



Terminal Operation in a changing world

**Efficiency improvement by lean operation
with humans and equipment**

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TRANSNET



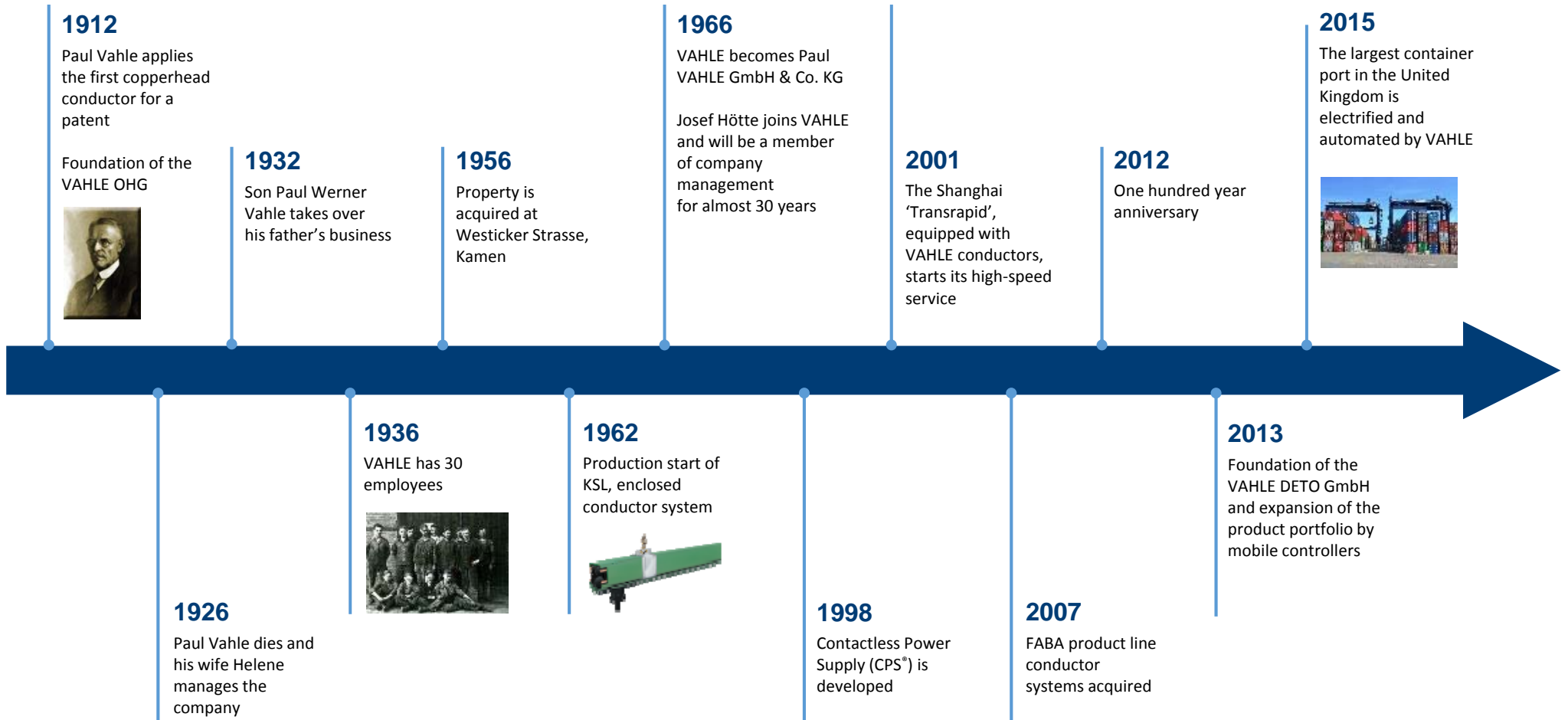
Organised by



TRANSPORT EVENTS

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www.vahle.com



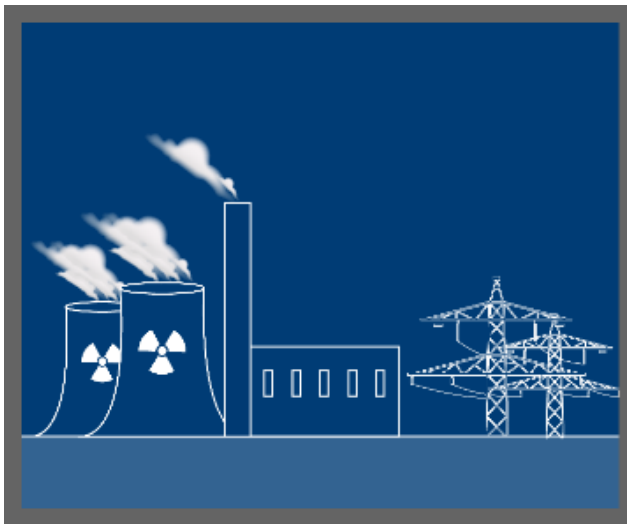
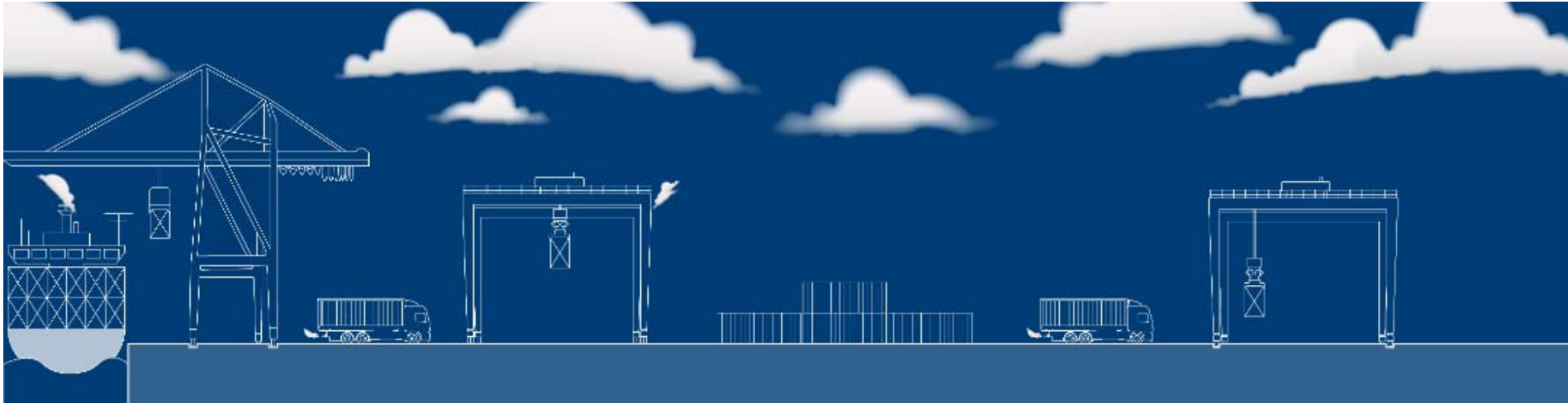


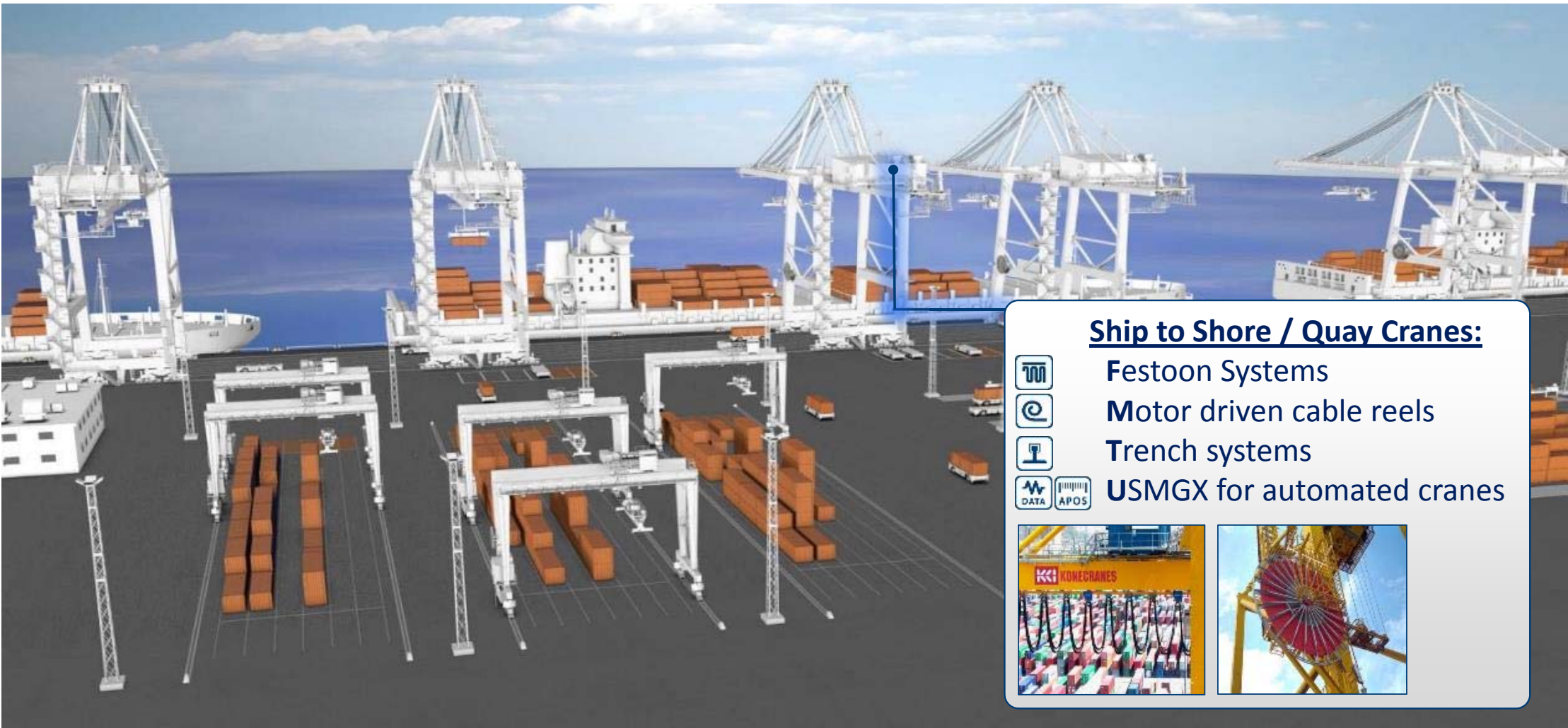
- ▲ Founded 1912
- ▲ > € 115 mil. In sales
- ▲ > 750 employees worldwide (01.01.2017)
- ▲ 12 VAHLE subsidiaries worldwide (VAHLE South East Asia founded in 2016)
- ▲ Representations in 52 countries
- ▲ 100 % family owned
- ▲ Production based in Germany



Terminal Operators

In a changing world – 15 years ago





Ship to Shore / Quay Cranes:



Festoon Systems



Motor driven cable reels



Trench systems







USMGX for automated cranes



STS / QC



RMG Cranes / ASC

-  Electrification with motor driven cable reels
-  Electrification with conductor rails for high speed applications
-  Data Communication
-  Independent Absolute Positioning

STS / QC



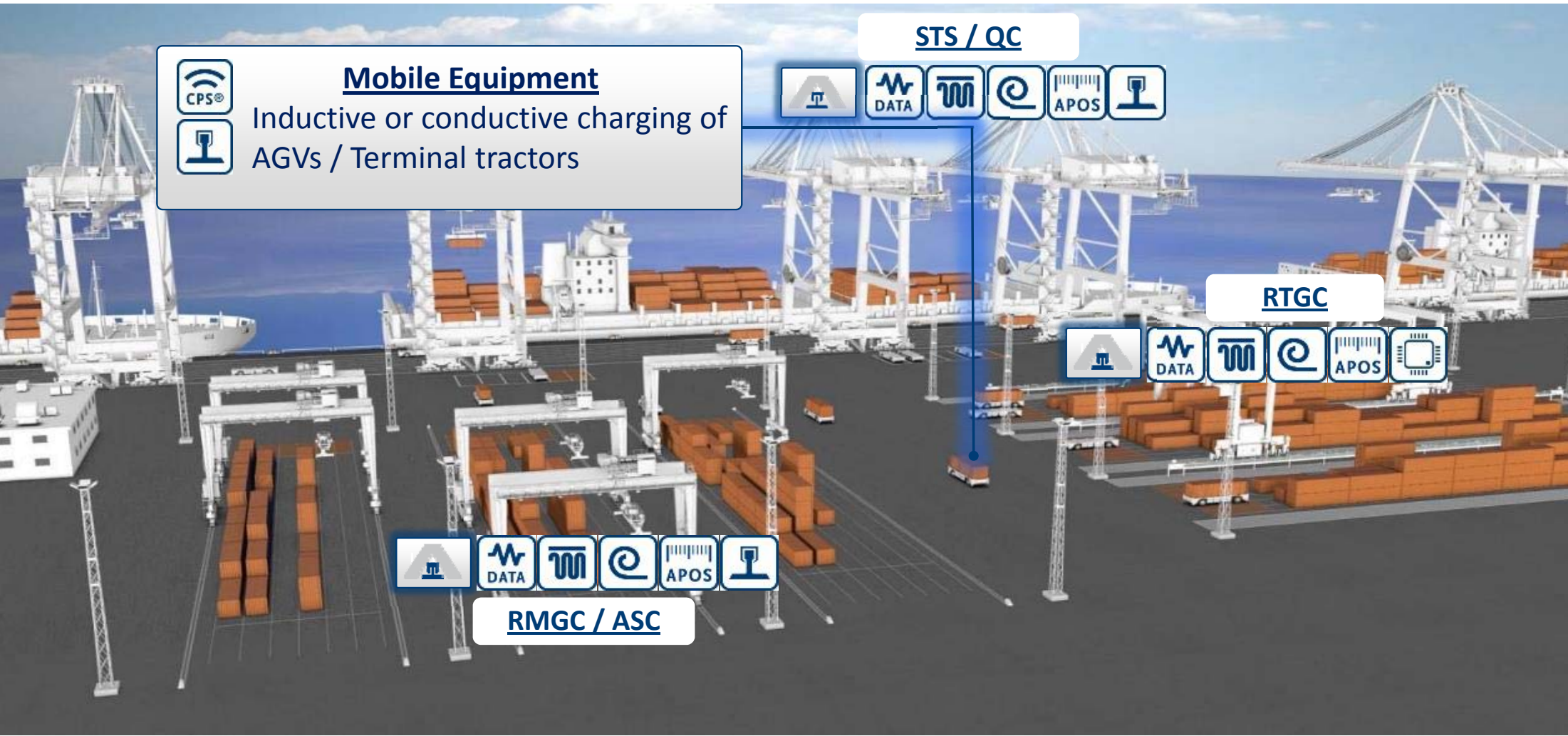
RTG Cranes




- OEM / Retrofitting
- Data Communication
- Absolute Positioning
- Automation
- Driver assistance system



RMGC / ASC



Energy Management

-  Energy storage technology
 - Use of solar electricity
 - Feeding vessels and yachts
 - Powering infrastructure
 - Decentral power management

 Containerized Substations

STS / QC



RTGC

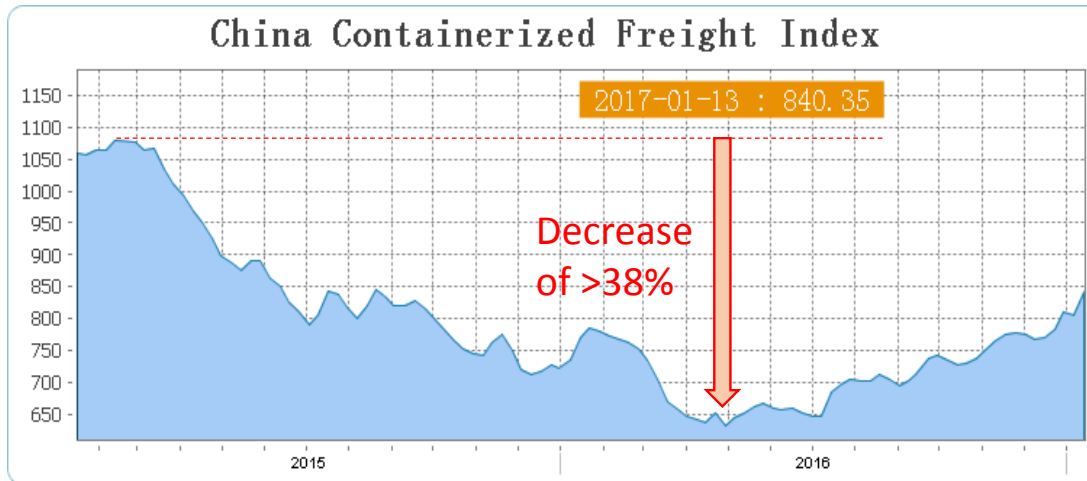


Mobile
Equipment



RMGC / ASC

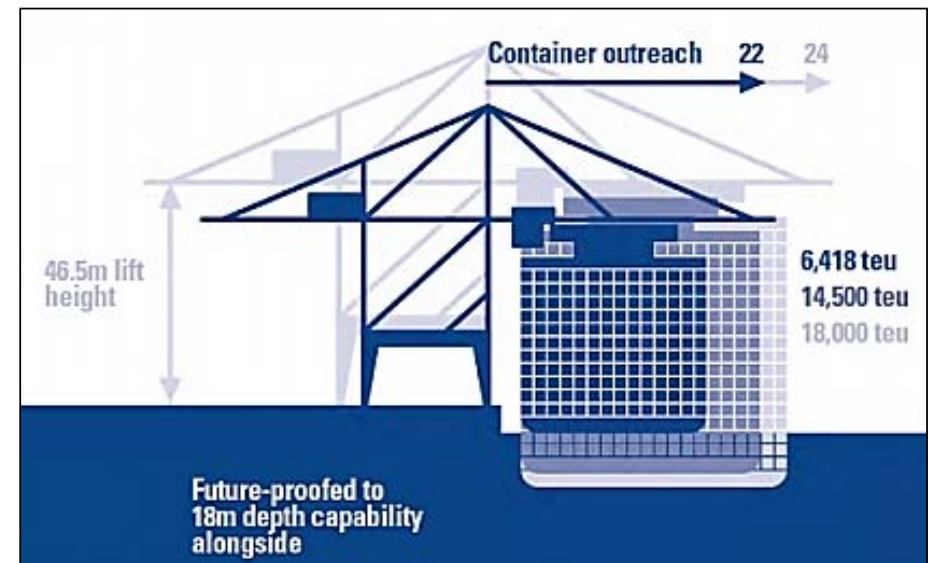
- Massive Supply-Demand imbalance



- Capacity is already high - Supply growth outpaced demand growth by more than 2% in 2016



- Investment for Terminal Operators to serve the bigger sized Container Vessels



- Maintain the handling charges by reducing the operational expenses
 - Fuel, maintenance, etc.
 - Idle time



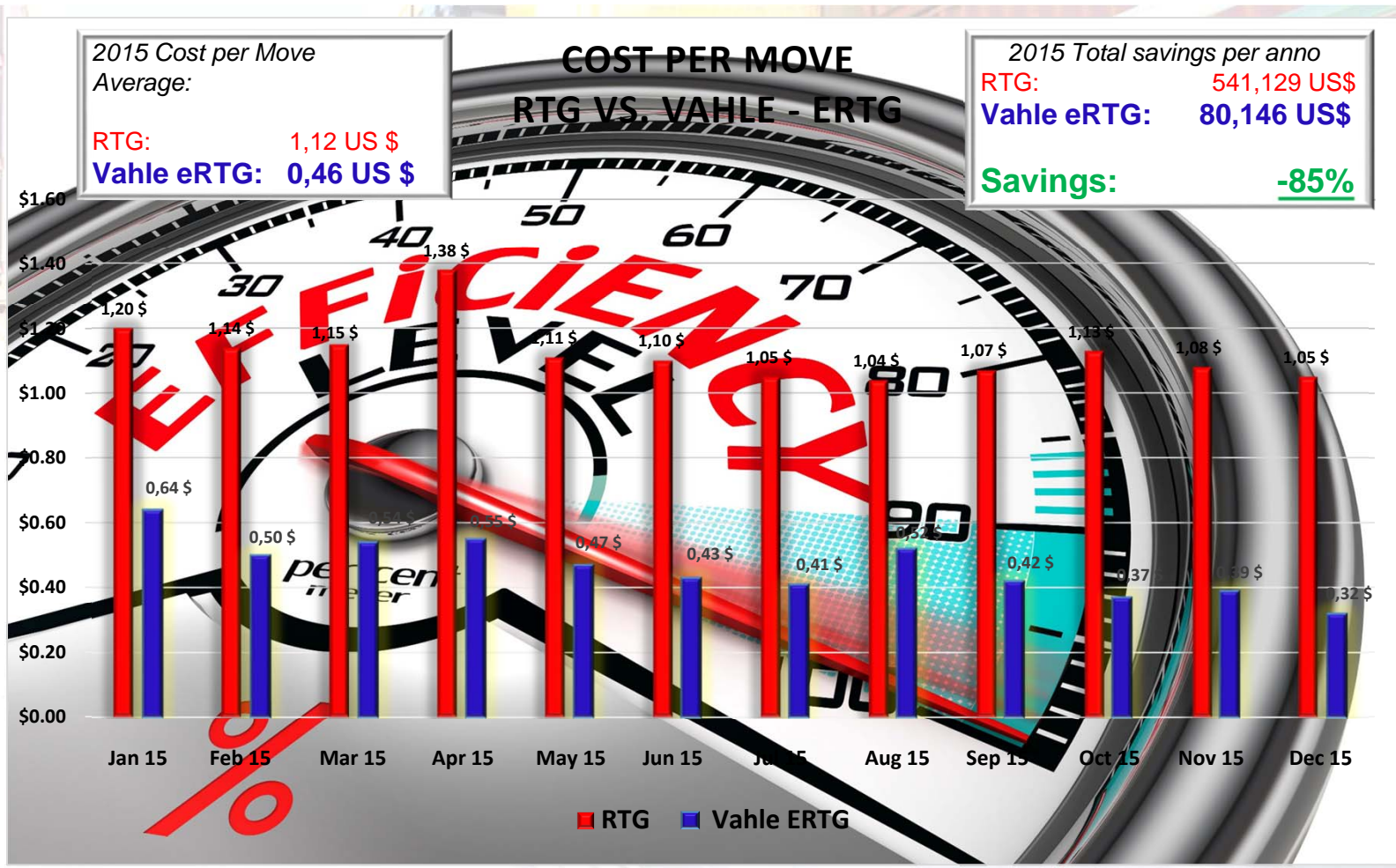


Electrification of RTG Cranes

Reduction of operational costs
Keeping the operational flexibility

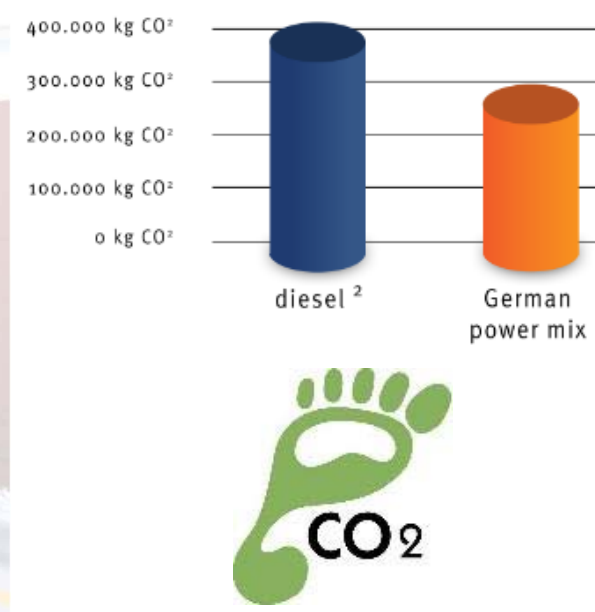
References in eRTG conversion

<u>Retrofitted RTGs:</u>	247
<u>New RTGs (OEM):</u>	108
<u>eRTGs in total:</u>	355
Supply of turnkey solutions	



Source: 1 of World's Top 3 Terminal Operator

Reduction of carbon footprint



²: based on 13L Diesel engine; 12h/d operations



Data communication SMGX

Shielded communication
(slotted waveguides)

Data communication

Different technologies available
- Radio frequency, Cable, Waveguide

Positioning Systems

Different technologies available
- GPS, D-GPS, Position Beacons,
Optical Systems, RFID

IMPORTANT ASPECTS

- ✓ Reliability of safe data communication
- ✓ Average availability of data
- ✓ Protection against external influences

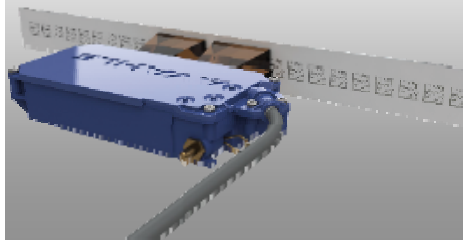
Electrification: flexible

- Electrification by **Conductor Rails**
- **Automated Power Connection** for block changes
- Automated **seamless switching**



Positioning: accurate

- **Absolute Positioning System** independent from external influences
- Position **accuracy** up to $\pm 1 \text{ mm}$
- **PN / PB / Ethernet** Interfaces for Plug and Play Integration



Data Communication: safe

- **Highly shielded data communication**
- Up to **100Mbit/s** gross rate
- **Low latency times**
- Interfaces **Ready for Automation** - Ethernet, Profinet & Profinet Safe

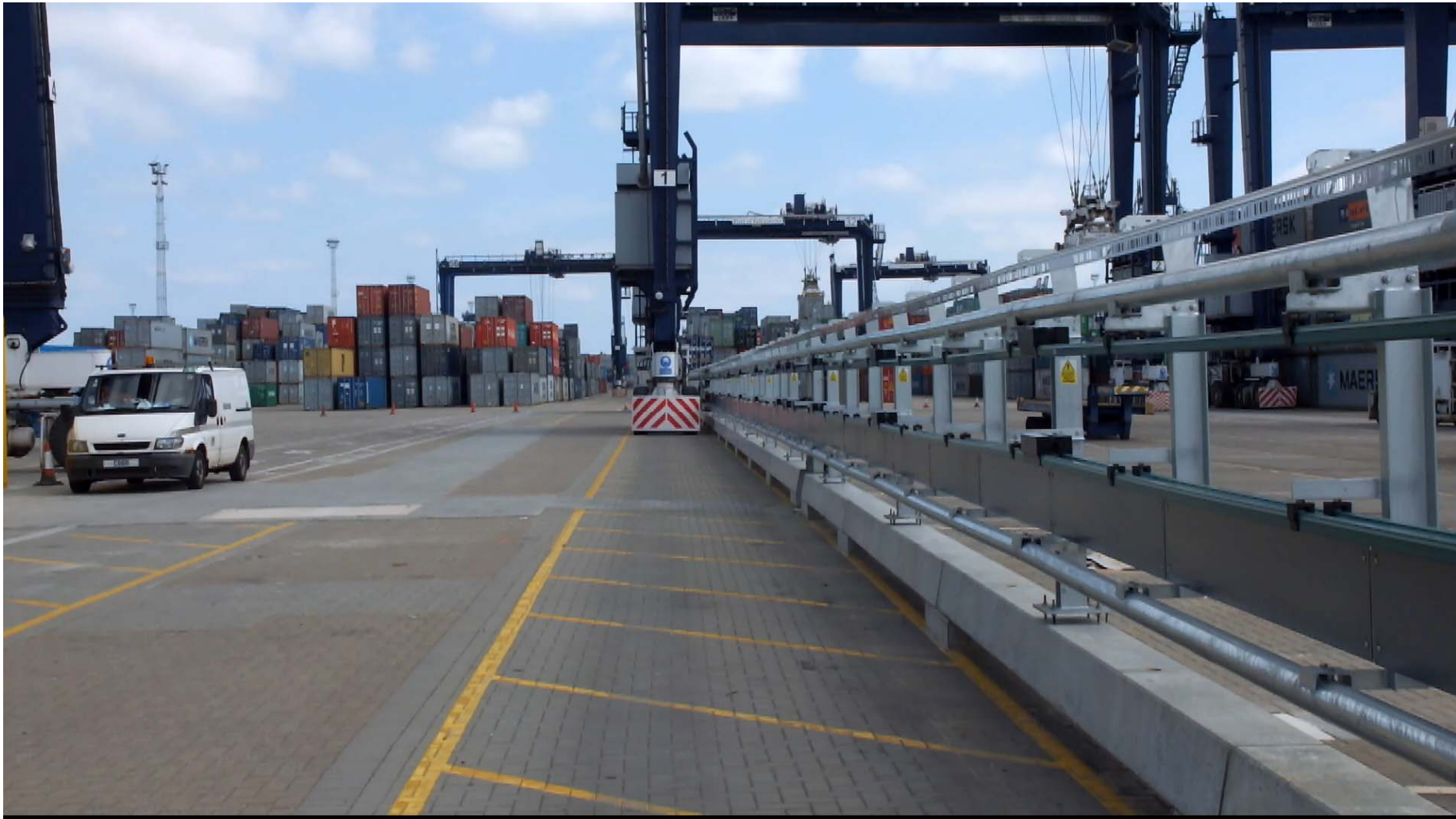


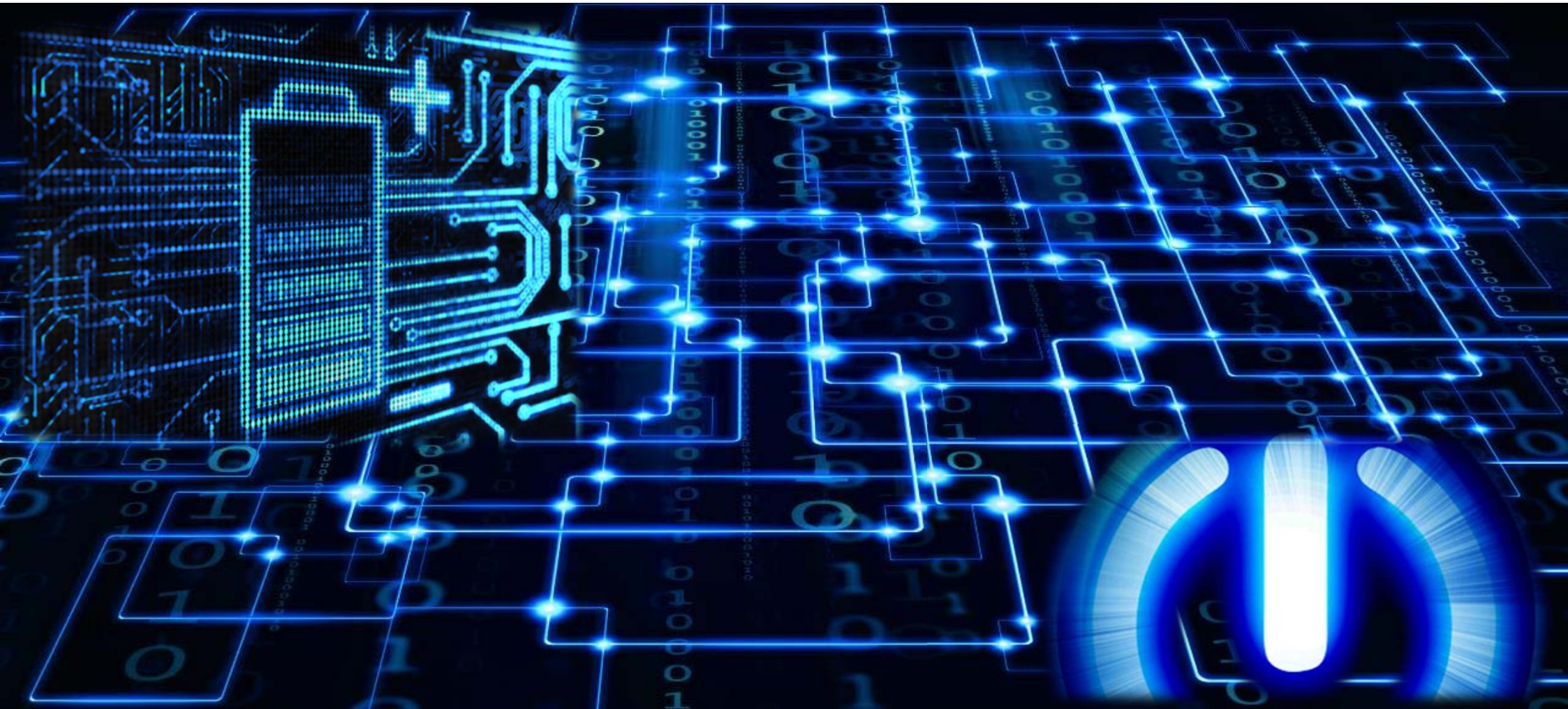
Control systems: modular

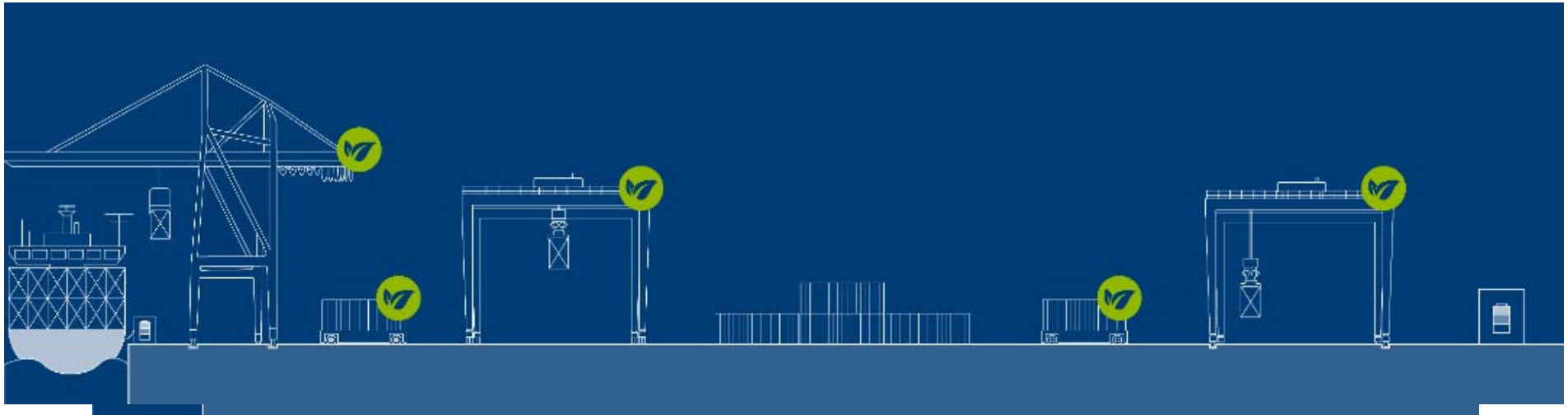
- **Autosteering**
- **Power measurement**
- **Remote Maintenance**
- **Operating data acquisition**











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