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IAPH World Ports Conference 2015

The importance of smartPORTs in global competition – challenges and solutions

Marco Lippuner, Siemens AG

Siemens and harbors?

1894 Rijnhaven, Rotterdam, the Netherlands:
An electrically powered harbor

Today

- Traffic control
- Safety and security
- Energy efficiency
- Environment protection

How can traffic be controlled intelligently?
60
30
50
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Intelligent traffic control

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Challenge

- Strong increase of freight transport
- Capacity limit of current infrastructure
- No controlled truck arrival and guidance
- Intransparent current traffic situation
- Traffic disruption through parking and waiting trucks
- High delay and handling time at ramps and terminals
- Inefficient disposition in terminals and at ramps

Solution

- Integrated Truck Guidance collects and anonymizes all truck data
- These data are bundled with available traffic data, such as travel time, traffic situation, and congestions
- Data are provided to truck drivers via mobile devices and variable message signs
- Truck drivers are routed to next available loading area or terminal in a coordinated way

Example: Pilot project in Duisburg, Germany
Implementation of Integrated Truck Guidance in Duisport

Intelligent traffic control

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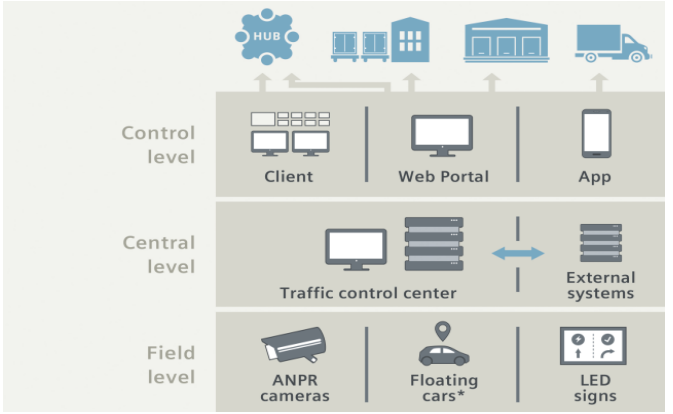
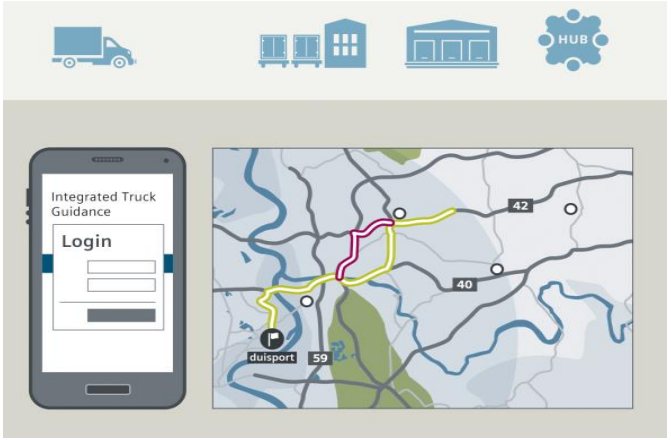
Advantages

- Shorter waiting and travel times
- Less congestion and faster handling
- Better vehicle and loading ramp utilization
- Lower fuel consumption
- Increased throughput and performance
- More efficient resource planning
- Improved pollutant balance and local traffic flows
- Quality enhancement of existing infrastructure and higher general traffic safety

Traffic control system



IT-based flow control



Electric-driven freight transport

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Electric-driven freight transport

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eHighway turns the future of electric-driven freight transport into reality. The concept for the electrification of road-freight traffic has three core components:

1. Diesel-electric hybrid technology
2. Power supply via overhead catenary lines
3. Intelligently controllable pantograph for energy transmission

Advantages:

- Easy to install: system can be seamlessly integrated in the existing infrastructure.
- Environmentally friendly: no local emission of CO2, nitrogen oxides, soot
- Efficient: electric propulsion, regenerative braking, exchange energy via the catenary system
- Economical: electric machines are very durable and reduce the dependence on fossil fuels
- Adaptable to a wide range of hybrid drive systems: diesel, battery, LNG, LPG, etc.

Example: Los Angeles

- **Electric trucks to reduce air pollution in California**
- **Demonstration route close to the major US ports of Los Angeles and Long Beach**

Picture shows testing site in Gross Dölln, Germany

How can harbors
be protected?

Security for Port of Miami

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Siveillance Vantage, the command and control solution from Siemens, is specifically designed to support security management and business continuity at ports. It offers real-time support to react effectively to security and safety incidents at any time.

Advantages:

- Resource- and Workflow Management
- Sophisticated Communication & Dispatching
- Protection of perimeter and land areas
- Compliance with state, federal and local regulations

Desigo MNS, the mass notification solution from Siemens, allows to reliably and quickly communicate alerts via multiple redundant channels such as text messaging and indoor/outdoor loudspeakers

Advantages:

- Rapid alerting and warning
- Minimizing panic and damages by maximizing control of people flows during incidents

Customer Benefits:

- **Single Situation Management SW Platform**
- **Enhanced capability of emergency notification**
- **Single Port Wide Mass Notification**
- **Support of Port Security Operation**
- **Reduction of operational costs**
- **Generation of additional revenue streams**

Security for Tank Terminals in New Jersey

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Siveillance SiteIQ Wide Area

Continuously monitors critical areas of seaports that need uninterrupted and reliable protection.

Using intelligent policy zones and virtual barriers, it stops attempted security breaches before they occur.

Advantages:

- Real time, continuous situational awareness and consistent policy enforcement
- Integrated view on a single screen
- Customizable detection parameters and alert levels
- Intelligent and automated monitoring of policy zones
- Relieves security resources from CCTV tasks
- Increasing their productivity for other security tasks

Example: International Matex Tank Terminals in Bayonne, New Jersey

- **Detection of unauthorized people, machinery and watercraft movement**
- **Earliest detection**
- **Pro-active response to threats**

How can a harbor‘s energy efficiency be optimized?

Efficient power supply for harbors

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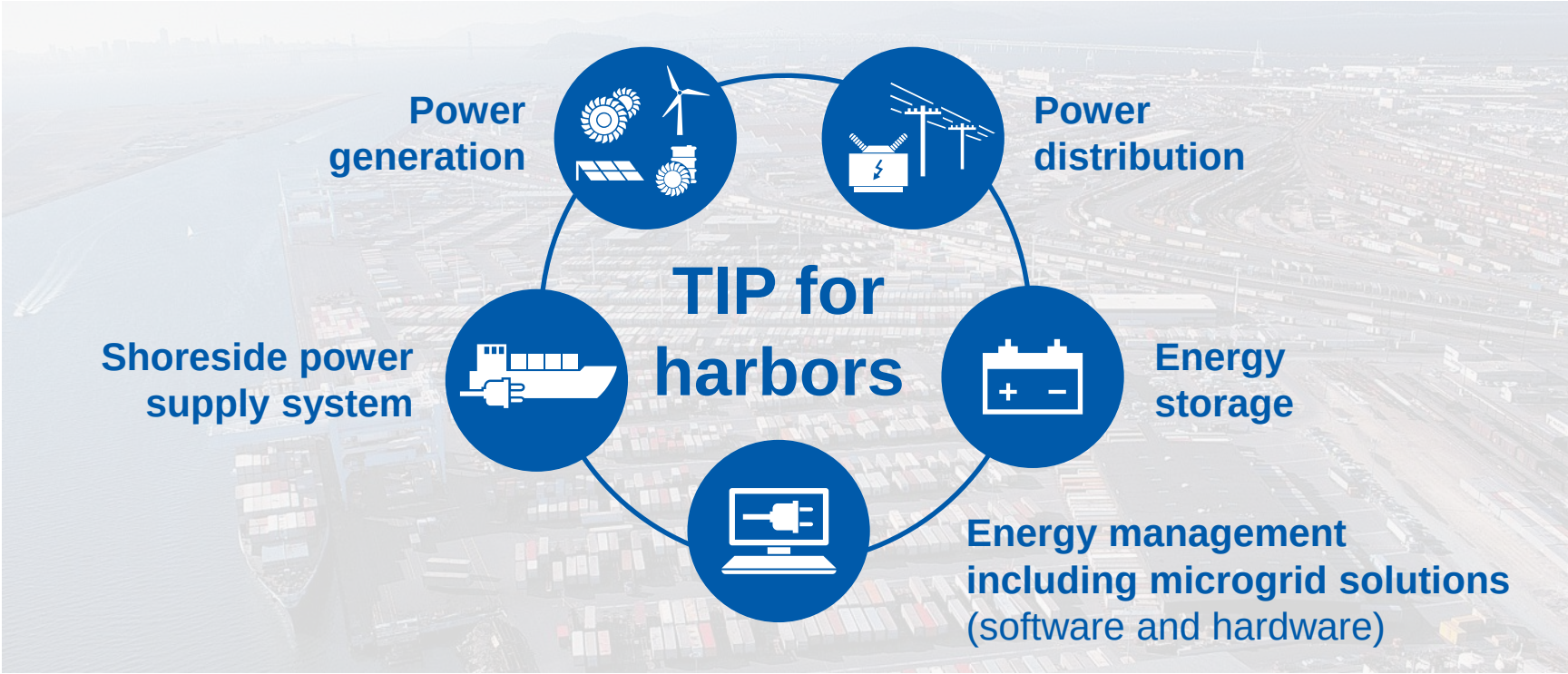
Totally Integrated Power (TIP)



Consulting, planning → Engineering, network design → Project management → Ordering, delivery → Installation, commissioning → Operation and aftersales service → Services, modernization

Efficient power supply for harbors

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Advantages:

- Higher energy efficiency
- Monitoring energy consumption
- CO2 reduction
- Independence of energy prices
- Fully customized solutions backed up with business plan
- Uninterrupted operation and processes
- Avoiding expensive peak loads

Consulting, planning → Engineering, network design → Project management → Ordering, delivery → Installation, commissioning → Operation and aftersales service → Services, modernization

Totally Integrated Power for harbors: portfolio

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Power generation	• Gas turbines, wind turbines, photovoltaics, etc.
Power distribution	• Transformers (GEAFOL cast-resin transformer, FITformer REG oil-immersed distribution transformers) • Medium-voltage power supply solutions (Siharbor, E-Houses) • Medium-voltage switchgear (8DJH36 GIS, NXAIR AIS) • Low-voltage switchboards (SIVACON S8 with MCC / LI busbars) • Low-voltage components (SENTRON devices) • Protection technology (SIPROTEC 5) • Substation automation (SICAM RTUs)
Energy storage	• SIESTORAGE
Energy management incl. microgrid solutions	• Grid Control (DEMS, Spectrum Power, …) • Grid applications (VPP, meter data management, demand response, etc.) • Big Data analytics
Shoreside power supply system	• SIHARBOR
Lifecycle services, consulting, and network planning	• Consulting (TIP Consultant Support, Power Technologies International) • Planning and simulation (PSS Sincal, Simaris planning tools) • Training • Transmission and distribution services

How can harbors become greener?

Shipping-related pollution

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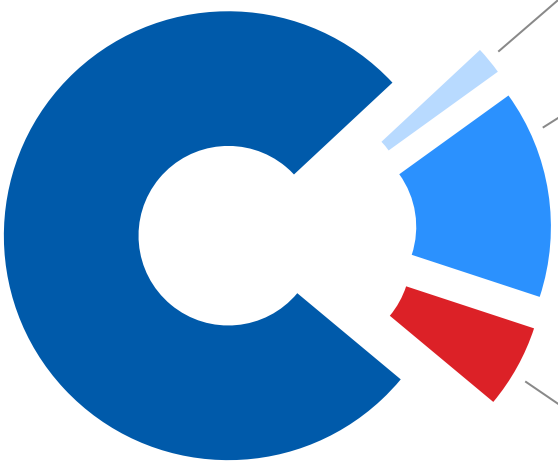
90% of transport on ships account worldwide for



2% of global CO_2 emissions

15% of global nitrogen oxide (NOx) emissions

6% of global sulphur oxide (SOx) emissions

Combustion of marine fuels port is a major contributor to air pollution

- Location of ports in congested areas of cities
- Activities (loading, unloading…) of ships are a source of emissions
- Concentration of SOx, NOx emissions and PM represents a real danger for the thousands of residents in the port area

Shore side power supply

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Shore side power supply: SIHARBOR

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Benefits for ports	• Provider of clean energy to ships • Minimized operational costs and carbon footprint • New business as energy provider to ships • Reduced noise pollution and vibrations in ports and vicinity
Benefits for ship-owners and shipyards	• Safer and more reliable power supply • Financially attractive option regarding the rising fuel prices • Lower maintenance costs (annual avg. saving per ship up to 100.000 US $) • Reduced port fees up to 10 % for ships equipped with a shore connection system (several ports are using ESI*)

Source: *Environmental Ship Index (ESI) measures the quantities of NOx, SOx, PM and CO_2 emissions from a ship and gives grades accordingly to assess ship environmental performance.

Siemens-electrified cranes: Rijnhaven, Rotterdam

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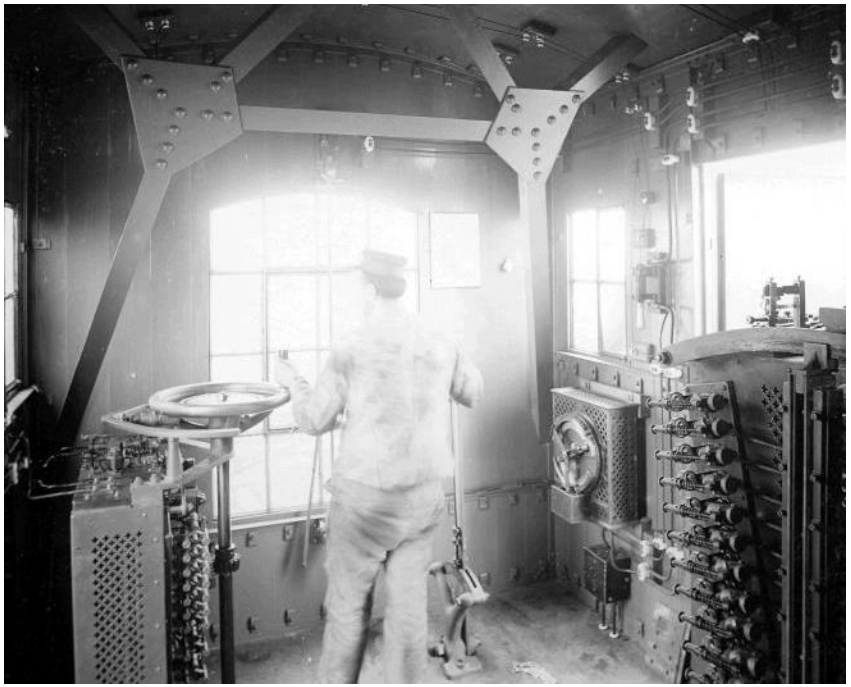
1896 – Crane boom

13 meters of outreach, 13 meters of hoisting height.

1896 – Crane attendant's hut with control levers and motorized hoist

Only two control levers are required



More than 30 percent of all harbor cranes worldwide are equipped with or driven by Siemens technology

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Visit Siemens at Booth 4!