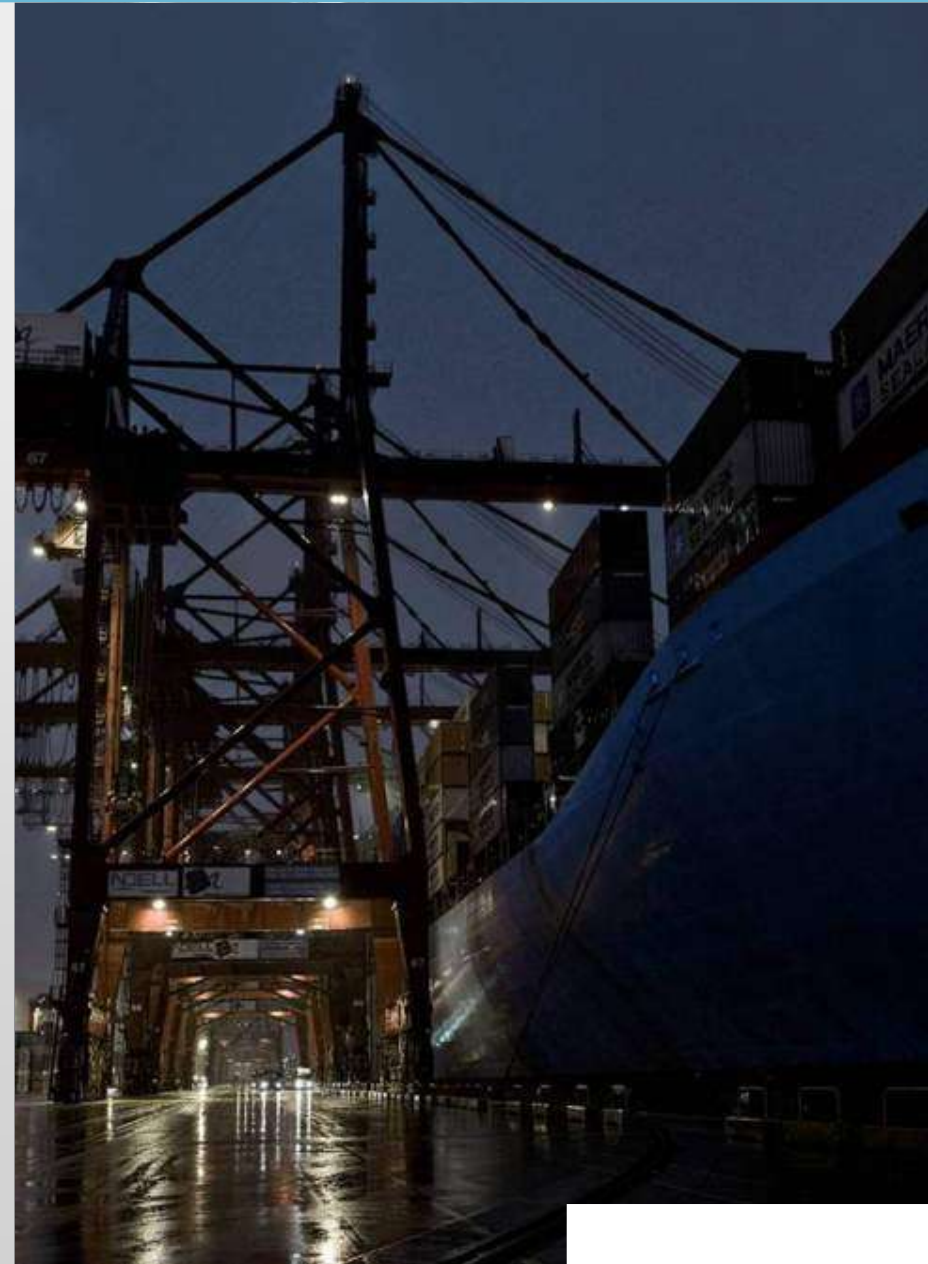


The Effect of Environmental Regulations on Maersk Line and Our Partners

AAPA HNE Committee Meeting
January 26, 2010

Capt. Bill Williams (USN, Retired)
VP-Health, Safety & Environment
Maersk Line North America



International vessels are highly regulated

- Vessels are regulated through a number of international conventions and treaties, as well as U.S. regulations, including:
 - International Maritime Organization (IMO)
 - International Safety management (ISM) code
 - MARPOL – all annexes
 - Vessel Classification Societies
 - 33 CFR (Navigation and Navigable Waters)
 - 46 CR (Shipping)
 - OPA-90
- Regulations are becoming more fragmented as states and local jurisdictions impose increasingly more stringent requirements

Remember when shipping was simply sailing from port to port?

(Under uniform, international regulations and standards)



TRANSPACIFIC 6 (TP6)



Transpacific 6 (TP6) - Eastbound

Simple no more...

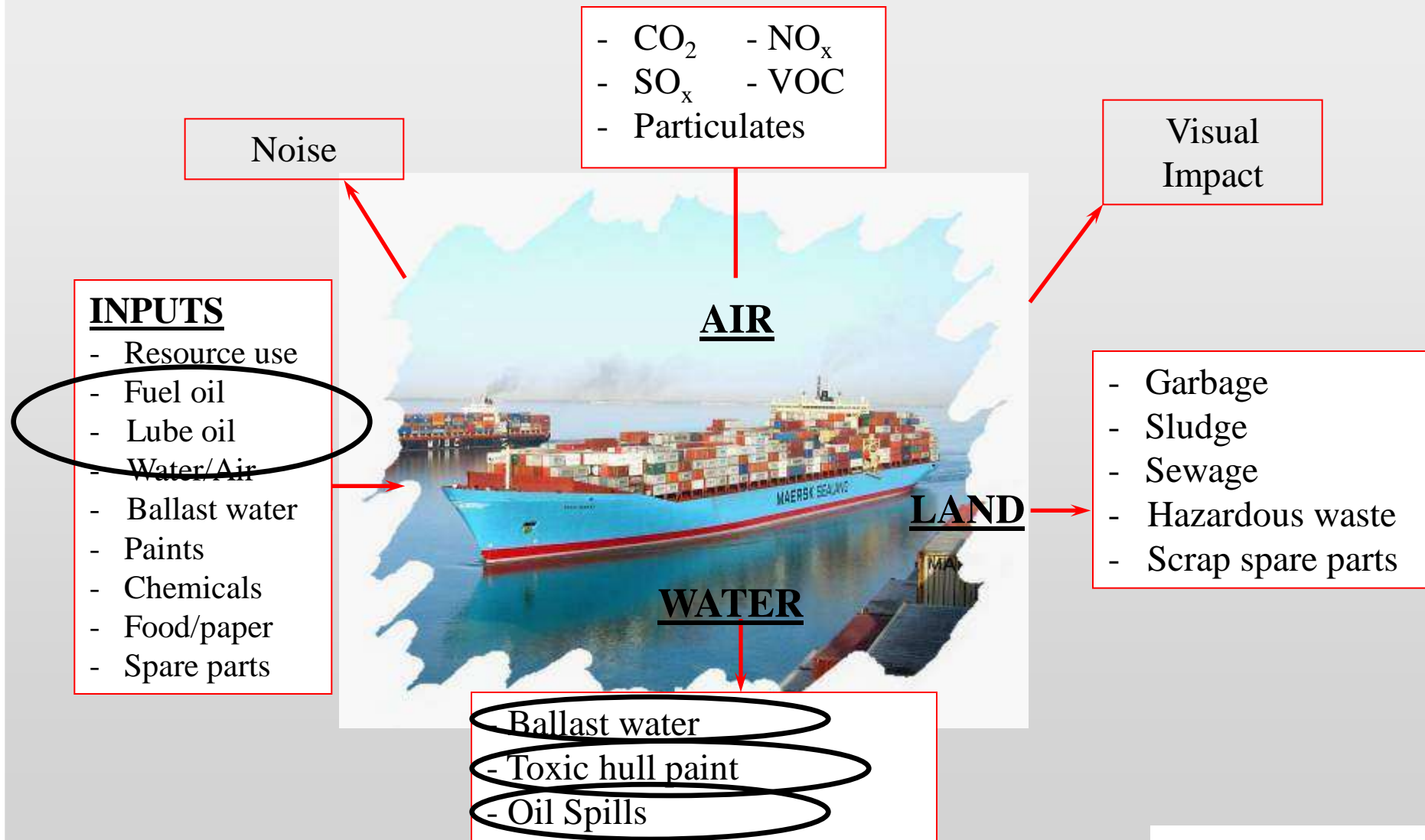
- Conflicting jurisdictions and enforcement authorities
 - Affect vessels multiple times during a voyage – and sometimes during the same day
- Regulations dictated by courts as a result of lawsuits
 - Rather than through the legislative and regulatory process based on good science
- Redefining conventional standards
 - “Waters of the State” – going beyond 3nm
- Unproven / unavailable pollution control technologies to meet the proposed regulations and standards
- Re-routing cargo to achieve lowest carbon footprint and meet customer expectations
- Increasing fees and taxes

Simple no more...

- Emission control areas
- Fuel switching, cold ironing, or slow steaming
- Endangered and invasive species
- Controlling deck runoff, gray water and other discharges
- Availability of ports, services, and inland transportation to meet business needs
- Piracy

This uncertainty increases business risks, impedes operational efficiency and may hinder our shared goal to protect the environment

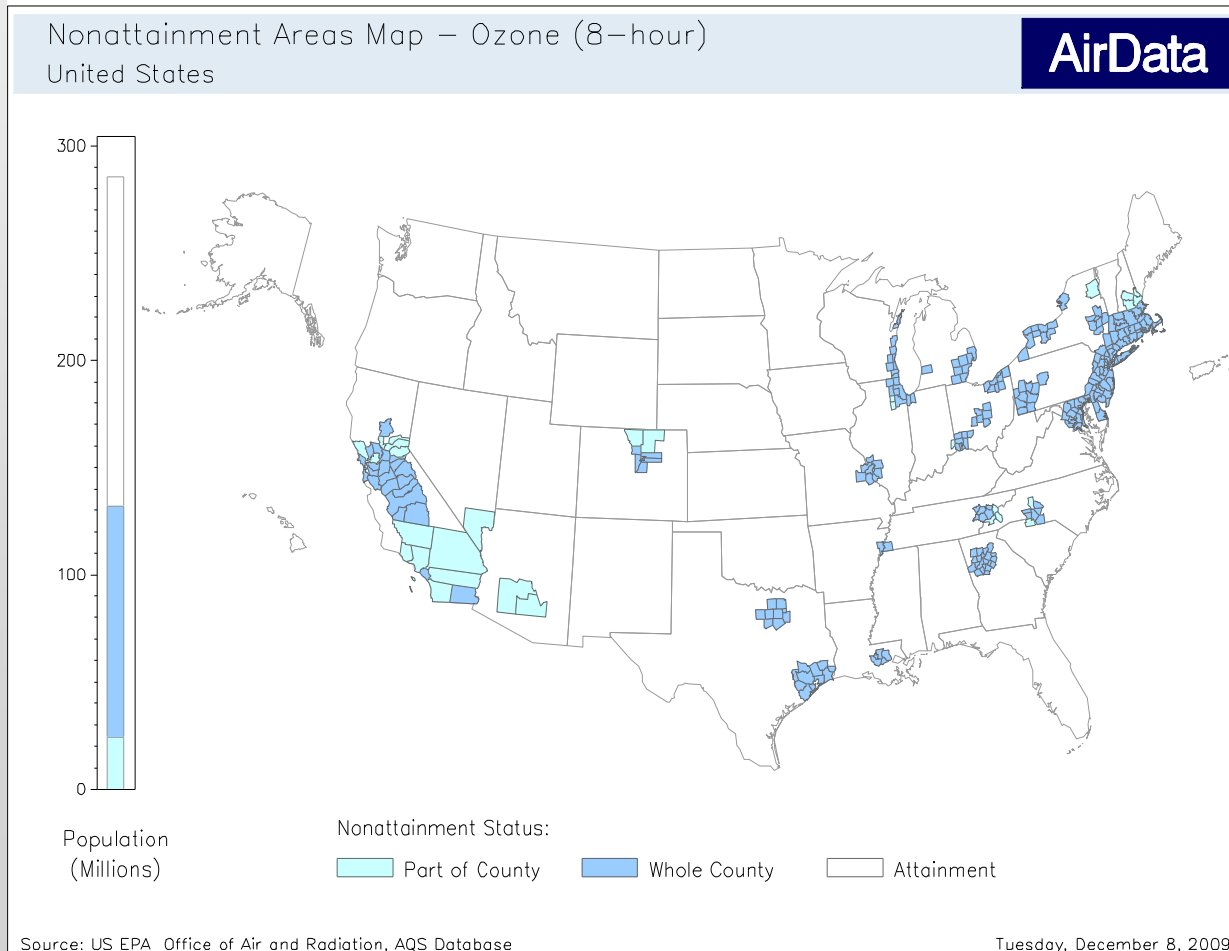
Vessels Environmental Impacts



Why care about air emissions?

Emission	Impacts	Regulated by
Sulfur oxides (SO _x) Nitrogen oxides (NO _x) Fine particles (PM)	<ul style="list-style-type: none"> ▪ Health ▪ Acid rain ▪ Ground-level ozone & smog 	US Clean Air Act + State laws Canadian Environmental Protection Act + Provincial laws
Carbon dioxide (CO ₂)	Climate change	Kyoto Protocol US Clean Air Act Endangerment Finding
Black carbon	Developing knowledge on health, climate, ice melting	No direct regulation (yet)

Air quality in many ports exceeds national standards (NAAQS), requiring reductions in emissions



Cold Ironing (shore power)

- Emissions reductions can be achieved when:
 - Both vessel and berth are equipped and hooked-up
 - Clean power is available - otherwise transfer emissions to shore generation
 - Benefits are reduced during connect and disconnect/engine restart
- High capital requirements
 - Vessel installation cost all inclusive—Est today approx \$1.2million/vessel
 - Marine Terminal -- all inclusive (vault, trenching, equipment, transformer, conduit and cables, switchgear) for one berth (1000 feet of wharf length) to dock one ship is approx \$4-5 million per berth
 - Off terminal infrastructure may also require upgrade
- Impact must consider hook-up/disconnect and engine restart
- Other implementation concerns for cargo vessels include very small crew, required skills, weather, location variations, high dock activity (safety)
- In contrast, fuel switch and slow steaming are quickly implemented, low capital investment, and mobile. Mobile solutions travel with the vessel → benefits everywhere the vessel travels

NPDES Vessel General Permit - History

- Discharges of “*pollutants incidental to the normal operation of a vessel*” had been exempt from NPDES permitting since 1973.
- In December, 2003, the long-standing exclusion became the subject of a lawsuit in the U.S. District Court for the Northern District of California.
 - The lawsuit arose from a January 13, 1999, rulemaking petition submitted to EPA by a number of parties concerned about the effects of *ballast water* discharges.
- The court ruled that EPA violated the law by exempting ballast water discharges and “any other discharge incidental to the normal operation of a vessel”.
- In response, EPA was required to develop a permit for all vessel discharges, including ballast water.

NPDES Vessel General Permit - Scope

- **VGP addresses 28 separate discharges from vessels, many addressed under existing regulation**
 - **Includes deck washdown and runoff, gray water, ballast water, bilge water and leachate from anti-fouling hull coatings**
- **VGP was developed based on data collected from military vessels**
 - **Military vessels have very different requirements and operations than commercial / container vessels**
 - **Military vessels are actually exempt for the VGP permit**
- **Ambiguities with respect to “permit ownership” and scope of inspections**
 - **Vessel owner often not responsible for crew or operations**
 - **Applicability of permit outside 3 nm (“Waters of the U.S.”)**

NPDES Vessel General Permit

-- Issues

- EPA signed the final VGP on December 18, 2008; permit became effective February 6, 2009.
- States were required to certify the Final VGP “as is” or include “additional conditions”.
 - Most of the regulated community did not have access to the additional state conditions until the permit was signed.
 - New Jersey’s certification included a prohibition on the discharge of graywater into state waters *with no exceptions*.
 - California’s certification contained sampling and testing requirements beyond anything the maritime industry had faced before.
 - Estimated costs for Maersk to comply with the California testing requirements - \$7M to \$18M/year.

NPDES Vessel General Permit -- Issues

- The “additional state” conditions caused turmoil in the industry
 - Required review of vessel routing decisions to avoid states where compliance could not be achieved
 - Extensive discussions and meetings with State regulators to modify requirements and allow vessels to call
- Ultimately the states with problematic compliance requirements deleted the conditions
 - Discussions with the regulators continue
 - Need consistent regulations to resolve the issues long-term

NPDES Vessel General Permit -- The Future

- **Vessels have been implementing the permit requirements over the past year**
 - **Litigation is pending**
 - **NGOs do not feel the regulations go far enough**
- **States are continuing to review their options in proposing more stringent standards**
- **Shipping industry is reviewing and testing technologies available to manage/treat discharges**
 - **Retrofits of vessels do not happen quickly – five year dry dock cycle**
 - **If vessels can't discharge or store, will Ports/terminals be required to install wastewater treatment plants to treat water discharges???**

Ballast Water

- Various ballast water regulations have been proposed by the IMO, Coast Guard, EPA and States
- Regulations as currently proposed require two phases of implementation
- Phase 1 requires new vessels to install treatment systems that comply with the IMO Convention starting in 2012
 - IMO standards are achievable with existing technology
 - Costs of treatment technologies estimated between \$250K to \$658K
- Phase 2 requires existing vessels to install treatment systems to meet 1,000 times the IMO standard starting in 2016
 - Vessels with phase 1 compliant systems would be required to install phase 2 compliant systems five years after the initial installations

Ballast Water

- Technologies to meet the Phase 2 standards are not yet commercially available
- Certification requirements for the ballast water control systems must be developed (Coast Guard process can take 18 months to two years)
- Testing protocols to verify that standards have been met are not yet available
- States are continuing to develop additional ballast water requirements leading to a patchwork of local regulations
 - California has two regulatory entities (State Lands and Water Resource Board) working on separate requirements
- Uncertainties in the regulatory process and the associated costs to comply with multiple standards have a real effect on business

“... shippers may see service reductions if carriers decide it’s not worth the expense to outfit fleets to meet local requirements”

The Journal of Commerce; September 4, 2009, V.10, N36

Endangered Species – Right Whale

- Maersk fully supports the intent of regulations to protect the Right Whale and other endangered species
- However, the regulations must be supported by data and the burden of operational requirements and enforcement should fall on the types of vessels shown to present the largest risk to the whales
 - Categories of vessels shown to present the greatest risk to whales (e.g., some ferries and sovereign vessels) are exempt from the regulations
- Speed reduction to 10 Kts (11.5 mph) were recommended to protect the whales
 - Speeds \leq 10kts reduce vessel maneuverability; may diminish vessel's capability to avoid marine mammals.

National Environmental Policy Act

White House working on guidance to add Greenhouse Gases to NEPA analyses

- The White House Council on Environmental Quality (CEQ) announced December 29, 2009, that it is drafting guidance to federal agencies on how to include consideration of greenhouse gas emissions and climate change impacts in National Environmental Policy Act analyses.
- CEQ believes that it is appropriate and necessary to consider the impact of significant Federal actions on greenhouse gas emissions and the potential for climate change to affect Federal Activities evaluated through NEPA.

Reference: *BNA Daily Environment Report*; January 5, 2010

National Environmental Policy Act

White House working on guidance to add Greenhouse Gases to NEPA analyses

- What effect will GHG analyses have on Port Authorities future ability to:
 - Expand terminals?
 - Build new terminals?
 - Increase throughput?
 - Add rail / intermodal?
 - Build roads and expand traffic lanes?
- If GHG analyses becoming a limiting factor to expand business, what are the alternatives?
 - Need to work with industry and communities and other stakeholders to develop solutions

Transportation does have a significant impact on the environment, but...

We are actually doing something about it.



Constant Care is part of our history and has become one of our Values

"My old saying 'No loss should hit us which can be avoided with constant care' this must be a watchword throughout the entire organization."

*A.P. Møller in a letter to
Maersk Mc-Kinney Møller,
December 2, 1946*

A.P. Moller – Maersk Values

Constant Care

Our Name

Our Employees

Humbleness

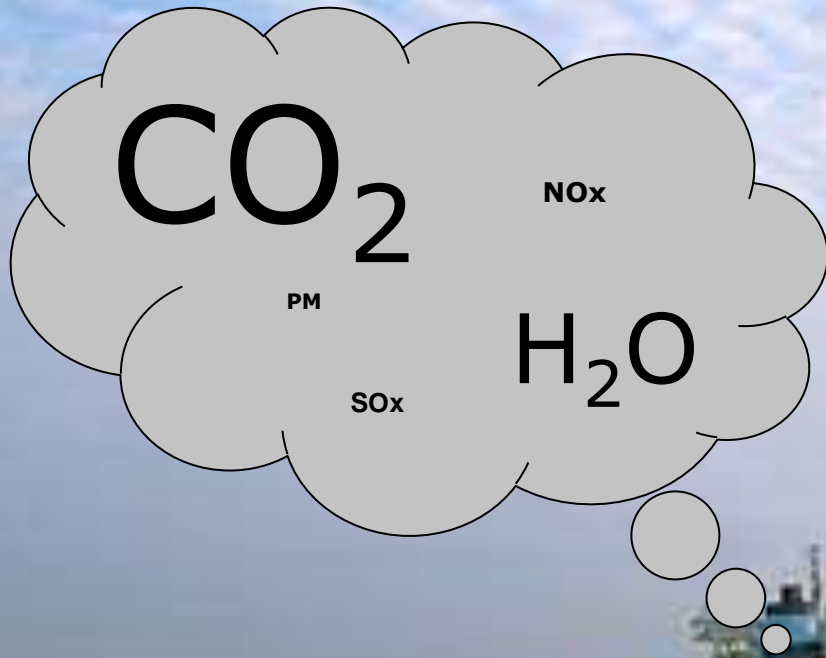
Uprightness



Our Environmental Vision

- **Maersk Line will be the recognized environmental leader in the container shipping industry.**
- **This will enable us to set the course for the industry and navigate the future more competitively, more profitably and more sustainably.**





Burning hydrocarbon fuel produces Carbon Dioxide and other air pollutants.



Envisioning emissions:



Fuel a truck with
2 drums of diesel
(110 gal or 760 lbs)



Truck travels
600 miles



Generates
1 ton CO₂

How much is a ton of CO₂?



Fills an average
1400 sq ft house

or



Fills about 8 containers

or



Block of dry ice about
the size of a file cabinet

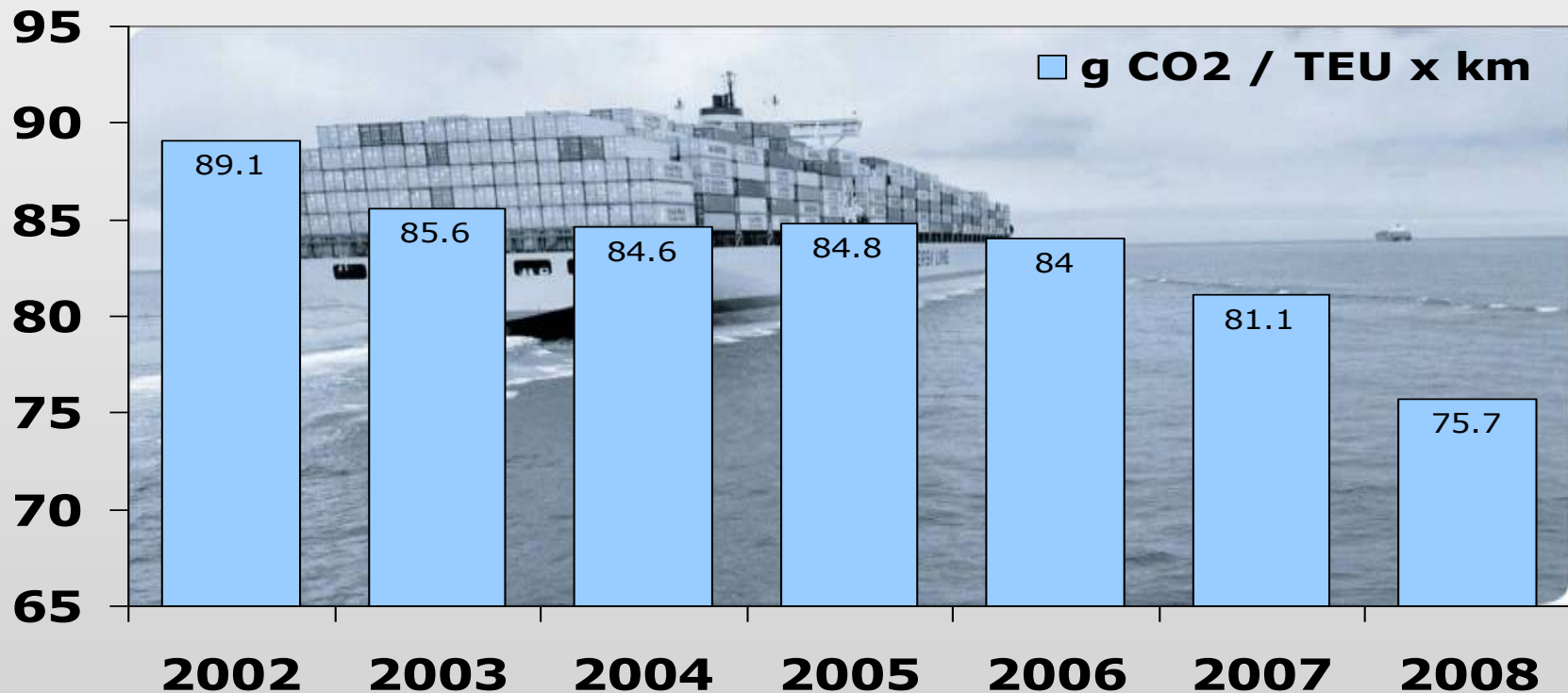
Vessels are getting more energy efficient

This is due to:

- Vessel size
- Capacity utilization
- Ship technologies
- Operating practices

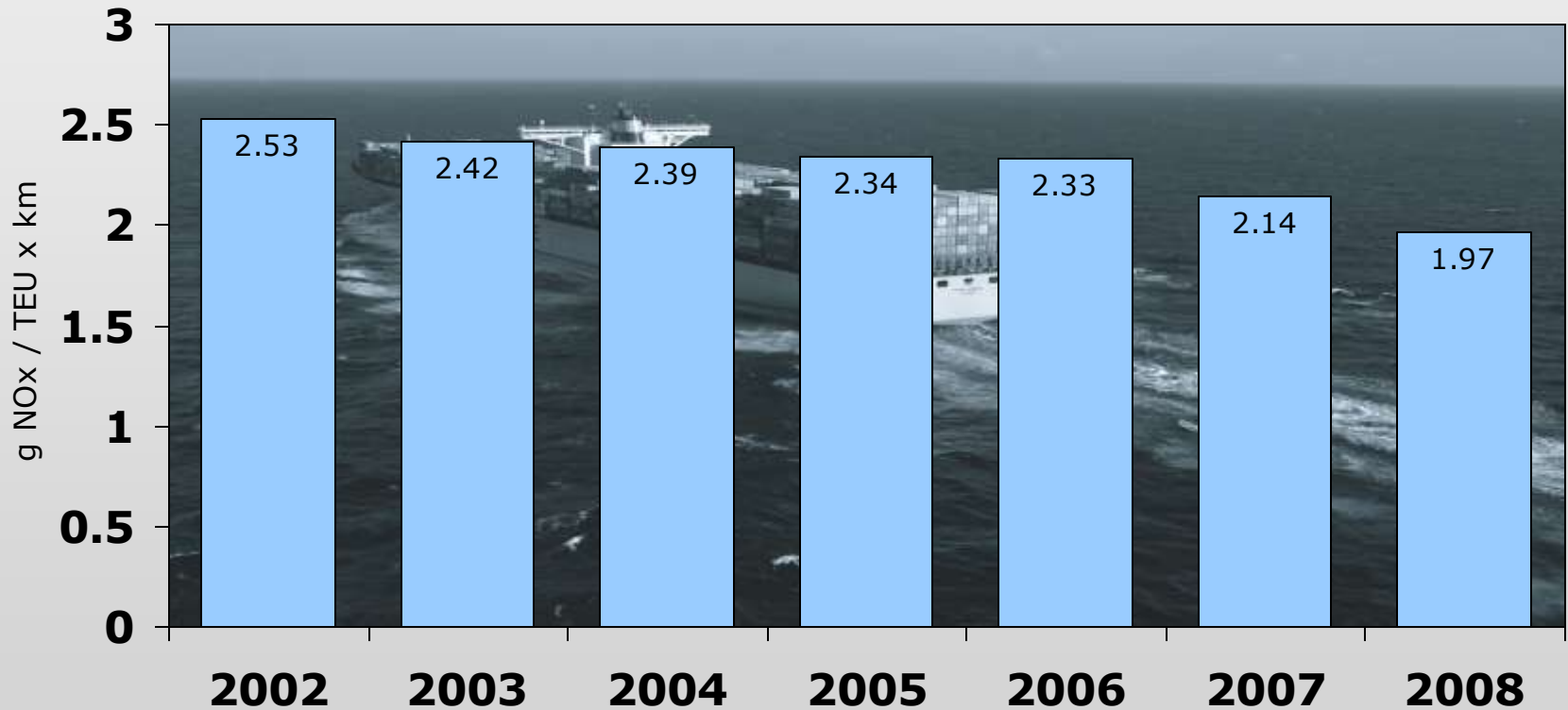


Maersk container vessels -- CO₂ emissions



- 15% decrease in fuel consumption and CO₂ emissions (per TEU x km)
- Reduced over two million tonnes CO₂
- Reduction target for 2007 – 2017 is 20%

Maersk Container Vessels -- NOx Emissions



- Decrease in NOx largely due to reduced fuel consumption
- Large and increasing number of vessels built after 2000,
- so NOx certified

Initiatives to minimize vessel environmental impact

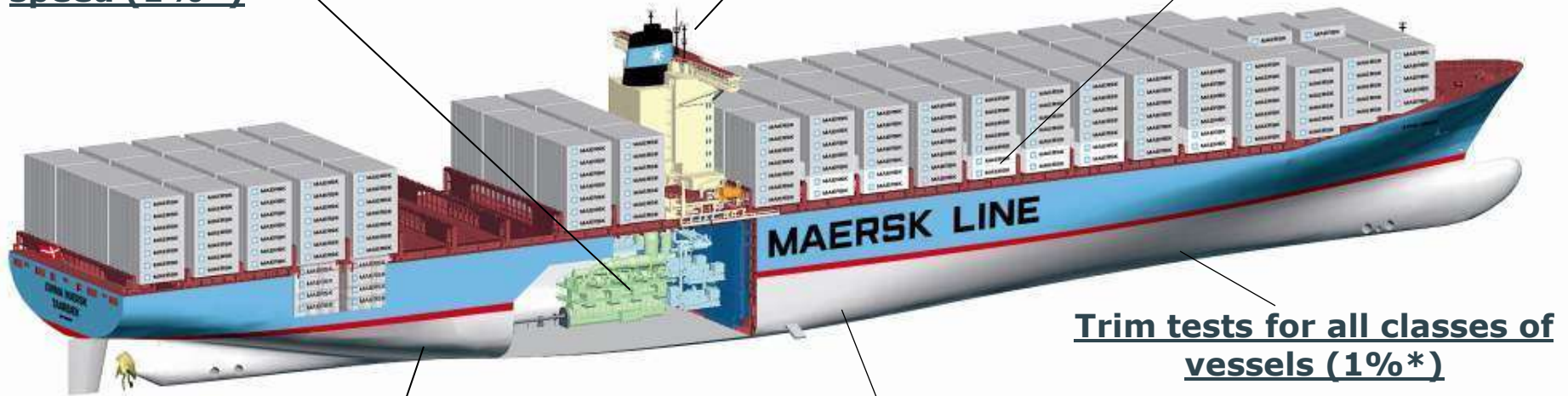
Waste Heat Recovery System (10%*)

Electronically controlled engine (0,5%*)

Adjusting main engines to economical speed (1%*)

Voyage Efficiency System (VES) (1%*)

QUEST: Low energy reefer containers (0,5%*)



Ballast water optimization

Trim tests for all classes of vessels (1%*)

Antifouling paint
Maintenance of hull and propeller (1.5%*)

Maersk West Coast Air Quality Initiative

Voluntary fuel program reduces air emissions

Over 1,300 port calls since 2006

Vessels change fuels

From Bunker avg. 2.5% sulfur
To Distillate avg. 0.1% sulfur

California:

- Fuel switch in/out and at dock
- 7/1/09 California started requiring all to switch to 0.5%

Vancouver, Seattle & Tacoma:

- Low sulfur fuel while at dock

Emissions reduced >800 tons/yr

SOx: 95%

PM: 86%

NOx: ~12%

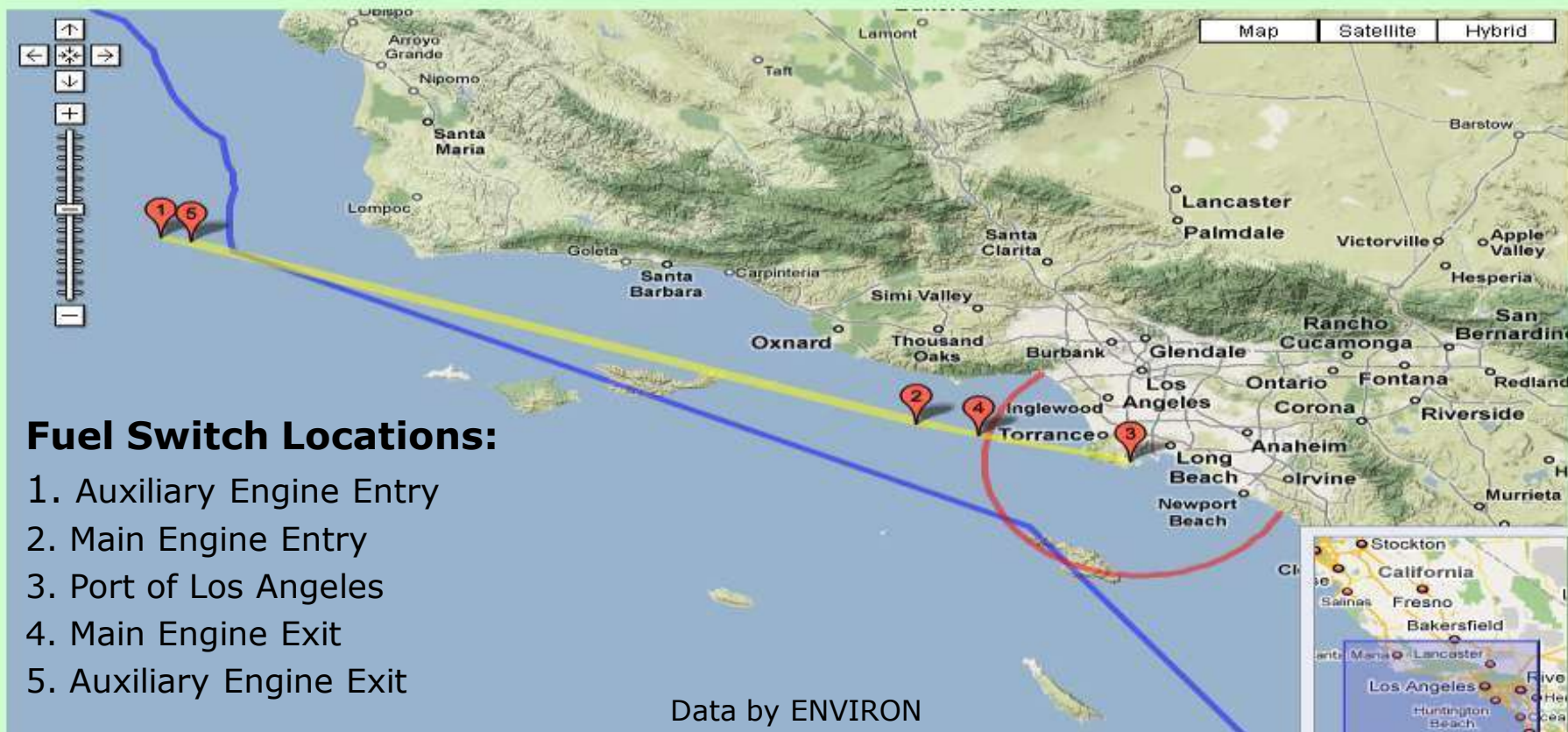


Mærsk Mc-Kinney Møller stands on the dock at Pier 400 in Los Angeles with the Sine Maersk at berth behind him. The vessel was the first to perform a fuel switch as part of a Maersk Line pilot environmental initiative in California.

Typical Fuel Switch Map

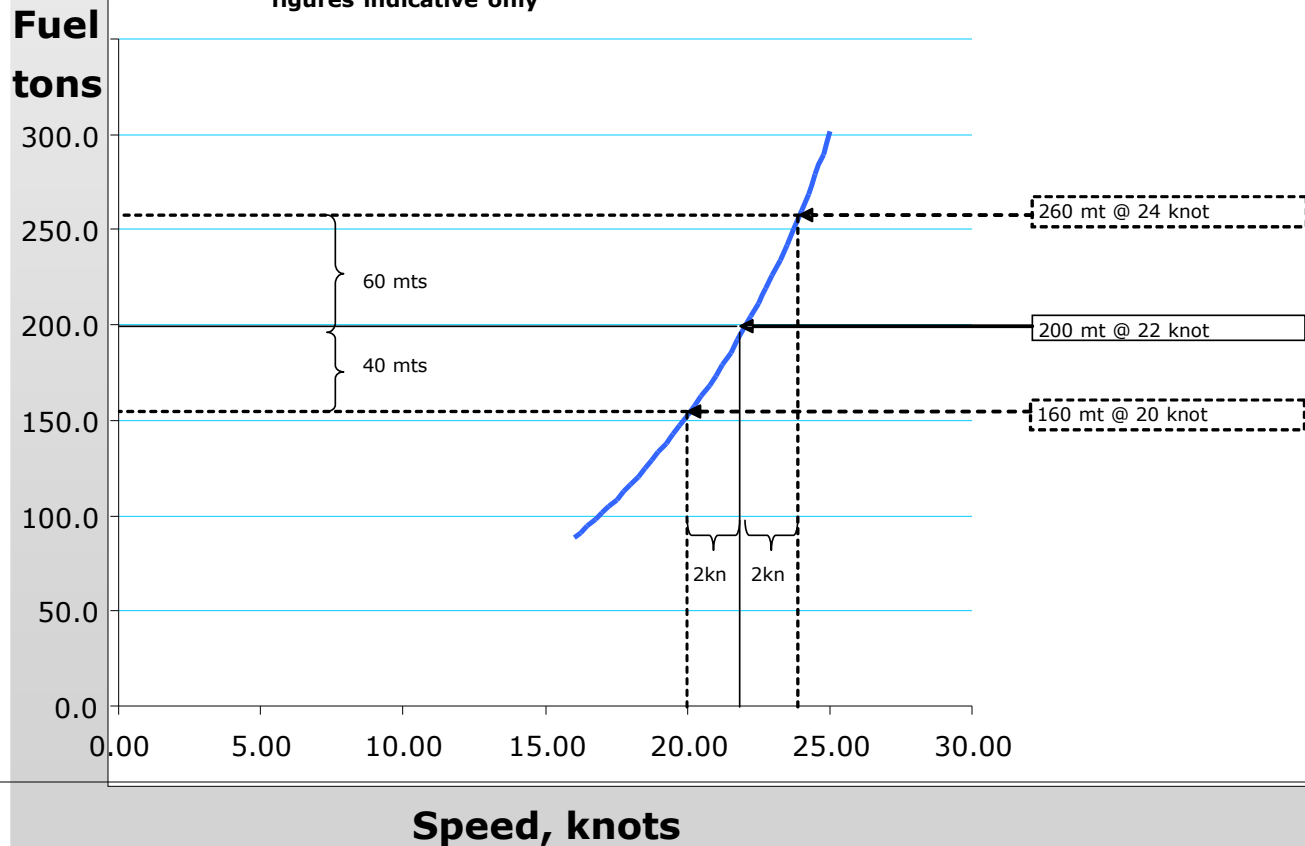
Choose a voyage from the drop-down menu to see fuel switch path: 12/21/2008 - CARSTEN MAERSK - (1506)

CARSTEN MAERSK - (1506)



Fuel use and costs increase exponentially at higher speeds

Speed/Bunker curve example
figures indicative only



- The speed/fuel use curve is exponential
- Speeding up will cost more fuel than what we save by slowing down
- **Lowest constant speed is best**

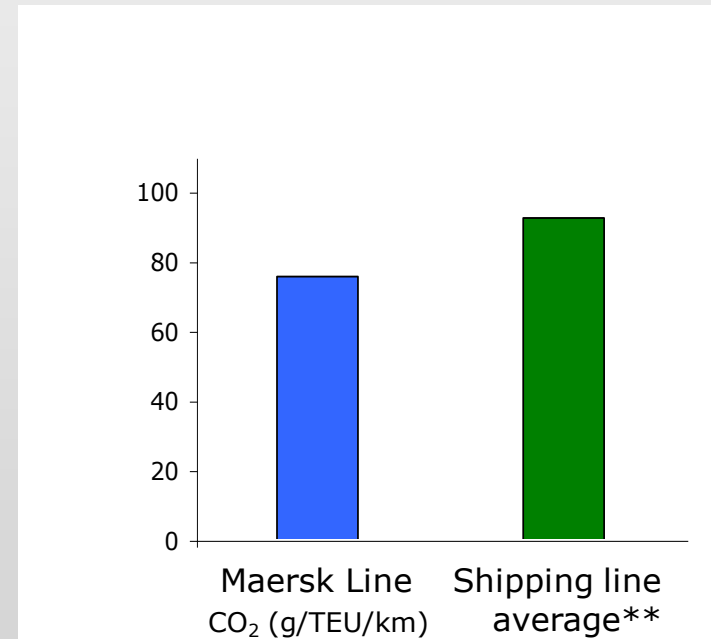
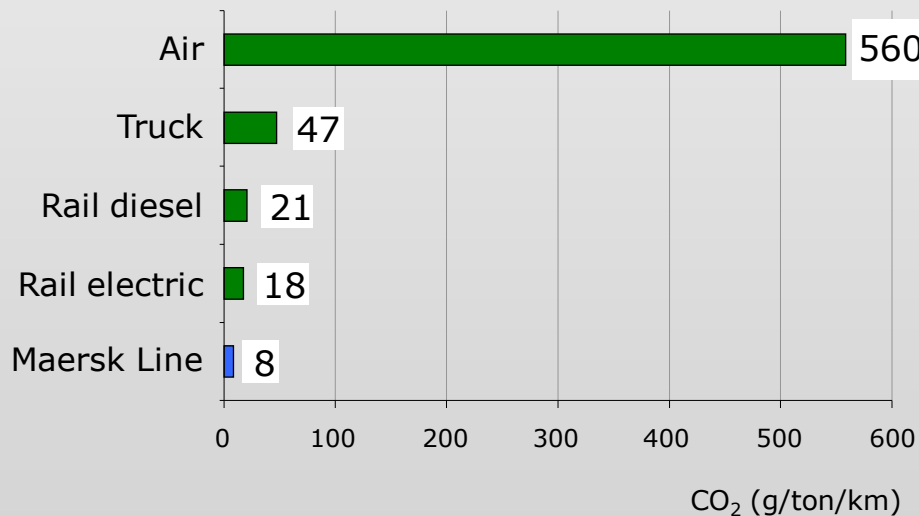
Super Slow Steaming Initiative

- Study started in 2007, covered 110 vessels
 - Maersk collaborated with engine manufacturers
- Results:
 - OK to operate as low as 10% engine load
 - Traditional range is 40% – 60%
 - Manufacturers have changed recommendations
- Over 100 vessels used since 2007. Results:
 - More flexible voyage and schedule planning
 - 10% – 30% fuel savings and reduced CO₂
 - Significant savings:
 - Post panamax: 3,500 MT fuel, 10,000 MT CO₂
 - \$1 million
- Sustainable Shipping Operator of The Year for 2009



The most energy efficient way of transporting goods

Ocean vs. other modes of transport



- Maersk Line's CO₂ emissions have been lower than the container shipping industry average

* As per CCWG
** Including Maersk Line

Ocean shipping **is** the most efficient mode of transportation

Transport 1 pair of shoes from China to North Europe

372 g CO₂

China

North Europe



3700 g CO₂

10x more

0 Km

20 Km

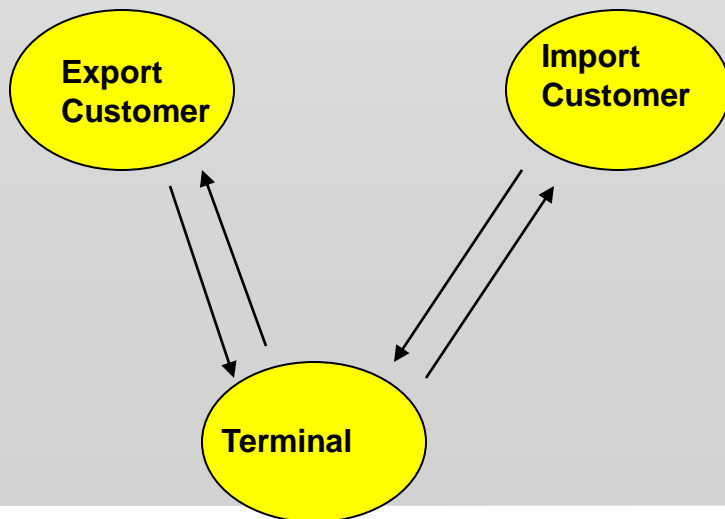


Shipping emits <4% of the world's CO₂ emissions while transporting 90% of the world's goods

Reducing emissions through route planning and collaboration

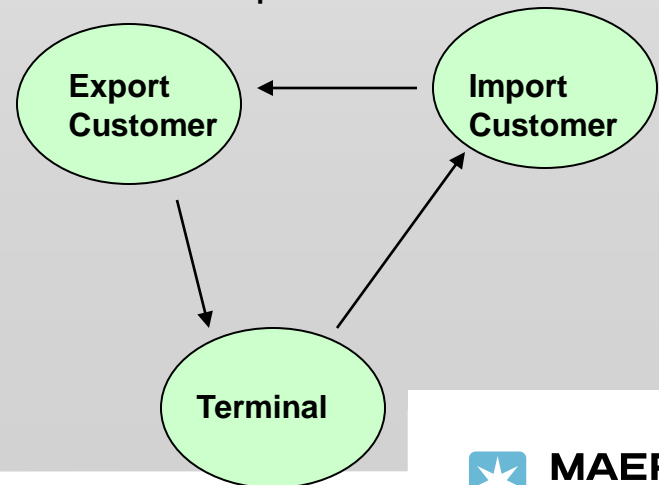
Dedicated trips are less efficient:

- More gate moves
- Unnecessary empty miles
- Increased total miles
- Extra chassis mileage and wear
- More fuel usage and pollution



“Triangulation” creates efficiencies:

- Reduces gate moves and time spent in line at a gate
- Reduces empty miles
- Reduces total driver miles
- Reduces chassis usage and wear and tear
- Less fuel use and pollution



Reducing environmental impacts on land

- **APM Terminals**

- Cargo handling equipment renewal – “Replace, don’t Retrofit”
- On-dock rail
- High-efficiency gates
- Idling shutdowns
- New Portsmouth terminal

- **Quest temperature controls** for chilled containers cut energy use ~50%

- **Direct ChassisLink™** starts up 8/09
- **MESC/Line Ops** -- New gensets are energy efficient and reduce emissions
- **MDSI, Maersk Distribution Canada & Gilbert** installed energy-efficient lighting
- **BTT** improved fuel efficiency 5%/year (SmartWay member)

- **All businesses**

- Updated environmental training and awareness programs.
- Recycling includes paper, cardboard, metal seals & electronics etc.
- Purchase environmentally friendly products: bulbs, cleaning supplies, degreasers

- **Certifications:**

- **Maersk Line:** ISO 14001
- **MLL:** ISO 9001/14001 & OHSAS 18001
- **SmartWay partners:** BTT & MDSI Warehousing & Logistics

Direct ChassisLink™

New common chassis model started 8/09 in NY-NJ area



- Safety first
- EPA recommends common chassis approach
- More efficient operations save fuel and reduce air emissions
 - Less idling
 - Less creeping
 - Fewer trips to get and drop chassis
- Emissions reductions*:
 - 2% to 4% in port areas (5 mile radius)

* Using US EPA DrayFLEET model



**A Glance at Clean Freight Strategies:
Common Chassis Pools for Drayage**

Common Chassis Pools can help trucking companies save fuel and reduce greenhouse gas emissions by lowering unnecessary truck movements and idling associated with switching chassis. Drayage trucks using pooled chassis could save up to 0.2 gallons per trip, reducing Storage, Idle and Particulate Matter emissions.

What is the challenge?
Fuel consumption and turn times for drayage trucks are increased through the common practice of picking up and dropping off chassis that belong to different terminal operators. Most chassis are owned and maintained by individual terminal operators or steering lines, and are not permitted for use with containers from another carrier. With one acre required for every 50 chassis, the storage of excess chassis requires space that could be allocated for more productive uses within the terminal. Port congestion associated with chassis storage can negatively impact terminal throughput, timeliness, and ability to compete as a shipping destination.

Chassis switching can add up to an hour per trip, substantially reducing income for drayage truck drivers. Since trucking companies and truckers are typically

subsidiary of the participating terminals, or a third party. This allows drayage trucks to use pooled chassis to serve multiple carriers and greatly reduces gate turn-times through greater streamlining of operations.

Common chassis pools can provide a more efficient management of terminal assets, increase the volume of goods through the port and free up space used to store chassis on port lands. Additional fuel savings from reducing miles traveled while switching chassis, is dependent on the size of the port facility and its physical layout. Pooled chassis can also facilitate the implementation of virtual container yards (VCY) and empty container yards (ECY), reducing the number of empty container movements, congestion and wait times at terminal gates.

The results are in . . .

Estimated Direct ChassisLink™ emissions reductions per year:

Based on US EPA DrayFLEET model

	CO₂	NOx	PM
NY-NJ only	>850 tons	>9 tons	>0.2 tons
Maersk Line – All US	>4,000 tons	>30 tons	>1 ton
National use – if all lines use this approach	50,000 to 70,000 tons	560 tons	12 tons

Reporting



- 2008 HSSE Report published May 5, 2009
- A.P. Moller - Maersk Group reduced CO₂ emissions by 9% in 2008
 - 5 million tonnes CO₂
 - Due to lower fuel consumption on ships and reduced flaring from platforms.
- Transport segment is responsible for more than 90% of the Group's fuel consumption
 - Optimized energy use
 - Fuel consumption dropped 8%
 - Ocean shipping is by far the most environmentally friendly way of transporting goods
- The Group's new environmental strategy focuses our efforts for the future



www.maerskgreen.com

Ever thought about why you are on an airplane, while your goods are on a container ship?

Because sea freight is the most economic and environmentally friendly mode of transportation, and you probably have to reach your destination within a few hours.

Shipping represents 30% of the world's cargo transportation. It also accounts for 4% of global CO₂ emissions.

As owner of the world's largest container shipping company, we are dedicated to developing sustainable solutions and thereby further reduce our environmental footprint.

Read more about our green initiatives at www.maerskgreen.com



ALFA ROMEO - MAERSK - BOSCH



For more information see www.maerskgreen.com

Our Challenges

- **Coordination with global standards – our vessels travel the world**
 - **Fragmentation by port, state or even country greatly increases complexity and cost**
- **Planning**
 - **What parameters need to be controlled in the future?**
 - New sources of fuels: oil sands, assorted bio-based, blends
 - **Cold ironing** – long lead time and high investment
- **Regulatory micromanagement**

What We Need From You

- Recognize our shared goal of maximizing business opportunities without increased negative impacts on communities or the environment
- Partner with us to educate regulators, NGOs and communities about the transportation industry and our environmental initiatives
- Advocate together for clear and effective environmental regulations
 - Set environmental impact standards and let operators develop the best ways to meet them.
- Work together to develop effective technologies –whether based on land or the vessel
- Incentive programs work – but they have to be simple

Thank you

