



Sustainability in Container Shipping

July 29, 2010

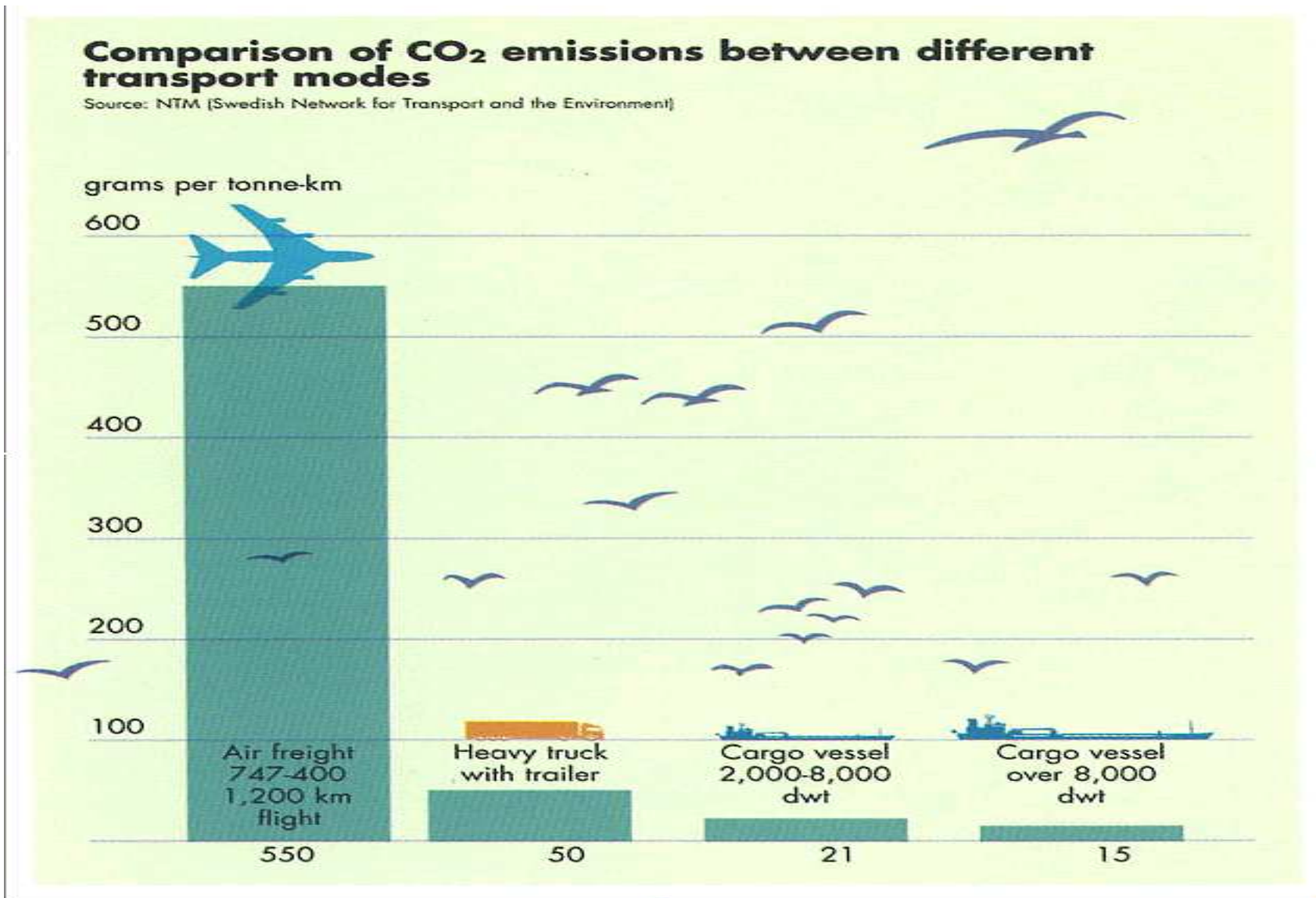


Sustainability in Container Shipping

“Go Clean – Go Green – Go with Kuehne + Nagel“



CO₂ Emissions: different transport modes





CO₂ Emission for laptop manufactured in Asia and sold in Rotterdam:

- FFE Shanghai to Rotterdam= CO₂: 1,600kgs
- 1600 laptops per FFE -> **1 kg CO₂ per laptop**
- Airfreight about 70 kg CO₂ per laptop



Clean Cargo

Transportation and logistics present a unique opportunity to clean up your supply chain and manage the convergence of cost and environmental pressures in today's global economy. What is the impact of your company's shipping and distribution decisions? Do you know your transportation footprint?

A BSR Working Group



BSR

San Francisco
Beijing
Guangzhou
Hong Kong
New York
Paris

www.bsr.org

Clean Cargo Working Group is a business-to-business collaboration dedicated to integrating environmental and socially responsible business principles into transportation management. Participants include more than 25 leading multinational manufacturers, retailers, and freight carriers, which collectively move nearly 60 percent of global container cargo.

Why Join?

- Access tools and best practices in transportation management
- Leverage a multi-industry approach to efficiently develop solutions for improving the environmental impact of transportation and logistics
- Join discussions with experts on sustainable transportation trends
- Enhance brand recognition and improve stakeholder relations from proactive engagement in sustainable transportation

What You Get

Environmental Performance Assessment: Annual survey to assess carrier performance, including analysis of trends and year-to-year improvements

Intermodal CO2 Calculator: Custom tool for calculating and comparing the carbon footprint of multiple modes of transportation

Alignment with Industry Standards: Ongoing updates from leading organizations and stakeholders in transportation and logistics to ensure coordination and relevance in group initiatives

Semi-Annual Working Sessions: In-person forums to share best practices, build consensus on the working group's approach to pressing issues, and network with member companies

60%

of global container transport represented by group members

(Source: BSR Clean Cargo Working Group)

Participants

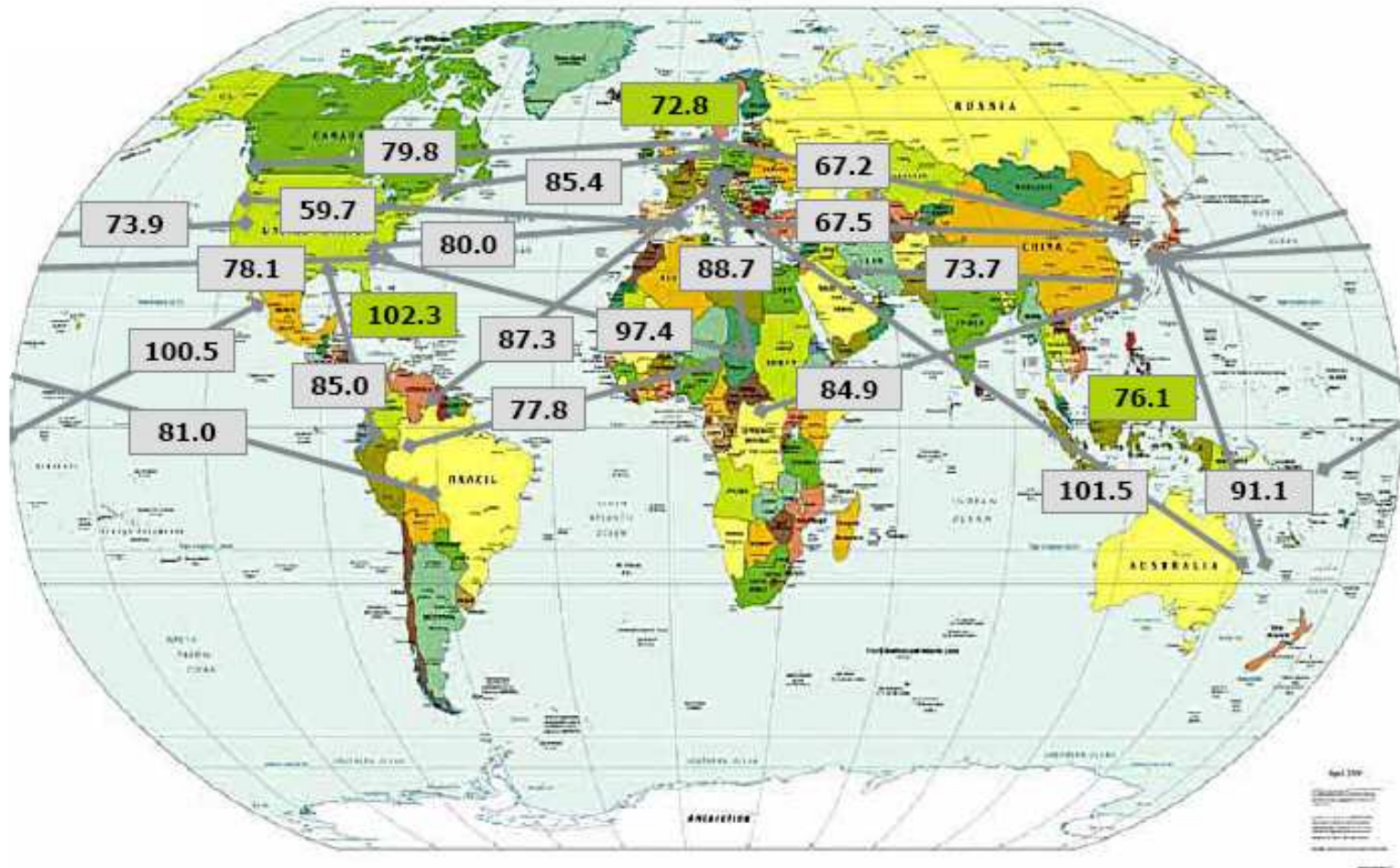
American Eagle Outfitters, Inc.
APL
Chiquita Brands, Inc.
CMA CGM S.A.
The Coca-Cola Company
COSCO Container Lines Co., Ltd.
Hamburg Süd
Hanjin Shipping
Hapag-Lloyd AG
Hyundai Merchant Marine Co., Ltd.
K&A Services AB
Johnson & Johnson
K Line
Li & Fung Limited
Maersk Line
Nike, Inc.
Nordstrom, Inc.
NYK Line
OOCL
Phillips-Van Heusen Corporation
Polo Ralph Lauren Corporation
Shell Marine
Starbucks Coffee Company
United Parcel Service (UPS)
Walmart Stores, Inc.
John Wiley & Sons, Inc.
Yang Ming Marine Transport Corp.

Contact Us

Eric Olson: olson@bsr.org
Raj Sapru: sapru@bsr.org
www.bsr.org/cleancargo



2010 CO₂ Emissions by Trade Lane [g/TEU-km]



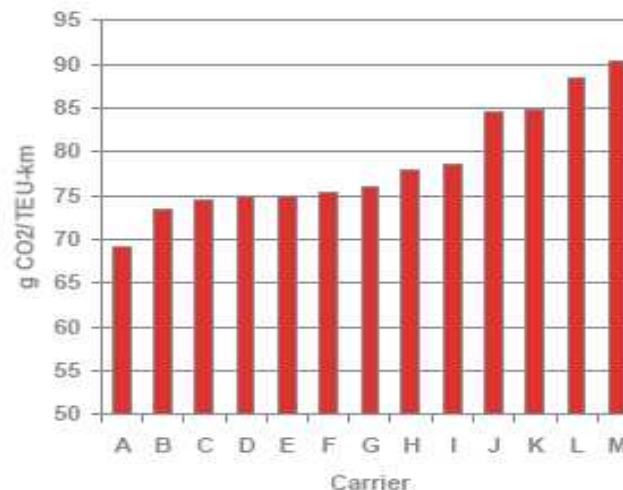


Average CO₂ Emission of Carriers (members of the CCWG) in terms of “grams, TEU, km”.

CO₂ emissions rates by carrier

Carrier	Score	g CO ₂ /TEU-km - dry	g CO ₂ /TEU-km - reefer
A	34	69.1	112.8
B	30	73.3	102.4
C	32	74.4	98.5
D	26	74.8	99.7
E	30	74.9	102.0
F	28	75.3	105.8
G	25	75.9	100.9
H	24	77.9	113.2
I	29	78.5	106.1
J	24	84.4	108.8
K	23	84.9	116.0
L	23	88.4	113.5
M	23	90.4	117.3

CO₂ averaged across trade lanes weighted by TEU volume for each trade lane





1. What influences CO₂ emission?

Speed, size, type:

- Vessel size, speed, load factor, engine type, vessel design / Equipment (re)positioning / inland transport

Bad planning / bad forecasting:

- Purchasing / source selection
- Production and inventory planning
- Lead time forecasting
- Store / consumer location



2. What reduces CO₂ emission?

Vessel:

- Engines and design and size
- Speed reduction
- Vessel maintenance (see next slide)
- Port handling

Cooperation or “carrier alliances”:

- Sailing schedule alignment
- Equipment sharing (gray box/chassis?)
- Rate or tax incentives / penalties
- Internationally enforced vessel “speed limits”



What influences CO₂ emission

CO₂ Reduction Activities from EPS

Several practices are common among most CCWG carriers

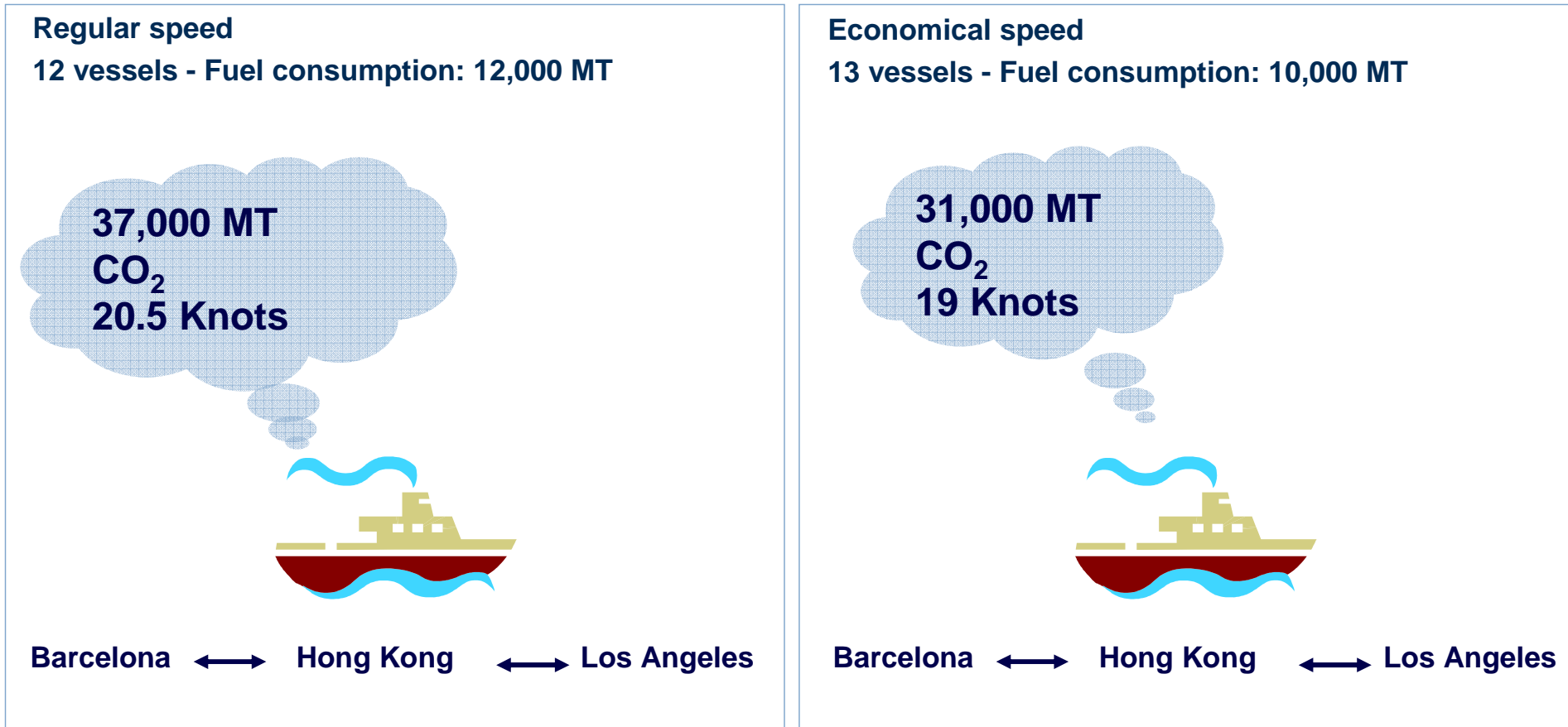
CO ₂ Reduction Activity	Adoption
Vessel speed optimization	13 out of 13 carriers
Hull & propeller polishing	13 of 13
Weather routing / Real-time vessel controls	13 of 13
Optimized vessel utilization	13 of 13
Optimized vessel load	13 of 13
Electronic engine controls	12 of 13
Optimal trim	12 of 13
Ballast water reduction	12 of 13
Optimal rudder adjustment	10 of 13
High pressure fuel injection systems	9 of 13
Shaft generators	7 of 13
Waste heat recovery systems	6 of 13

NOTE: The degree to which carriers are implementing these activities across their fleet is unclear.





CO₂ impact from slowsteaming

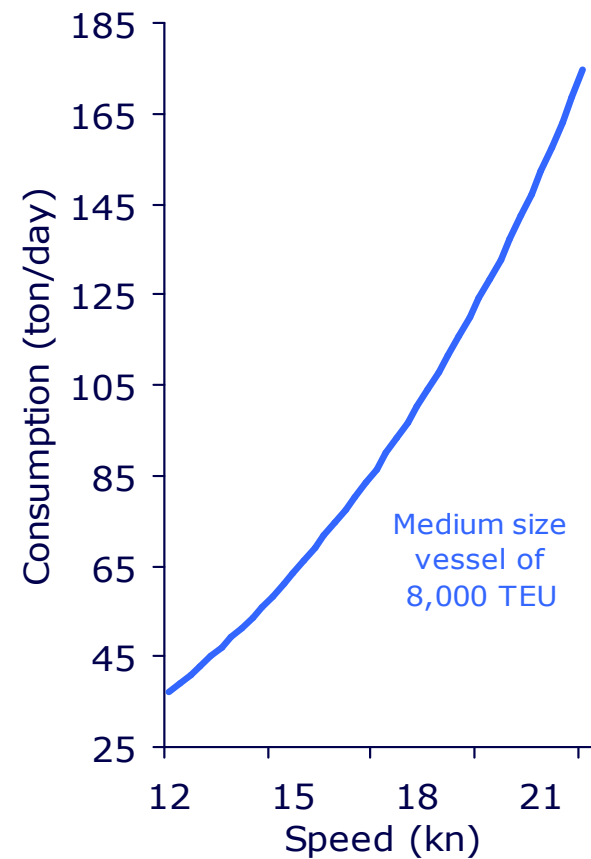


16% savings on CO₂

Fuel consumption increases exponentially with speed

Reducing engine load dramatically decreases fuel consumption

- Fuel consumption and CO2 emissions increase exponentially with speed
- Going at full throttle is economically and ecologically questionable





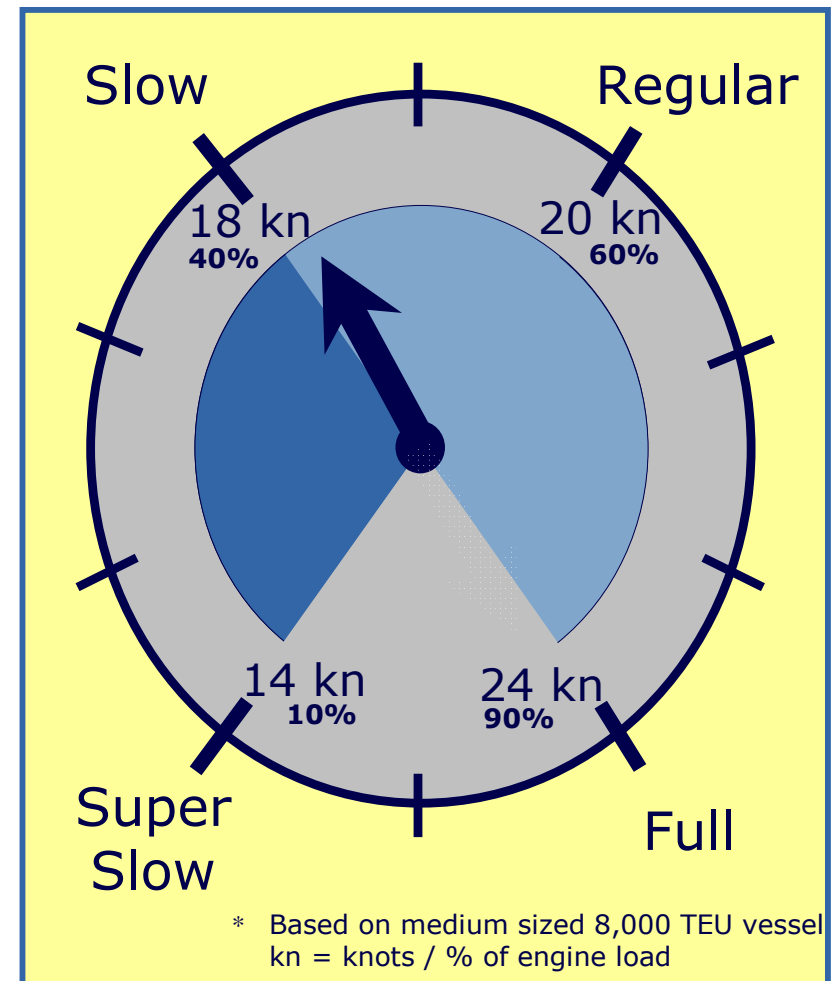
What generations of shipbuilding engineers were taught...

... and how the myth was challenged ...



Further slowing down seemed impossible

- Manufacturers traditionally designed vessel engines for high speed
- Further reduced engine load below 40% and consequently lower vessel speed was feared to damage engines



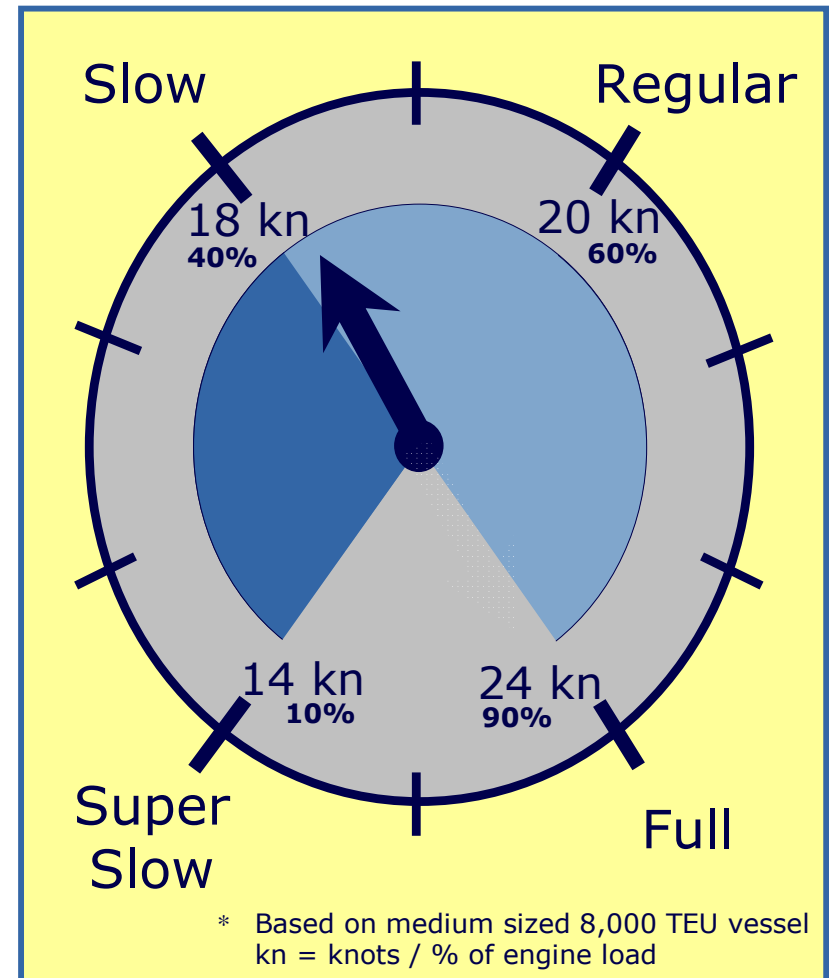


Further slowing down seemed impossible

- It became feasible to go down as low as 10% engine load - when applying expertise and constant care

Fuel and CO₂ savings:
43% per vessel
30% per service

- This breakthrough means increased flexibility in choosing the right speed
- Engine manufacturers revised their guidelines - for the benefit of the whole industry and our environment





CO₂ impact vessel size and speed

AE1/ AE10				
	Before	After	Difference	
Vessels (S-types)	19	21	2	
Speed (knots)	19,25	18,00	(1,25)	
Bunker (mt/roundtrip/vsl)	15.471	14.396	(1.075)	
CO2 mt/roundtrip/vsl)	48.578	45.204	(3.374)	
FFE	3.625	3.625	-	
kgCO2/FFE/rt	6.700	6.235	(465)	-7%

AE7				
	Before	After	Difference	
Vessels (PS-types)	9	10	1	
Speed (knots)	19,25	16,75	(2,50)	
Bunker	9.127	7.784	(1.343)	
CO2	28.659	24.443	(4.216)	
FFE	6.500	6.500	-	
kgCO2/FFE/rt	4.409	3.760	(649)	-15%

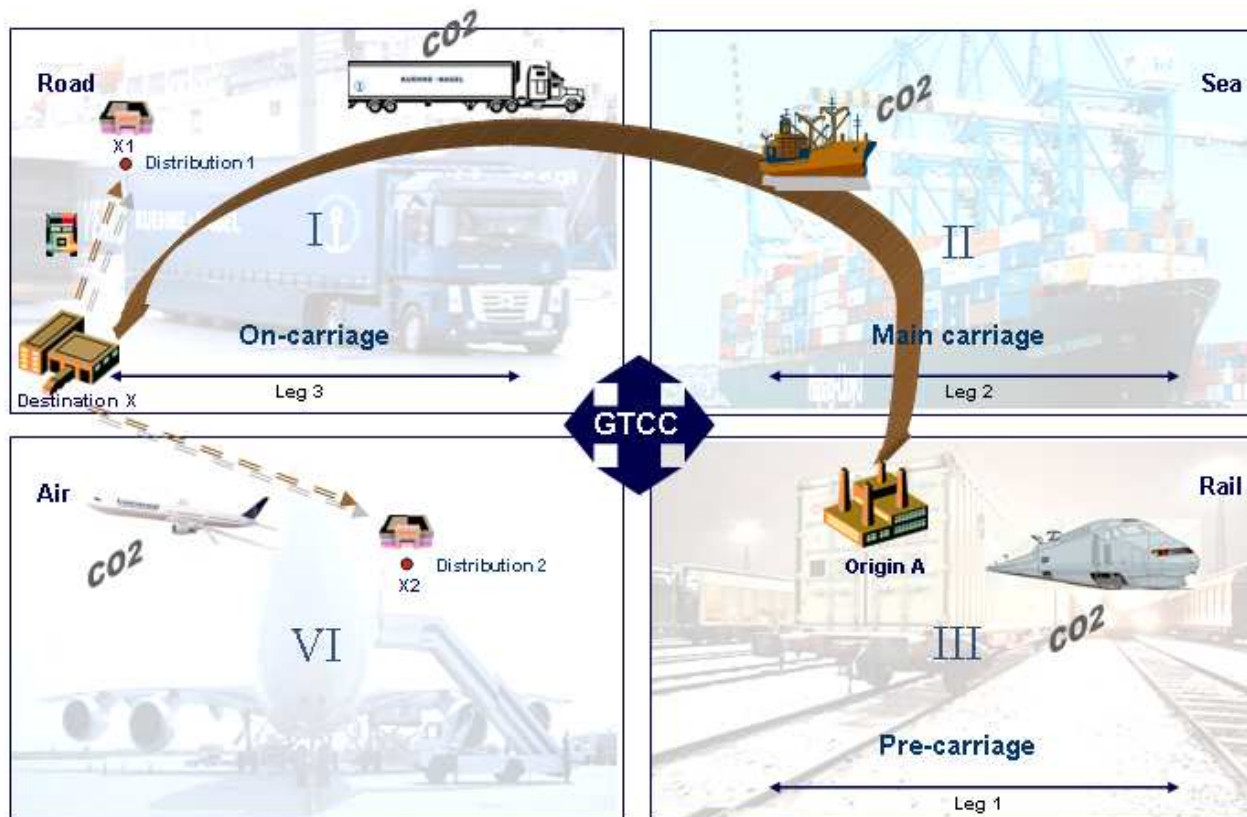


Goals

- Increase customers' awareness of CO2 emission of their products and supply chain and transportation choices.
- Make the CO2 emission for moving goods visible by providing CO2 emission reports per container, package, carrier, trade-lane, month, year.
- Offer the ability to select carriers and vessels which produce the lowest CO2 emission, reducing the carbon footprint and help the social and environmental image.



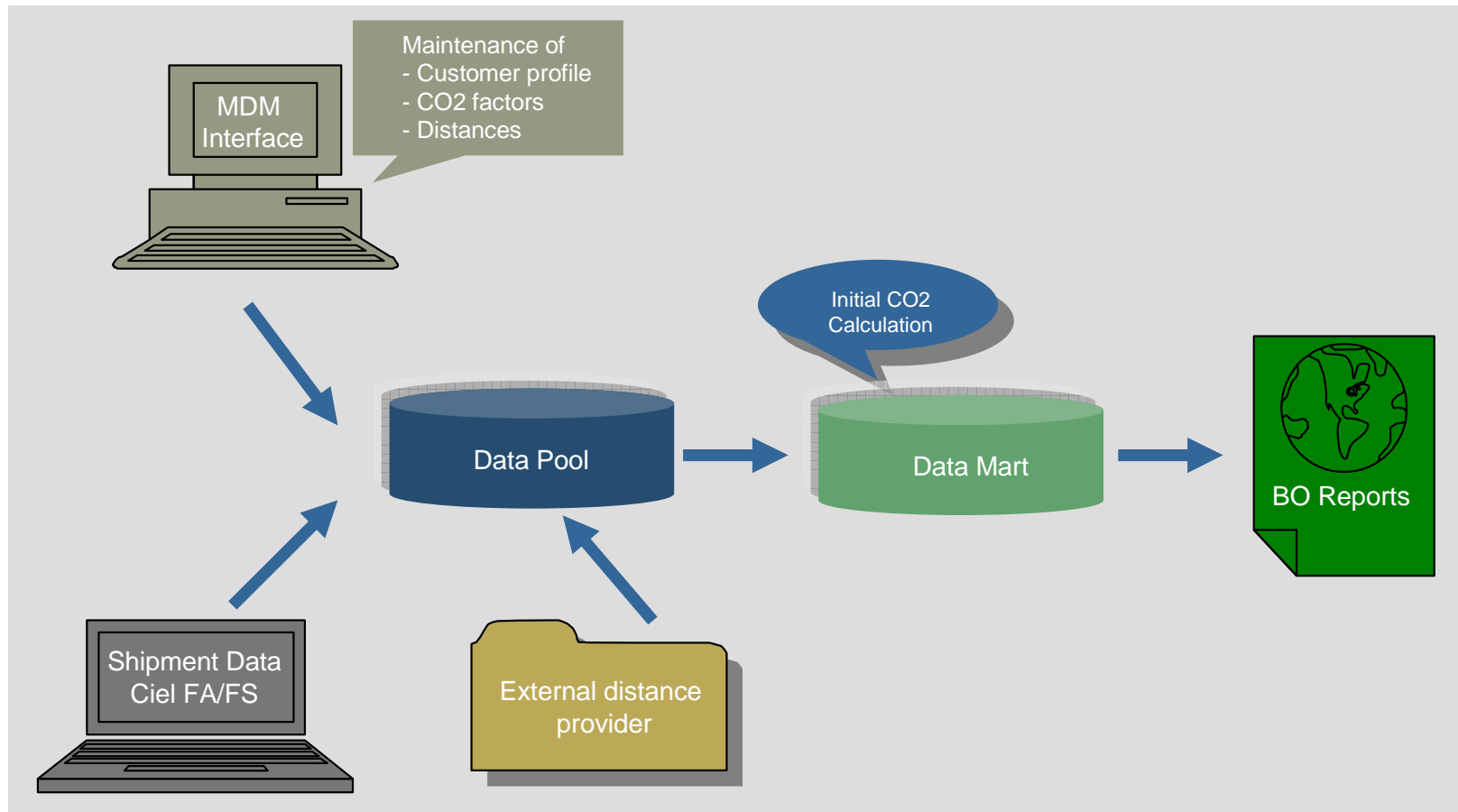
Global Transport Carbon Calculator (GTCC)



- I. Road transportation
 - II. Marine transportation
 - III. Rail transportation
 - IV. Air transportation
1. Pre-carriage (origin)
 2. Main carriage (port-to-port)
 3. On-carriage (destination) + distribution
 4. Equipment positioning / repositioning



Global Transport Carbon Calculator Architecture





Example of A GTCC Customer Report

SPONSER AB EDI											
Report considers all Air and Sea Shipments for Date Range (based on Shipment Date) b										01/04/2009	31/03/2010
Departure (KN Region Code)	Airport of Departure / Port of Loading	Trade Lane by 5-Letter UN Code Locations	Number of Shipments	No of TEU	Travelled Distance (km)	Gross weight (kgs)	CO2 Emission (kg)	Average Gross Weight (kgs) per shipment	Average CO2 Emissions (kgs) Per Shipment	Average Gross Weight (kgs) per TEU	Average CO ² Emission (kgs) per TEU
AP	Nanking/Nanjing	CNNGK-INNSA	7	23	64'225	113'274	10'975	16'182	1'588	4'924.94	477.1679658
	Shanghai	CNSHA-INNSA	1	2	8'840	9'469	884	9'469	884	4'734.55	441.9721363
AP		Sum:	8	25	73'065	122'743	11'859	15'343	1'482	4'909.71	474.35
CE	Bremerhaven	DEBRV-PECLL	1	15	11'949	14'140	1'784	14'140	1'784	942.67	118.9470374
	Hamburg	DEHAM-BRSSZ	3	6	31'968	9'600	1'080	3'200	360	1'600.00	180.043776
CE		Sum:	4	21	43'917	23'740	2'864	5'935	716	1'130.48	136.40
NA	Norfolk	USORF-BRSSZ	3	5	27'273	37'161	3'567	12'387	1'189	7'432.15	713.4931509
NA		Sum:	3	5	27'273	37'161	3'567	12'387	1'189	7'432.15	713.49
NW	Aarhus	DKAAR-BRSSZ	1	6	11'212	24'354	2'883	24'354	2'883	4'059.00	480.5804045
	Göteborg	SEGOT-BRSSZ	2	5	22'012	14'090	1'638	7'045	819	2'818.00	327.5174285
	Göteborg	SEGOT-INNSA	4	4	51'272	18'826	2'548	4'707	637	4'706.50	637.0628035
	Göteborg	SEGOT-PECLL	1	6	11'914	9'768	1'229	9'768	1'229	1'628.00	204.8216755
	Göteborg	SEGOT-UYMVD	1	9		9'845		9'845		1'093.89	
NW		Sum:	9	30	96'410	76'883	8'298	8'543	922	2'562.77	276.61
Total		Sum:	24	81	240'665	260'527	26'589	10'855	1'108	3'216.38	328.26