

North American ECA

AAPA

Harbors Navigation & Environment Seminar

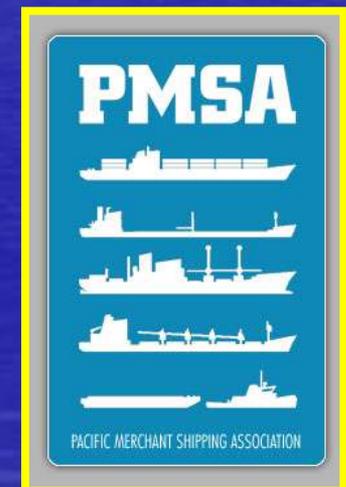
May 1, 2012

T.L. Garrett

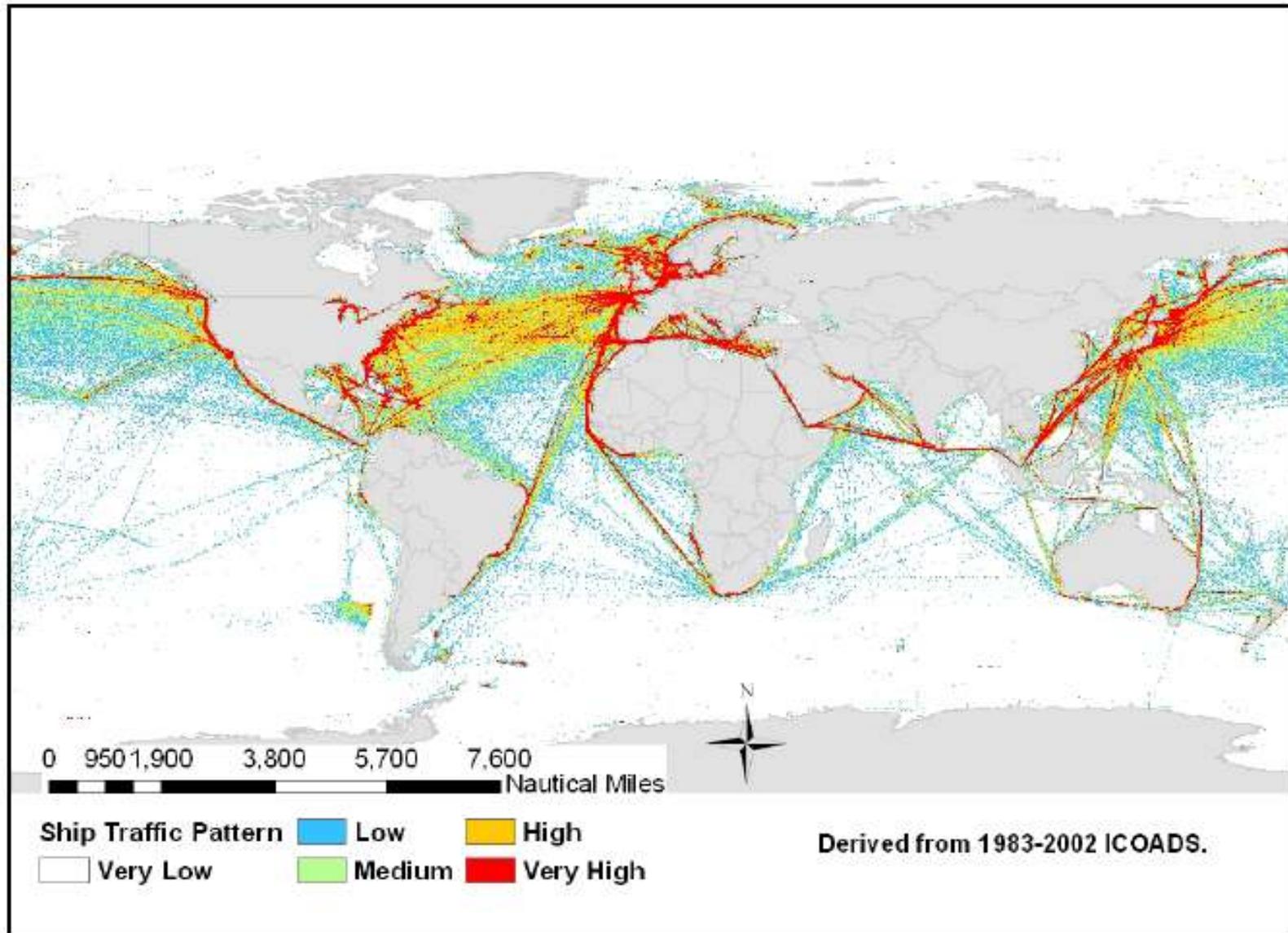
Pacific Merchant Shipping Assoc.



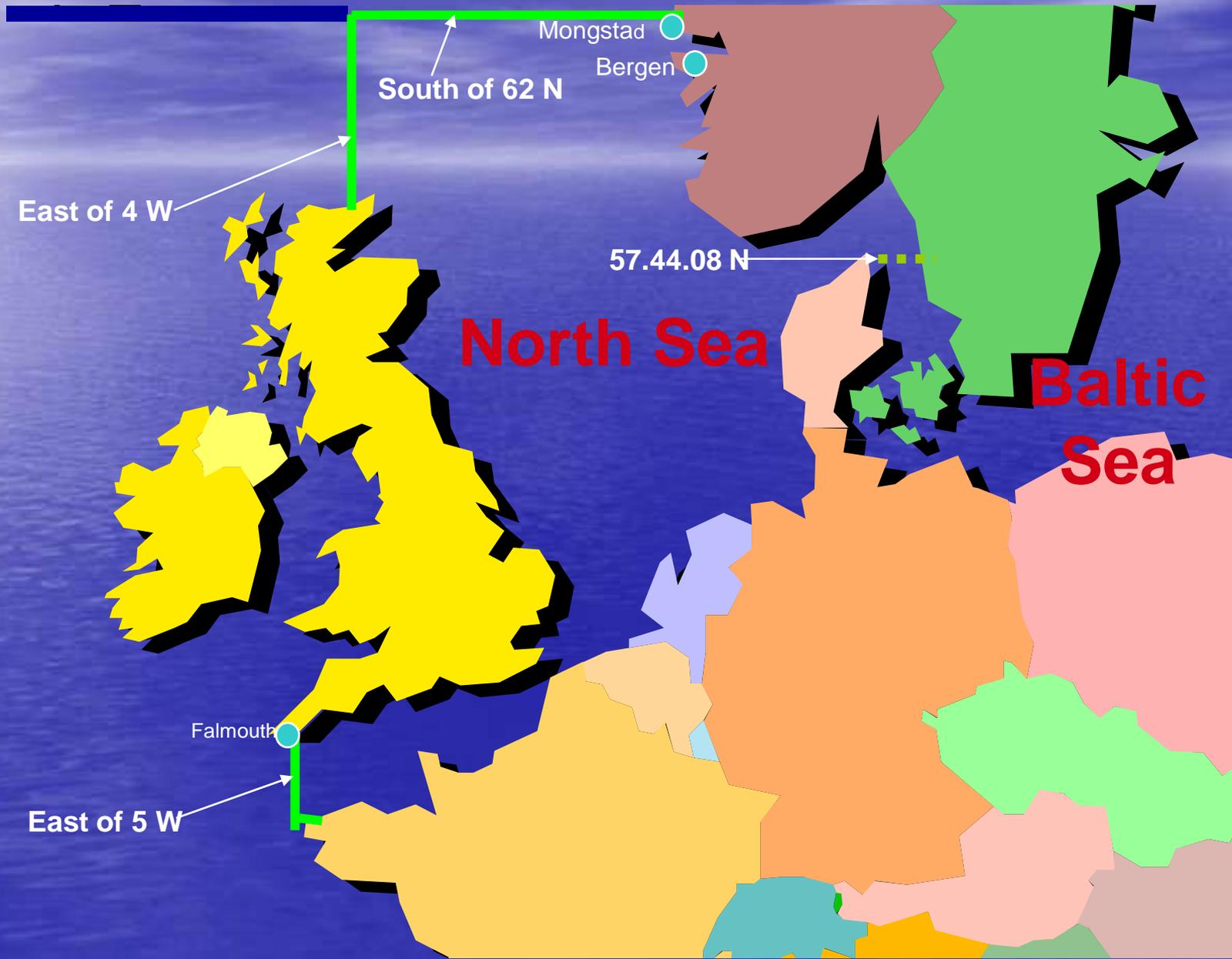
Alliance of the Ports of Canada, the Caribbean,
Latin America and the United States



Ship Traffic Patterns



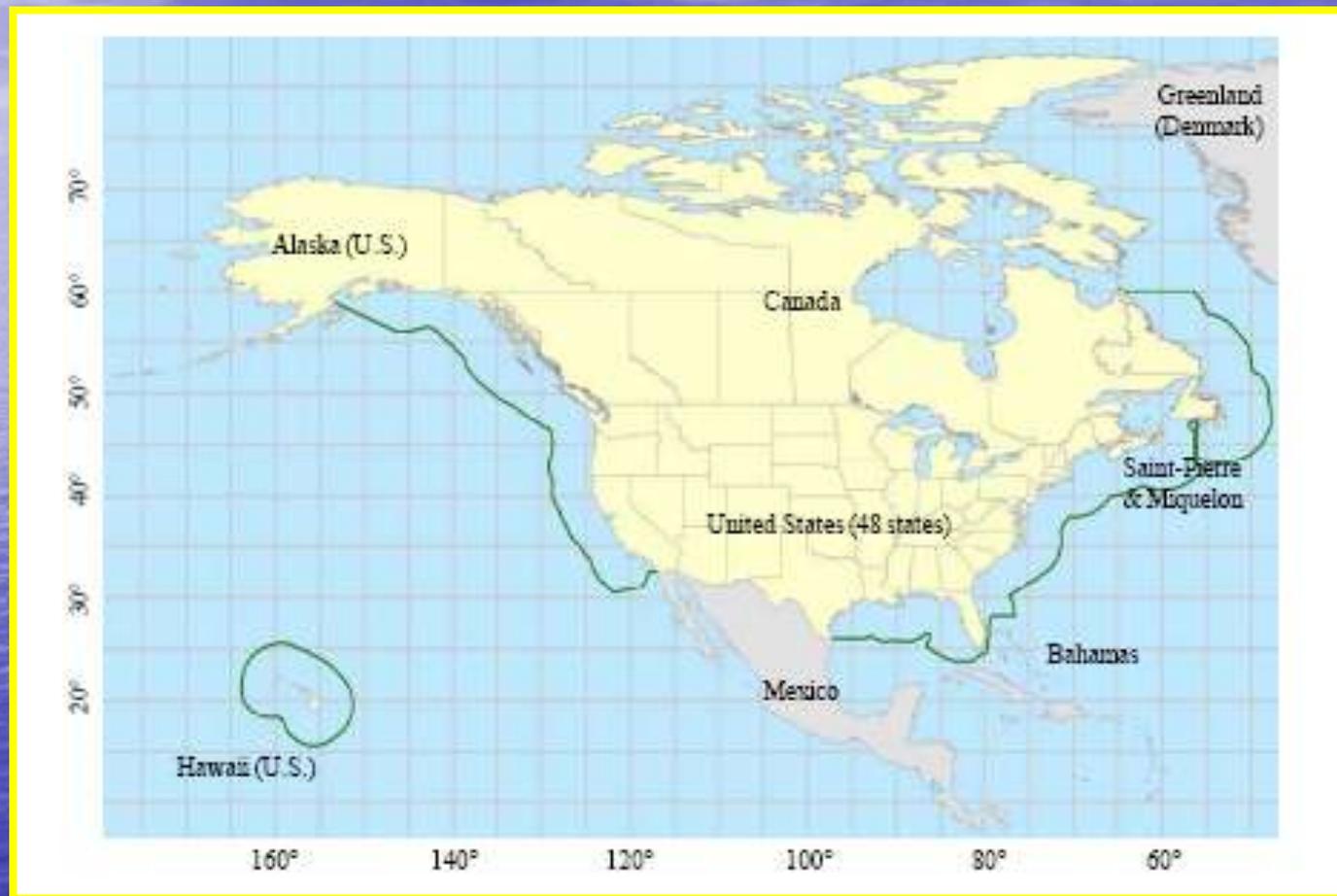
The Baltic and North Sea ECA



U.S./Canada Emission Control Area (ECA)



IMO

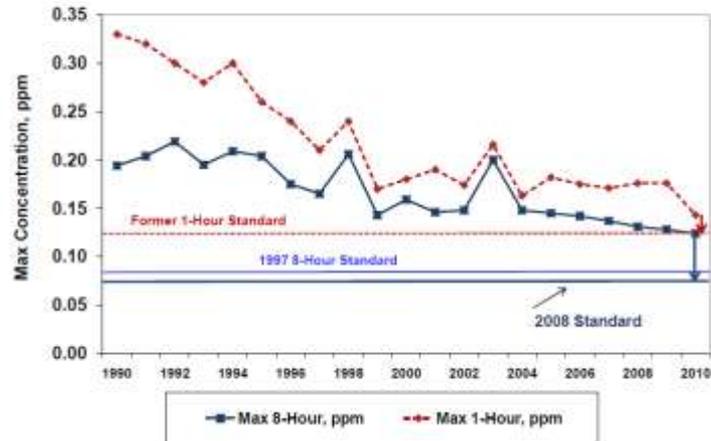


1st Phase August 2012 – 1.0% S Fuel
2nd Phase January 2015 – 0.1% S Fuel

The Air is Getting Cleaner!

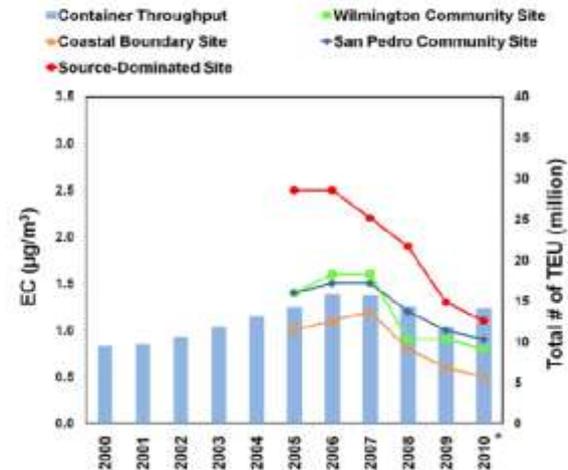
South Coast Air Basin

Annual Maximum Ozone Concentration

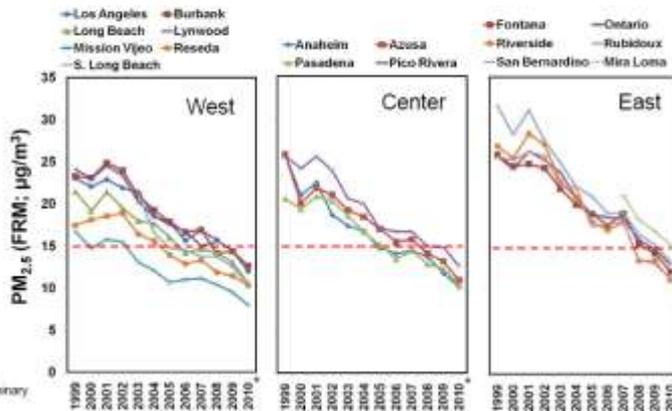


Diesel Emission Trends

Port of LA Monitoring Sites



PM_{2.5} Trends



IMO Annex VI – '08



NOx Engine Standards

- Tier 1 – 17.0 g-NOx/kW-hr, vessels 1990 - 2010
- Tier 2 – 14.4 g-NOx/kW-hr January 1, 2011
- Tier 3* – 3.4 g-NOx/kW-hr January 1, 2016

*In ECA, Tier 2 outside ECA

Global Sulfur Cap

- 4.5% reduced to 3.5% in 2012
 - 0.5% as early as 2020 but no later than 2025*
- * fuel availability study 2018.

SECAs to ECAs

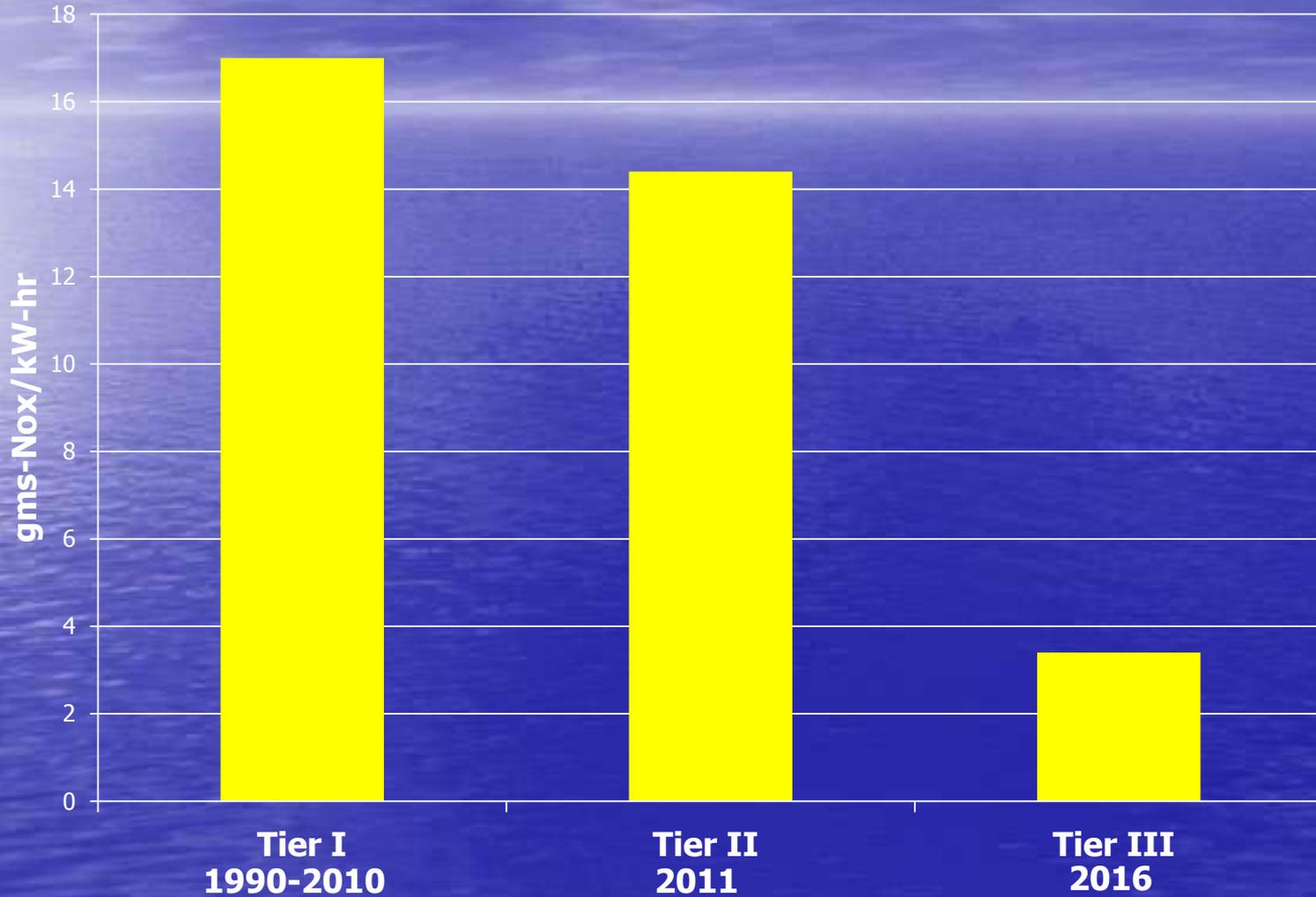
- 1.5% sulfur reduced to 1.0% on July 1, 2010
- 0.1% on January 1, 2015

Annex VI

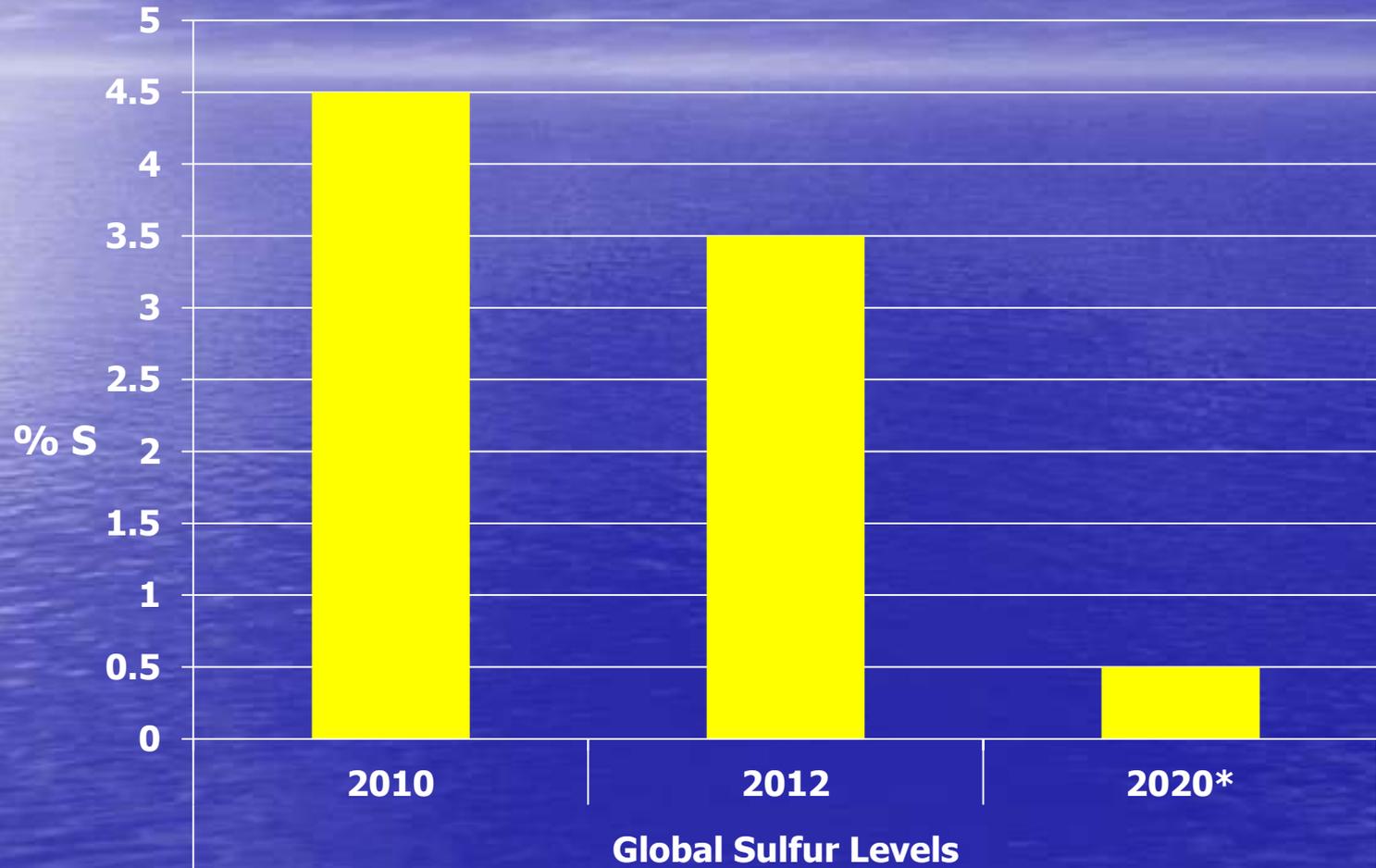
Ship Emissions Reduction

	<u>Global</u>	<u>ECA</u>
NOx	15-20%	80%
SOx	80%	96%
PM	73%	83%

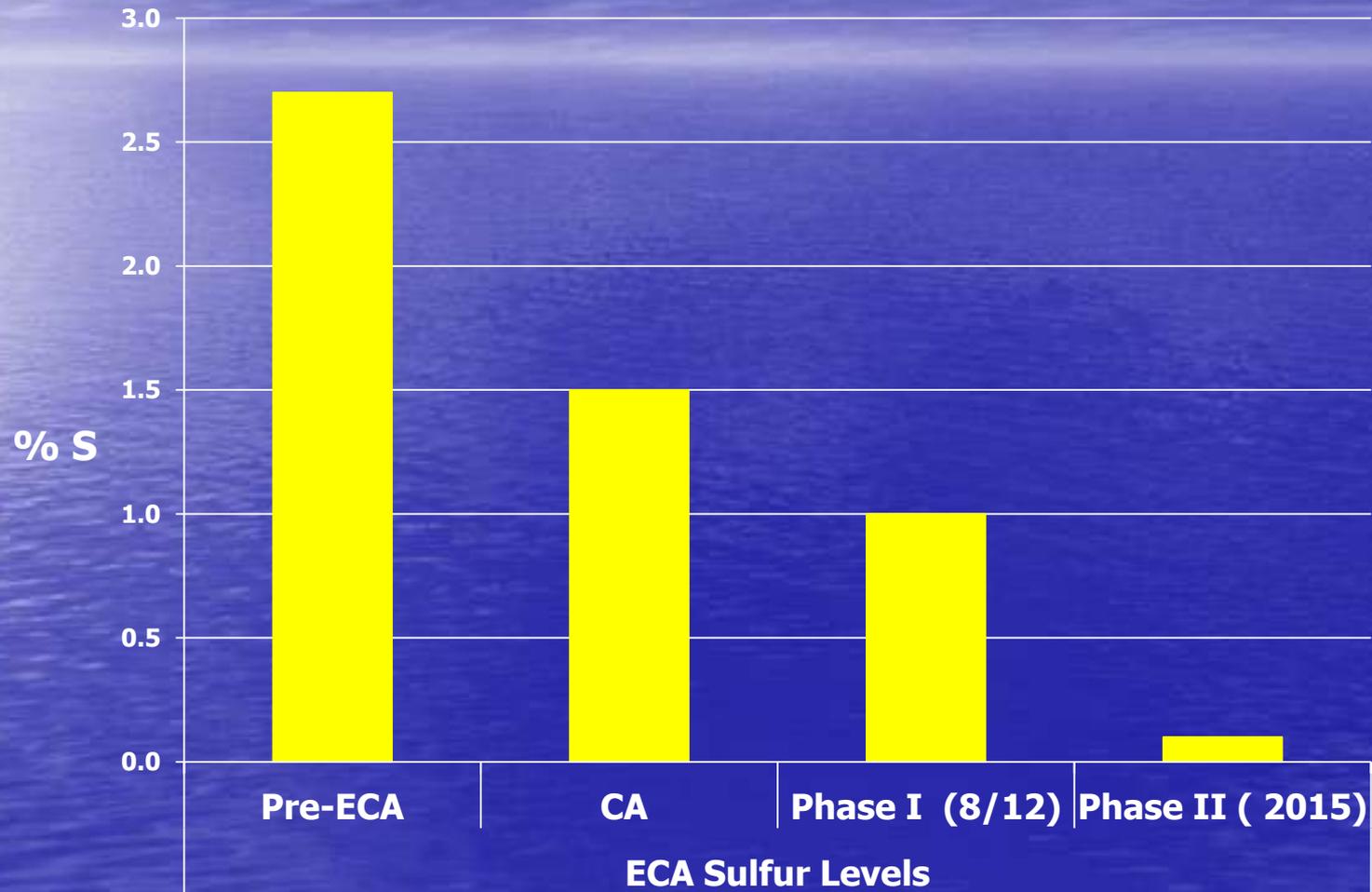
IMO NOx Engine Stds.



IMO Global Sulfur Levels



IMO ECA Sulfur Levels

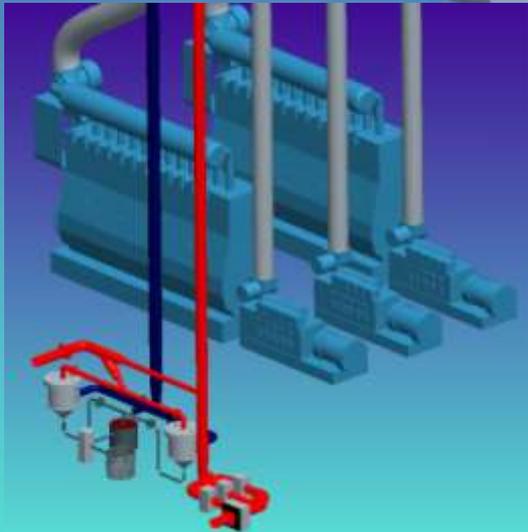
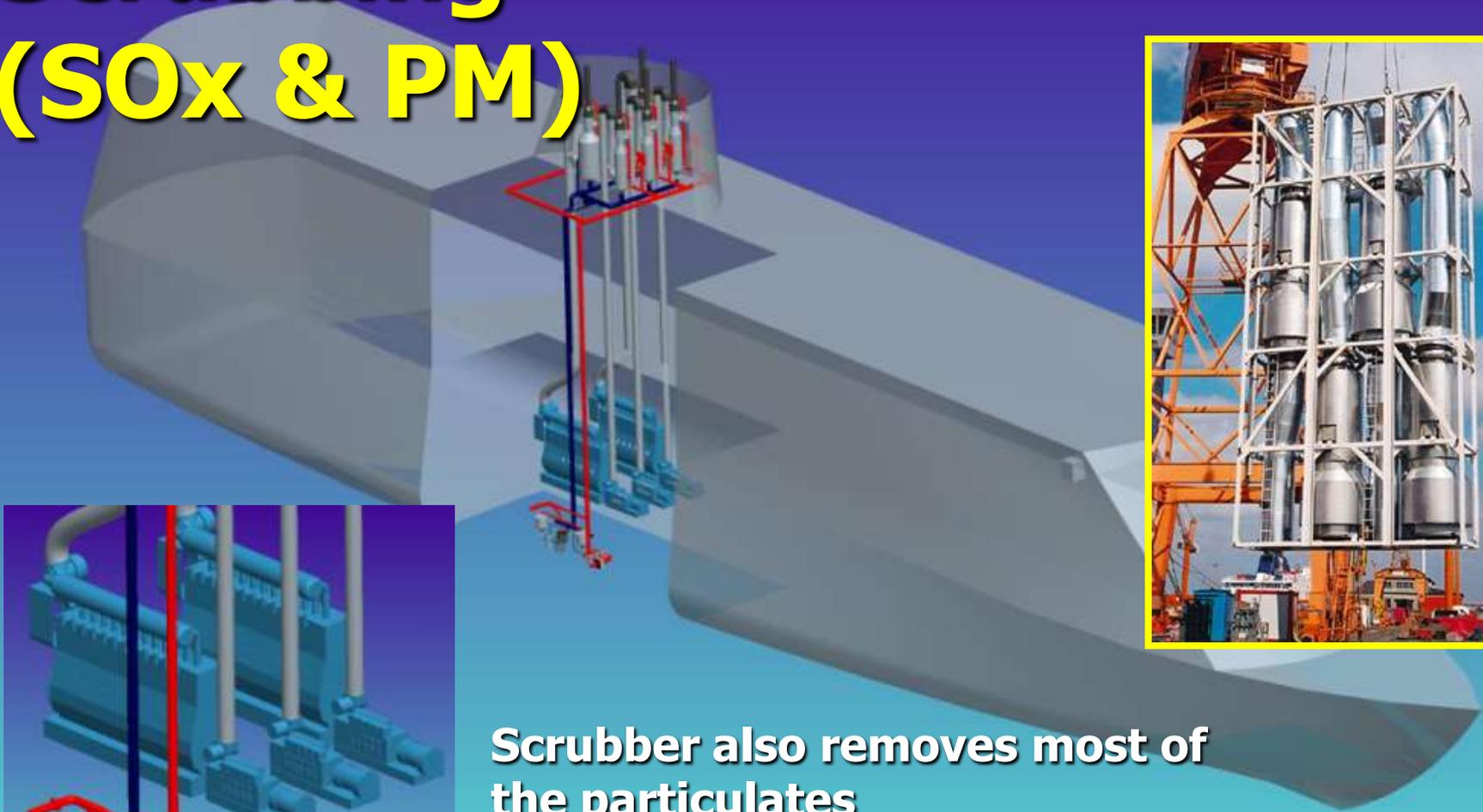


Out Standing Issues

- **Fuel Availability**
 - **Compatibility**
 - **Stability**
- **Enforcement**
 - **USCG Guidance**
 - **US EPA EIAPP**
 - **Canada?**
- **Alternatives**
 - **Scrubbers**
 - **Others?**

Sea Water Scrubbing (SOx & PM)

Sea water is pumped to the scrubber
CaCO₃ absorbs the SO_x from the
exhaust Produces CaSO₄ in discharge



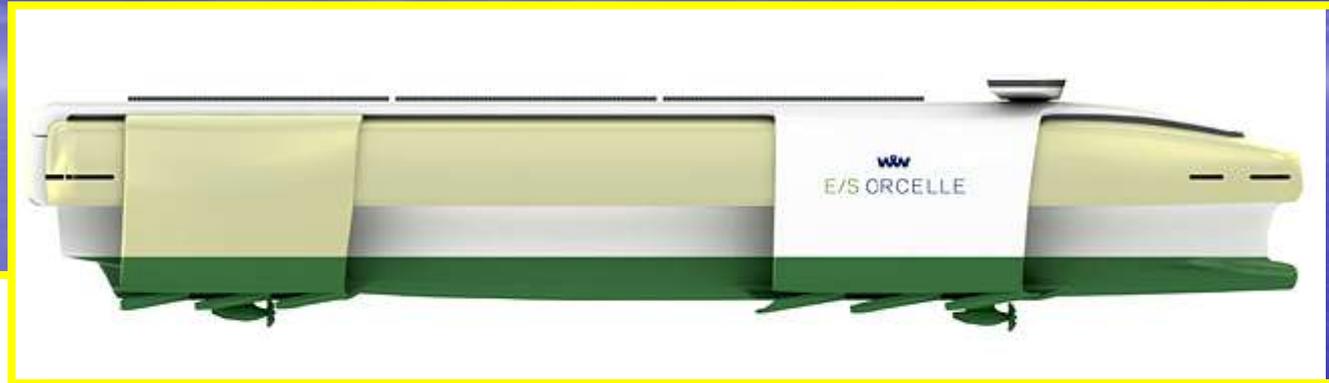
Scrubber also removes most of
the particulates
PM is removed from the
discharge
and disposed at dock

MAN Diesel Engine Technology (NOx)

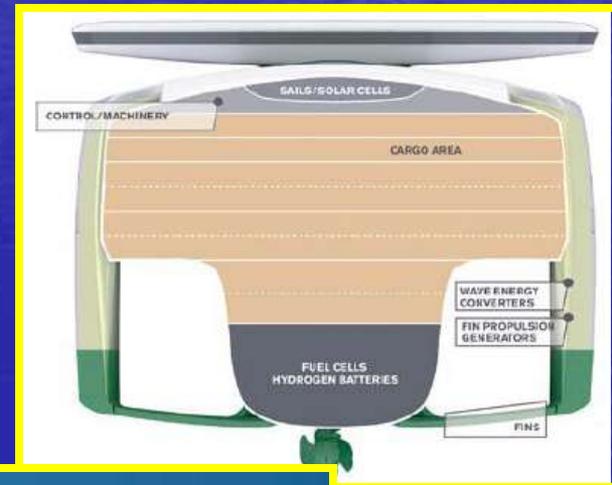


Electronic Controls	-30%
Slide Valves	-30%
Water Emulsification	-30%
Scavenge Air Moistening	-50%
Selective Catalytic Red.	-98%

Concept Vessel of the Future

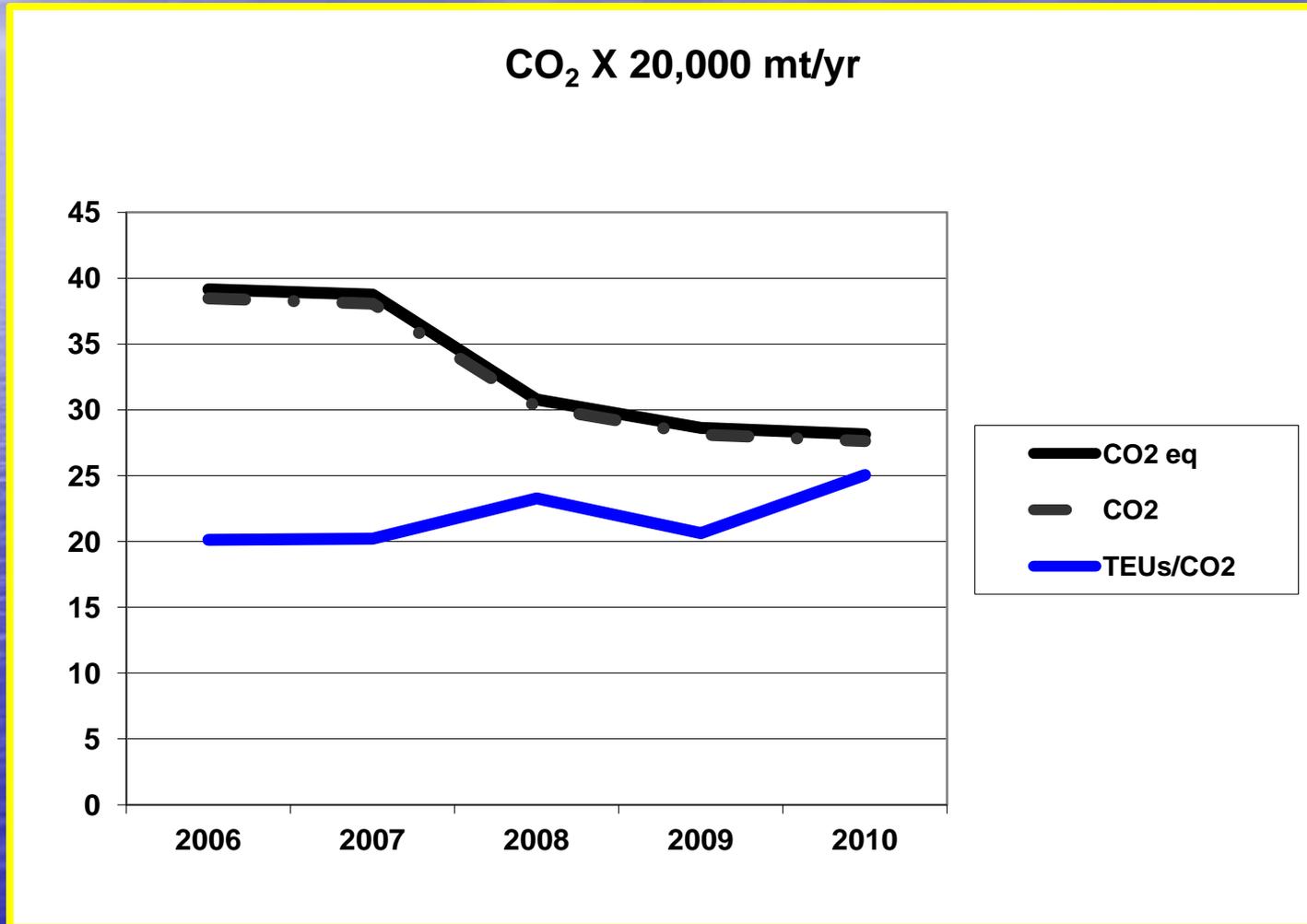


- Solar
- Wind
- Wave
- Fuel Cells



WALLENIUS WILHELMSEN
LOGISTICS

Ocean Going Vessels Greenhouse Gas Emissions

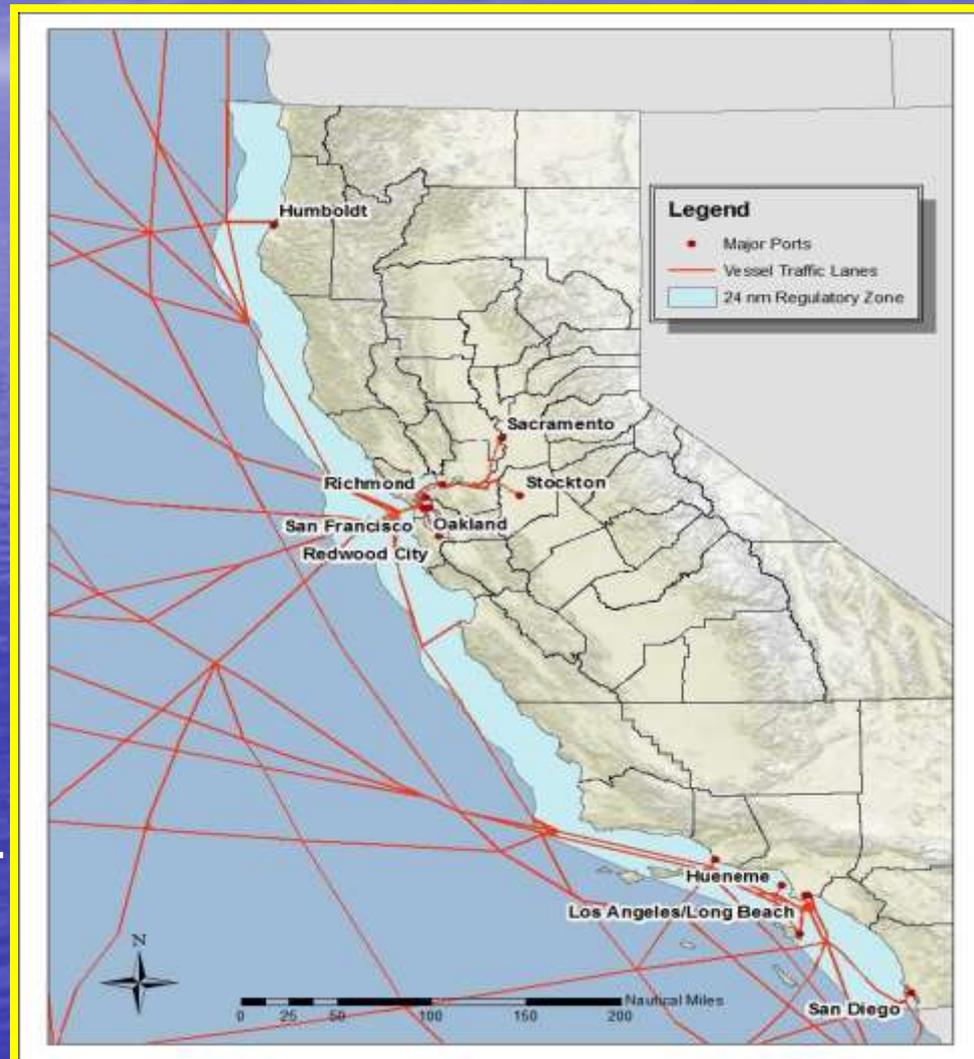


CARB Regulatory Boundaries (24nm*)



Began
July 2009

*Amend.
June 2011

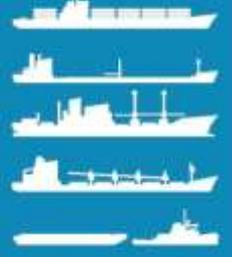


Thank you



Alliance of the Ports of Canada, the Caribbean, Latin America and the United States

PMSA



PACIFIC MERCHANT SHIPPING ASSOCIATION

