Towards energy efficient and low emission shipping

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Shipping affects us all

- ~ 90% of global trade by sea
- Growth predicted, especially in intra-regional trade, in Asia and in South-South cooperation and links
- Climate change is the biggest challenge of our time
- ~ 3% of global GHG emissions, predicted increase of 50 to 250% by 2050
- Shipping a part of the solution
Responding to Climate change

- **Globally harmonized rules in IMO** on EE shipping and reduction of GHG emissions from international shipping

- **Innovations** to transform current technologies (both software and hardware) into cleaner and climate-resilient technologies, including use of **digitalization** as a tool to optimize ship’s performance

- **Enabling environments** for energy efficient technologies and practices to be absorbed worldwide
International Maritime Organization (IMO)

- A specialized agency of the UN
- The IMO Convention adopted in 1948
- 171 Member States
- Develop and maintain a comprehensive regulatory framework for shipping
- Safety, **environment**, legal matters, technical co-operation, security and the efficiency of shipping

**Safe, secure and efficient shipping on clean oceans**
Regulations on energy efficiency for ships

IMO Marine Environment Protection Committee adopted in July 2011 regulations on energy efficiency for ships as amendments to MARPOL Annex VI – into force 1.1.2013

Chapter 4 – Regulations on energy efficiency for ships
Attained Energy Efficiency Design Index (EEDI) Reg.20
Required EEDI Reg.21
Ship Energy Efficiency Management Plan (SEEMP) Reg.22
Technical co-operation and transfer of technology Reg.23

EEDI mandatory for all new ships: 30% increase in EE in 2025
SEEMP mandatory for all ships
Further measures in IMO

MEPC 69 in April 2016

- approved draft amendments to MARPOL Annex VI for a **mandatory data collection system for fuel consumption**
- reiterated its endorsement of the **three-step approach** consisting of data collection, analysis and decision making
- considered proposals for development of **further work** to define international shipping’s share of global CO₂ emissions and will hold an in-depth discussion at MEPC 70 in October 2016 on how to progress the matter

Download as free ebook from: [www.imo.org](http://www.imo.org)
Technical Measures

Efficiency Improvement by enhanced hardware

- Improvement of hull form/hydrodynamics (reduction of propulsion resistance)
- Improvement of engine/propeller (improvement in propulsion efficiency)
- Hull appendage for energy saving
- Waste Heat Recovery
- Utilization of renewable energy, etc.
Operational Measures

Efficiency improvement by operational efforts

- Optimization of operating plan for each ship or fleet
- Speed Reduction
- Weather Routing
- Just in Time arrival in Port
- Hull cleaning
- Propeller polishing
- Maintenance of engine
Potential energy efficiency improvements

Operational
- Weather routing: 1-4%
- Autopilot upgrade: 1-3%
- Speed reduction: 10-30%

Auxiliary power
- Efficient pumps, fans: 0-1%
- High efficiency lighting: 0-1%
- Solar panel: 0-3%

Aerodynamics
- Air lubrication: 5-15%
- Wind engine: 3-12%
- Kite: 2-10%

Thrust efficiency
- Propeller polishing: 3-8%
- Propeller upgrade: 1-3%
- Prop/rudder retrofit: 2-6%

Engine efficiency
- Waste heat recovery: 6-8%
- Engine controls: 0-1%
- Engine common rail: 0-1%
- Engine speed de-rating: 10-30%

Hydrodynamics
- Hull cleaning: 1-10%
- Hull coating: 1-5%
- Water flow optimization: 1-4%

Source: ICCT, 2013
The future is about ECO-shipping and ECO-logistics

- Optimizing performance of ships and the whole logistic chain
- Gives reduced fuel consumption, **reduced emissions**, reduced costs
- Real time data collected from sensors on board, analyzed, translated into recommendations and actions
- Huge amount of data exists already, but fragmented
- **Open and transparent data information for all stakeholders will be the game changer**
IMO’s response path to promote transfer of technology and capacity building

- Reg. 23, MARPOL Annex VI, MEPC Resolution, TT-EG
- ITCP: Awareness raising and capacity building tools
- Major Projects: Capacity building & private sector partnerships
- Global network to promote technology cooperation and transfer
- Catalyze institutions and financing for sustainable marine transport
The role of IMO and all stakeholders

- **IMO brings** different actors together
  - IMO Technical Cooperation Programme (ITCP) with regional and sub-regional activities, incl. capacity building workshops
  - Global network of regional **Maritime Technology Cooperation Centres** (**MTCC**)  
- **IMO World Maritime University** (**WMU**)  
- IMO Member States supporting the work
Technical cooperation and capacity building activities

- IMO Integrated Technical Cooperation Programme
- UNDP-GEF-IMO Global Maritime Energy Efficiency Partnerships Project (GloMEEP Project) launched in September 2015
  - focus in particular on building capacity to implement technical and operational measures in developing countries, where shipping is increasingly concentrated
  - 10 Lead Pilot Countries – support provided to enable governments to pursue legal, policy and institutional reforms

- Global network of regional Maritime Technology Cooperation Centres (MTCC)
  - four-year project seeks to promote the uptake of low-carbon technologies and operations in maritime transport
  - administered by the IMO with funding from the European Union
  - aim to limit and reduce GHG emissions from the shipping sectors through technical assistance and capacity building, while encouraging the uptake of innovative energy-efficiency technologies among a large number of users through the widespread dissemination of technical information and know-how

- Train the Trainer package on “Energy Efficient Ship Operation”
  - training materials such can be downloaded from the following website: http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/IMO-Train-the-Trainer-Course.aspx
Global Partnerships

- A multi-stakeholder and multi-layered process (national, regional, international, e.g. through IMO)
- Bring together public & private actors (policymakers, business, finance, R&D)
- Short, medium and longer term perspectives
- Business co-operation and Joint Ventures for developing technologies, new innovations, new operational practices
Thank you for your kind attention!

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