



**Port planning for the 21st Century –
aspirations and innovations**
Friday 16th November 2012 - London

ICHCA
International Ltd



Making Container Terminals greener

Richard Marks

Director

ICHCA International Limited
(the cargo handling association)

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'Dedicated to the promotion of safety, security, environmental protection and efficiency in the handling of cargo by all modes and during all phases of the international transport chains'

What is ICHCA International?

- ICHCA International is a membership organisation for the cargo handling industry globally
- It is an independent, non-political and non-profit making organisation.
- It represents its members and the industry at international level through NGO status with UN Organisations, the International Maritime Organisation, the International Labour Organisation and ISO
- If you have a cargo handling problem ICHCA International can help with
 - Expert technical advice service
 - Investigation by the Expert Panel
- ICHCA International publishes a wide range of easy to use best practice guidance on cargo handling safety, security and environmental issues

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Introduction

- Container terminals use large amounts of electrical energy and fuels for:
 - Operating handling equipment
 - Reefer connections
 - Lighting (area and local)
 - Buildings
- Terminals generate emissions affecting air quality from:
 - Hydrocarbon fuelled equipment and vehicles
- Terminals generate emissions affecting water quality from:
 - Rainwater run-off
 - Leakage of cargoes

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Introduction

- Container terminals generate noise from:
 - Equipment and port vehicle motors
 - Handling containers
 - Handling ships' hatch covers
 - Road and rail transport
- The construction of container terminals
 - Is often on reclaimed land in intertidal areas impacting on marine flora and fauna
 - Involves hydrocarbon fuelled heavy construction equipment



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Energy use in Container Terminals

- Typically use 5-15kWh of electricity/teu
- Generates 15-20 kg of CO₂/teu
- Increased productivity requires higher energy use for:
 - Higher hoist speeds
 - Higher trolley travel speeds
 - Higher long travel speeds for yard gantries
- Shore power supply increases energy use to 1-4MW depending on ship size
- Use renewable sources of energy
- Convert diesel powered equipment to electrically powered

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Energy use in Container Terminals

How can we save energy and emissions

- Use renewable sources of energy
- Convert diesel powered equipment to electrically powered
 - Hybrid diesel-electric
 - Full electric
 - Battery – require charging facilities
- Regenerate electricity on lowering & braking (saves 30-70%)
- Use new fuel sources
 - methane, biomethane, CNG and LNG (but still produce GHG)
 - Hydrogen
- Low energy lighting (LEDs save up to 70%)

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Reducing equipment movement

- Yard gantries use energy in long travel & 'digging' in stack
- Effective Yard Management Systems reduce this
- Internal transport in Yard should take most direct route
- This requires planning of container movements
- Container terminal simulation software can assist



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Energy reduction for reefers

- Container terminals with large volumes of reefers use a high percentage of the total energy (up to 65%)
- Monitor energy use to individual reefers
- Use reefers with on-board energy management systems
- Shade reefers to reduce solar gain



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Delays at terminal

- Trucks can cause long queues at and near terminal
- They create congestion, noise and produce GHG
- Energy is wasted from engine idling
- Sufficient gatehouses are required to process trucks
- Pre-notification of truck arrival and planning of slot
- Balance of yard equipment and internal transport
- Computer simulation and TOS



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Inland Transport

- Trucks generate more emissions per teu
- Improve by transferring to other inland transport modes such as:
 - Barges/small feeder ships on inland waterways
 - Electrically powered freight trains
- Trucks generate 5 times more CO₂ in grams per tonne-kilometre than inland waterways and about 10 times more than electrified rail freight



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Construction methods and materials

- Excavated soft soils need to be re-used but may be contaminated
- Often large quantities of suitable fill have to be imported
- Control of excavation and filling required to contain contaminants harmful to marine fauna
- Dredgers and construction equipment use hydrocarbon fuel
- Construction materials should be selected for their low carbon footprint
- Increase use of recycled materials
- Make use of LEED, CEEQUAL, Green Star etc

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Conclusions

- Container terminals can make themselves more sustainable
- They need to be more sustainable to satisfy:
 - Legislation
 - Their customers sustainability objectives
 - The need to be good neighbours
- GHG emissions can be reduced by:
 - Reducing energy consumption
 - Using renewable energy
 - Better planning of movements
- Container terminal equipment and construction materials contain high embedded carbon
- Need more innovation in materials

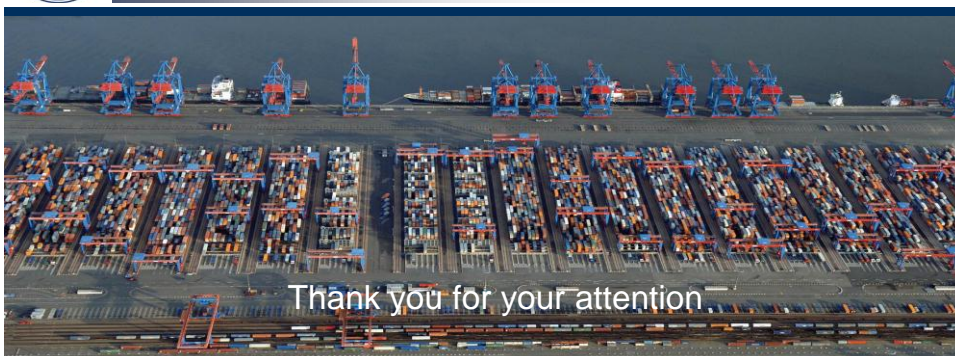
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Thank you for your attention

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