

MARITIME

# Environmental outlook, Fuel Cost projections and implications for the South Pacific

2<sup>nd</sup> International Sustainable Sea Transport in the Pacific  
Talanoa

**J.E. Moreno**

17th July 2014

## Today's topics

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- Outlook upcoming Environmental Regulations
- Fuel Prices & Technology trends
- Pacific Island Countries, case study

*... but a short introduction of DNV GL first*

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# Taking a broader view

## A brief introduction to DNV GL

## Industry consolidation

DNV·GL



**We are a global classification, certification, technical assurance  
and advisory company**

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OUR VISION

**GLOBAL IMPACT FOR A SAFE  
AND SUSTAINABLE FUTURE**

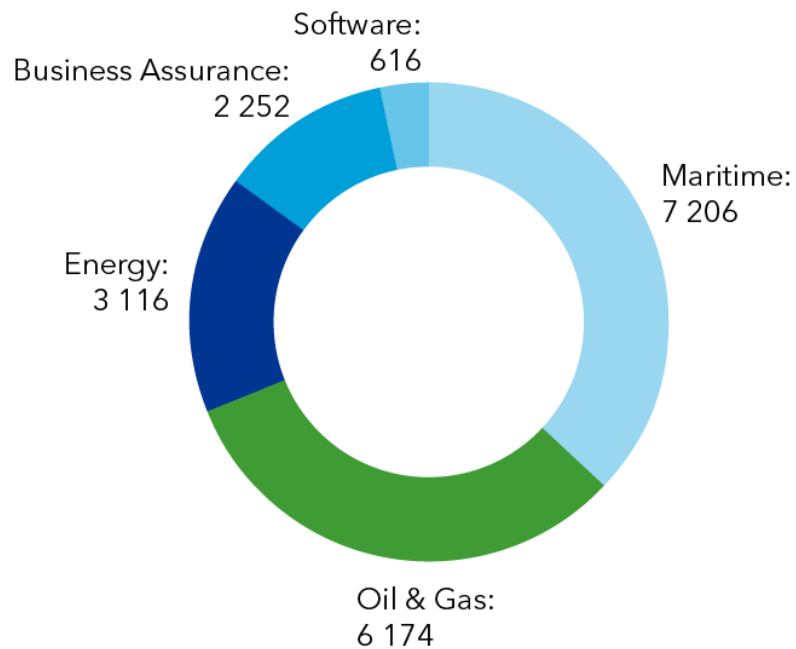
## Committed to innovation

- Investing 5% of our revenue in research and innovation every year
- Collaborating with industry partners and external experts
- Sharing knowledge through standards and recommended practices
- Providing foresight and initiate competence building and innovation

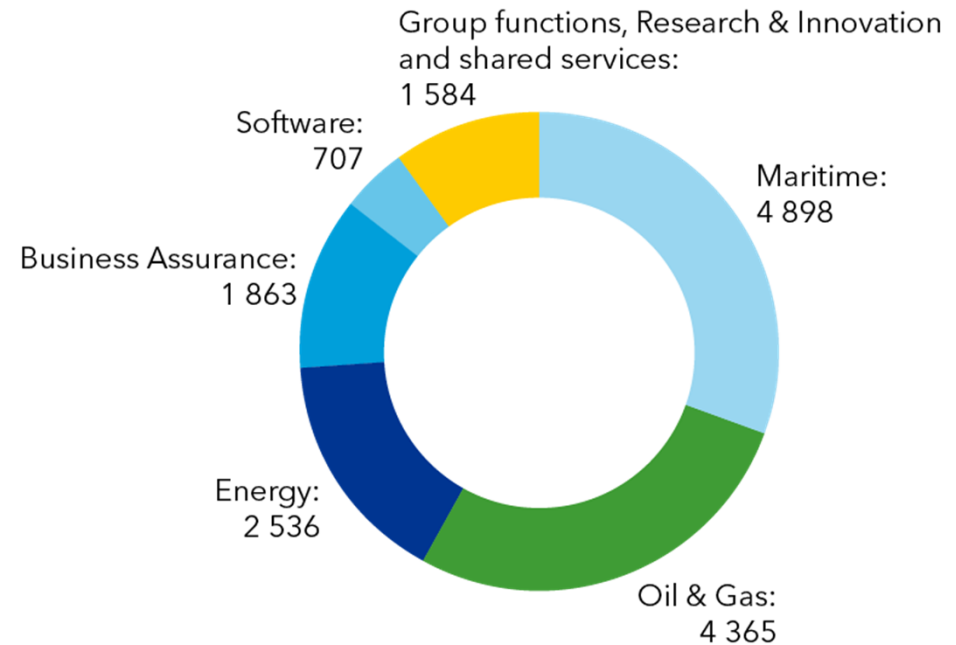


## Revenue and people by business area/unit (as of 1.1.2014)

**Revenue:**  
**20 000 Mill NOK**  
**(3 250 Bill US\$)**



**Employees:**  
**16 000**



*\*Pro forma figures by 1.1.2014*

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# Environmental Regulations

# Main regulatory instruments and bodies on environment

## International conventions

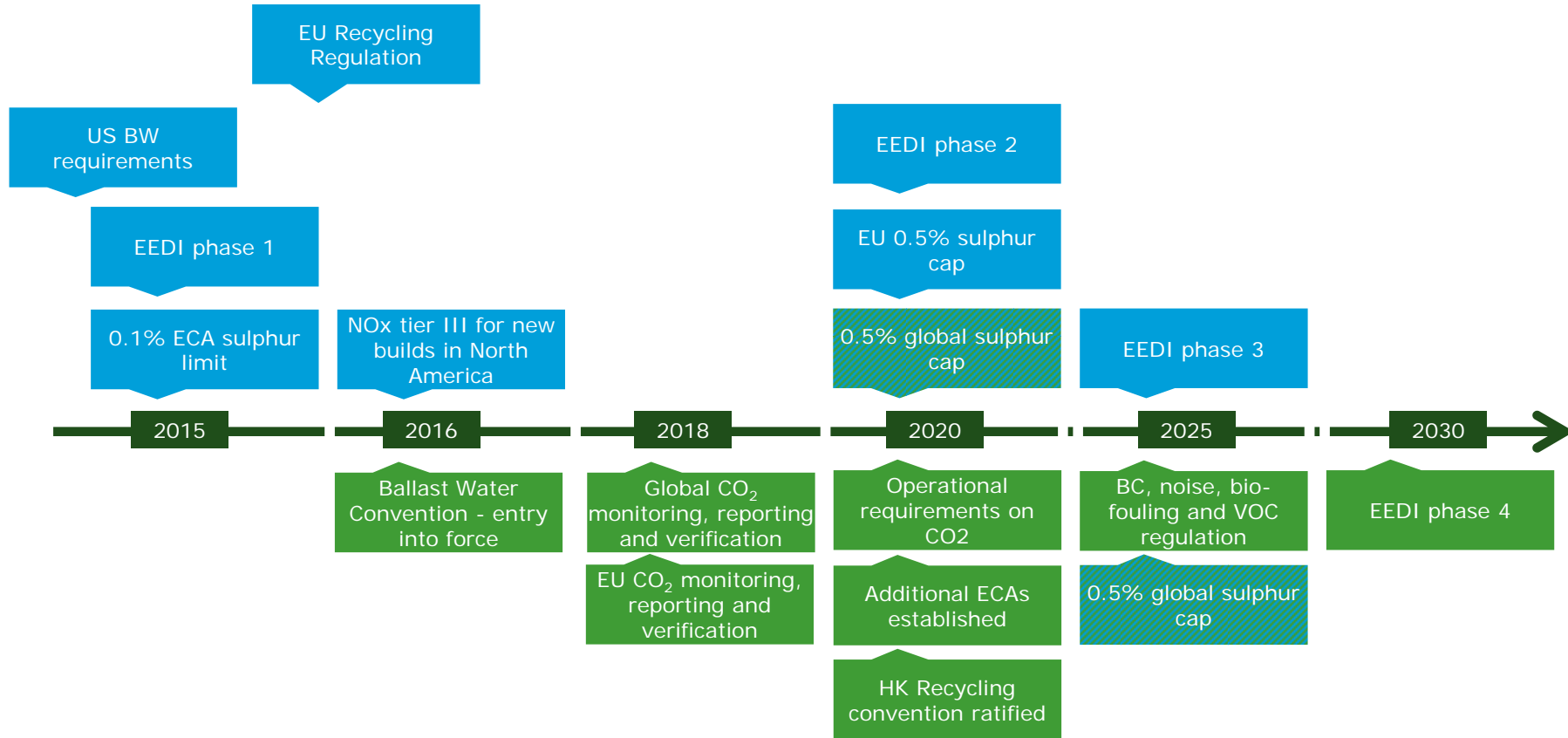


## Major regional regulators



# Environmental Regulations towards 2030

## Adopted



## Possible

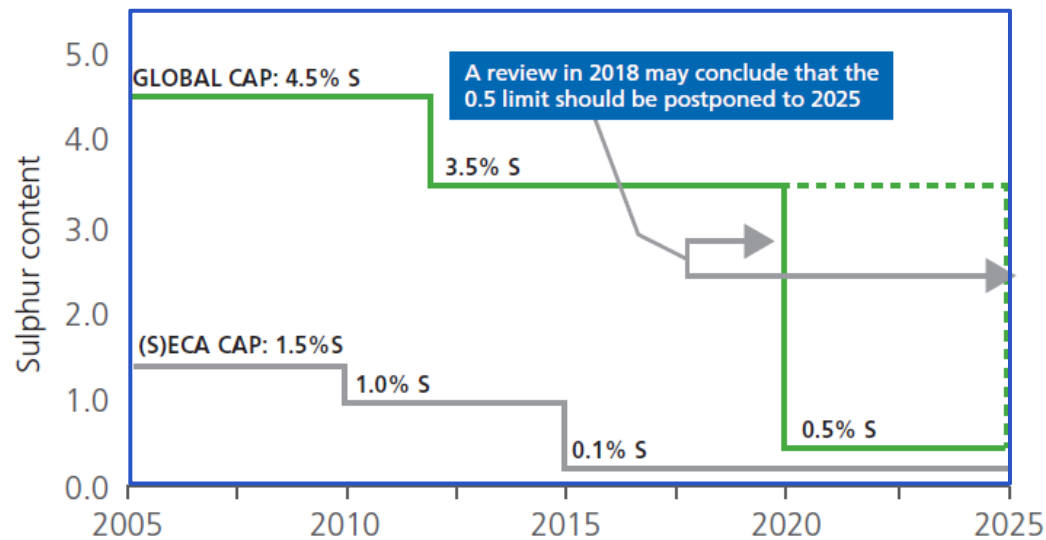
## Upcoming regulations tighten emission requirements

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- SOx reduction will have the greatest impact
- NOx Tier III restricted to newbuildings / US waters
- CO2 (GHG emissions) is being addressed at different levels (IMO, US, EU and UNFCCC) with mixed results:
  - EEDI & SEEMP from IMO already mandatory
  - MBM (CO2 trading) “dead for the time being”
  - MRV from EU is moving forward
- Other environmental topics (non exhaust gas emissions):
  - Ballast Water Treatment, US requirements stricter than IMO
  - Ship recycling, moving forward at IMO & EU level
  - Other issues will become new topics in the next 5 – 10 years: Hull bio-fouling, particles / “Black Carbon”, underwater noise...

## Future SOx emission requirements

Global sulphur	ECA sulphur	EU sulphur
<p>Requirement</p> <p>2020 / 2025*; Sulphur &lt; 0.50%</p> <p>* Date TBD pending MEPC review, end-2018 latest</p>	<p>Requirement</p> <p>2010; Sulphur &lt; 1.0%</p> <p>2015; Sulphur &lt; 0.1%</p>	<p>Requirement</p> <p>2012; updated ECA reqs. in EU law</p> <p>2020*; Sulphur &lt; 0.50%</p> <p>* All EU waters; EEZ (200NM)</p>



# NOx emissions – MARPOL Annex VI

**NOx**

2011: NOx Tier 2, -20%  
 2016: NOx Tier 3, -80%\*

\* New builds, only in existing North American / U.S. Caribbean NECA. New NECAS define own date

**NECA - Baltic**

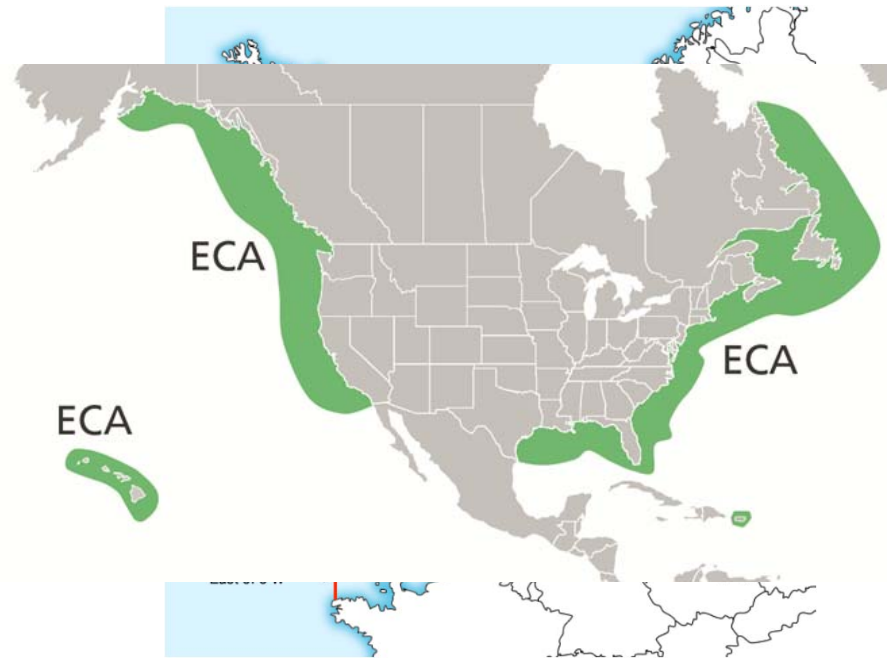
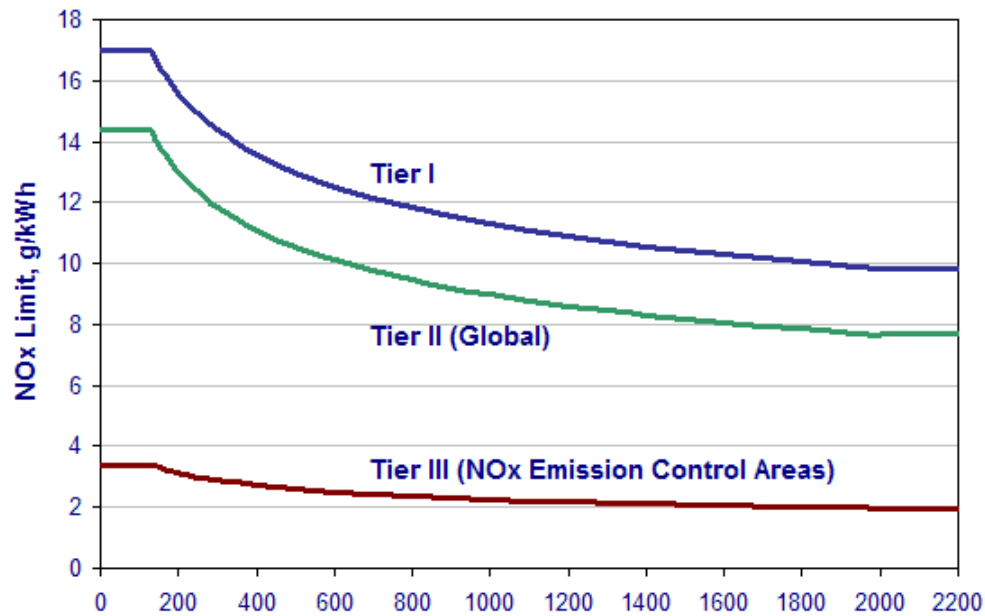
HELCOM working on issue. EC and EU Council pushing, member states split

Submission date uncertain

**NECA – North Sea**

Consultations on-going but slow moving – must be seen in conjunction with Baltic NECA activities

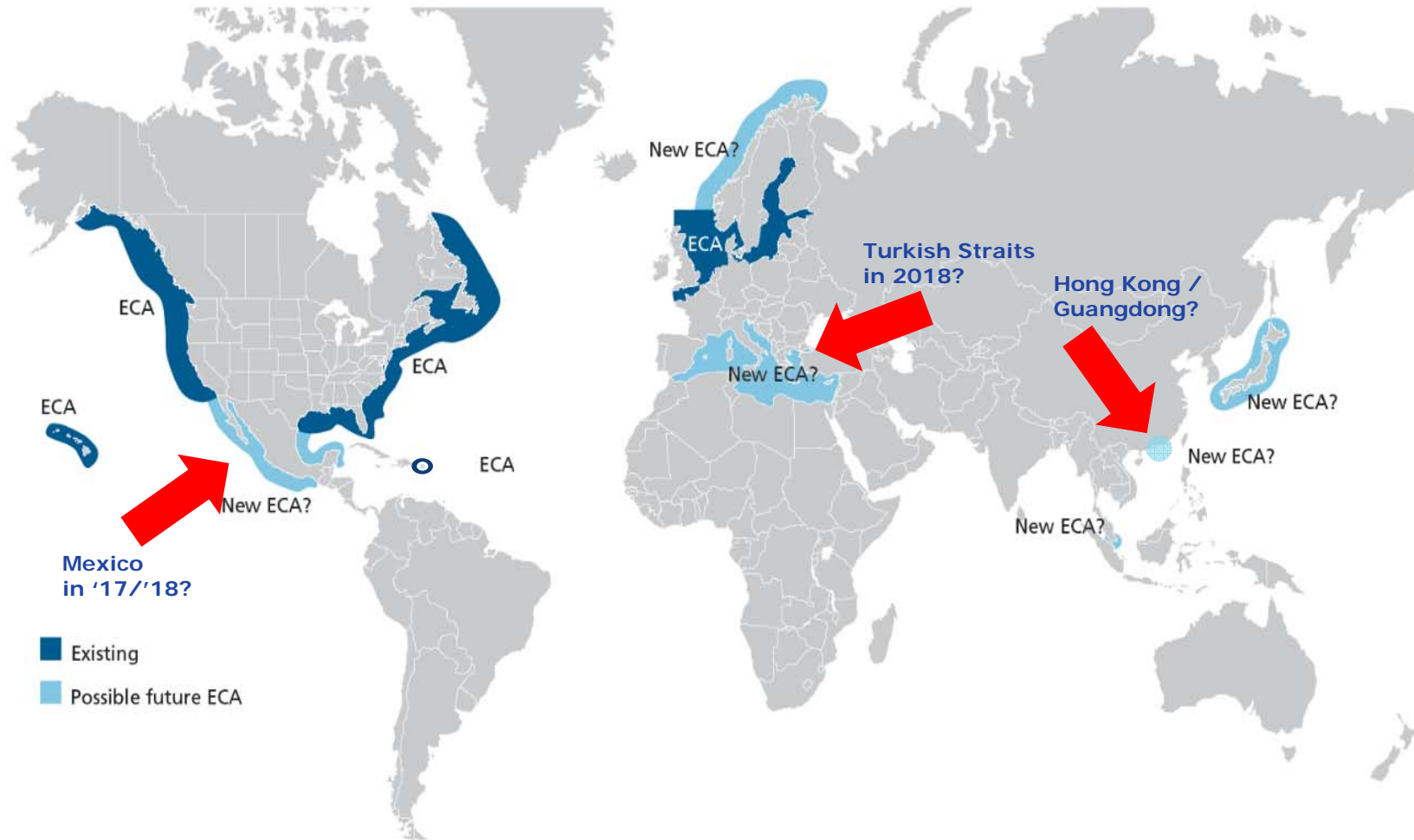
Submission date uncertain



# Existing Emission Control Areas



# New ECAs – fact or fiction?



## 3 sulphur control options

1 LNG as fuel



2 HFO + scrubbers for exhaust gas cleaning



3 HFO + change over to low-sulphur fuel in ECA



## Fuel to comply with 0.1% ...not only MDO/MGO!

- One of the major oil companies already announced **0.1% Sulphur HFO**

*News Release* XXXXXXXXXXXXXXXX  
*Marine Fuels & Lubricants*

FOR IMMEDIATE RELEASE  
9 July 2014

XXXXXXXXXX Launches XXXXXXXXXX Premium HDME 50 Marine Fuel  
*New fuel offers potential performance and safety benefits versus distillate marine gas oil*

- New category of marine fuel now available to help marine operators meet the ECA 0.10 percent sulphur limit in Jan. 2015
- MAN Diesel & Turbo provides No Objection Letter for use in main and auxiliary engines
- XXXXXXXXXX Premium HDME 50 helps provide performance and safety benefits.

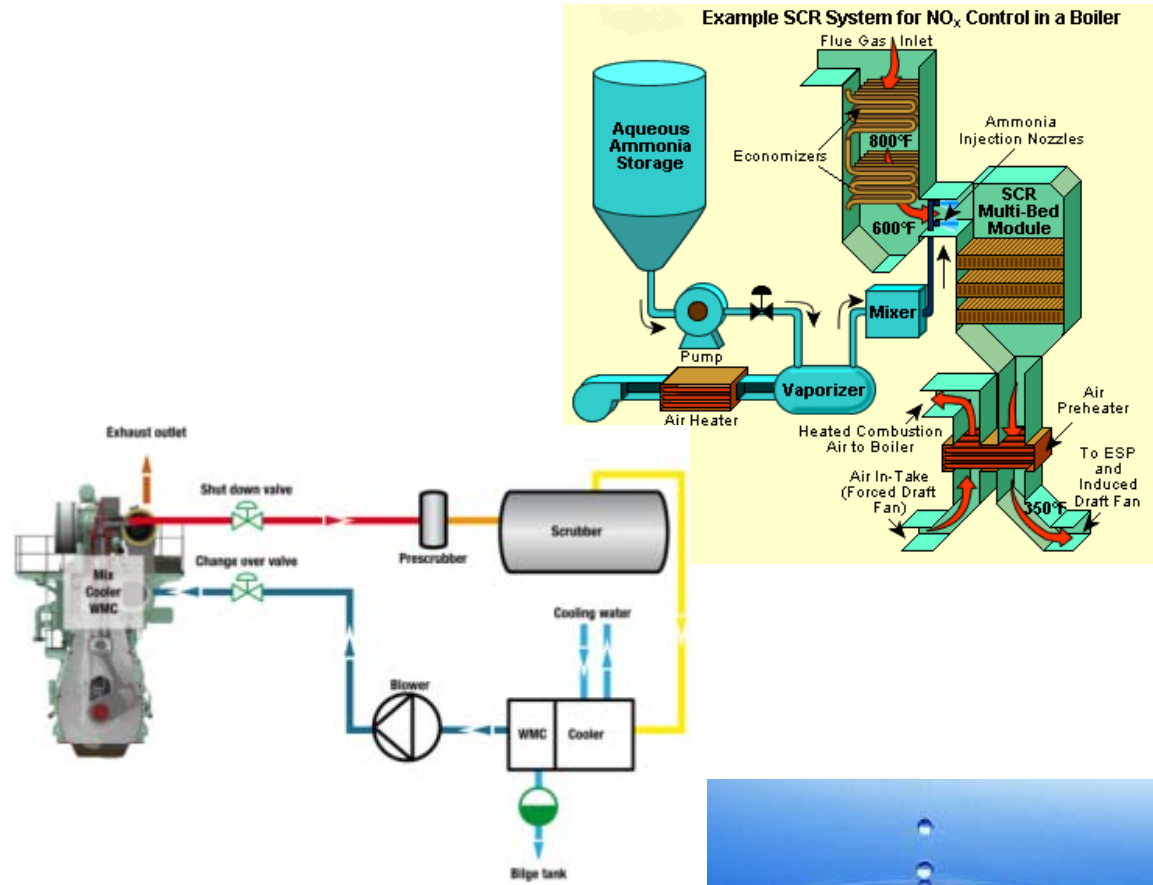
- What will be the effect in upcoming implementation of SOx requirements?

# NOx compliance options

1 Selective catalytic reduction

2 Exhaust gas recirculation

3 Various water based technologies



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# Fuel Prices & Scenarios

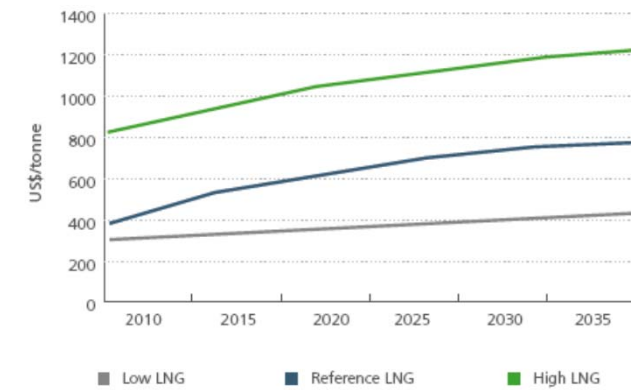
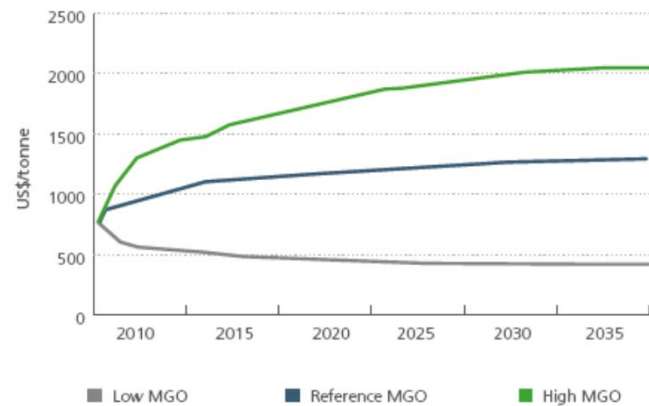
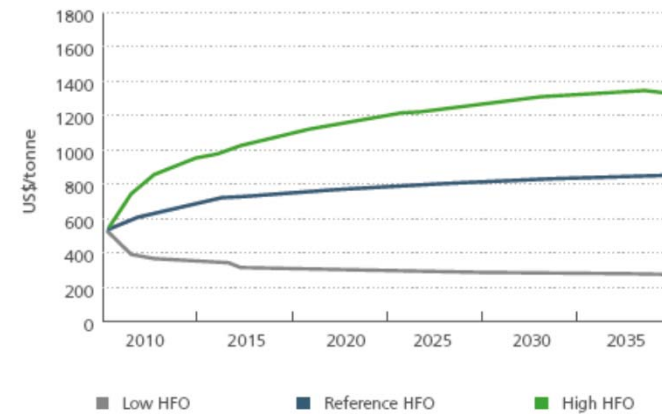
## Fuel prices, looking into the Crystal Ball

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- SOx regulations will have the greatest impact in marine fuel prices (distillates)
- Factors to be considered
  - Global Oil Market situation
  - Investment/finance situation in the shipping world
  - Implementation of SOx requirements
  - Demand/Availability of 0.1% Sulphur Distillates fuels
  - Impact of alternative fuels/technologies
- Alternative fuels,
  - LNG, the only real 'alternative'?
  - Biodiesel, Methanol, others...
- Alternative propulsion technologies
  - Wind assistance
  - Fuel Cells
  - Batteries, others...

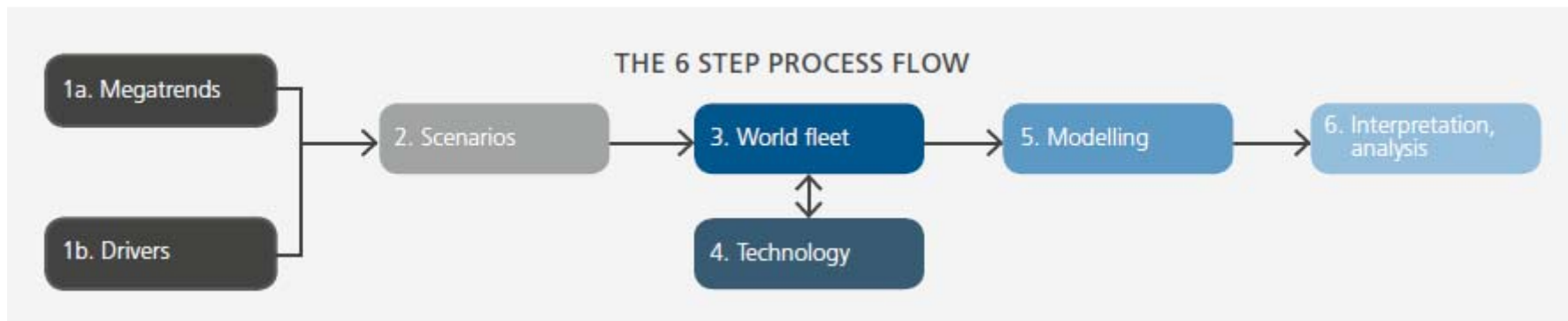
# Fuel prices, future trends

- Projection of future Fuel prices
  - Fuel price projections 2010-2035 (real terms)
  - Based on OECD, IEA, EIA info
  - DNV GL "Shipping 2020" Report



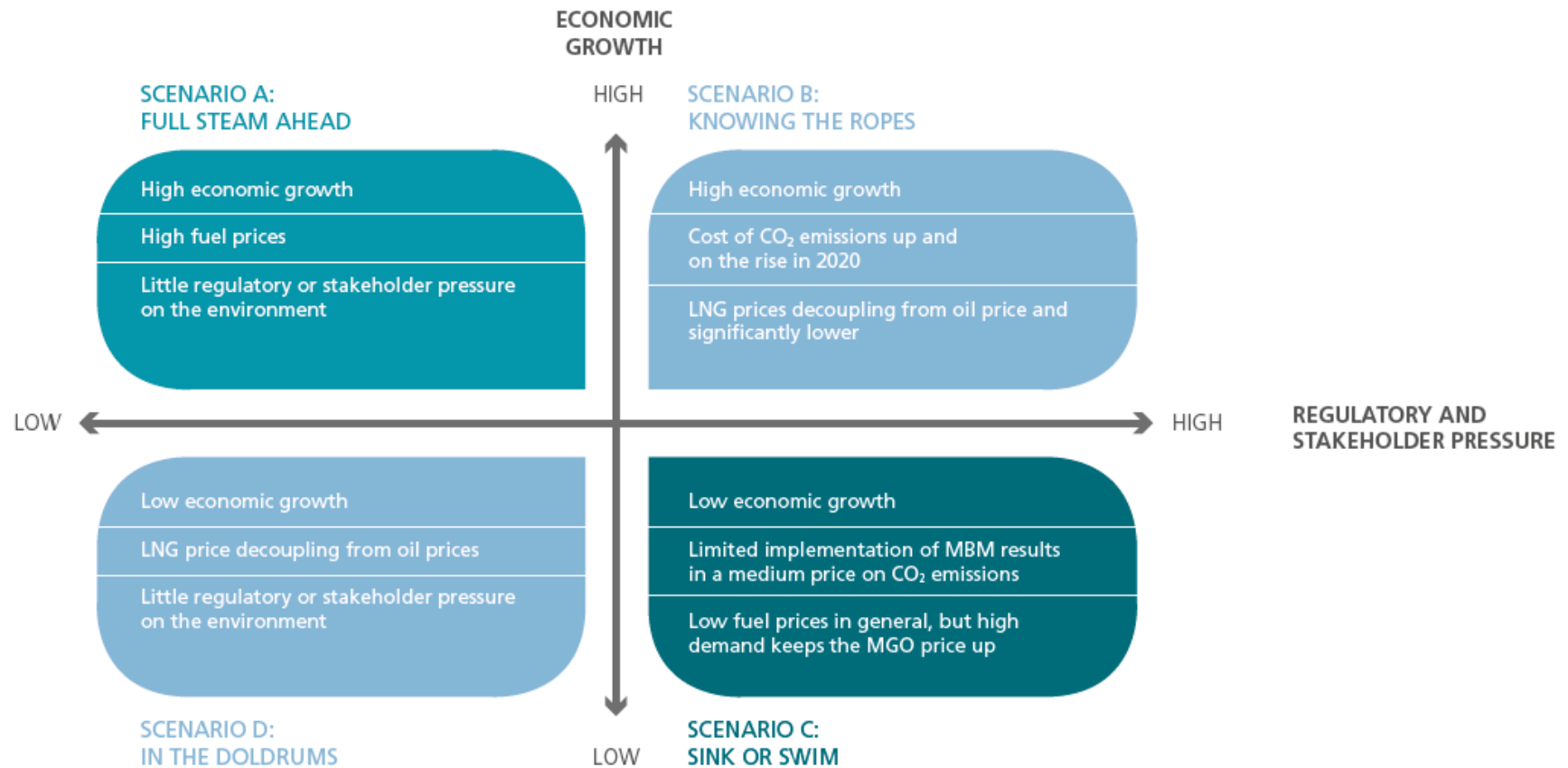
## Scenarios approach, taking the broader view

- Shipping 2020 Report, wider approach
  - Simulation Model for technology choices
  - Scenario = outcome on technology developments, investment and strategies
  - Six step process:



# Future scenarios

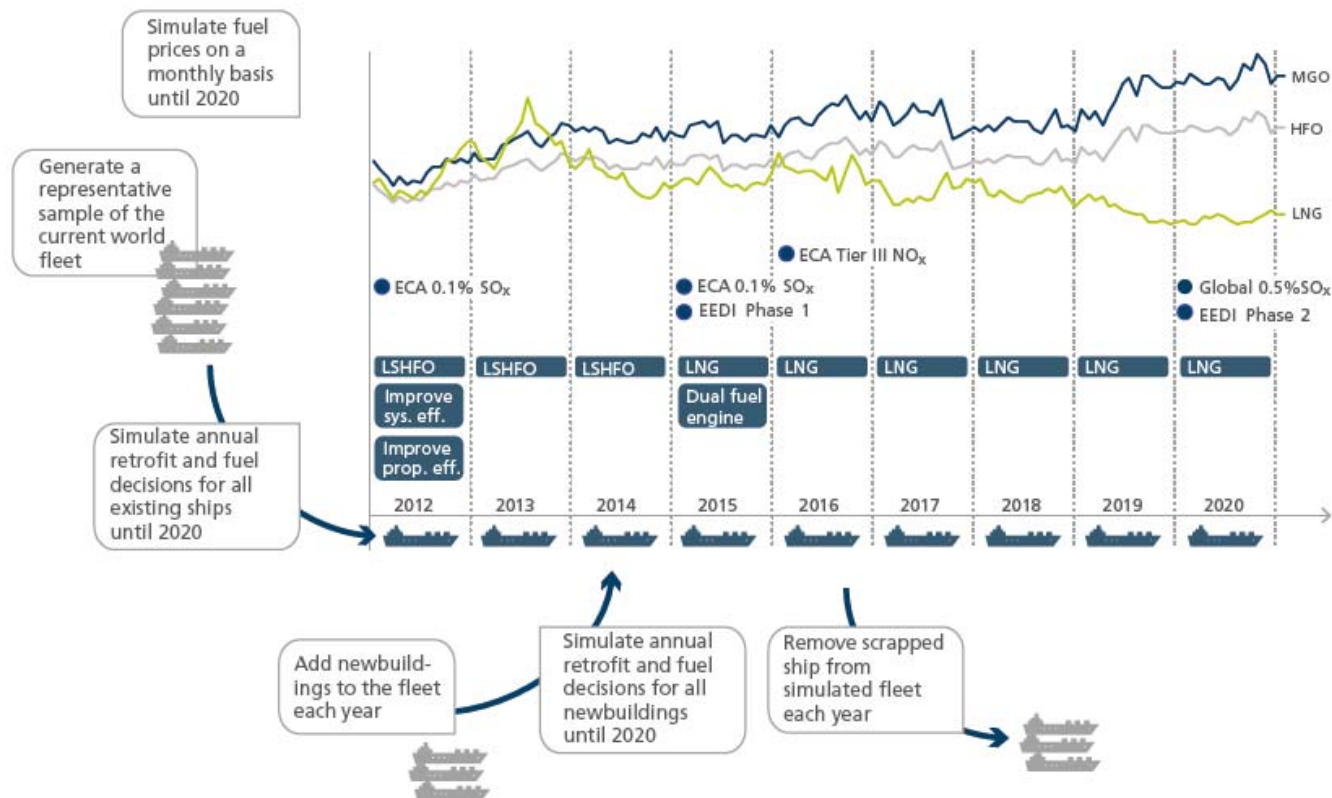
- Scenario selection



# Scenarios approach, calculation

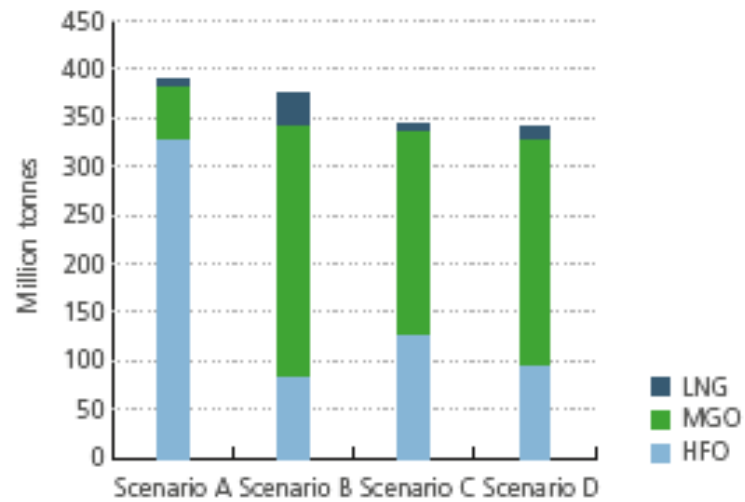
## Scenario calculation

- Based on fuel prices, technology costs and specific ship owner characteristics, the model selects the technologies with the highest NPV that ensures compliance with the requirements.

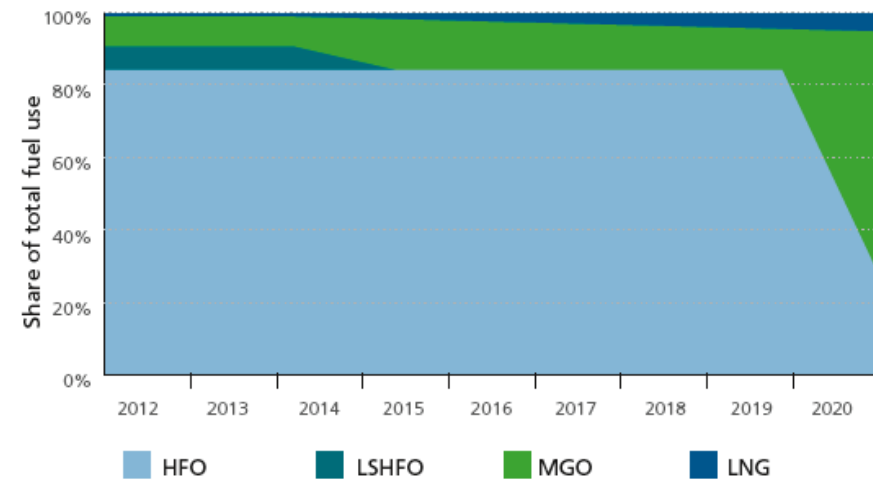


## Scenarios approach, outcome

- Scenarios detailed outcome:



Fuel demand and mix in 2020



Fuel mix in Scenario D

## Scenarios approach, Main Findings

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- Finding 1: More than 10% of newbuildings till 2020 will run on LNG.
- Finding 2: In 2020, demand for marine distillates could be as high as 200-250 million tonnes annually.
- Finding 3: Newbuildings in 2020 will emit up to 10 to 35% less CO<sub>2</sub>.
- Finding 4: Scrubbers are a significant option after 2020.
- Finding 5: BWTS will be installed on at least half of the world fleet.
- Finding 6: At least 30-40% of newbuildings will be fitted with EGR or SCR by 2016.

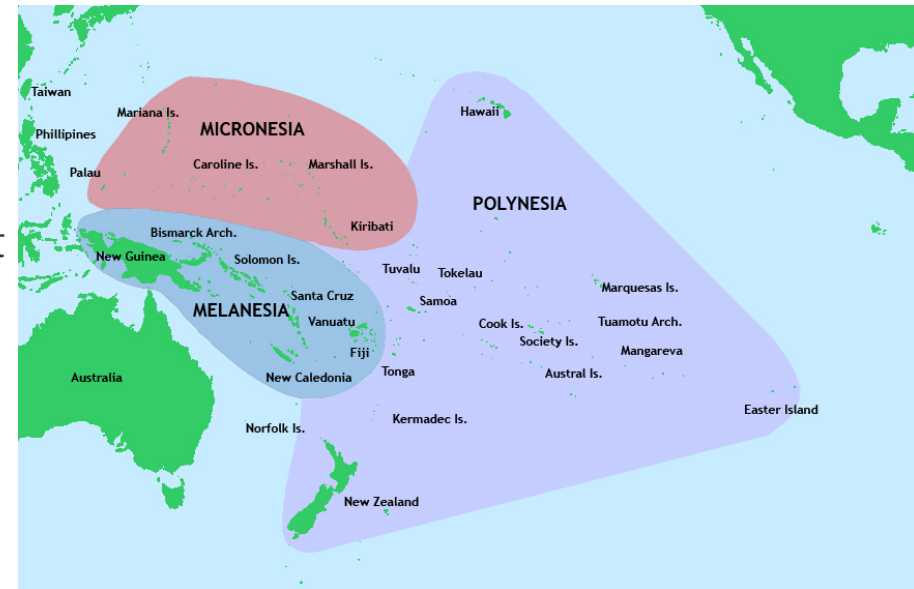
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# Pacific Island Countries

## Case study

## Pacific Island Countries

- A challenging case:
  - Vast ocean area with population scattered
  - Inter-island Transport has important social considerations
  - Highly dependant on oil imports for transport and energy production
  - Own Fleet: in general consists on small and aged vessels
  - Lack of Infrastructure
  - Inter-island transport small compared with total transport in the area
  - Lack of reliable information about available fleet and use of fuels



## Inter-island transport vs. total shipping

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- Most of GHG emissions generated by 'foreign' ships
- Also particles, SO<sub>x</sub> and NO<sub>x</sub> to be considered (health relevant)
- Additional risks to be kept in mind (oil spill, grounding)

## Foreign vessels added risks

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- Containership Rena aground off NZ coast



- Wreck removal costs could escalate up to **\$425 million!**

## Pacific Island Countries: chances, risks, opportunities

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- What to expect in the future?
  - Most likely no immediate change in fuel prices
  - Very likely a general increase in prices after 2020 due to the global SOx requirements
  - Events after 2015 will set future trends regarding SOx compliance
  - Ballast Water Treatment, low impact to be expected in the region
  
- Where are the opportunities?
  - Inter-island transport is de-coupled from global transport, there is an opportunity to set own trends
  - New technical solutions are also available for retrofitting
  - Technical Co-operation and Transfer of Technology from IMO

# Technical Co-operation and Transfer of Technology

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- Where does it come from?

MEPC 65/22  
Annex 4, page 1

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## ANNEX 4

### RESOLUTION MEPC.229(65)

Adopted on 17 May 2013

#### PROMOTION OF TECHNICAL CO-OPERATION AND TRANSFER OF TECHNOLOGY RELATING TO THE IMPROVEMENT OF ENERGY EFFICIENCY OF SHIPS

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

6 URGES also Member States with an ability to do so, and subject to their respective national laws, regulations and policies, to promote the provision directly, or through the Organization, of support especially to developing States and including, but not limited with regard to:

- .1 transfer of energy efficiency technologies for ships;
- .2 research and development for the improvement of energy efficiency of ships;
- .3 training of personnel, for the effective implementation and enforcement of the regulations in chapter 4 of MARPOL Annex VI; and
- .4 the exchange of information and technical co-operation relating to the improvement of energy efficiency for ships;

# Technical Co-operation and Transfer of Technology

- It's already working...

7/11/2014

IMO | First ship energy efficiency and technology transfer workshop

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## First ship energy efficiency and technology transfer workshop held in Ghana

Briefing: 25, July 3, 2014

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Representatives from 11 West and Central Africa countries are in Accra, Ghana, to attend the first IMO regional workshop on "MARPOL Annex VI – Ship energy efficiency and technology transfer", from 2 to 4 July.

The workshop, which is being hosted by the Ghana Maritime Authority, is aimed at building capacity with regards to knowledge about energy-efficiency measures, while also assessing the regional needs and barriers related to technology transfer.

The information gathered during group and plenary discussions on the third day of the regional workshop will be forwarded onto the Ad Hoc Expert Working Group on the Facilitation of Transfer of Technology for Ships, which will meet for its second meeting from 9 to 10 October, at IMO Headquarters in London, United Kingdom.

The Ad Hoc Expert Working Group held its first meeting during the 68th session of IMO's Marine environment Protection Committee (MEPC) in March-April this year. A work plan, endorsed by the Committee, envisages: assessing the potential implications and impacts of the implementation of the energy-efficiency regulations in chapter 4 of MARPOL Annex VI, in particular, on developing States, as a means to identify their technology transfer and financial needs; identifying and creating an inventory of energy-efficiency technologies for ships; identifying barriers to transfer of technology, in particular to developing States, including associated costs, and possible sources of funding; and making recommendations, including the development of a model agreement enabling the transfer of financial and technological resources and capacity building between Parties, for the implementation of the energy efficiency regulations.



First IMO regional workshop on "MARPOL Annex VI – Ship energy efficiency and technology transfer" held in Ghana

# Thanks for your attention!

## Questions?

**Jose-Emilio Moreno**

**Environmental Research and Development**

**DNV GL - Maritime**

[jose-emilio.moreno@dnvgl.com](mailto:jose-emilio.moreno@dnvgl.com)

+49 40 36149 8725

**www.dnvgl.com**

**SAFER, SMARTER, GREENER**

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# Abbreviations

## Key abbreviations

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BC – Black Carbon  
BCH Code - Dangerous Chemicals in Bulk Code  
BLG – Bulk Liquid and Gases (MEPC sub-committee)  
BWMC – Ballast Water Management Convention  
CARB – California Air Resources Board  
CG – Correspondence Group  
DMA – Marine gas oil  
DMB – Marine diesel oil  
EC – European Commission  
ECA – Emission Control Area  
ECJ – European Court of Justice  
EEDI – Energy Efficiency Design Index  
EEOI – Energy Efficiency Operational Indicator  
EEZ – Exclusive Economic Zone  
EIA – US Energy Information Administration  
EiF – Entry into Force  
EMSA - European Maritime Safety Agency  
EPA – US Environmental Protection Agency  
ESSF – European Sustainable Shipping Forum  
EU – European Union  
FORS - Fuel Oil Reduction Strategy  
GHG – Greenhouse gases  
IAEA – International Atomic Energy Agency  
IBC Code - International Bulk Chemical Code

ICS – International Chamber of Shipping  
IEA – International Energy Agency  
III Code – IMO Instruments Implementation Code  
ISPI - Individual Ship Performance Indicator  
LNG – Liquid Natural Gas  
MARPOL - International Convention for the Prevention of Pollution from Ships  
MBM – Market Based Measures (“carbon price”)  
MEPC – Marine Environmental Protection Committee  
MRV – Monitoring Reporting and Verification  
NECA – NOx Emission Control Area  
NOx - Nitrogen oxides  
OECD – Organisation for Economic Co-operation and Development  
PPR – Pollution Prevention and Response (MEPC sub-committee)  
SECA – SOx Emission Control Area  
SEEMP – Ship Energy Efficiency Management Plan  
SOx – Sulphur oxides  
TBD – To Be Determined  
UNFCCC – United Nations Framework Convention on Climate Change  
US – United States of America  
VGP – Vessel General Permit