Federal Marine Diesel Standards

- Federal marine diesel engine emission standards
  - Final Rule establishing emission standards published December 29, 1999 (64 FR 73301)
  - Rulemaking documents available at: *http://www.epa.gov/otaq/marine.htm*
- Federal standards apply to new commercial engines
  - » Installed on US-flagged vessels
  - » At or above 37 kW, but less than 30 l/cyl
  - » Propulsion and auxiliary engines
  - » Exemption available for vessels used 75% or more of total operating time outside of US territory

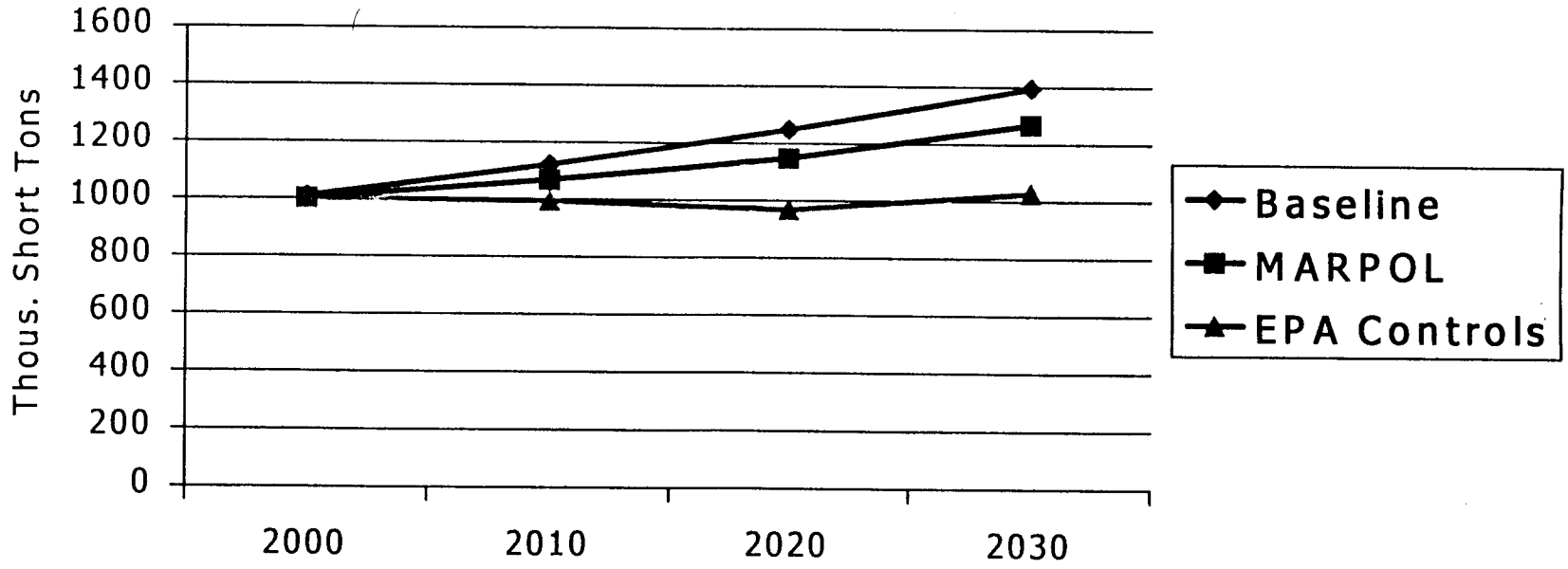
Federal Marine Diesel Standards

- Federal Standards
  - Prior to effective dates of the federal standards, engine manufacturers are encouraged to voluntarily comply with the MARPOL Annex VI NOx limits

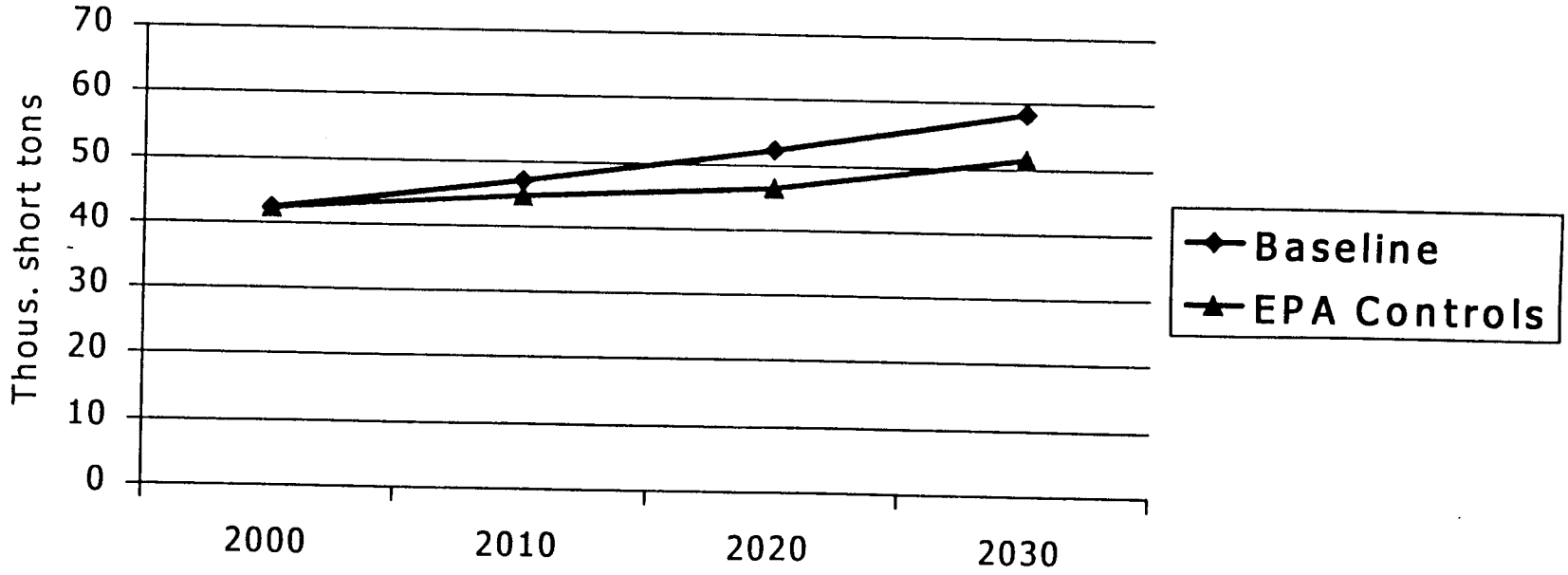
U.S. EPA Emission Standards and Dates for Marine Diesel Engines ≥ 37 kW

Category	Displacement	Starting Date	NOx+HC (g/kW-hr)	PM (g/kW-hr)	CO (g/kW-hr)
1	disp. < 5.0 liters/cylinder	2004-7	7.2-7.5	0.20-0.40	5.0
2	disp. ≥ 5.0 liters/cylinder, < 30 liters/cylinder	2007	7.8-11.0	0.27-0.50	5.0
3	disp. ≥ 30 liters/cylinder	No standards finalized; engines subject to MARPOL Annex VI requirements			

Federal Marine Diesel Standards



Federal Marine Diesel Standards

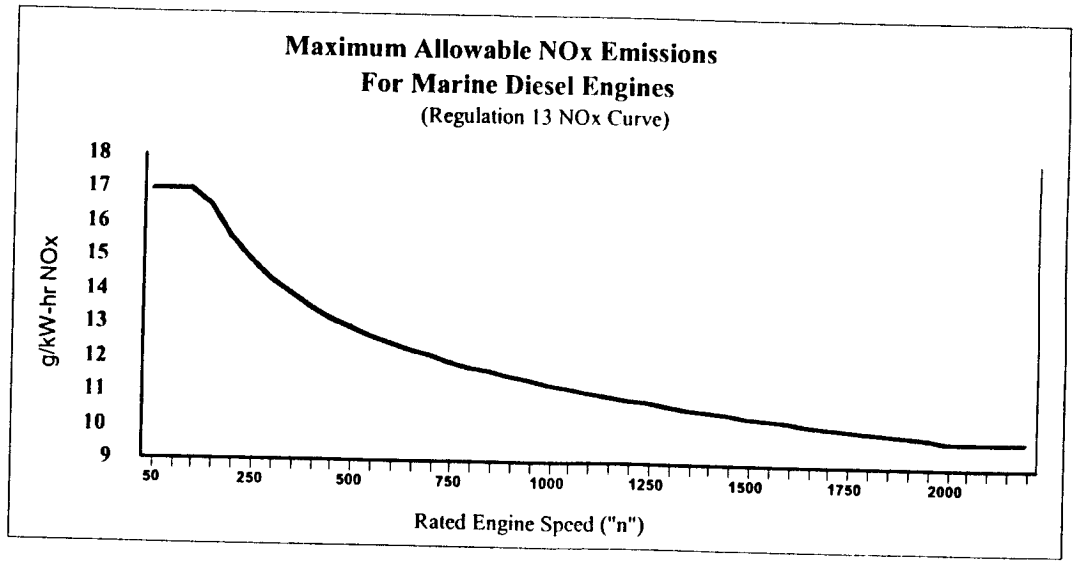


MARPOL Standards

- MARPOL
  - Annex VI was adopted by IMO in 1997
  - Standards are not yet in force internationally
    - » 3 countries have ratified (7 percent of world merchant tonnage)
    - » Need 15 countries with 50% of world merchant tonnage
  - Annex includes regulations for
    - » Engine NOx levels
    - » Shipboard incinerators
    - » Fuel sulfur content and fuel quality
    - » Tanker vapor emission controls
    - » Ozone-depleting substances

MARPOL Standards

- Engine standards - NOx only
  - Applicable to engines > 130 kW, beginning 1/1/2000
- Fuel standards:
  - 45,000 ppm fuel sulfur content cap
  - 15,000 ppm fuel sulfur content limit for special control areas



Federal Category 3 Marine Standards

- EPA did not include Category 3 standards in 1999 rule
- We are currently preparing a proposal for these engines
  - NPRM: April 30, 2002; FRM: January 31, 2003
  - Must propose and take final action on NOx limits
  - We are also considering the appropriateness of
    - » Standards for other pollutants (PM, CO, HC)
    - » Fuel controls
    - » Application to foreign flag vessels

- *http://www.epa.gov/otaq/marine.htm*

Marine Fuel Standards

MARPOL 73/78 Annex VI includes:

Fuel sulfur cap of 45,000 ppm (4.5%)

Fuel sulfur cap of 15,000 ppm (1.5%) for "SOx Emission Control Areas"

Currently the Baltic Sea and North Sea have been granted the SOx Emission Control Area designation.

There is interest in looking into a SOx Emission Control Area designation for the West Coast, possibly including Canada and Mexico.

- Bluewater Network has approached EPA and Environment Canada about supporting such an effort.
- EPA is open to investigating the issue to determine the benefits and costs of such a designation.
- A lower sulfur fuel would provide SOx, PM and NOx benefits.
- Current worldwide fuel sulfur content is estimated to be 2.7-2.8%.

The IMO would need to approve the SOx Emission Control Area designation as an amendment to Annex VI. The proposal would need to address criteria such as:

- SOx impacts on land and sea area under consideration, including ecosystems, water quality, and human health;
- relevant meteorological conditions;
- nature of ship traffic;
- description of current control measures for SOx land-based sources