

Residual Fuel Market Outlook



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& GERTZ
INC.

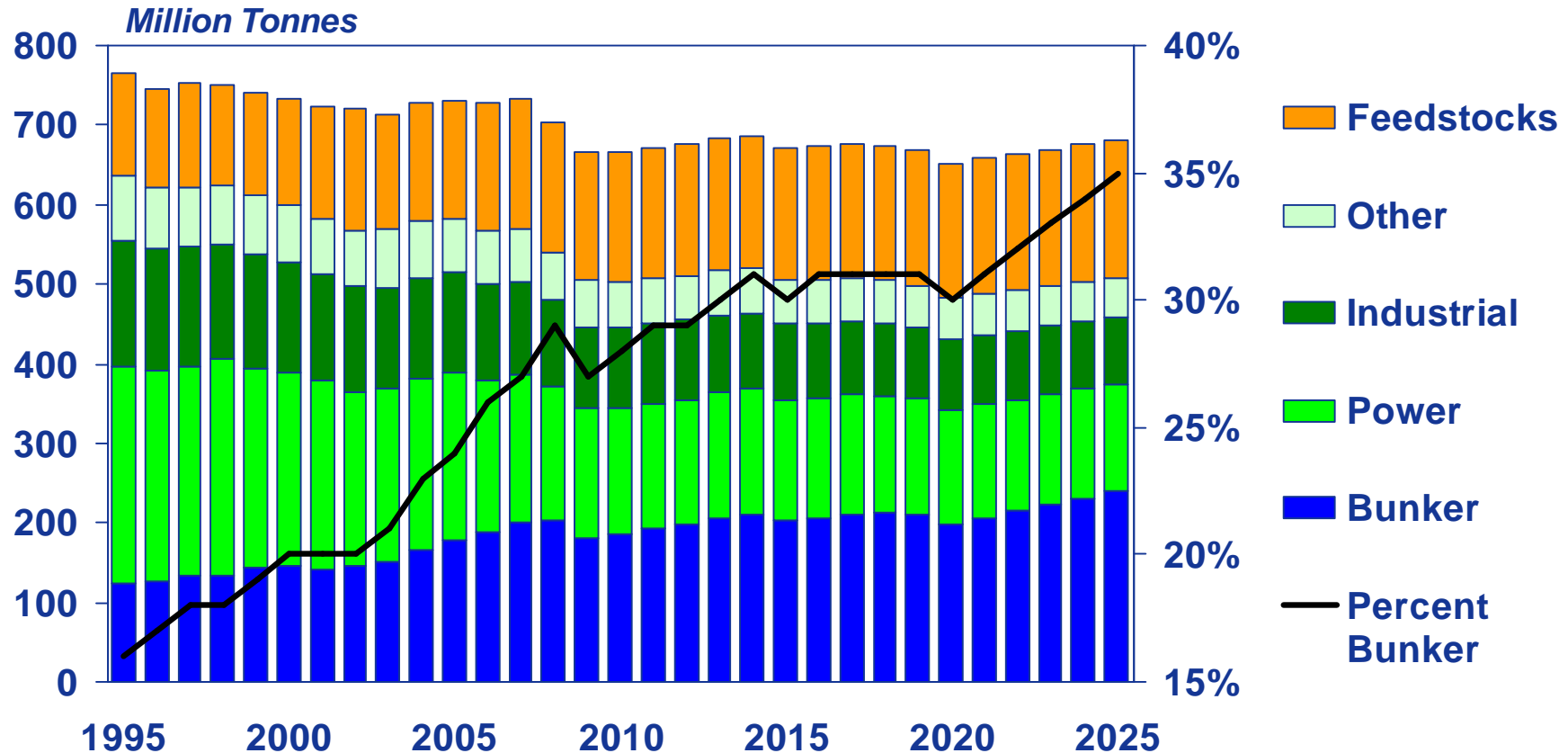
Purvin & Gertz study is based on a scenario analysis to understand impact on refining industry

- **Reduction of bunker fuel emissions is a complex inter-industry issue**
 - Shipping and refining industries both face challenging issues
 - Who invests? What quality of fuel is needed?

- **Scrubbing of stack gases has the potential to significantly reduce compliance cost**
 - Degree of scrubber adoption will have a direct effect on refiners
 - The uncertainty of this variable examined through two scenarios:
 - **Fuels Compliance** – Stringent and disruptive case for refining, suppliers and bunker consumers
 - **Significant refining industry impact/ less impact on shipping industry**
 - **Scrubber Compliance** – Broad scrubbing adoption by key vessel classes and voyages which moderate need for fuel quality improvements
 - **Moderate refining industry impact/ more impact on shipping industry**

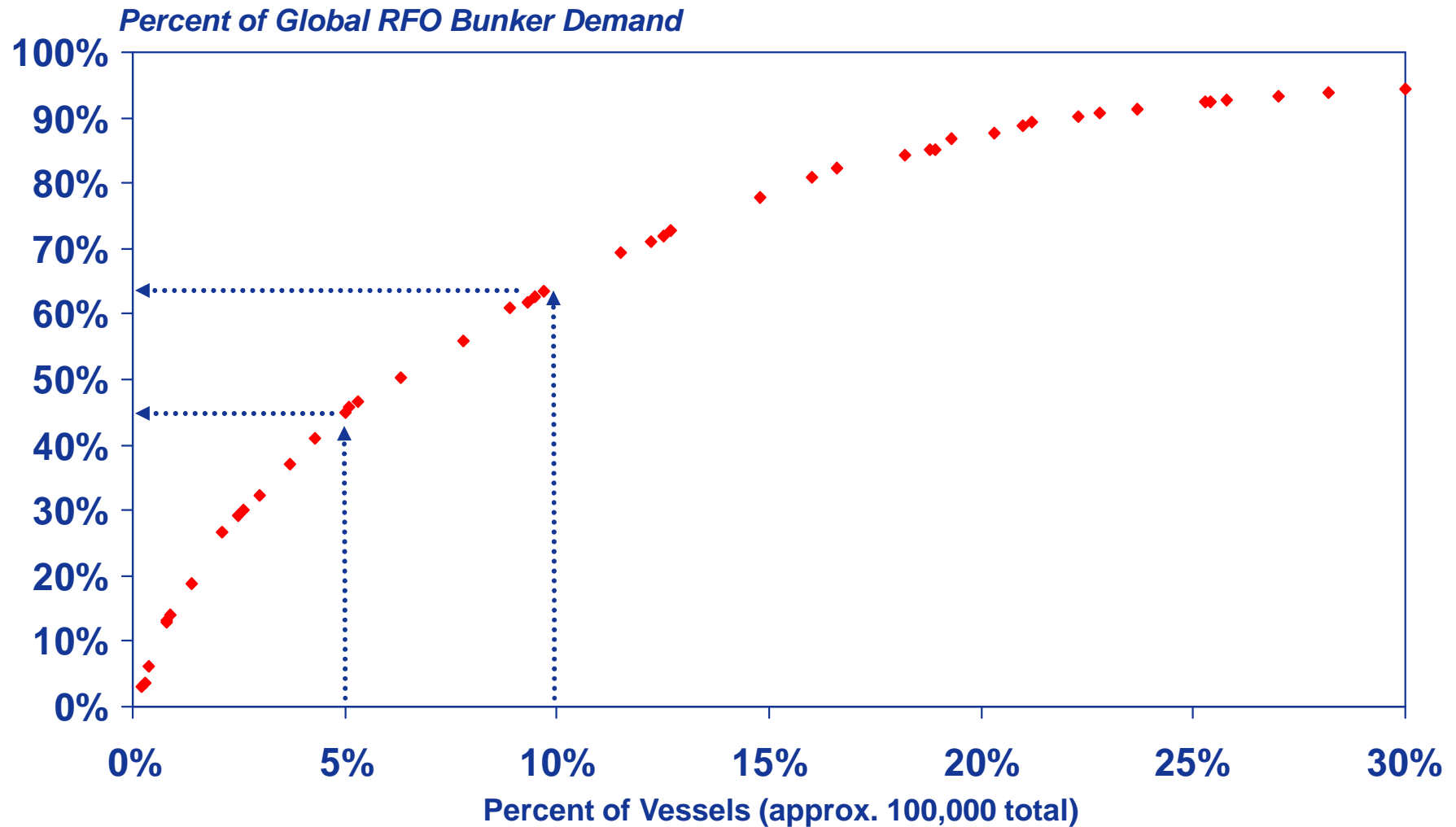
World marine bunker demand has been increasing as overall fuel oil demand declines

World Residual Fuel Demand



Bunker fuel shown includes only residual fuel oil blends that are partially displaced in 2020 due to IMO regulations.

Heavy fuel oil (RFO) bunker consumption is concentrated in a small portion of long-haul vessels

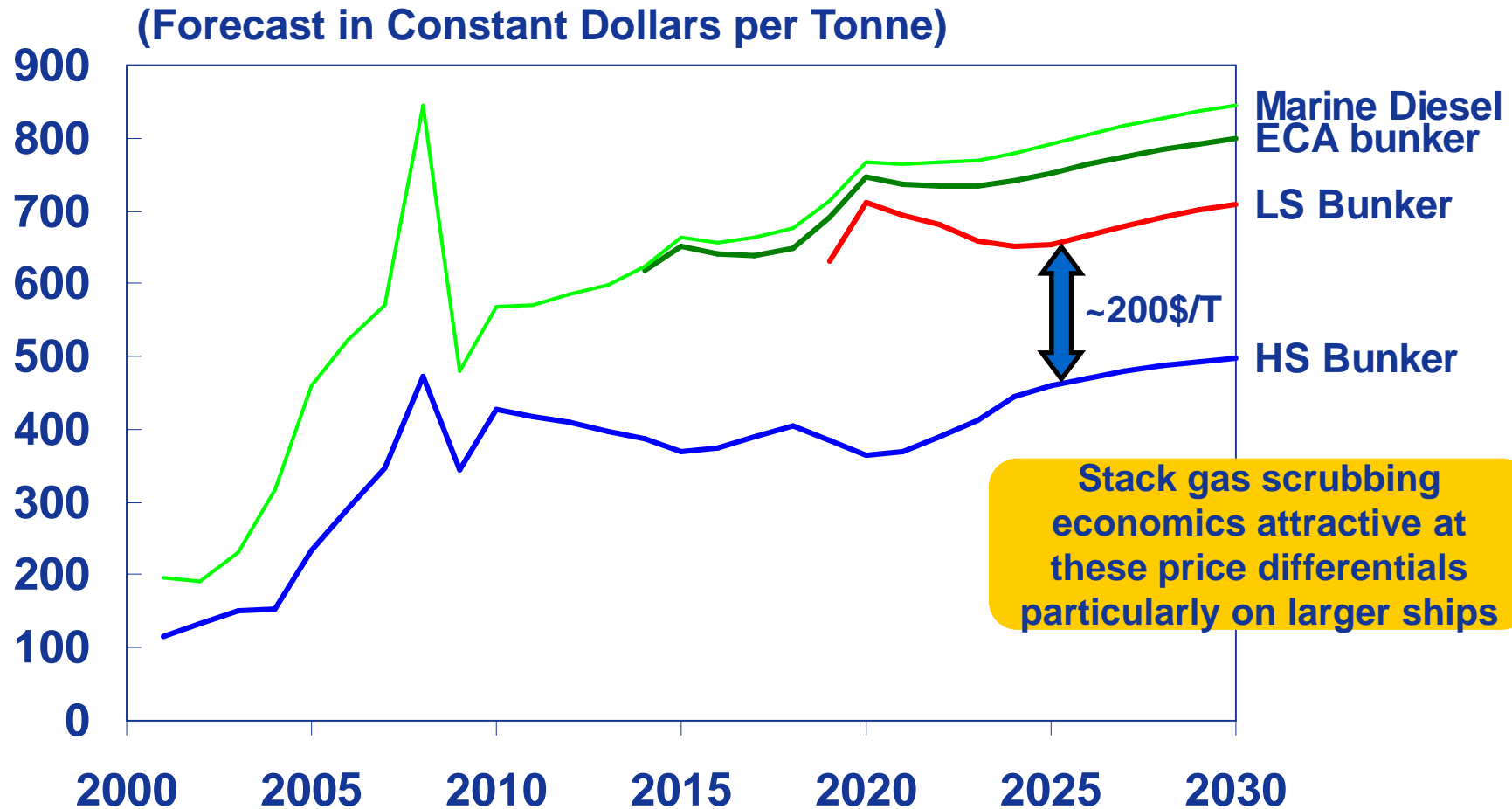


Installing scrubbers on a few thousand of the largest bunker consuming vessels would allow a large portion of bunker to remain high sulphur

Refiner dilemma

- **Current situation is that refineries produce high sulphur bunkers at low cost from streams produced from high sulphur crudes with little processing**
- **Refineries will need to make significant investments to produce 0.5%/0.1% sulphur bunkers from these streams**
- **The processes required are similar to those needed to convert these streams into other transport fuels such as diesel and jet fuel**
- **The choice for refiners is**
 - **Invest to produce low sulphur bunkers or**
 - **Invest to produce diesel, jet fuel etc.**
- **The option of the low sulphur bunker fuel production will need similar returns on investment, supported by higher bunker fuel prices, to those expected for the second option**

Projected Rotterdam Bunker Prices (2009 forecast)



About this presentation...

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