Refining and Bunker Trends to 2015

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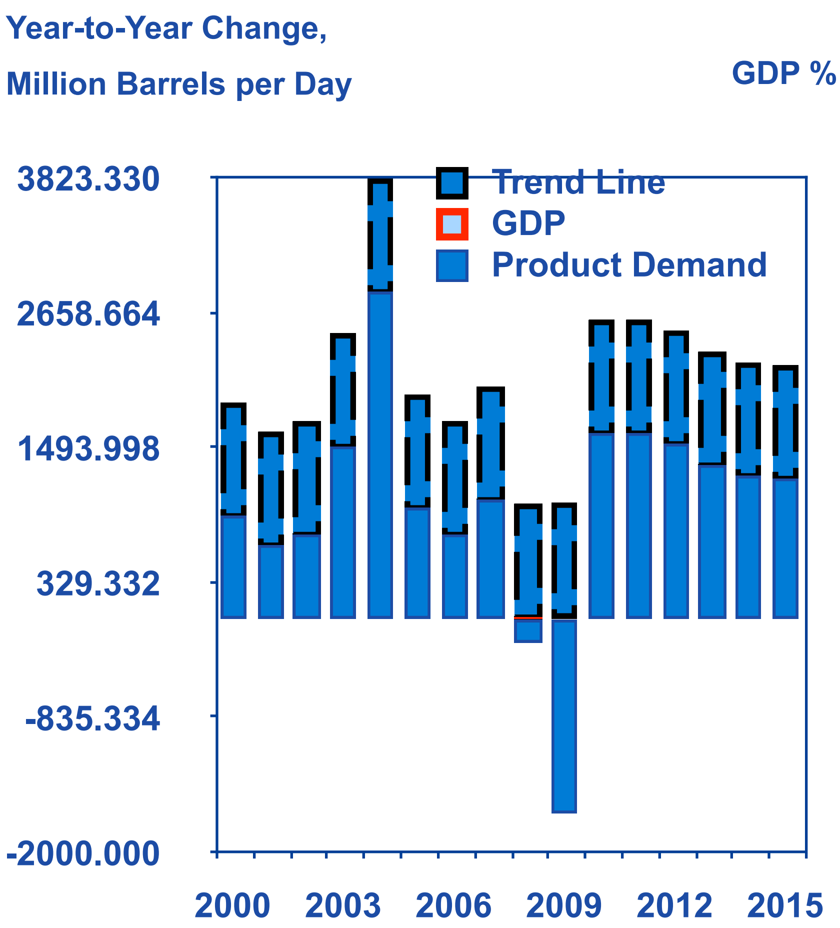
John Vautrain
Senior Vice President
Purvin & Gertz, Inc.
Singapore

Agenda

- Demand Situation
- Supply Side Considerations
- Outlook

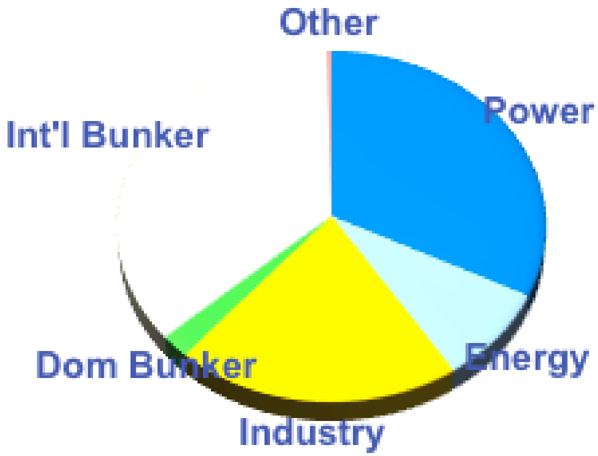
Over the short term there has been considerable product demand loss.

Global Petroleum Demand and GDP Growth



- Product demand globally has fallen even as new refinery projects have been completed.
- High prices and GDP declines have combined to reverse growth.
- With economic recovery and more moderate crude prices, demand growth should return

Most residual fuel oil is used in non-bunker applications.



- Domestic and international bunker accounts for about 200 million tonnes per year.
- Non-bunker applications represent about 320 million tonnes per year.

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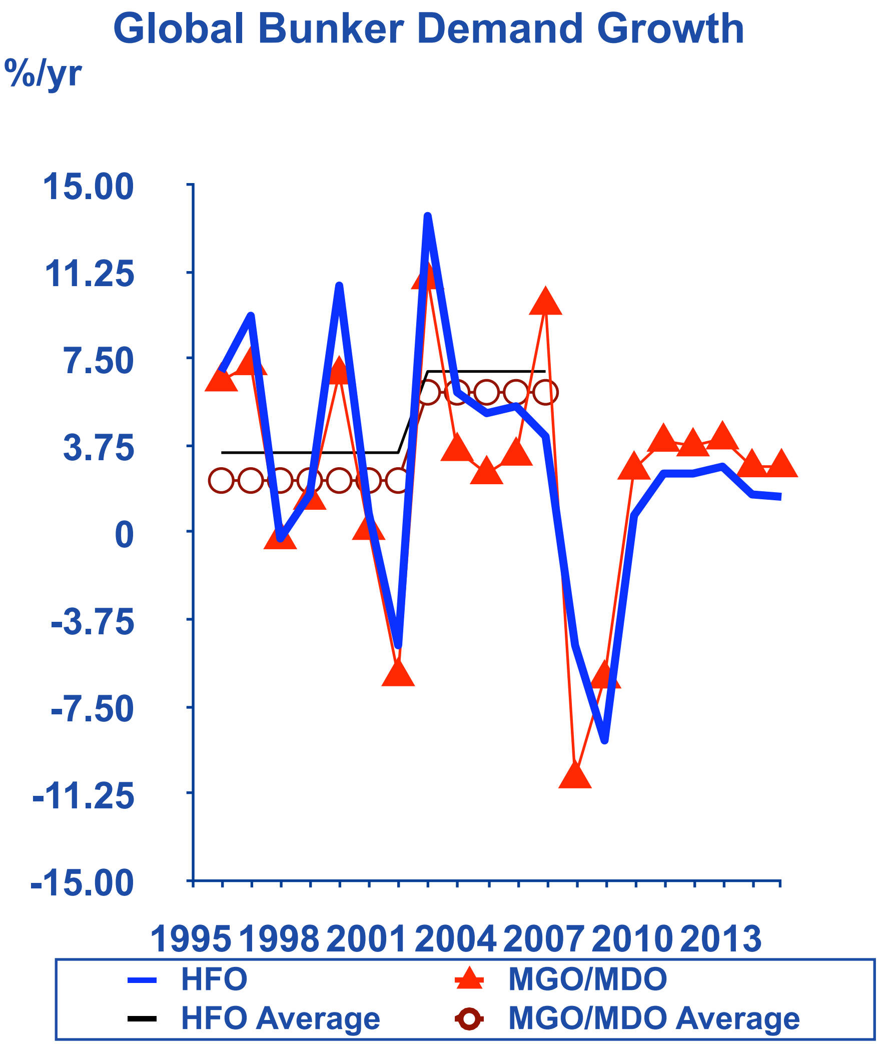
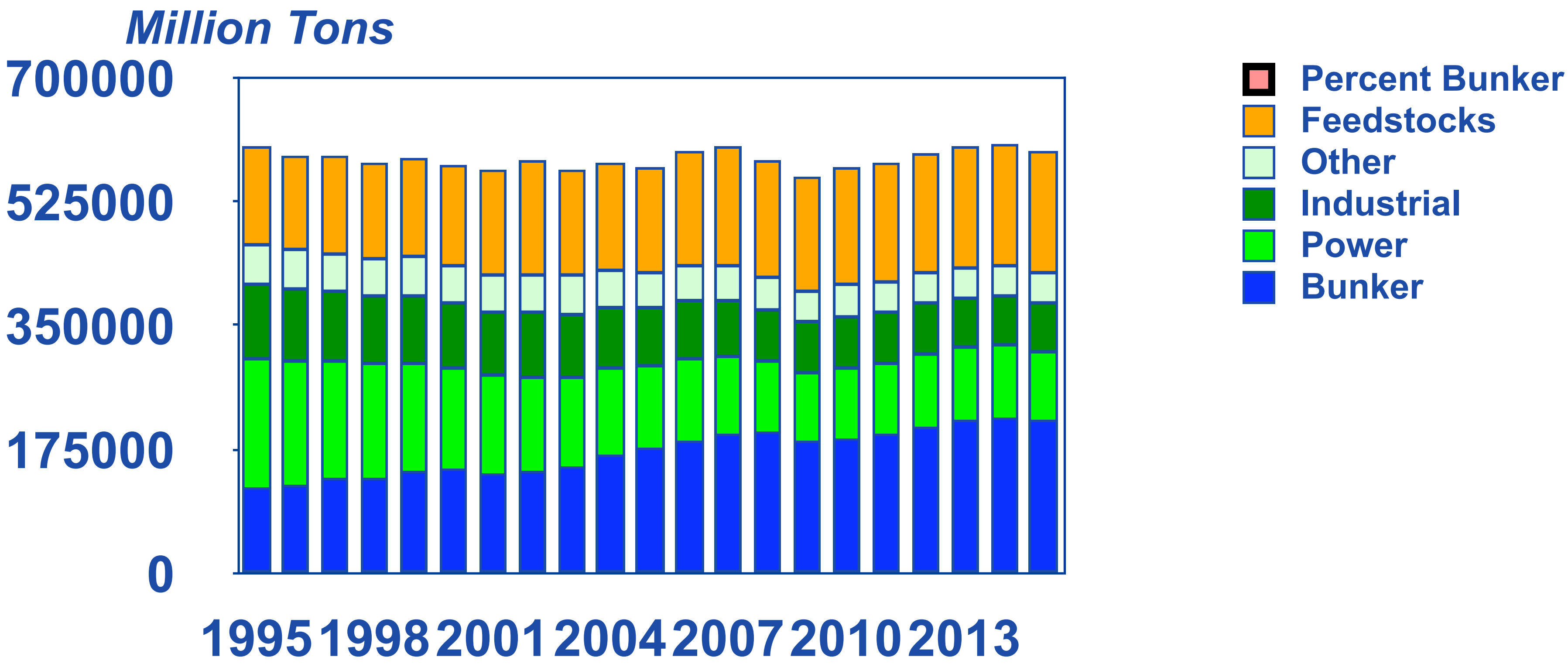
Bunker growth of the last decade will fade and earlier patterns will be restored.



- Bunker demand growth in the past decade has been exaggerated.
- Substantial declines are expected for both 2008/2009.
- Growth will resume with economic recovery but at rates similar to the late 1990s.

World marine bunker demand has been increasing as overall fuel oil demand declines

Total Bunker and Residual Fuel Demand



Bunker fuel demand growth has been nearly offsetting stationary fuel oil demand declines.

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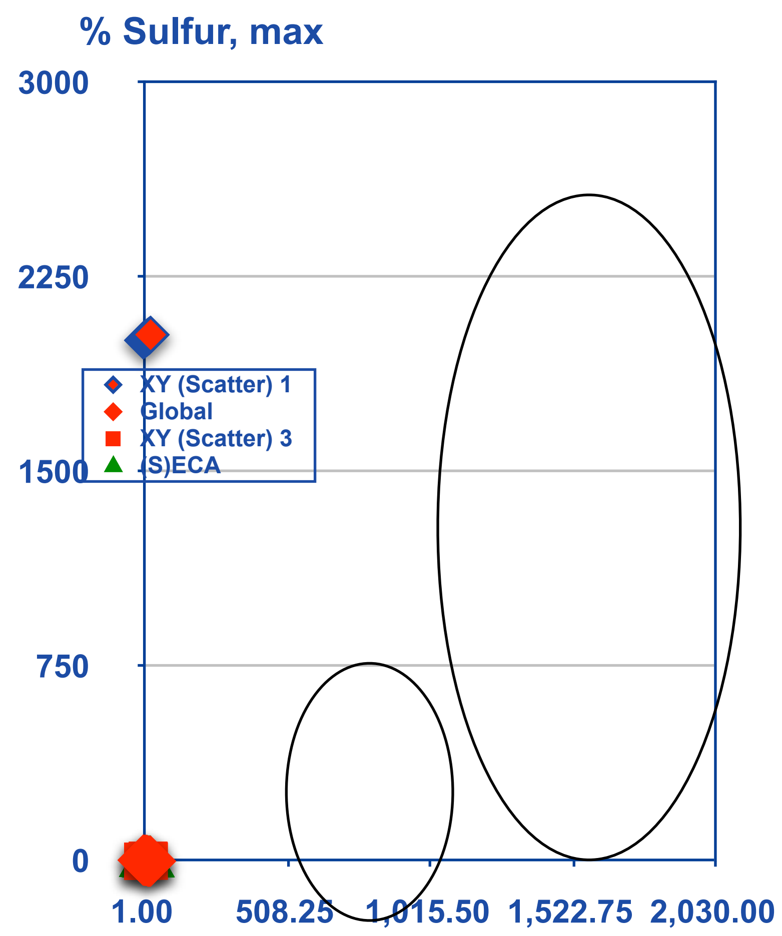
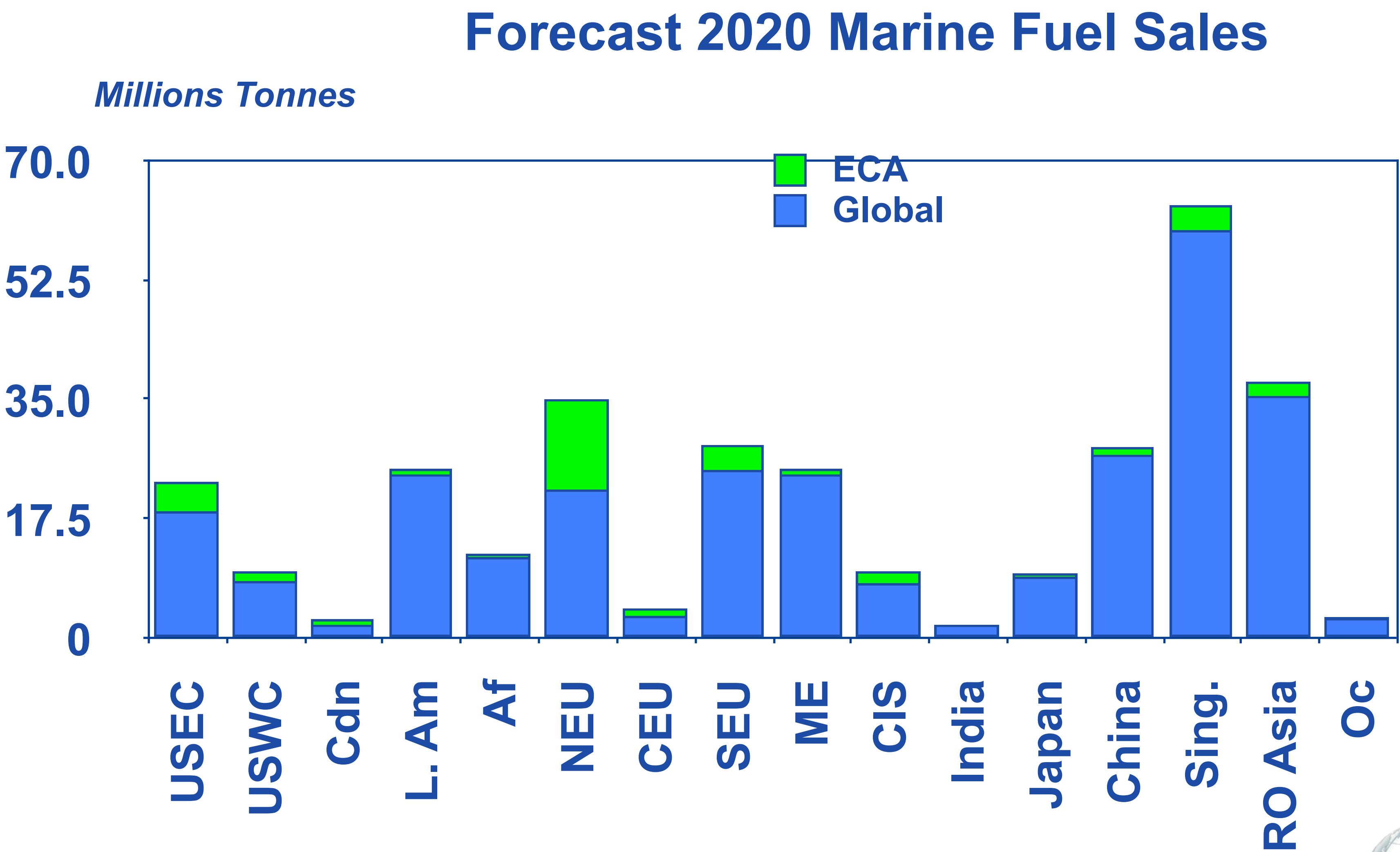
Proposed IMO regulations will significantly reduce sulfur emissions from bunker fuel consumption

- 2015 SECA reductions will be very difficult to achieve.
- Desulfurizing high sulfur heavy fuel oil to 0.1% is beyond limits of current technology.
- The 2020/2025 changes in global bunker quality are daunting and could require massive refinery investment.



ECA bunker will be a modest portion of total bunker demand in most regions even far in the future.



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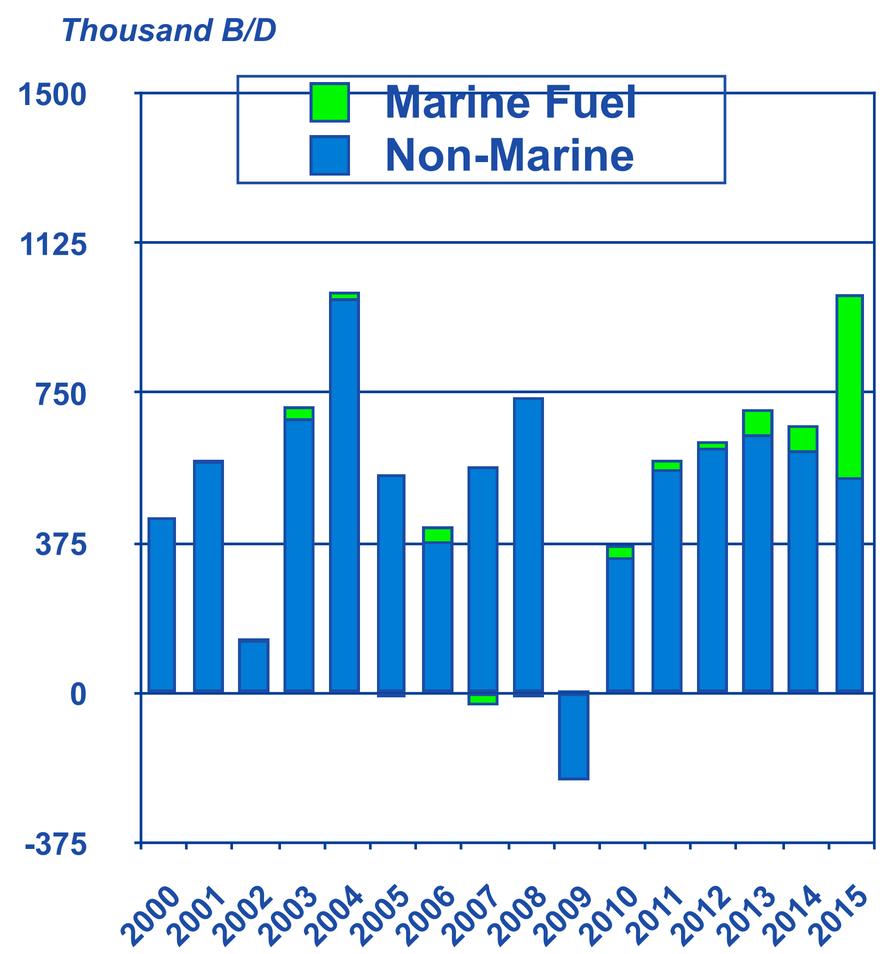
IMO's ECA regulations will trigger a step change in diesel demand around 2015.

- Manufacturing RM bunker grades to the required sulfur level generally will not be possible.
- Lighter marine fuels will become obligatory unless scrubbers are widely adopted by that time.
- These lighter fuels will be expensive.

Year-Year Change in Global Diesel Demand



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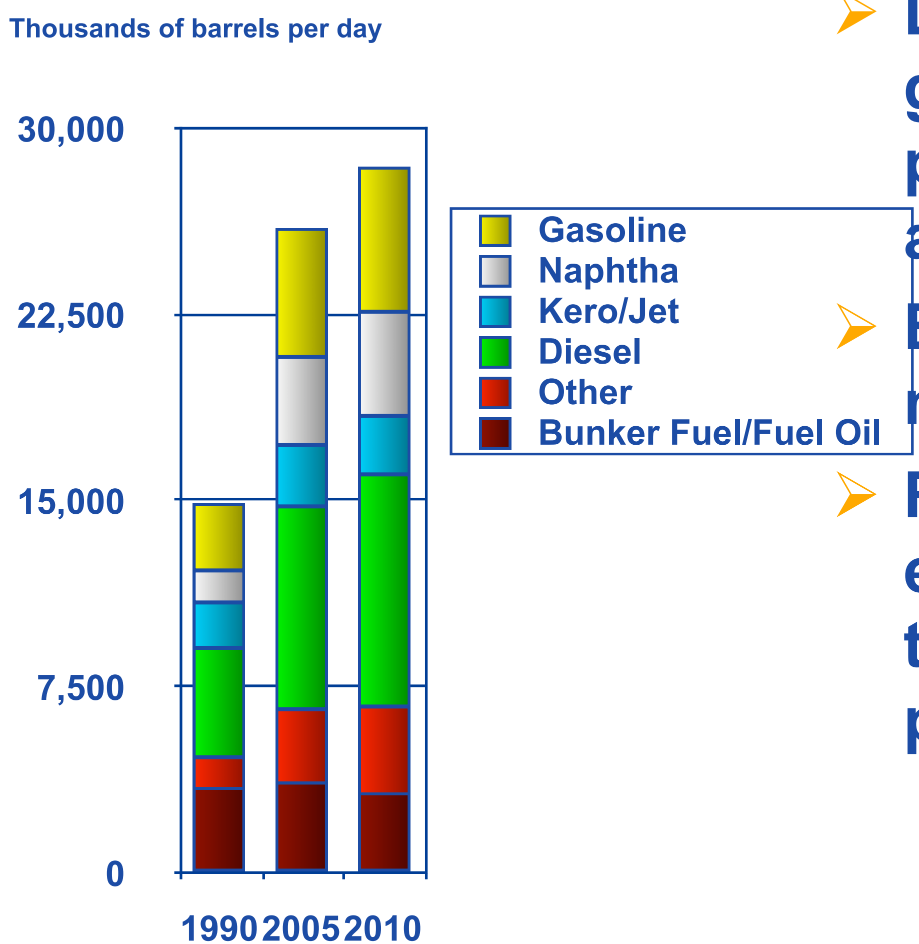
East of Suez markets are growing well but not for heavy fuels.

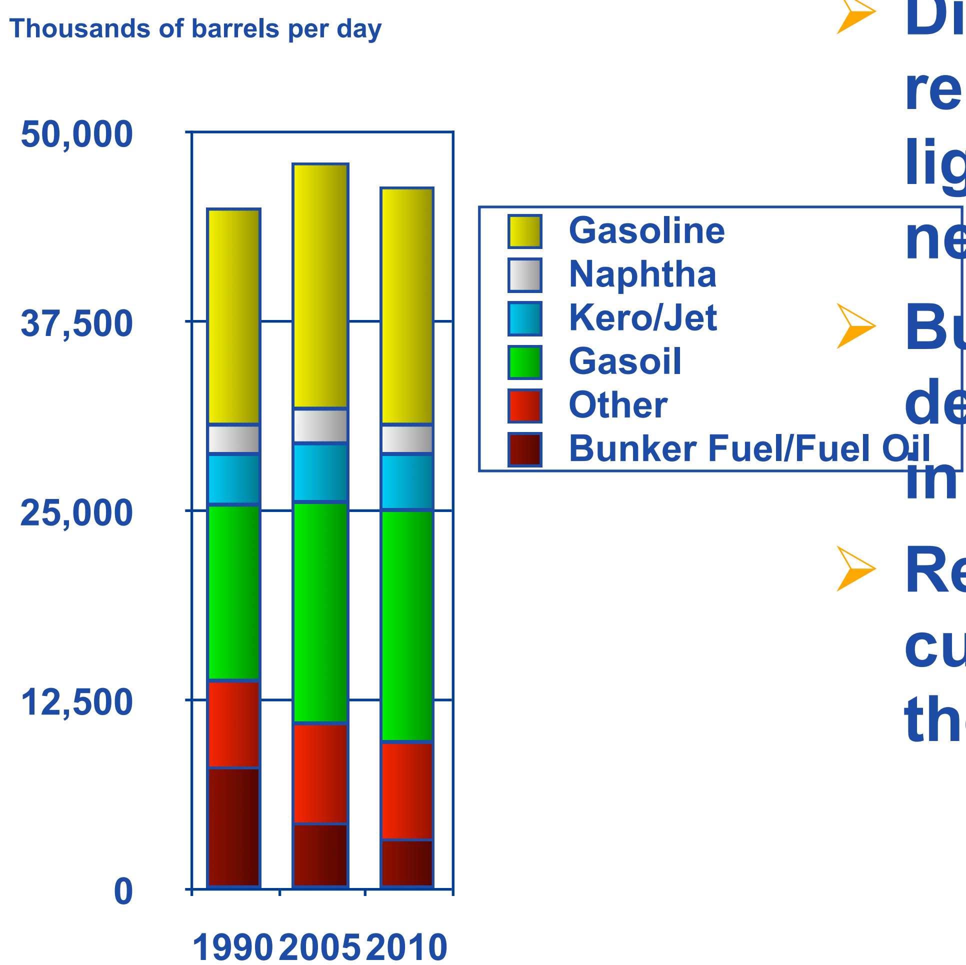
East of Suez Petroleum Product Demand



- Light product demand growth is high particularly for naphtha and diesel.
- Bunker fuel/fuel oil are not growing rapidly.
- Refiners are obligated to expand but to orient themselves to light products.

West of Suez markets are flat to shrinking.

West of Suez Petroleum Product Demand



- Diesel growth is reasonable but other light products are flat to negative.
- Bunker fuel/fuel oil demand has been falling in total.
- Refiners are obligated to cut back and to reorient themselves to diesel.

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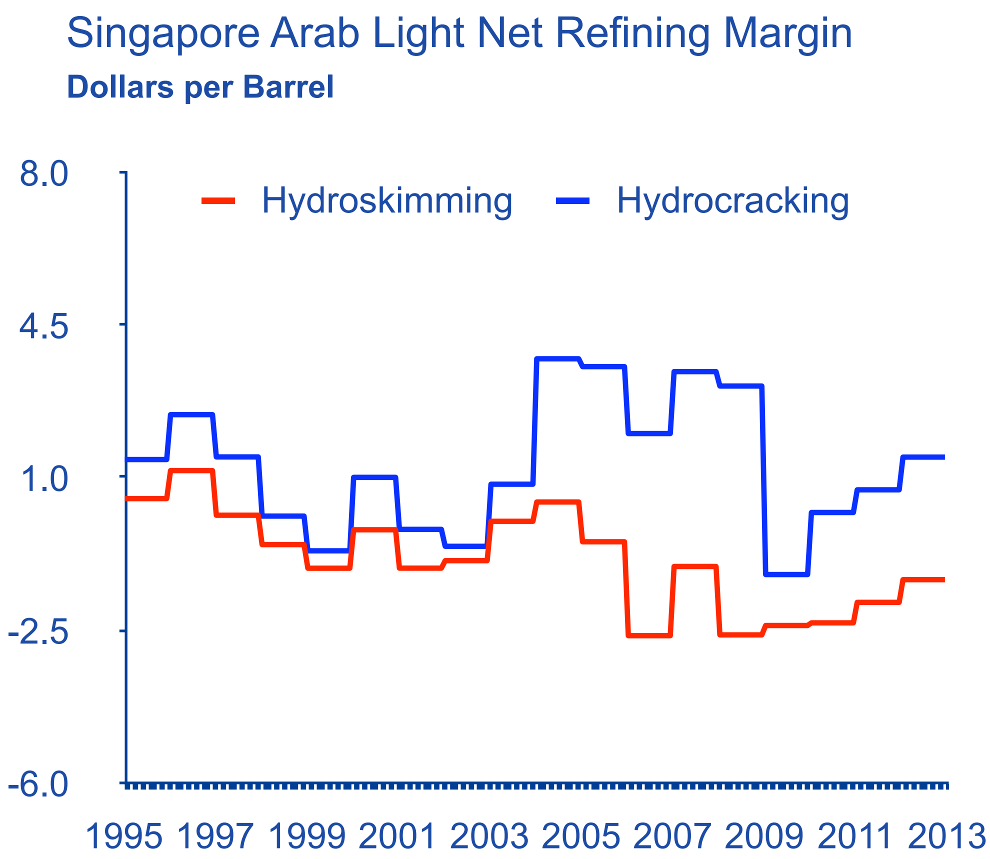
We anticipate recovery to come over the next four years but not for simple refiners.

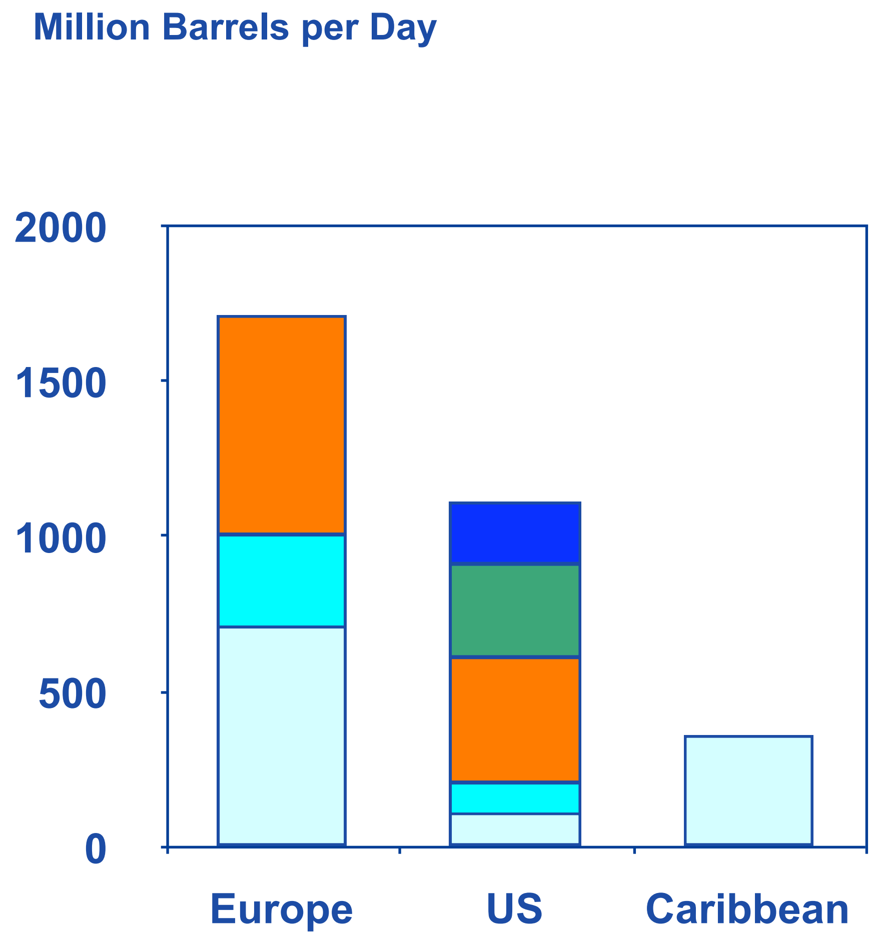


- **Simple refining oriented to bunker fuel will continue to be unattractive.**
- **Refiners will tend to move into more sophisticated categories suppressing fuel oil and bunker production.**

About 3.6 MMB/D of refining capacity will need to be rationalized to bring supply and demand back into balance

- Mismatch of refining capacity to demand requirements is a major cause of poor profitability.
- Most of the imbalance is West of Suez.
- Refinery closures will be forced by the economic factor of low profitability.

Excess Refining Capacity



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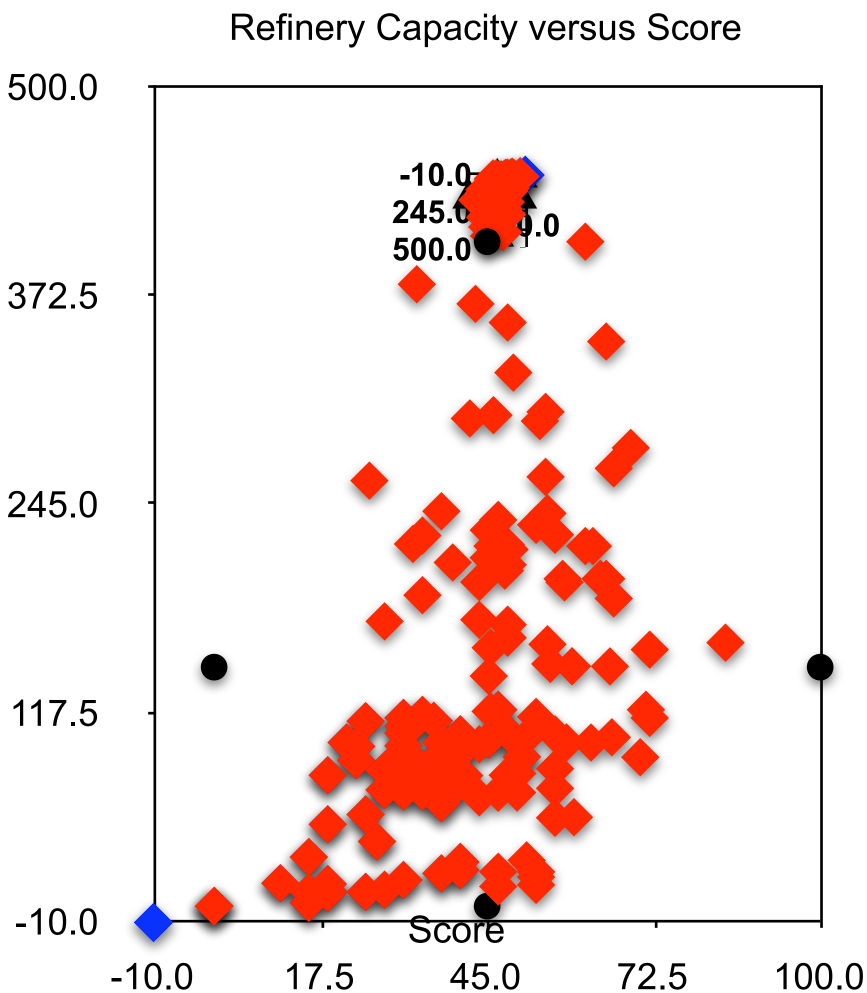
Bunker manufacturing is a key indicator of poor profits and probability of closing.

European Refinery Competitiveness



- European refining industry includes many refineries that are vulnerable to economic conditions.
- Vulnerable refineries share common characteristics:
  - Small
  - Coastal
  - Large proportion of products devoted to bunker fuel
  - Lacking preferential market access
- Simple refineries oriented to fuel oil and bunker fuel are most at risk.

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What the future holds.

- Bunker fuel demand growth will taper off after economic recovery.
- Shoreside fuel oil applications will decline in volume releasing more RM-type material into the bunker pool.
- Low sulfur fuels will become far more expensive as required sulfur levels fall.
  - Beyond 2015 the same threat applies to global bunker
- Bunker fuel consumers may compete with high speed diesel applications leading to very high prices.
  - Widespread scrubbing technology adoption is a key factor to control marine fuel costs.
- Refining sector woes will affect bunker markets.
  - Simple refineries will close West of Suez and upgrade East of Suez, both reducing fuel oil/bunker supply.
  - Bunker prices will stay high relative to crude oil over the medium term.

www.purvingertz.com

John H. Vautrain
Senior Vice President & Director
jhvautrain@purvingertz.com

69 Duxton Road
Level 3
Singapore 089528
Tel: +65-6227-2758
Fax: +65-6227-2753

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