

# Availability of Low Sulphur Marine Fuels: Prospects & Issues

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# Overview

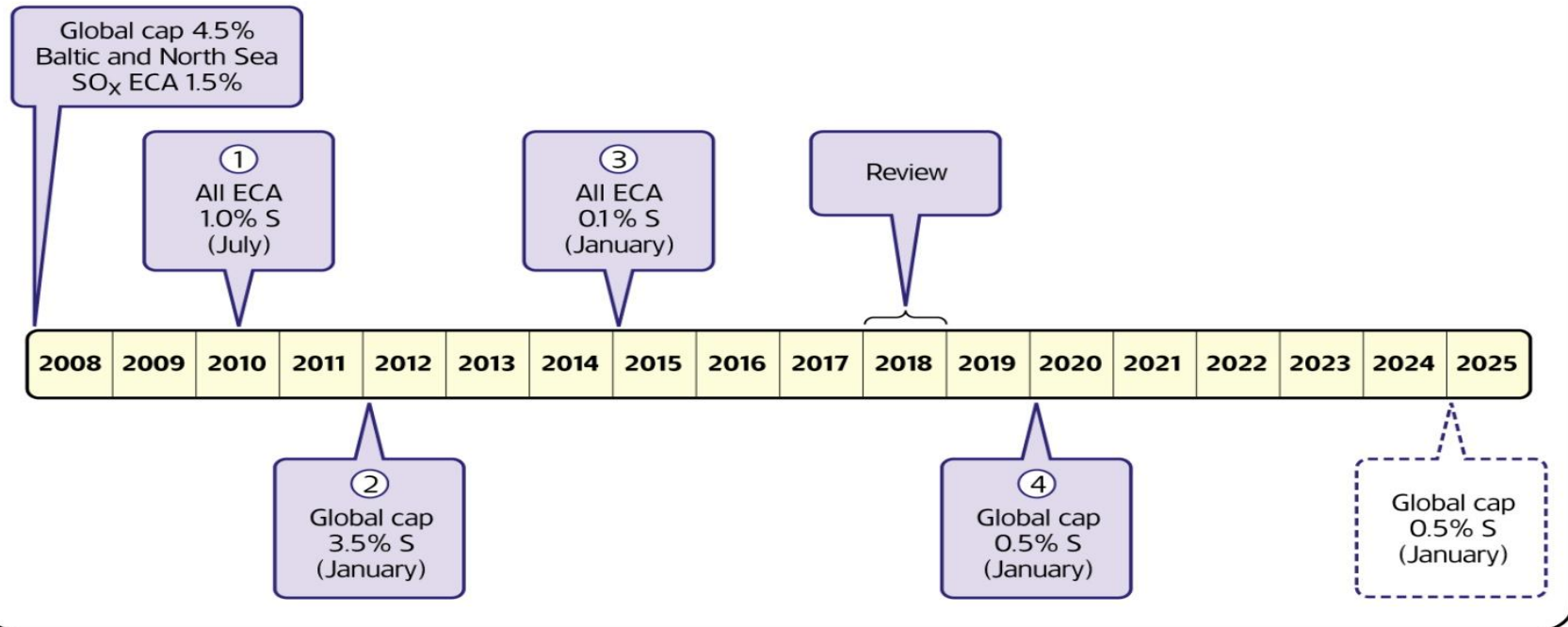
- **Annex VI – the timeline**
- **Marine fuels demand – status & outlook**
- **Issues in supplying fuels to comply with AnnexVI**
- **Need for task forces, assessment, update**
- **Conclusions**

# Annex VI – the timeline



## Proposed implementation schedule has four steps

Ratified at the October 2008 IMO MEPC meeting



# Marine Fuels Demand

## Demand has Recovered to pre-2008 levels

- Demand ~ 370 million tons
  - IFO 180/380 ~ 290 million tons
  - MDO/MGO ~ 80 million tons
- Major trades have recovered
  - Global GDP 2010 > 2008
  - Global Oil Demand
    - 2008 83.9 MBD
    - 2010 84.2 MBD
- Freight rates have lagged due to newbuildings
  - 2007 year end Fleet 1,084.7 m.DWT
  - 2010 Sept. 2010 Fleet 1,310.5 m.DWT

## GHG Issues and Potential Improvements in Fuel Efficiency Unknown but Mostly Overstated

- IMO MEPC 61
  - EEDI (Energy Efficiency Design Index) & EEOI (Energy Efficiency Operational Indicator)
- Multiple potential efficiency improvements
  - Claims of over 40% have been made
    - **Has no one studied thermodynamics?**

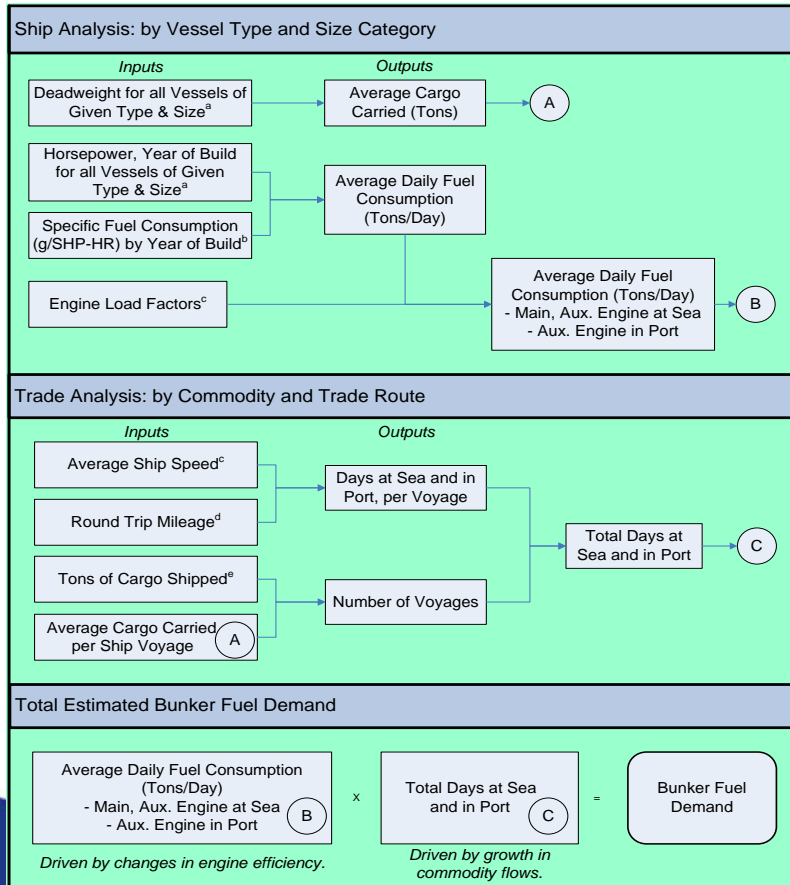


# Marine Fuels Outlook

- So the prospect is for global marine fuels demand to grow from 370 million tpa today to around 450 million tpa by 2020
- and
- For rising volumes to be at ECA standard (0.1% sulphur) and balance at 0.5% by 2020 or latest 2025
- Are there issues and concerns regarding this outlook? **YES**

# Issue 1 – the world does not have a clear picture of marine fuel demand and outlook

## Navigistics Rigorous Methodology



- **Work by Navigistics showed global marine fuel demand is twice that reported by IEA**
  - Other analyses supported this
  - IMO developed very similar figures
- Result is major bodies – IEA, EIA, OPEC, others – are understating future marine fuel (and total oil) demand
- Risk of understating potential requirements for refining and supply of low sulphur fuels under Annex VI

a – Clarksons Ship Register Database  
 b – Engine Manufacturers' Data, Technical Papers  
 c – Corbett and Wang (2005) "Emission Inventory Review: SECA Inventory Progress Discussion"  
 d – Combined trade routes and heavy leg analysis  
 e – Global Insight Inc. (GI) Trade Flow Projections

# Issue 2 – getting from current to low sulphur marine fuels is costly and requires long lead time

- **Technically, today's MGO/MDO can readily be desulphurised with added HDS capacity to Annex VI ECA/global standards**

• **But not IFO fuels**

		typical	AnnexVI target	
Main Marine Fuels	type	sulphur	by desulphurisation	
		today	0.5%	0.1%
MGO/MDO - mainly DMA	diesel	up to 1.5%	yes	yes
IFO - mainly RMG 380	residual	up to 3.2%	NO	NO

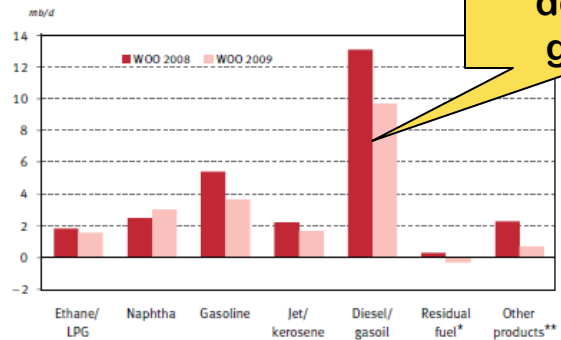
- **IFO must be upgraded to DMA to meet AnnexVI standards**
  - Requires high cost refinery units to upgrade (crack) the IFO to diesel and desulphurise it
  - Prior Ensys work for IMO showed potential massive refinery investments (\$150 billion) would be needed for global conversion to marine distillate
    - Many major new units, long lead times
  - **Potentially 10-15 years to complete if full conversion to distillate**

# Issue 3 – conversion to marine distillate must compete with general global growth in diesel / jet / kerosene

- Diesel fuel is projected to be the main global growth product over the next 20 years
- Substantial refining investments will be needed to meet this, i.e. before any conversion of IFO to distillate
- Recovery in global economic growth is projected to lead to a return to some degree of distillate tightness and price premiums in oil markets by 2015

Source: OPEC World Oil Outlook 2009

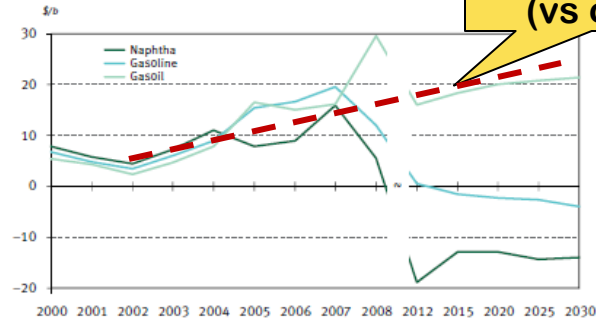
Global product demand growth between 2008 and 2030 compared



High distillate demand growth

\* Includes refinery fuel oil.  
\*\* Includes bitumen, lubricants, waxes, still gas, coke, sulphur, direct use of crude

Price differentials for major products\* Historical and projected



Rising dist price premium (vs crude)

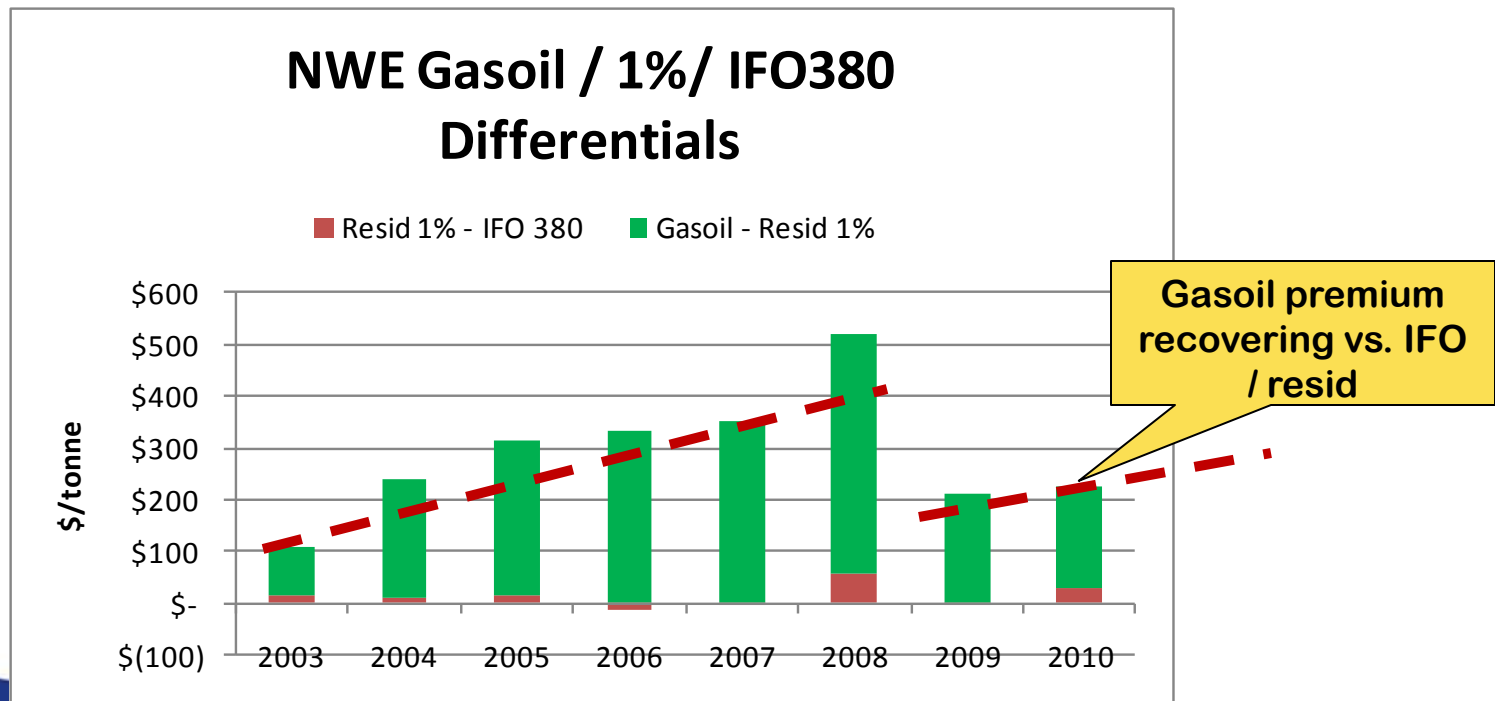
\* Price differentials are for Rotterdam market calculated versus Brent.



# Issue 3 – conversion to marine distillate must compete with general global growth in diesel / jet / kerosene

- **Gasoil vs. IFO380 differentials likely to be maintained at the \$200 - \$350 / tonne level**

Source: Bloomberg



# Issue 4 – timing and extent of conversion to marine distillate is highly uncertain

- **Annex VI rule is clearly written but leaves open major uncertainties:**
  1. Future extent of ECA's
  2. Timing of global 0.5% rule (2020 / 2025?)
  3. Potential extent of compliance by fuel versus on-board scrubbing (800 lb gorilla!)
- The general trend to more global distillate helps refiners but still investment to make marine distillate beyond known ECA requirements is high risk
  - Also geographic location of marine fuels supply is not set
- Result is a “wait and see” situation
- Creates risk of tight refining capacity, market/pricing instability, (delays?), in meeting AnnexVI marine fuels demands



# Regular review and update needed to assess situation and send signals to refiners and shippers

- **Integrated global approach** (as via EnSys' *WORLD* model for IMO, EPA, API leading up to AnnexVI) helps project:
- Short/medium term refiner potential to supply (low sulphur) marine fuels, e.g. if more ECA's enacted
- Longer term investment / capacity needs under different scenarios
  - associated market/price, refinery CO2 emissions impacts, trade impacts, potential regional imbalances
- **Any opportunities that might exist:**
  - e.g. recent investments plus recession have created a surplus of refining capacity including coking units that could contribute to converting IFO to distillate



# Regular review and update needed to assess situation and send signals to refiners and shippers

- Parallel assessment of scrubber and ship efficiency (hence fuel mix / demand) developments essential
  - With integration into refining/supply assessments
- **Results need to be communicated to all stakeholders:**
  - refiners, shippers, bunkers suppliers, industry & statistical organisations
- **Updates need to be undertaken** and focus needs to be on short term through what can be achieved next 10-15 years



# Conclusions

- Marine fuels statistics & demand
  - **Current statistical deficiencies are major**
  - Lead to misconceptions over marine and total future oil demand
  - Implications: AnnexVI impacts on refining/supply
  - **Task force is needed to tackle and resolve**
    - Key players:
      - Major statistical organisations - IEA, EIA, OPEC, IMO, other
      - Shipping and refining/bunkering sectors

# Conclusions

- Marine fuels refining & supply
  - **2018 is far too late to undertake evaluation study**
  - Potential effects of new ECA's, alternative 0.5% timing, scrubbing and vessel technologies need to be studied and communicated to the shipping and refining sectors – and updated
- MEPC 61
  - **The opportune time to initiate action on both demand statistics and refining / supply evaluation**
  - **And ensure successful implementation of AnnexVI**



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