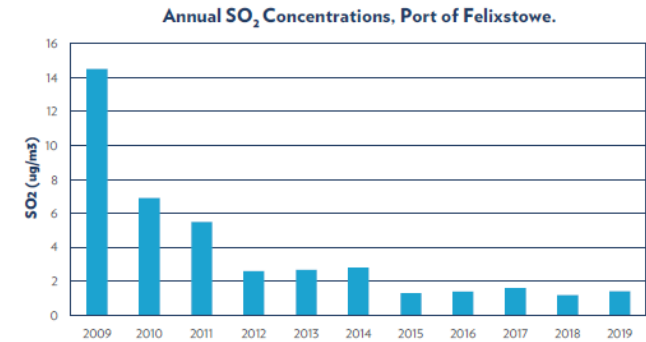
59 blocks (15,322 m)

Greenfield

Berth 9: 8 container blocks



Automation with **SMGX data communication** and positioning



Scope 1 (direct) emissions produced on-site by fossil fuel combustion; mainly by RTG cranes, internal movement vehicles and port vehicles.

Total savings since 2015:

89.620.000,00 kgCO₂ *₂

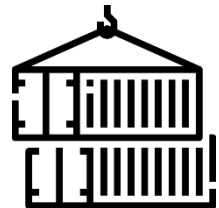


2017 - today

World's
first
remote
controlled
terminal



Remote operation with 28 new AERTGCs



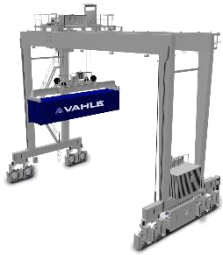
Automation of 20 container blocks
in phase 1 – 5,040 m
Phase 2 already in progress



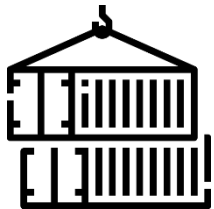
SMGX data communication system
For remote control



2021 - today



9 new Konecranes AERTGCs



Automation of 6 container blocks
in phase 1 - 1,316 m

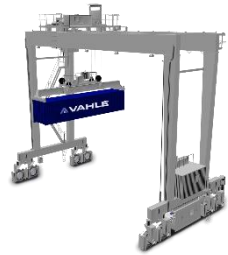


Including **SMGX data communication system**

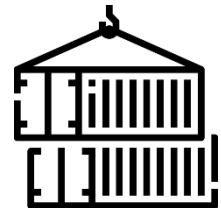




2021 - today



15 new Konecranes AERTGCs



Automation of 4 container blocks
in phase 1 – 1,176 m

Commissioning project ongoing



SMGX data communication system
For remote control



VAHLE eRTG with Battery Storage on the RTG

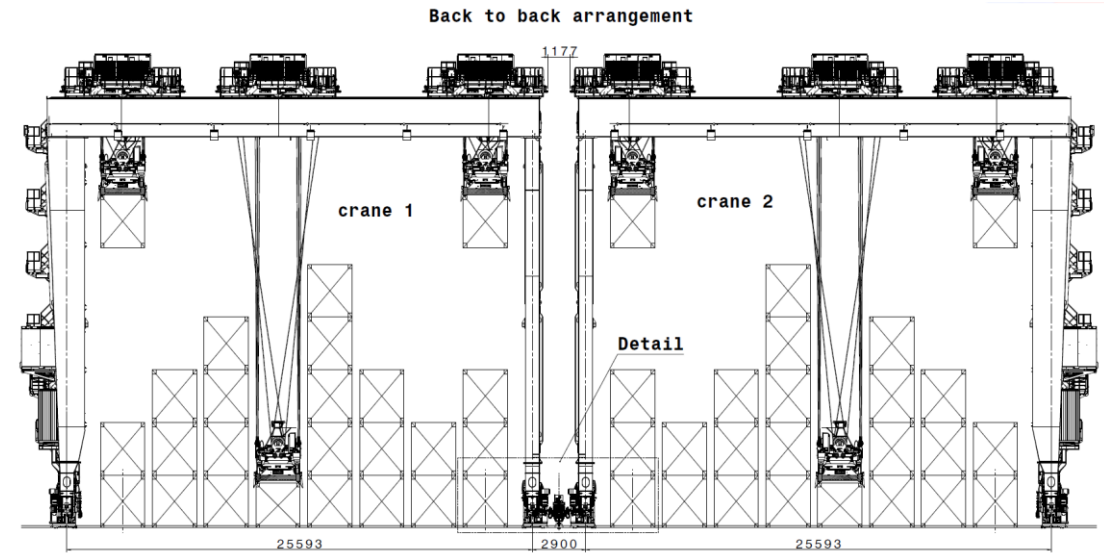
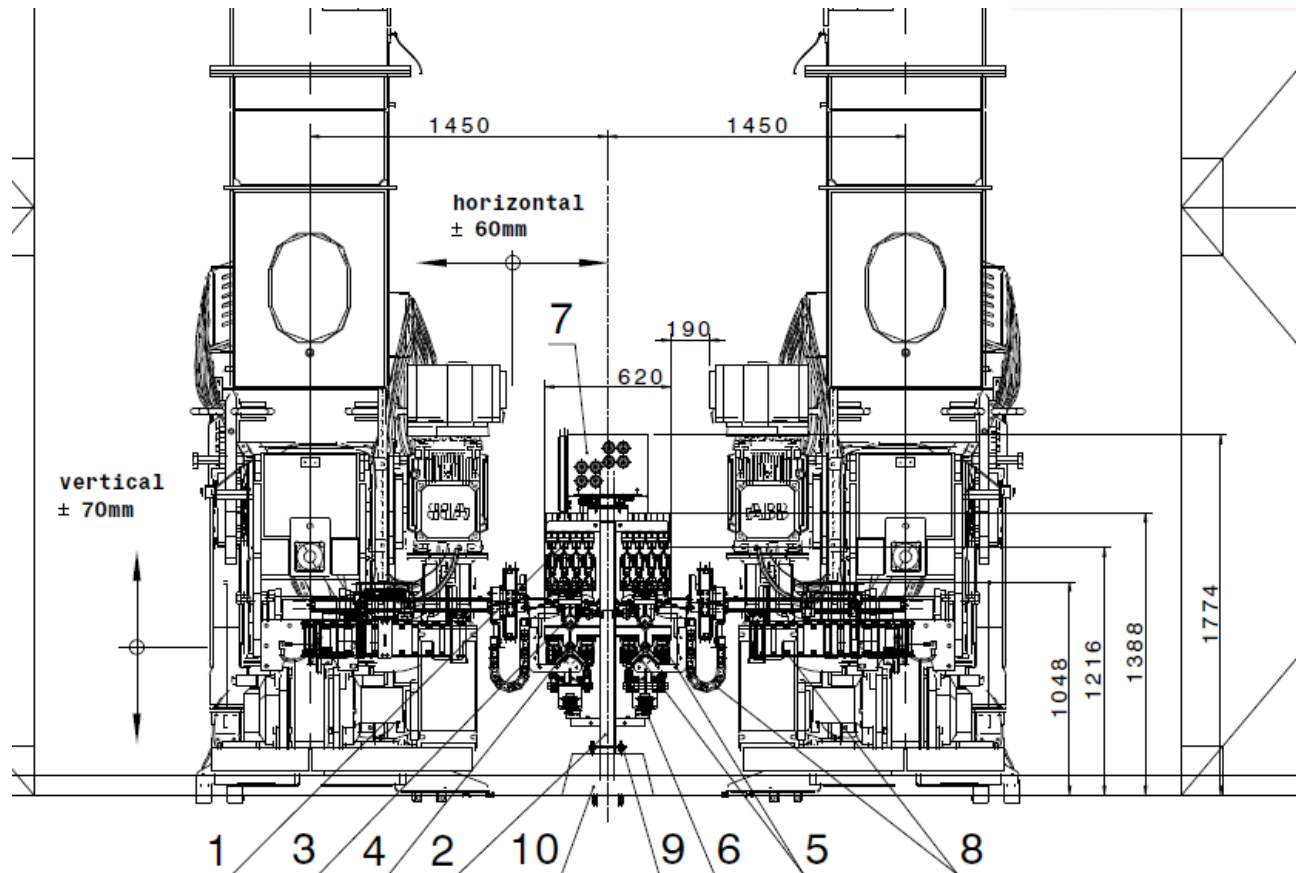
- Battery storage system **replaces** the generator on the RTG
- Batteries get charged during the operation in the conductor rail system

Benefits:

- Generator gets redundant, therefore no CO2 emission and fuel consumption of the RTG
- Saving maintenance cost
- Saving expansive load peaks, which can be reduced by the batteries

New ASC solution

Busbar with back to back design



Advantage

- reduced weight
- No restriction on acc. And max. speed
- Minimum maintenance work
- Optimized total cost of owner ship
- LV direct feeding



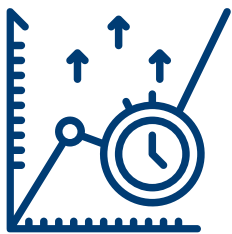
ECONOMIC

- Optimized OPEX by reduced fuel cost and idle time
- Reduced dependency on fossil fuel supplies
- Reduced GenSet maintenance cost
- Smart / remote maintenance
- Personnel costs are saved
- Productivity is increased
- Optimized Total Cost of Ownership



ECOLOGIC

- Reduction of CO₂ emissions and noise pollution
- Sustainable and green – at best with renewables



EFFICIENT

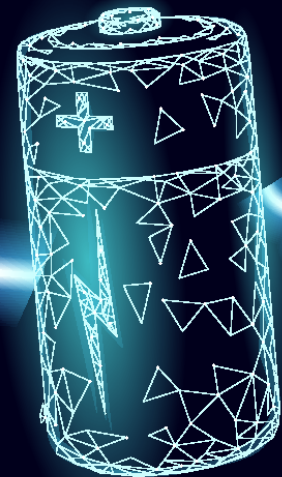
- Flexible yard operation
- Automatic connection system
- Autosteering
- Seamless synchronization
- Human Safety

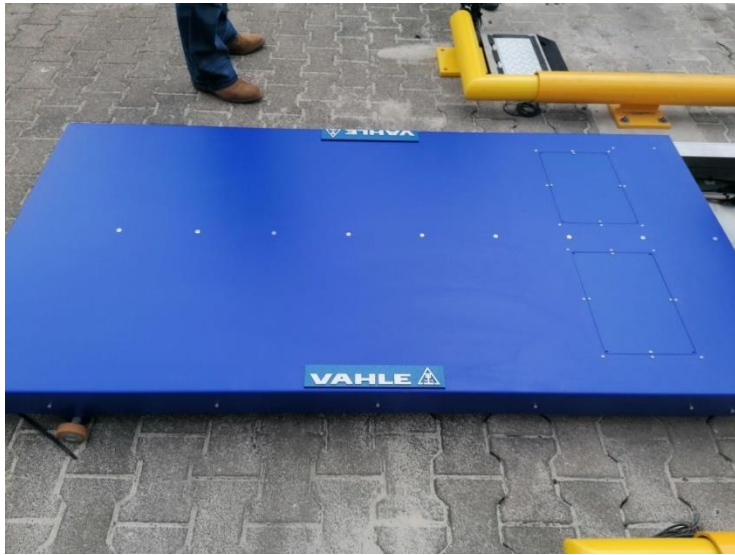




VAHLE Park & Charge

SAFE | EASY | RELIABLE







**THANK YOU FOR
YOUR ATTENTION**

Source 1: MTL Sustainability Report 2018-2019

Source 2: PoF Environment Report 2020