GREENER SHIPPING SUMMIT

SHORT TERM MEASURES TO REDUCE EMISSIONS

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Emissions and Shipping

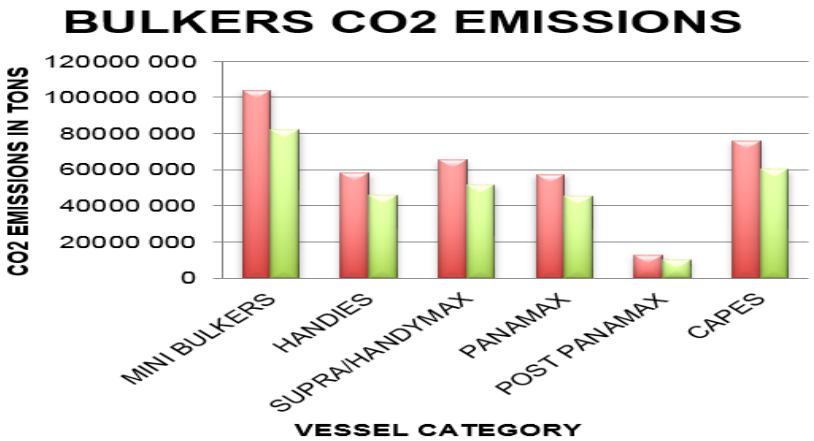
- It is expected to have 3 billion tons of CO2 emissions in year 2050 alone, unless measures are taken.
- Short-term measures could be finalized and agreed to between 2018 and 2023
- 60,000 vessels rely on diesel — only 600 ships use alternative fuels
- By 2030, 10 per cent of the global shipping fleet will be powered by LNG.
- Consider the emissions released over the full life cycle and not just during fuel combustion

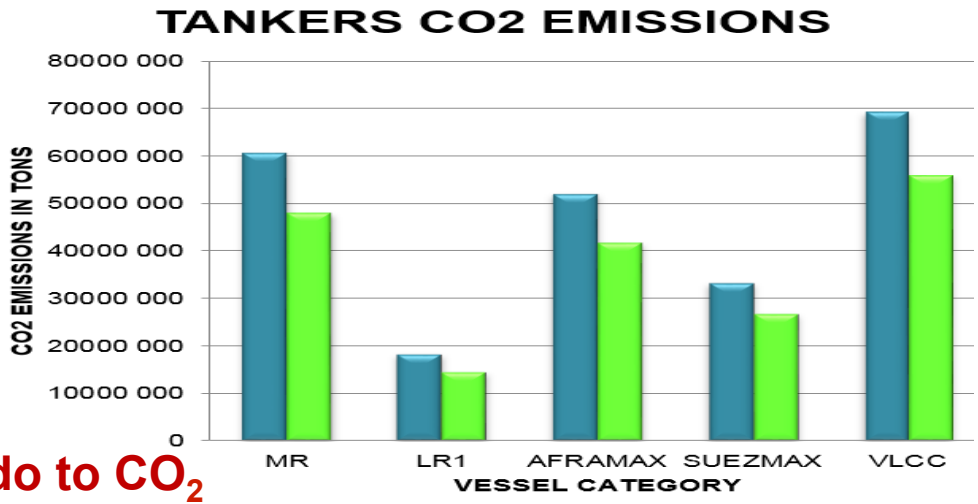
Short term measures

- Energy efficiency improvement focus on EEDI and SEEMP
- Technical and operational energy efficiency measures for both new and existing ships (Hull fouling management, speed reduction, route optimization)
- Initiate R&D to address marine propulsion and innovative technologies (renewable energy/wind, hull design)
- Additional GHG emission studies
- Encourage port developments and activities globally to facilitate reduction of GHG emissions (cold ironing)
- Consider and analyze the use of speed reduction as a measure
- Consider and analyze measures to address emissions of methane and volatile organic compounds (LNG as fuel)

Slow speed drivers

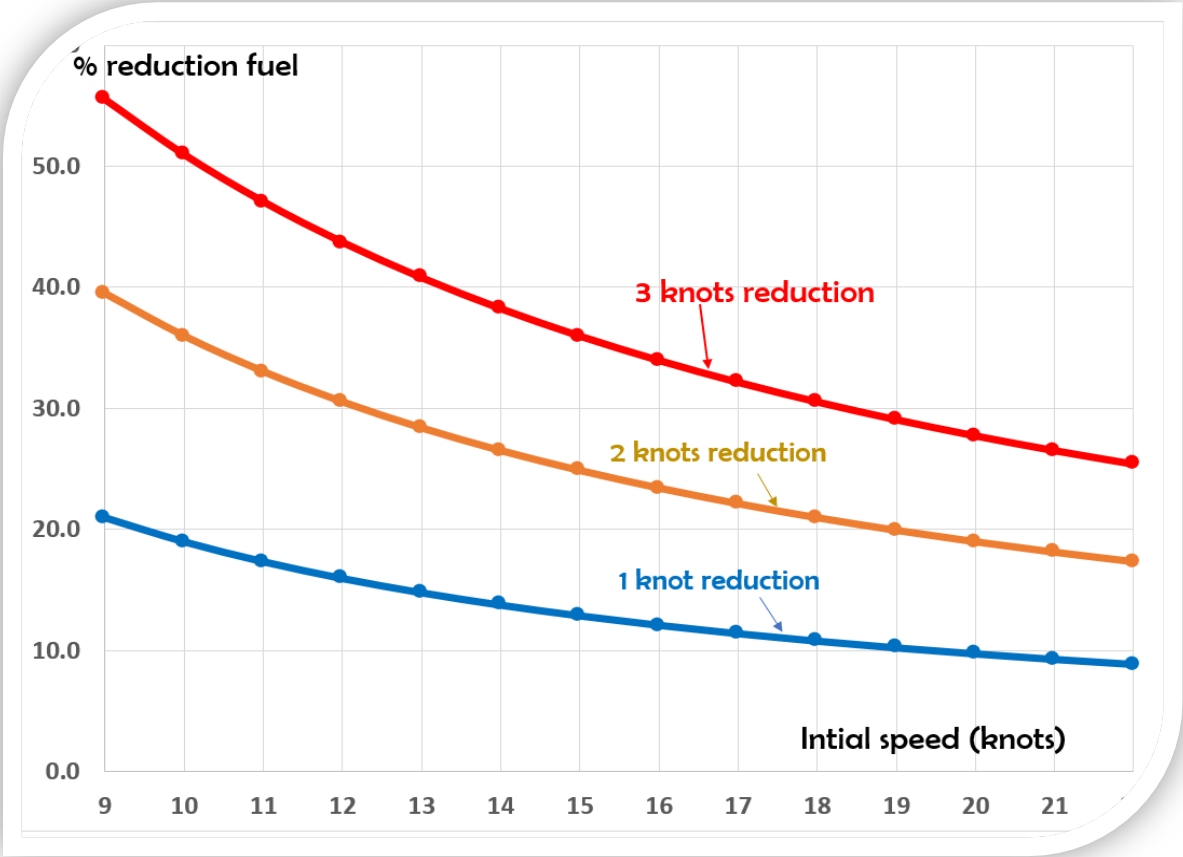
- Slow speed is more beneficial in ships with higher utilization.
- Low freight rates set de facto slow speeds
- Lower RPM increase propeller efficiency
- Energy efficient ship designs will have a greater market advantage





What 1 knot speed reduction will do to CO_2

Fuel savings with moderate speed reduction



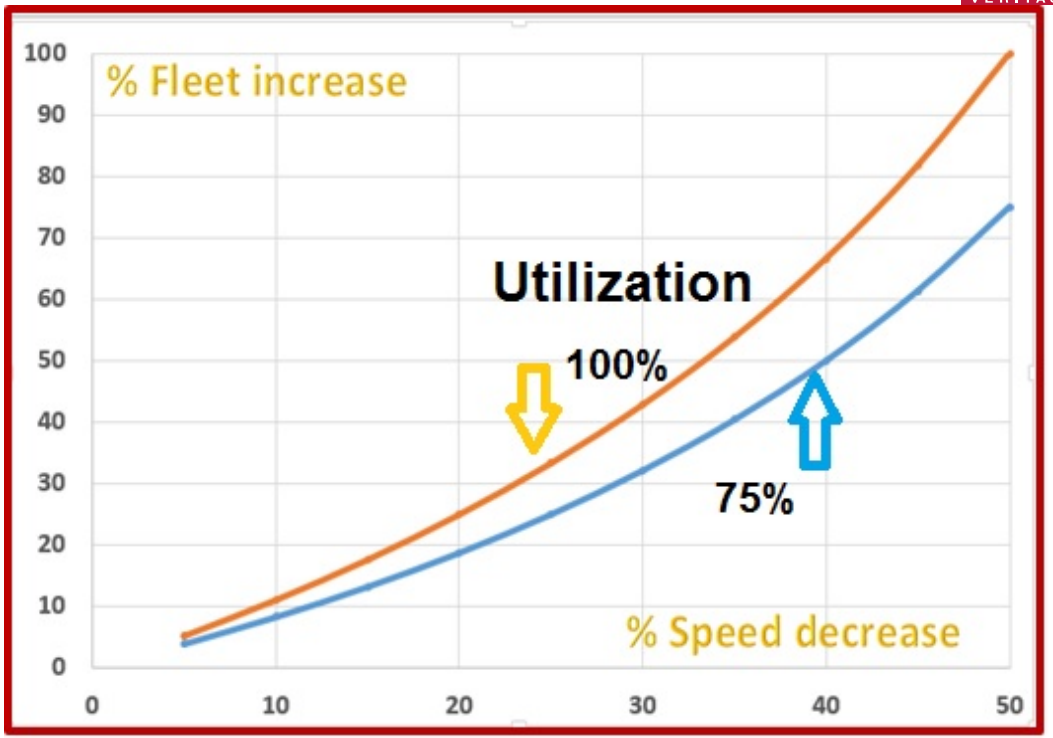
The arguments against slow speeds

- Mandated speed limits are essentially a half-measure. Same designs and continue burning CO2 emitting fossil fuels, just at a slower rate.
- Slow steaming may be risky and expensive
- More ships will be needed

Fleet increase due to slow speeds (IMarEST)

$$\Delta N = \frac{DAS}{3.65} \times \frac{\Delta v}{100 - \Delta v}$$

Δv : Percentage of speed reduction
DAS : Days at sea per year
ΔN : Percentage fleet increase



A 25% speed reduction will result in a 25% fleet increase and reduction of fuel consumption by 1.25x (0.75)x(0.75) or 30% (75% utilization)

The saga of EEDI

- Today EEDI is the only mandatory instrument to enforce decarbonization.
- Discussion on adoption of Market Based Measures for GHGs was suspended in 2013. An EU ETS may not be a good instrument for reducing GHG emissions
- EEDI regulation is equivalent to imposing an upper bound on the speed. This translates to an upper bound on MCR.
- We may see underpowered unsafe ships. In bad weather they would emit more CO_2
- Any bad-inefficient design could be made acceptable by a reduction in “design speed”
- No incentive for more efficient future ship designs. A quantum leap in improving efficiency does not seem likely.

EEDI = A virtual speed limit

→ 10% Required EEDI reduction DV= 5.0 % DP=14.0 %

→ 20% Required EEDI reduction DV=10.6 % DP=28.5 %

→ 30% Required EEDI reduction DV=16.3 % DP=41.0 %

→ 40% Required EEDI reduction DV= 22.5 % DP=53.4 %

GREECE MEPC 62/5/6

MO/YEAR	YARD	DWT (Ton)	Engine (HP)	Speed (kn)	EST EEDI
Feb-95	YARD 1	68519	9799	15.00	3.388 (3.730)
Jun-94	YARD 1	68621	9800	13.90	3.652 (4.019)
Jul-81	YARD 2	65337	15200	15.50	5.334 (5.871)
Jul-81	YARD 2	65020	15202	16.80	4.946 (5.444)
Aug-99	YARD 3	73725	10261	14.00	3.533 (3.889)
Sep-99	YARD 3	73659	10261	15.50	3.194 (3.516)

$$EEDI = cV^2 < EEDI_{required}$$

The two D's of modern power

→ Digitalization and decarbonization will shape the power generation industry for years to come

- Digitalization opens up new possibilities altering how power is generated and supplied.
- 3D printing allows easier production increasing manufacturing flexibility
- Decarbonization is about climate, but also about fuel supplies and electrification.
- Everything digital is electric. The future of energy is going to be about electricity.
- Artificial Intelligence – Machine Learning

Thank You

Move Forward with Confidence