

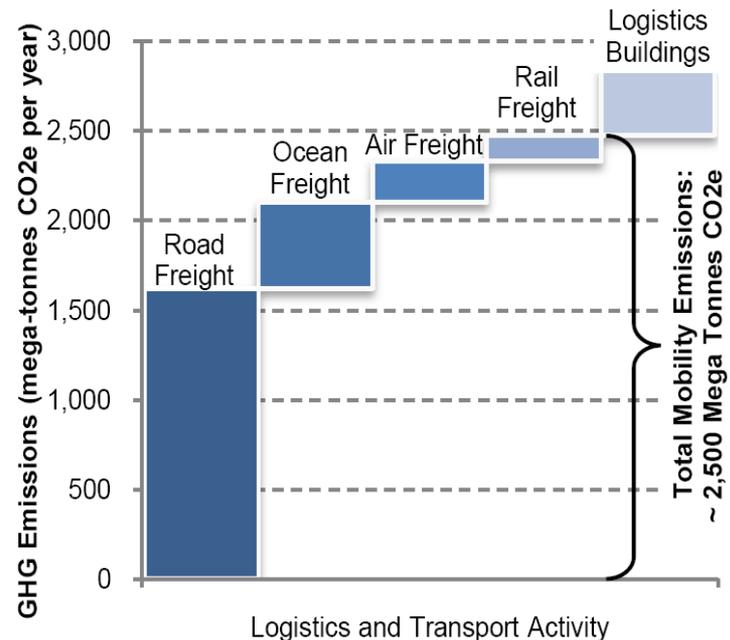
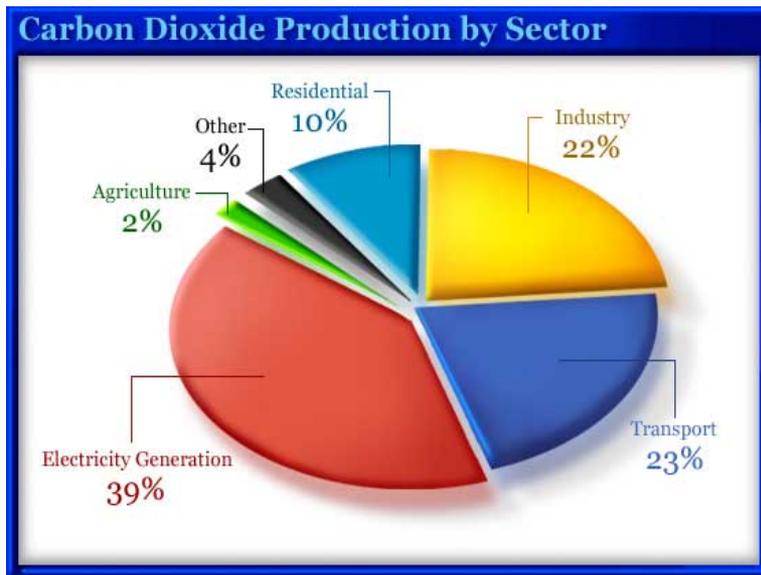


# Shipping 101

Marine Shipping Working Group Webinar– April 30, 2012  
Jeromy McConnell  
Manager, Environment & Sustainability



# Transport is a significant source of CO<sub>2</sub> and other air emissions.



- Human activity generates GHG emissions of about 50,000 mega-tonnes CO<sub>2</sub>e.
- An estimated 5.5% of the total is contributed by the logistics and transportation sector.

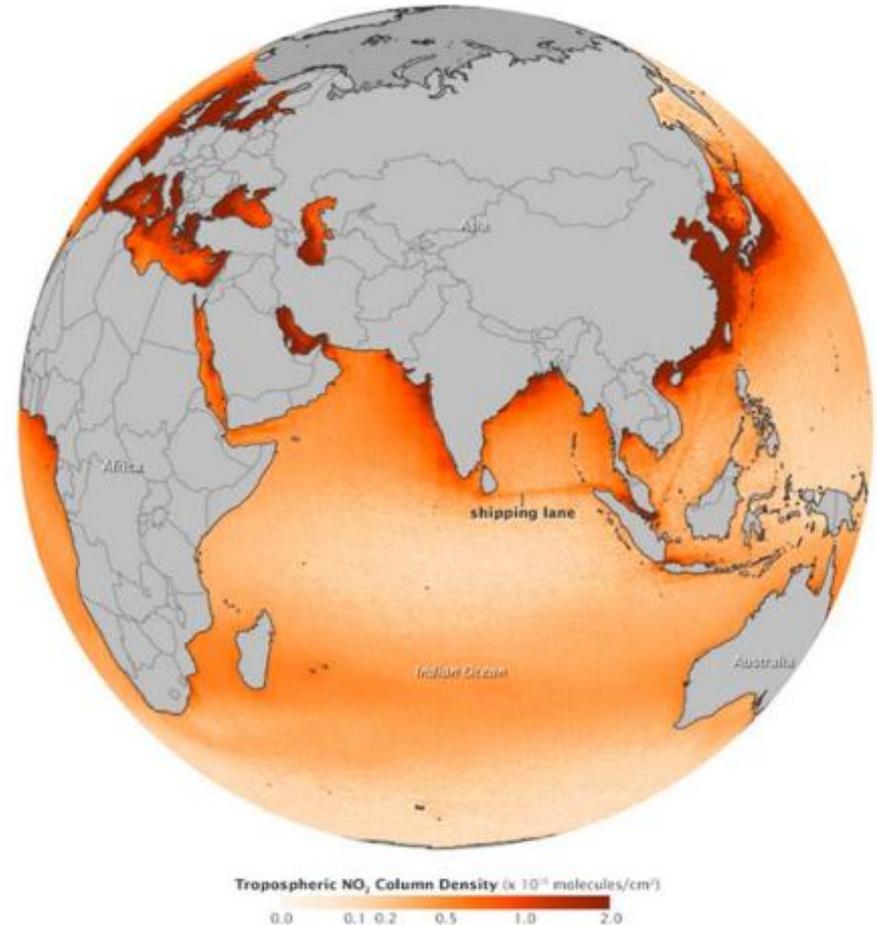
Source: World Economic Forum, 2009; Energy Information Administration (EIA), 2007

Ocean shipping is the most energy-efficient way to move cargo long distances...

*But is impacting the planet*

90% of all goods transported globally are carried by ship.

Ocean shipping generates 4% of all man-made CO<sub>2</sub>.



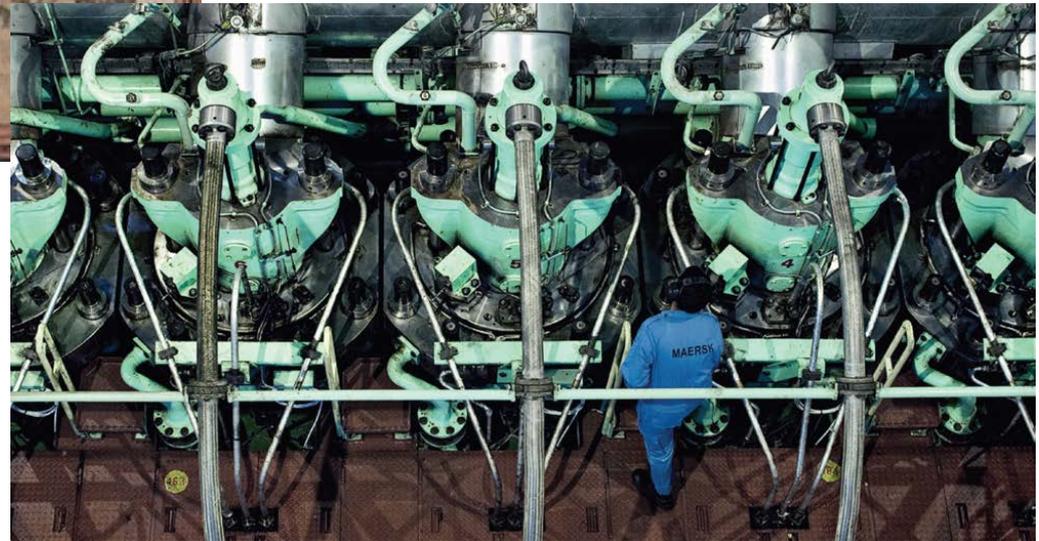
acquired 2005 - 2012

<http://climate.nasa.gov/news/860>

Today, a single ship can deliver thousands of tons of cargo for many customers to dozens of ports. But it was not always this way ...



# Diesel engines have replaced wind power



# Containers have replaced “break bulk” cargo handling



Containers are standard sizes: 20', 40', 45'

*A 40-foot container is the size of a city bus. It can hold . . .*



One million Legos



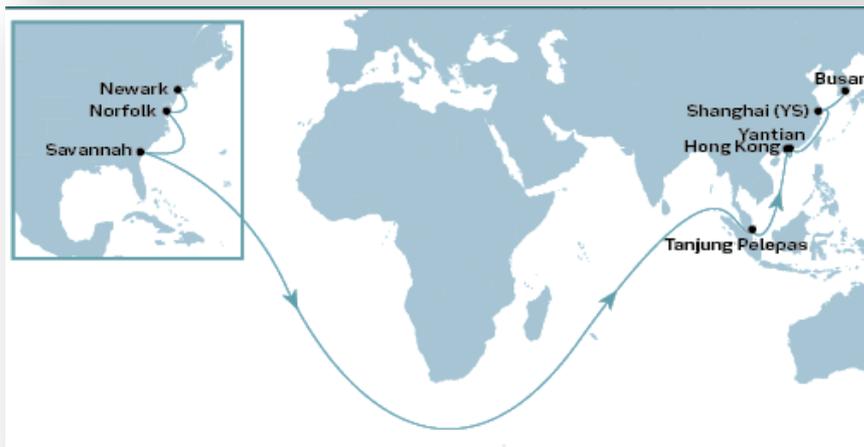
10,000 Nike Shoes



1,500 DVD Players

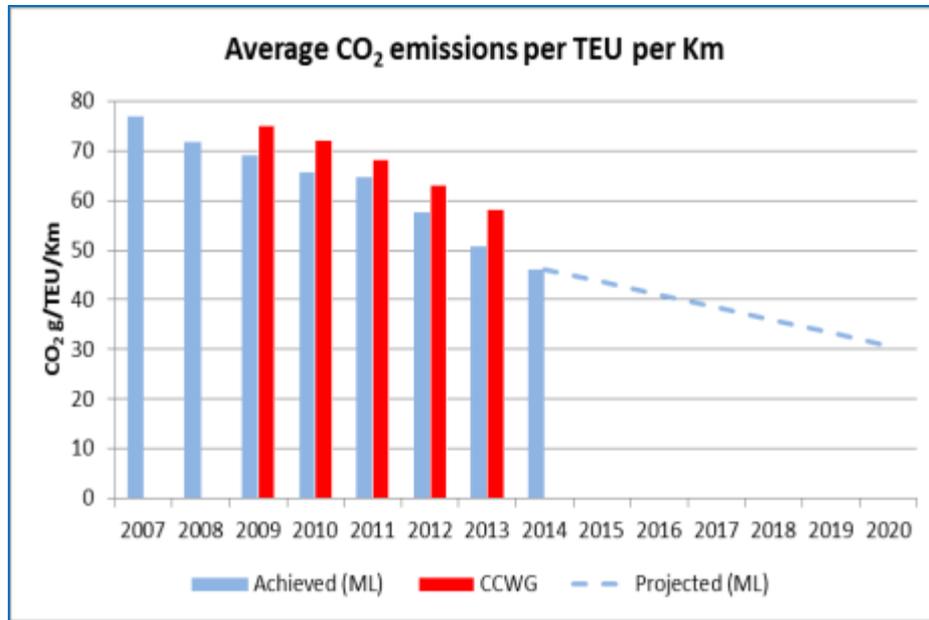
Liner shipping means vessels have strict routes / schedules.

*A 16 week round trip requires 16 vessels to provide regular weekly service.*



Axel Maersk Arrival	City
01-05 -2014	Vancouver
01-08	Seattle
01-20	Yokohama
01-23	Shanghai
01-24	Ningbo
01-27	Hong Kong
01-28	Yantian
02-01	Tanjung Pelepas
02-12	Suez Canal
02-24	Newark
02-27	Norfolk
03-01	Savannah
03-18	Suez Canal
04-01	Tanjung Pelepas
04-07	Hong Kong
04-08	Yantian
04-11	Shanghai
04-14	Busan
04-24	Seattle
04-27	Vancouver

Vessels are increasingly fuel efficient.  
*This reduces fuel use, CO<sub>2</sub> and other air emissions.*



### Key Initiatives:

- New vessels
- Eco-Retrofitting vessels
- "Smart steaming"
- Network design
  
- Focus on energy efficiency for sustained performance

- In 2014 our air emissions dropped 8% per container while volume grew.

**40%**

less CO<sub>2</sub> per container per km 2007 - 2014

*New 2020 goal is a 60% CO<sub>2</sub> reduction.*

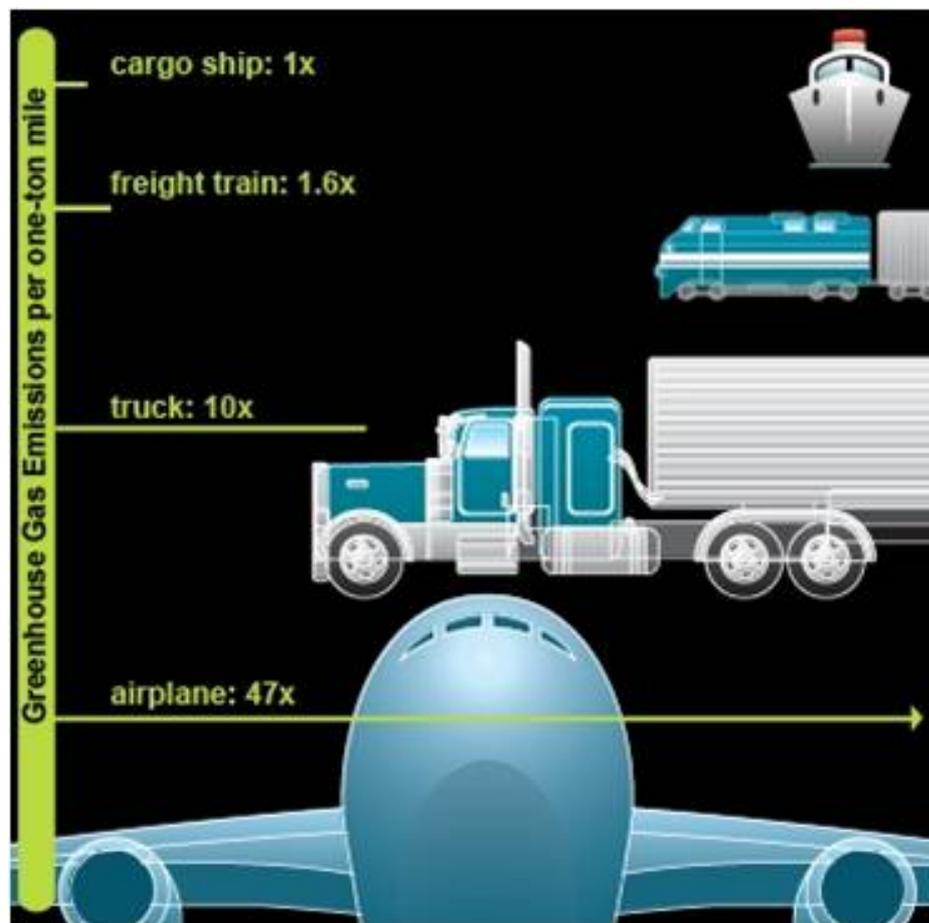
# Supply chain transportation CO<sub>2</sub> impacts can now be calculated.

Factors include:

- Mode of transportation
- Distance traveled by each mode
- Cargo weight and volume
- How is the impact calculated?



# Mode selection is a major factor in supply chain environmental impact.



*Ocean shipping has the lowest environmental impact for long distance transportation...*

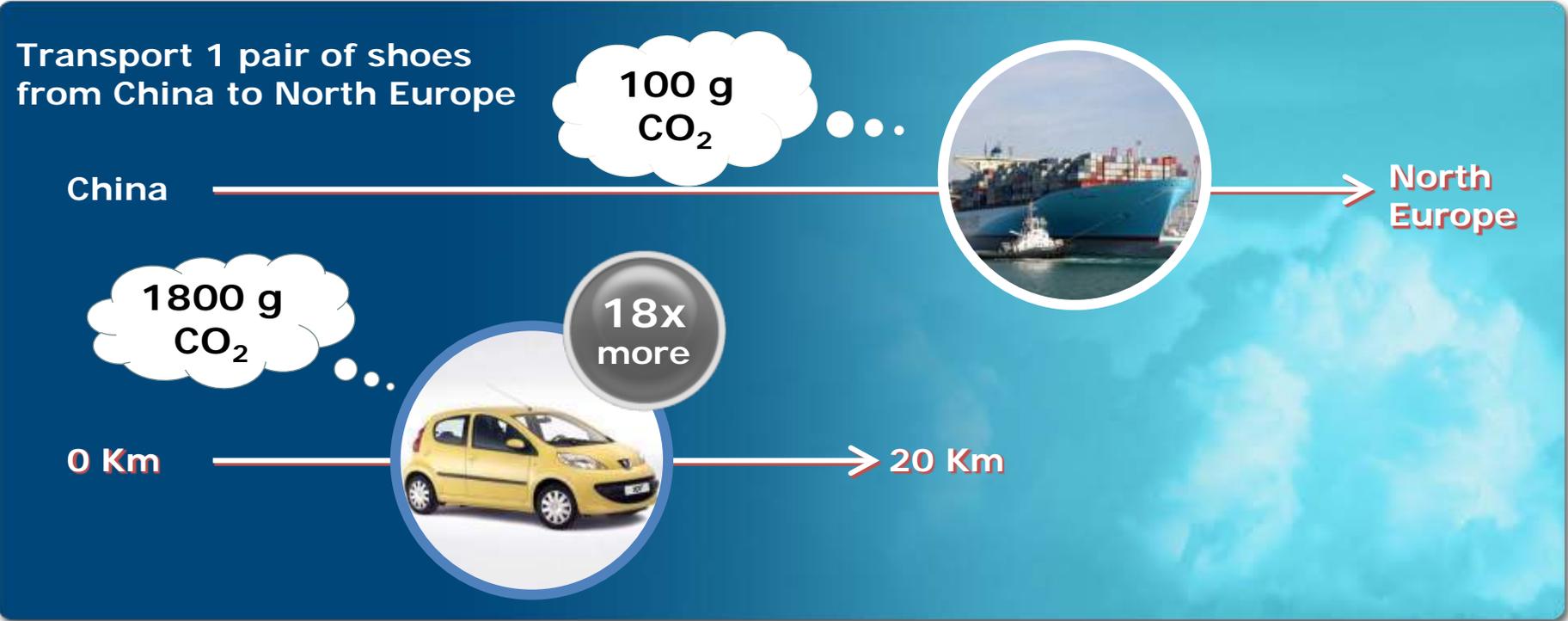
*Then rail...*

*Then truck...*

*And air has the highest impact.*

Graphic provided by Edgar Blanco, MIT Center for Transportation & Logistics

# Ocean shipping is the most energy-efficient mode of transportation



Shipping emits <4% of the world's CO<sub>2</sub> emissions while transporting 90% of the world's goods

# Innovation is essential for sustainability



- Propeller, hull & trim optimization
- Waste heat recovery system
- Slow steaming and super-slow steaming

## Other Initiatives

- Alternative fuel tests
- New propulsion technologies
- ISO 14001 certified
- Crew awareness and engagement
- Maintenance of hull and propeller
- Voyage Efficiency System (VES)
- Trim optimization
- SOx scrubber studies
- Antifouling hull paint
- QUEST: Low energy chilled containers
- Modified bulbous bow
- Micro bubbles
- Ballast water optimization and treatment systems

Thank you

