REPORT OF

IMO REGIONAL WORKSHOP ON MARPOL ANNEX VI – SHIP ENERGY EFFICIENCY AND TECHNOLOGY TRANSFER

Istanbul, Turkey, 3-5 November 2014

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SUMMARY SHEET

Title of the Workshop:	Regional Workshop on MARPOL ANNEX VI – Ship Energy Efficiency and Technology Transfer
Host:	Republic of Turkey, Ministry of Transport, Maritime Affairs and Communications, General Directorate for Maritime and Inland Waters Regulation
Venue:	Elite World Hotel, Sehit Muhtar Cad. No: 40-42, 34435, Taksim, Istanbul, Turkey.
Date	3-5 November 2014
Type:	Regional
Organized by:	REMPEC (Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea)
Implemented by:	IMO – Marine Environment Division
No. of participants:	27 (from 15 countries) – Excludes facilitators
Points of contact:	REMPEC: Mr Jonathan Pace Officer-in-Charge/Head of the Office, REMPEC Maritime House Lascaris Wharf, Valletta VLT1921 Malta Email: jpace@rempec.org IMO: Dr Theofanis Karayannis Marine Environment Division Email: TKarayan@imo.org
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EXECUTIVE SUMMARY

Representatives from 15 Mediterranean countries took part in the IMO Regional Workshop on "MARPOL Annex VI – Ship energy efficiency and technology transfer" that was organised in Istanbul, Turkey, from 3 to 5 November 2014. This Regional Workshop is the third in a series which will assist in the implementation of the IMO Technical Cooperation work plan on technology transfer for ship energy efficiency.

The main objective of the Workshop was to raise awareness among the participating regional countries on the recently adopted Chapter 4 of MARPOL Annex VI on energy efficiency regulations for ships as well as other relevant topics such as alternative fuels, energy efficient ship design and operation and regulatory impact assessment.

The other objective of the Workshop was to discuss the issue of Technology Transfer as related to Regulation 23 of MARPOL Annex VI and Resolution MEPC.229(65) that deals with the working of the AHEWG-TT (Ad Hoc Expert Working Group on Facilitation of Transfer of Technology for Ships) as well as to receive the participants' views on regional requirements for feedback to the third AHEWG-TT meeting that will be held at the IMO from 15 to 16 January 2015.

The final objective of the Workshop was for the participants to have a greater understanding and appreciation on the requirements and implications of implementation and enforcement of Chapter 4 of MARPOL Annex VI in order to enable them to lead their Governments' efforts in ratification/enforcement of MARPOL Annex VI, development of relevant procedures for compliance, monitoring, and enforcement both for Port State and Flag State purposes.

The Workshop covered the following main topics over three days:

- The international regulatory framework for preventing pollution from ships
- Overview of the GHG issue and the role of international shipping
- MARPOL Annex VI, Chapter 4 - Regulations for Ship Energy Efficiency including related guidelines on EEDI (Energy Efficiency Design Index), SEEMP (Ship Energy Efficiency Management Plan) and EEOI (Energy Efficiency Operational Indicator)
- Alternative fuels and their impact on EEDI
- Energy efficient ship design and ship operation and relevant energy efficiency measures
- Further measures to enhance the energy efficiency of ships and potential impacts of regulations on future shipping CO_2 emissions and fuel cost including debates on data collection
- Implementation and enforcement of MARPOL Annex VI with specific reference to its Chapter 4
- Fundamentals of technology transfer for ship energy efficiency and GHG controls
- IMO capacity building activities, Regulation 23 on technical cooperation and Resolution MEPC.229(65) on AHEWG-TT and other relevant IMO activities
- Regional/industrial perspectives on technological developments related to energy efficiency and GHG reduction with a focus on technology transfer
- Local presentations on relevant energy efficiency activities and their relation to technology transfer
- Group discussion and brainstorming on how technology transfer can help the countries of the Mediterranean to move to a more energy efficient shipping and identification of the regional requirements

Overall, the Workshop provided the participants with relevant information for a better understanding of IMO working practices, Chapter 4 of MARPOL Annex VI and wider aspects of shipping GHG emissions. Also, the Workshop provided information on the tasks needed for

enforcement in relation to newly adopted regulations including Flag State aspects and Port State Control. Finally the Workshop dealt with the Technical Cooperation, Technology Transfer, and related IMO activities via technical presentations, group discussions and brainstorming.

The Workshop was conducted interactively. Participants expressed significant interest on the subject and actively took part in the Workshop deliberations. They demonstrated their willingness in understanding the details of regulations, importance of reducing GHG emissions from ships, implementation aspects of MARPOL Annex VI and fully engaged in debates on technology transfer in particular on how to mitigate the impact of shipping on climate change.

The Workshop was jointly managed by REMPEC Officer-in-Charge/Head of the Office Mr Jonathan Pace and the IMO Technical Officer Dr Theofanis Karayannis and facilitated jointly by Dr Karayannis and the IMO Lead Consultant Dr Zabi Bazari and Independent Consultant Dr Raphaël Baumler. Additionally, invited speakers from Turkey's Maritime Administration, Turkish Shipbuilders' Association and Turkish Chamber of Shipping presented their views with a focus on Turkey's status, relevant activities, technology transfer and regional requirements. Each of the participating countries were also given time to present their points of view and plans as related to maritime GHG emissions and technology transfer.

At the end of the Workshop, evaluation forms were completed by participants and subsequently analysed and reported herein. Evaluation results show a very high level of satisfaction by participants with the way the Workshop was organised and executed, the venue and also the IMO facilitators / experts.

Overall, the Workshop was completed successfully and according to plan.

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ANNEXES

Regional Workshop on MARPOL ANNEX VI – Ship Energy Efficiency and Technology Transfer

Istanbul, Turkey, 3-5 November 2014

1 INTRODUCTION

1.1 IMO's MEPC (Marine Environment Protection Committee), at its 62nd meeting in July 2011, adopted amendments to MARPOL Annex VI via addition of Chapter 4 on Energy Efficiency Regulations for Ships (Resolution MEPC.203(62)).

1.2 The above Regulations deal with Attained EEDI (Energy Efficiency Design Index), Required EEDI and SEEMP (Ship Energy Efficiency Management Plan). They specify methods of calculation, survey and verification of EEDI as well as development of SEEMP. The Regulations are supported by a number of guidelines that were subsequently adopted at MEPC's 63rd to 67th meetings including guidelines on calculation of EEDI, guidelines for survey and verification of EEDI, guidelines for development of the SEEMP and a number of other guidelines.

1.3 IMO endeavours to support capacity building in developing countries on relevant regulations. Specifically within the MEPC and in relation to energy efficiency regulations, there have been calls by a number of countries to support the capacity building and technology transfer processes. This led to the adoption of Regulation 23 on technical cooperation and Resolution MEPC.229(65) on setting up of the Ad Hoc Expert Working Group on Facilitation of Transfer of Technology for Ships (AHEWG-TT).

1.4 This Workshop was planned and executed to increase awareness on the above two main topics. The objectives were to provide in-depth information on Chapter 4 of MARPOL Annex VI, its implementation and enforcement, IMO technical cooperation and technology transfer issues. The Workshop was implemented by IMO's Marine Environment Division using IMO Technical Cooperation Funds and additional funds provided to REMPEC by the Government of Malta and REMPEC funds, organised by REMPEC and hosted by the General Directorate for Maritime and Inland Waters Regulation of the Government of Turkey at a venue in Istanbul, Turkey.

2 AIMS & OBJECTIVES

Aim

2.1 The aim of this Regional Workshop was to increase awareness and familiarize the maritime stakeholders from Mediterranean countries with the latest developments in the new Chapter 4 of MARPOL Annex VI on "Regulations for Energy Efficiency of Ships" with a view to help the Parties to implement the energy efficiency requirements and for other Member States to prepare for future adoption and implementation of these regulations. The Workshop also aimed to raise awareness on the IMO technical cooperation plans, the IMO AHEWG-TT and related technology transfer issues and find out the regional requirements on the subject.

Objective

2.2 The objective of the Workshop was to create for participants a greater understanding of:

- IMO working practices and its initiatives for capacity building in developing countries.
- MARPOL Annex VI in general and more specifically its Chapter 4 on energy efficiency for ships.

- Importance of control of GHG emissions and relevant international efforts and initiatives and IMO's actions.
- Related guidelines on calculation of EEDI, verification of EEDI, development of SEEMP and use of EEOI (Energy Efficiency Operational Indicator).
- Implementation and enforcement aspects of Chapter 4 of MARPOL Annex VI.
- Energy efficiency measures for ship design and operation.
- Technology transfer for ship energy efficiency.
- Gathering of the participants' views and thoughts on technology transfer and their feedback to the AHEWG-TT.

Expected outcomes

2.3 For this Workshop, the expected outcomes were as follows:

- Increased awareness on IMO working practices and Chapter 4 of MARPOL Annex VI regulations and its relevant guidelines and methodologies.
- Greater understanding of the factors that impact a ship's energy efficiency and how it could be improved in practice.
- Familiarization with implementation and enforcement aspects of Chapter 4 of MARPOL Annex VI and relevant capacity building activities.
- Increased regional cooperation on the subject and MARPOL Annex VI implementation.
- Enhanced understanding of technology transfer in the context of ship energy efficiency and IMO's current debates on the subject.
- Clarification and gathering of regional views on Chapter 4 related technology transfer issues.

Workshop programme

2.4 The Workshop programme is given in **Annex 1**. The Workshop was conducted according to this programme.

2.5 Time was also allocated for country presentations and group debates on technology transfer as related to participating countries' needs and gathering of relevant information for feedback to the IMO AHEWG-TT.

Pre-Workshop assignments

2.6 Prior to the Workshop, the participants were given a Pre-Workshop assignment on Chapter 4 of MARPOL Annex VI (as preparation for Days 1 and 2 of the programme) and a questionnaire on issues related to technology transfer (as preparation for Day 3 of the programme). These are both attached to this report for information (see the last two Annexes).

3 VENUE, DATES, PARTICIPANTS AND FACILITATORS

3.1 The venue for this Regional Workshop was: Elite World Hotel, Sehit Muhtar Cad. No: 40-42, 34435, Taksim, Istanbul, Turkey.

3.2 The Workshop was held from 3 to 5 November 2014 at the above venue that included all amenities needed for the Workshop.

Logistical arrangements

3.3 The Workshop was planned and implemented by IMO's Marine Environment Division, hosted by the Republic of Turkey's General Directorate for Maritime and Inland Waters Regulation and organised by REMPEC with all the relevant logistical supports.

3.4 REMPEC provided excellent organisational aspects and supports both logistically and with the venue during the Workshop. This support included managing the Workshop proceedings, formal engagement during the opening and closing ceremonies and logistical support for the participants including assistance with travelling and making all the necessary arrangements for the hotel and the venue.

3.5 **Mr Jonathan Pace,** Officer in Charge and Head of the Office, REMPEC, had the overall management of the organisational aspects and also the Workshop's chairmanship during the three day event. He closely worked with the IMO, Workshop facilitators, Turkey's General Directorate for Maritime and Inland Waters Regulation and local/regional participants to ensure that the Workshop is planned and executed smoothly. Also, REMPEC provided logistics for the Workshop via provision of support for facilitators and participants before and during the Workshop including liaison with Turkey's General Directorate for Maritime and Inland Waters Regulation and IMO Marine Environment Division. Moreover, REMPEC, through its Mediterranean Trust Fund (MTF) budget and also through a voluntary contribution from the Government of Malta to REMPEC, financed the participation of the countries that were not covered by the IMO ITCP funding, as well as English-French-English simultaneous interpretation.

3.6 The Workshop was conducted in English with simultaneous translation to/from French.

3.7 Participants were provided with the following materials:

- A participant "pen drive" with digital resources and manuals including all the presentations, guidelines, major background documentation and other relevant materials;
- A hardcopy (book) of MARPOL Annex VI (consolidated English and French Editions 2013);
- IMO/KOICA energy efficiency pocket booklet; and
- IMO/KOICA energy efficiency DVD.

Participants

3.8 A total of 15 countries took part in this Workshop that represented the majority of the countries from the Mediterranean region including both developing and developed countries. The participation of the non-ITCP eligible countries was facilitated outside the IMO Technical Cooperation funding via provision of support by the Government of Malta through REMPEC. The host country (Turkey) attended with a larger delegation representing various relevant stakeholder groups. A total of 27 participants attended the Workshop. The full list of participants is given in **Annex 2**.

Chairperson, Facilitators and Presenters

3.9 The Workshop was chaired by **Mr Jonathan Pace** (REMPEC), and facilitated by **Dr Theofanis Karayannis** (IMO), **Dr Zabi Bazari** (Energy and Emissions Solutions, UK, acting as Lead Consultant to IMO) and **Dr Raphaël Baumler** (Independent, acting as Consultant to IMO, France). They were supported by local presenters on Day 3 when Technology Transfer was debated.

3.10 **Mr Jonathan Pace,** REMPEC Officer-in-Charge/Head of the Office, joined REMPEC in September 2002, holds a B.A. (Hons) Public Administration degree from the University of Malta and an MSc degree in General Maritime Administration from the World Maritime University (WMU) Malmo, Sweden. Before joining the Centre, he held the post of Deputy Executive Director at the Merchant Shipping Directorate of the Malta Maritime Authority where he obtained considerable experience in dealing with shipping related matters. As Officer-in-Charge and Head of the Office, he is responsible for the overall operation and administration of REMPEC. He is also responsible for the activities of the Centre related to the prevention of pollution from ships including inter alia the development and implementation of programmes and projects (such as the EU-financed MEDA Regional Project SafeMed and the GEF/UNDP/IMO GloBallast Partnerships' Project), the planning and organization of training activities, the drafting and editing of the Centre's documents, and the provision of technical assistance and advice to the Mediterranean coastal States. Mr Pace also fulfils the role of the United Nations Country Security Focal Point for Malta.

3.11 **Dr Theofanis Karayannis** is a Technical Officer in the Marine Environment Division of the IMO. His responsibilities cover MARPOL Annex VI including regulations on energy efficiency for ships, as well as biosafety-related instruments (BWM Convention, AFS Convention and Bio-fouling guidelines).
Prior to joining IMO he worked for Lloyd's Register, as a Senior Specialist in the Strategic Research and Technology Policy Group, and prior to that in Greece's national maritime Administration's Marine Pollution Prevention and Cargoes Department. Dr. Karayannis is a member of the Royal Institution of Naval Architects (RINA) and is a Chartered Engineer; he has a Diploma in Naval Architecture and Marine Engineering from the National Technical University of Athens and a Doctorate in Ship Science from the University of Southampton.

3.12 **Dr Zabi Bazari** is the Director of Energy and Emissions Solutions (UK) Ltd where he provides services on ship's energy efficiency and emissions control. His experience spans over 40 years (about 23 years with Lloyd's Register, UK) and includes many aspects of energy-efficient and low carbon shipping. As a principal expert in this field, he has delivered a significant number of consultancy and training projects on marine engines, ship propulsion, ship performance monitoring, ship energy audits, GHG studies, benchmarking and ship energy management including EEDI, SEEMP and EEOI regulations. In the past, he has been a regular participant at the IMO GHG meetings on behalf of the IACS (International Association of Classification Societies) on energy efficiency. He has been engaged in EEDI verification while at LR including the development of LR procedures for EEDI verification. Dr Bazari has more than 30 written technical papers, a large number of conference presentations and regularly provides training and coaching to maritime industry internationally. Dr Bazari has frequently been engaged as an IMO Lead Consultant for delivery of similar Workshops.

3.13 **Capt./Dr Raphaël Baumler** is presently an independent consultant in shipping. He deals with environmental issues (BWM Convention, MARPOL Annex VI and Hong Kong Convention) as well as social issues (MLC 2006 and the Human Element). In addition, he lectures at the World Maritime University (WMU), Dalian Maritime University and Paris-La Sorbonne University. Former Associate Professor at WMU, he also served more than 20 years in the shipping industry as a deck and engine officer. He completed his seafaring career life as containership Master. He holds a PhD in risk management and a Master's degree in crisis management. As a seafarer, he is certified as shipmaster and first engineer. He recently worked as consultant and project manager for the IMO on the BWM Convention and MARPOL Annex VI. In 2014, he participated in the development of the Lloyds Maritime Academy-WMU Postgraduate Diploma in Maritime Energy Management and joined ships as Shipmaster.

3.14 The local experts who supported the Workshop deliberations were:

- **Mrs Mehtap Karahalli Özdemir,** Head of Safety, Environment and Quality Department, Turk Loydu, on behalf of the Turkish Shipbuilders' Association.
- **Professor Mustafa Insel,** Business Development Manager, Hidroteknik, on behalf of the Turkish Chamber of Shipping.

A short biography of the above experts is given in **Annex 3**.

4 ACTIVITIES AND PROCEEDINGS

Opening of the Workshop

4.1 The opening ceremony was initiated and managed by Mr Jonathan Pace, REMPEC. Initially, he introduced the Workshop programme in brief and number of participants and the fact that this Workshop included the great majority of the Mediterranean countries irrespective of being developing or developed. He explained that IMO Technical Cooperation funding has been used to support the participation of those present from relevant eligible countries while the participation of other delegates as well as provision for interpretation were funded through the kind financial support of the Government of Malta as well as REMPEC own funds. He also thanked the Government of the Republic of Turkey for hosting the Workshop and appreciated their support for organising the event. He then invited **Mr Naci Kaya,** Deputy of General Director, General Directorate for Maritime and Inland Waters Regulation, to open the Workshop.

4.2 **Mr Naci Kaya**, after a short welcome to the IMO team and other participants, in particular those from the regional countries, gave an opening speech in which he highlighted the following aspects:

- Turkey has been a member to IMO since 1958 and Party to the majority of the IMO Conventions including MARPOL Convention and all its annexes.
- The Republic of Turkey has ratified Annex VI of MARPOL on air pollution and the relevant National Law was issued and entered into force on 4 February 2014. This ratification has contributed to the improvement of the Turkish fleet performance as represented by the white list under The Paris Memorandum of Understanding.
- Turkey appreciates that combating the climate change and control of GHG emissions is a significant global task with engagement of all national sectors. For shipping, while considering it as the most efficient mode of transport, the Turkish maritime Administration gives much importance to efficient fuel consumption in shipping and port management as well as the technology transfer issue.
- The adoption of the Energy Efficiency Design Index for new ships, Ship Energy Efficiency Management Plan for all ships and also discussing new tools for ship energy efficiency is the main reason for gathering together with a view to focus on these important subjects, to update local knowledge and create a platform for an interactive discussion with exchange of opinions among the seminar lecturers, professionals and all participants.

My Kaya wished good luck for the Workshop and for the participants a very nice stay in Istanbul. The full text of Mr Kaya's opening speech is included in **Annex 4**.

4.3 Subsequently, **Dr Karayannis** gave an opening speech on behalf of the IMO. Dr Karayannis initially thanked the Government of Turkey for hosting and REMPEC for organising

and logistically supporting this Workshop. He emphasised the importance of dealing with climate change as an international effort, and the importance of shipping for world trade. He then gave a brief overview of the Workshop, its aims and objectives, with reference to the other Workshops of this series that had been implemented previously in Accra, Ghana, and Mumbai, India. He mentioned that the content of the Workshop is gradually evolving and he encouraged the participants to contribute actively to the discussions that would follow in order to elicit the regional perspective on the subject. The full text of Dr Karayannis' speech is given in **Annex 5**.

4.4 Following the opening speeches, a group picture was taken. **Annex 6** shows the pictures from the Workshop.

WORKSHOP TECHNICAL PROCEEDINGS

Introduction

4.5 **Mr Pace** initially asked the participants to introduce themselves. He then encouraged the participants to actively take part in the debates by raising their questions and relevant issues to facilitators as the Workshop moves ahead. He invited everybody to make the Workshop interactive.

Day 1 Presentations and Discussions

4.6 The first presentation (given by Dr Karayannis) was entitled "**The International Regulatory Framework for Preventing Pollution from Ships**". This presentation provided a general introduction to the IMO working practices, organisation, regulatory framework and achievements. This included a description of IMO's various Committees and Divisions that deal with various regulatory aspects. He also provided an overview of MARPOL Convention and its requirements and roles of Flag and Port States in implementing MARPOL. He then moved to provide an overview of MARPOL Annexes I to VI.

4.7 The next presentation (given by Dr Baumler) related to an "**Overview of the global GHG emissions and the role of international shipping**". First, he highlighted the changes in global temperature and atmospheric CO_2 emissions and the significant impact that GHG emissions may have on various countries. He then discussed various international efforts and initiatives on GHG emissions control including UNFCCC, Kyoto Protocol, IMO obligations within Kyoto Protocol and recent developments in this area. On shipping emissions, he highlighted results of the 2nd and 3rd IMO GHG studies and various scenarios on future shipping GHG emissions. He then continued and explained the related historical activities of IMO since 1997 to date that have led to EEDI and SEEMP regulations. He also touched on past discussions on MBM work within IMO and various schemes that have been proposed by various countries. Some discussion on the level of GHG emissions from international shipping, current study on quantification of emissions and likely developments in data collection were also covered.

4.8 The next presentation of was entitled "**IMO MARPOL Annex VI Chapter 4 Regulations on Energy Efficiency for Ships**" and was given by Dr Bazari. This generally covered the contents of Resolutions MEPC.203(62) and MEPC.251(66) on Amendments to MARPOL Annex VI plus relevant unified interpretations. After a short introduction to the subject and IMO historical activities, he first explained in detail the amendments made to already existing Regulations 1 to 11 of Annex VI, in order to accommodate the Energy Efficiency Regulations. This created some discussion on the International Energy Efficiency (IEE) Certificate, definition of "major conversions", waiver clause and roles of Port States. He then moved to describe in detail Regulations 19 to 23 of MARPOL Annex VI (Chapter 4). This included information on Chapter 4 application domain, Attained EEDI, Required EEDI and SEEMP. He then explained how the Required EEDI is calculated using numerical data, reference lines and reduction factors

and why the Required EEDI has not been mandated for a number of ship types as well as the small size ships. He also clarified that there is a plan for future reviews (at the mid-point between phase 2 and 3) and that IMO's MEPC in its 67th meeting decided to set up a Correspondence Group for evaluating technologies for meeting Required EEDI for Phases 2 and 3. On attained EEDI, he mentioned that the calculation formula, calculation guidelines and survey and verification guidelines will be covered later. Regulations 22 on SEEMP and 23 on Technology Transfer were presented and the concept of the EEDI Technical File, the relevant Ship Records of Construction and the IEE Certificate and its validity period were extensively discussed.

4.9 The next presentation of the day was on "**Guidelines supporting Chapter 4 of Annex VI on EEDI**". This presentation was given by Dr Bazari and included a description of various guidelines including "Guidelines on calculation of Attained EEDI (Resolution MEPC.245(66))", "Guidelines for verification of EEDI (Resolution MEPC.234(65))", Guidelines for minimum power, Guidelines for innovative energy efficiency technologies and finally Industry Guidelines. He spent some time to describe the EEDI formula and its various parameters. He then presented a set of slides that described in more detail various aspects of EEDI calculation. He emphasised that the objective is not for the participants to become experts in this type of calculations but to be able to appreciate how it works. He talked about EEDI verification in detail via review of the EEDI survey and verification guidelines. He explained in detail the pre-verification and final verification of EEDI, what needs to be submitted by the submitter and what will be checked by the verifier including tank testing and speed trials observations. He mentioned that, due to the complexity of the formula and specific factors used, the verification will most likely be delegated to ROs (Recognised Organisations) by Flag States. He briefly touched on other relevant guidelines including "minimum power", "innovative energy efficiency technologies" and "industry guidelines".

4.10 The next presentation was on "**Guidelines supporting Chapter 4 of Annex VI on SEEMP**". This presentation was given by Dr Baumler. He covered two guidelines in detail including Resolution MEPC.213(63) on SEEMP; and Circular MEPC.1/Circ.684 on EEOI. He initiated to describe in detail the main features of an IMO SEEMP that included the Plan-Do-Check-Act (PDCA) continuous improvement cycle. He then moved to discuss the following SEEMP development topics in more detail:

- Goal-setting;
- Implementation system;
- Training aspects;
- Record keeping and monitoring aspects and possible use of EEOI or a similar indicator for this purpose; and
- Self-assessment and reviews.

As part of his deliberations, he provided examples of operational energy efficiency measures that may be included in the SEEMP. Finally, a SEEMP template was presented and enforcement aspects discussed. He then moved to explain the guidelines on EEOI calculation, giving the EEOI formula, defining the main parameters, clarifying where the data need to be gathered from and the fact that EEOI calculation and SEEMP monitoring is best to be carried out by the head office in order to reduce the burden on ship crew. He finished with a sample calculation of EEOI.

4.11 The Day 1 deliberations ended at 17:40 hours. For the evening of Day 1, a social dinner was kindly hosted by the Government of Turkey where most of the participants took part.

Day 2 Presentations and Discussions

4.12 Day 2 started with a group exercise conducted by Dr Bazari on the question of "**What do you remember from yesterday – Share one item with the group**". The group gave a

significant number of items of what they had learnt in relation to IMO and energy efficiency regulations for ships as well as EEDI calculation during Day 1. The main items of interest that were brought up by participants included:

- EEDI calculation and complexity of formula and various terms.
- Attained EEDI versus Required EEDI and related regulations.
- SEEMP, in particular aspects such as certification and application.
- EEOI and the fact that it shows the overall performance of a vessel.
- Application areas of the regulation in terms of ship types and sizes.
- Preliminary and final verification aspects of EEDI.

The exercise proved to be successful in consolidating the in-class learning process and prepared the group into a participatory mood for the Day 2 deliberation.

4.13 The first presentation of Day 2 (given by Dr Bazari) was on "**Alternative fuels**". He initially focussed on the forthcoming changes as a result of NOx and SOx (sulphur) regulations as well as ship fuel price rises as the main drivers for the shipping industry seeking alternative methods for reducing SOx, NOx, CO_2 and costs. He then moved to identify the compliance options that are available to shipping including:

- Use of more expensive low sulphur fuels (such as marine distillates)
- Use of SOx scrubbers and NOx SCR (Selective Catalytic Reduction)
- Use of LNG as marine fuel
- Ship design aspects including multi-fuel bunkering aspects

The discussion then concentrated on scrubbers and LNG-as-fuel, their status and impacts on EEDI and pros and cons of alternative solutions. He concluded that there is no single solution for the future. He emphasised that, as a result of MARPOL Annex VI forthcoming emissions limits, the shape of ship technologies and operation will see drastic changes in the future. As part of this presentation, he briefly touched on biofuels and nuclear power as other less potential alternatives.

4.14 Following this presentation and in preparation for the next one, Dr Bazari gave the participants an exercise on "**How to reduce EEDI?**" He asked the participants to use the EEDI formula and come up with ideas on ways for reducing a ship's EEDI in terms of percentage reduction in EEDI as well as changes to ship's CAPEX (capital expenditure) and OPEX (operational expenditure). The group picked up a number of measures for EEDI reduction including:

- Hull optimisation
- Contra rotating propellers
- Hull air lubrication
- Waste heat recovery
- Alternative fuel (nuclear)
- Speed reduction

On each case a discussion followed on the impact of the measure on EEDI, the change in shipbuilding costs and other aspects such as impact on ship's fuel and other lifecycle costs.

4.15 The next presentation was made by Dr Bazari on the topic of "**Energy efficient ship design and technical energy efficiency measures**". In this presentation, he introduced a variety of technologies that could be used to reduce a ship's EEDI. As part of this presentation, he covered extensively ship hydrodynamics and possible changes to ship design as well as propellers that may be used to improve energy efficiency. He then moved to ship engines and auxiliary machinery and provided a list of technologies such as engine de-rating, waste heat

recovery, variable speed drives and so on that may be adopted for improving machinery energy efficiency.

4.16 The next presentation by Dr Baumler was on the subject of "**Energy efficient ship operation and operational energy efficiency measures**". In his presentation, he emphasised the importance of operational controls in the context of ship energy management. He covered a wide range of topics on ship energy management and how the operational energy efficiency management can be practically carried out via use of:

- Just-in-time operation
- Virtual Arrival
- Weather routeing
- Relevant tools such as monitoring aspects
- Trim optimisation

He then moved to define the staged and systematic processes and approaches, use of performance monitoring and benchmarking and so on. He described in detail just-in-time operation and virtual arrival, weather routeing, hull and propeller condition improvement and engine condition monitoring. He explained practical energy saving examples from his own ship-board experiences as a chief mate and Master.

4.17 Dr Baumler then made a presentation on "**Further measures to enhance the energy efficiency of ships**". He addressed commercial aspects of shipping, methods of energy saving, typical energy efficiency measures and the MAC (Marginal Abatement Cost) curve. He then gave an overview of future IMO plans and discussed the ideas on monitoring and reporting, data collection, etc. Related issues such as ownership of data, commercial sensitivity of fuel consumption data and methods of measurement were discussed.

4.18 The next presentation was made by Dr Karayannis on the topic of "**Port State control and enforcement of MARPOL Annex VI**". He first introduced why it is beneficial for a country to become Party to MARPOL Annex VI via explaining the importance of enforcement and also privileges that membership brings about. He then moved to details of PSC including MARPOL provisions for survey and inspection, clear grounds for detailed inspection and detention and on to Flag State aspects and Port State Control aspects of MARPOL requirements. He showed a typical EEDI Statement of Compliance and accompanying Record of Construction. A number of Guidelines were introduced at the end of the session to help with various PSC issues.

4.19 The next presentation of Day 2 was given by Dr Bazari entitled "**Amendments of MARPOL Annex VI – Potential impacts on reduced GHG emissions and fuel consumption**". In this presentation, he introduced the report of a study that has been commissioned by the IMO in order to quantify the impact of EEDI and SEEMP regulations on the future level of marine CO_2 emissions. He described the methodology used, scenarios modelled and assumptions made. He then presented the results of this study in terms of growth of CO_2 emissions by 2050 and the reduction levels due to EEDI and SEEMP. He concluded that the impact will be significant but not sufficient enough to change the rising CO_2 trend of international shipping to a reduction trend. He mentioned this as the main reason that there will be future pressure on IMO to do more work in this area as the continuously rising trends will not be acceptable to the international community.

4.20 Dr Karayannis then made a presentation entitled "**Introduction to capacity building and technology transfer"**. In this presentation, he initially explained IMO's Integrated Technical Cooperation Programme (ITCP) in terms of its objectives, method of working and achievements. He also explained the historical background on MDGs (Millennium Development Goals) and the maritime sustainable development goals. He explained that international cooperation forms the cornerstone of fighting GHG emissions and global warming. He discussed that the main

beneficiary of technical cooperation is going to be the maritime stakeholders in the developing countries. He then moved to the following topics:

- III Code and IMO Audit Scheme;
- Examples of ITCP activities such as model maritime legislation, development of maritime training academies, etc;
- The details of the IMO regional activities under various initiatives; and
- Process for countries to approach IMO to seek support including the main IMO points of contacts.

He then moved to MARPOL Annex VI Regulation 23 and explained the scope of this regulation. Additionally, he referred to Resolution MEPC.229(65) on technology transfer and presented its main points, mandating the establishment of the AHEWG-TT and other principles in this area. He explained the working of AHEWG-TT, its meetings so far, the next planned meeting and the fact that all these will be debated on Day 3 on Technology Transfer.

Countries' presentations

4.21 Towards the end of Day 2, **country presentations** started with a Turkish presentation. In this presentation, Turkey elaborated on various aspects of its maritime statistics and activities including:

- National and international Turkish fleet statistics.
- Turkey is a Party to MARPOL Annex VI and exercises relevant privileges and powers.
- Turkey is implementing 10 ppm sulphur cap in its waters for national shipping.
- Description of Turkey's and Spain's collaboration project (twinning project). The project is on "Control of Ship Sourced Emissions in Turkey" and conducted between the Ministry of Transport, Maritime Affairs and Communications of the Republic of Turkey and the Ministry of Transportation and Public Works of Spain, initiated on 25 May 2012 and concluded on 23 June 2014. Then the main components of the project were explained as below:
    - Component 1 - Ship Emission Modelling
    - Component 2 - Harmonization of the Legislation
    - Component 3 - Action Plan/ECA
    - Component 4 - Trainings
- Discussed the studies in detail with relevant activities conducted during the course of the project implementation.

4.22 After the Turkish presentation, other countries provided the relevant views of their Administration on Chapter 4 of MARPOL Annex VI as follows:

- Slovenia: Very small country; Party to Annex VI; PSC controls certification; two flagged ships and not much experience in issuing the certificates.
- Malta: Malta fleet is largest in EU; Party to Annex VI; about 800 IEEC issued for existing ships and a number of EEDI preliminary certification issued.
- France: Party to Annex VI; part of EU and coordinates policy with EU. Working on LNG as well.
- Italy: Similar situation as of France in coordination with other EU countries. Also working on LNG, biofuels and also cold ironing. Closely working with EMSA on PSC aspects and training.
- Croatia: Party to MARPOL Annex VI and follow EU policies. The Croatian Register of Shipping is responsible for acting as RO.

- Greece: Party to Annex VI and EU member; no problem; two new ships are certified to EEDI so far.
- Israel: Half way in the process of joining MARPOL Annex VI.
- Montenegro: Ratified Annex VI; revision of law will take place in 2015 and will include Chapter 4; two ocean going ships. Upon completion of this Workshop, discussion with stakeholders would follow on the subject and how to reduce GHG emissions.
- Morocco: Delivering IAPP certificates; ratified MARPOL Annex VI and will include energy efficiency in national regulations.
- Algeria: Not Party to Annex VI; small fleet.
- Tunisia: Ratified Annex VI.
- Lebanon: Not a Party to Annex VI; this is under process; issuing Statements of Compliance for IAPP and IEEC.
- Albania: Not ratified Annex VI. Ratification will help in supporting the environmental protection.

4.23 The Day 2 deliberations ended at 17:45.

Day 3 Presentations and Discussions

4.24 Day 3 started with a group exercise conducted by Dr Bazari on the question of "**Review of the yesterday's deliberations – Share one item with the group**". The group gave a significant number of items of what they had learnt in day 2 but their emphasis was on:

- Technologies for EEDI reduction and relevant costs.
- Port State Control aspects.
- Operational energy efficiency measures including operation, technical and technology upgrade.
- Cost of EEDI reduction and associated fuel consumption and fuel cost reductions.
- Impacts of IMO regulations on CO_2 and fuel consumption, in particular the short to medium term impact of SEEMP and long term impact of EEDI.
- Alternative fuels and technology including drivers and relevant issues.
- Need for monitoring of fuel oil quality and the decisions of MEPC 67 in initiating activities in developing a guideline for this purpose.
- Further operational measures including the data collection aspects.

Similar to Day 2, this exercise proved to be useful in consolidating the in-class learning process and prepare the group into a participatory mood for the Day 3 deliberations.

4.25 Dr Karayannis then explained the programme for Day 3 and the fact that there will be few presentations for the morning including two from local experts. He then introduced the brainstorming session for technology transfer by stating that groups will be organised, time will be allocated for deliberations and reporting by each group. Dr Karayannis then asked the participants to express their views on what they expect to gain from these discussions. The responses from participants indicated that they had found the first two days of the Workshop very useful in helping them to achieve a better understanding of the ship energy efficiency regulations, including their technical and operational implications, and that they were keen to proceed to the discussions on technology transfer that were to follow.

4.26 Dr Karayannis then briefly explained the plan for the day and invited Dr Bazari to give his introductory presentation.

4.27 Dr Bazari gave a presentation entitled "**Introduction to Technology Transfer for Ship Energy Efficiency and GHG Emissions Reduction**". In this presentation he covered the fundamentals of technology transfer, definitions, push and pull factors, technology need assessment, capacity need assessment and barriers. He then moved to shipping and presented some views on the working of the IMO, Regulation 23 of Chapter 4, activities that are needed for compliance to EEDI and SEEMP requirements as well as what is needed to go beyond compliance. A number of questions were raised and discussed during this debate.

4.28 Dr Bazari then provided an overview of the proposed IMO-GEF-UNDP project on reduction of GHG emissions that will support a number of developing countries in various regions. He gave some general information on the project, responded to specific questions on the subject and informed the participants that they will know more details as soon as the project is approved.

4.29 The next presentation was given by **Mrs Mehtap Karahalli Özdemir** entitled "**Investing for the future: Creating Greener & Smarter Technology for Maritime Industry**". This presentation was given on behalf of the Turkish Shipbuilders' Association. In her presentation, she elaborated on the following topics:

- Turkish Shipbuilders' Association:
  - 90 shipyards; founded in 1970.
  - 71 active shipyards and 56 shipyards under construction located mainly in Marmara area.
  - Ship maintenance is big in the country with 15m DWT capacity.
  - Provided details of Turkish shipyards.
- 4 universities with shipbuilding department.
- For energy efficiency and emissions: Istanbul technical university has tank test and emissions testing facility.
- 24 newbuilds in shipyards that have attained EEDI certification but no ships with required EEDI.

4.30 She then elaborated on projected implications of energy efficiency regulations and highlighted the following:

- Performance measurement is required.
- Database to support EETs application and their benchmarking will be useful.
- Smaller ships have fewer options for energy efficiency. Reliable data is needed on this.
- Financial model and new innovative financial modelling was proposed as one solution.
- Monitoring of Regulation 23 implementation will need to be done by IMO.

4.31 Following this presentation, the floor was opened for discussion and the views expressed as below:

- Reference to first LNG tug: Design came from Norway and building was carried out in Turkey. Dr Karayannis highlighted this as a model of technology transfer between two countries (in this case between Norway and Turkey).
- Malta raised the question on IMO Audit Scheme and how it will apply to Regulation 23. It was proposed that the implementation level shall be audited and reported by IMO. Turkey proposed a more forceful monitoring of implementation of Regulation 23 as part of a more proactive monitoring of activities in relation to IMO Audit Scheme or any other methods that need to be followed.

4.32 The next presentation of the day was given by Prof Mustafa Insel on behalf of the Turkish Chamber of Shipping entitled "**Energy Efficiency Measures in Turkish Maritime Fleet**". In this presentation, he introduced the Turkish Chamber of Shipping, the maritime

sectors in Turkey and the result of survey on energy efficiency activities in the Turkish shipping sector.

4.33 On the Chamber of Shipping, Professor Insel clarified that:

- Chamber of Shipping is not ship owners only but all other parts of the maritime industry; has 7 branches and 8400 members in Turkey.
- It looks into everything including training, safety and environment.
- Develop fair and equitable competition.
- On energy efficiency, a number of Workshops have been organised.
- Chamber of Shipping represents Turkey in a large number of international organisations.
- It covers all the maritime sector, maritime transport, ports (about 180 ports), ship-owners, shipbuilders:
    - Ship recycling is a big business in Turkey (5th largest in world).
    - Maritime tourism is also part of the Chamber's activities.
    - Fishing and aquaculture facilities.
    - Maritime education: Chamber of shipping supporting universities.
    - National fleet is young: 56% less than 10 years old now.

4.34 On ship energy efficiency for existing ships, a survey has been done in Turkey and the results presented in detail. Accordingly, 92 ships have been included in the questionnaire. Results indicated that they have: 100% IEEC and SEEMP, 97% has EEOI, 32% has calculated EEDI and 32% conducted energy audit. 33% of companies surveyed have ISO 140001 or ISO 50001 certification.

4.35 Professor Insel reported that relevant research activities include those that are carried out through public and private funding and include:

- TARGET project – 9 energy audits were conducted within this project.
- TEFLES: Mainly aimed at emissions for RoRo ships.
- SMOOTH – On air lubrication. Pilot project and 14% energy saving is targeted.
- Dynamic Energy Simulation project: One full simulation of ships.
- CFD use for design changes due to slow steaming, aerodynamics or appendices.
- Sail Assistance Project.
- Shaft power measurement: Measurements for two ships with two different paints. The need for reliable data was highlighted. Ship-owners require measurement and verification.
- Research on Mewis Duct use; mainly on bulk carriers and containership to improve the flow into the propeller.

Group brainstorming on technology transfer

4.36 Dr Karayannis thanked the participants for filling out the technology transfer questionnaire (as part of Pre-Workshop activities) and announced that a group discussion / brainstorming was going to be carried out. He then presented a number of questions to the participants, which corresponded to the questions in the Technology Transfer questionnaire (shown in **Annex 9**) and explained that he would like to have a group discussion on these questions. He then presented the definition of technology transfer again and emphasised the need for delegates to bear this in mind.

4.37 Subsequently, four groups were formed, each group representing a mix of various countries, including both developed and developing countries as well as 2-3 people from Turkey's participants. The participation in the four groups, in addition to Turkey, which was represented in all the groups, included in Group 1 Albania, Algeria, Greece, Lebanon, Morocco and Tunisia; in Group 2 Montenegro and Spain; in Group 3 Croatia, Israel and Italy; and in Group 4 France, Malta and Slovenia. Each group chose a person(s) for reporting back the results of brainstorming. Dr Karayannis coordinated the discussion, raising particular points that came out of the group reports that merited further debate and comparing the responses of the various groups when this provided an interesting basis for discussion.

4.38 The 4 groups were given about one hour for discussion time. Dr Karayannis then asked for each group to give the results of their deliberations on a question by question basis. One interesting point that was made, which was not the case at the previous Workshops, was that sometimes it was not easy for each group to provide a common response, due to the significantly different circumstances between the various countries within the group. It is believed that this is due to the mix of countries with a wide range of levels of development in the Mediterranean region.

4.39 **Feedback on Question 1:** The following were stated by different groups:

- GROUP 1
  - Mixed answer. Some countries are not ready for it.
  - Some countries have not ratified MARPOL Annex VI yet.
- GROUP 2:
  - Answer is mostly yes. They have ratified MARPOL Annex VI but there are issues with implementation.
- GROUP 3
  - No for overall regional implementation.
  - Yes at national level for most countries.
- GROUP 4
  - Yes. The majority of countries implement MARPOL Annex VI and the countries are in a good position to comply with the new regulations.

4.40 **Feedback on Question 2:** The following were stated by different groups:

- GROUP 1
  - There are some specific barriers: insufficient time to prepare; human resource lacking; complex administration procedures; political aspects; and stakeholders that are not familiar with EEDI and other regulations.
- GROUP 2:
  - Needs and barriers differ between countries.
- GROUP 3
  - Some countries have limited capacity and insufficient level of technical knowledge.
  - Some countries have financial difficulties.
- GROUP 4
  - No specific needs for this group.

4.41 **Feedback on Question 3:** The following were stated by different groups:

- GROUP 1
  - The implementation will reduce the fuel cost.
  - It will increase financial burden for administration and stakeholders.

- GROUP 2:
  - Reduction in emissions.
  - Lower fuel costs.
  - LNG storage is an issue and there is not enough experience in this area.
  - Environment will benefit from this and use of LNG.
- GROUP 3
  - Environmental benefits.
  - The negative aspect is that the developing countries will be in need of technology transfer, due to insufficient level of technical expertise.
  - EEDI reduction factor required by regulation may cause issues for some countries.
- GROUP 4
  - Improved environment.
  - Small and medium size owners may have difficulty in paying for more expensive ships and therefore be disadvantaged in competition terms. This may have a negative impact on growth.

4.42 **Feedback on Question 4:** The following were stated by different groups:

- GROUP 1
  - Yes we specifically feel that there is a need for technology transfer.
  - Training for effective implementation.
  - Exchange of information and technical cooperation.
  - Barriers are lack of expertise and the need for experts from outside to support.
  - Access to data is limited and is needed.
- GROUP 2:
  - The need for collaboration between the developed and developing countries that are neighbours in the Mediterranean area was highlighted.
  - Technology transfer could include knowledge and human capacity development between these countries.
  - Regional collaboration needs to be promoted (e.g. cooperation projects).
- GROUP 3
  - Technology transfer is a complex issue and wide range of factors and actors are involved.
  - Also it is a long term issue and requires investment.
  - Requires coordinated activities and multi-lateral cooperation.
  - Market/competition issues.
  - Maritime industry is private to a large extent so establishing a good balance between private and social benefits is the main issue (win-win scenarios).
- GROUP 4
  - Agreed with what other groups mentioned.
  - Technical cooperation and assistance could be achieved to certain levels.
  - On technology transfer and sensitive technical know-how, there are big barriers and stakeholders keep things to themselves. Thus the process requires much more convincing to practically be initiated.
  - There is more need to convince people that the “process” could be initiated without damaging the interests of parties that are mainly private companies.

4.43 The participants enquired how their feedback will be treated. It was mentioned that these results will normally be reported to AHEWG-TT as well as to IMO and will be used for other relevant activities. Additionally, the REMPEC website will include a report of the proceedings of the Workshop plus relevant reports.

4.44 Dr Karayannis then summarized the discussions, compared the responses to those that have been received from the first (Ghana) and second (India) Workshops, demonstrating the differences in the specificities of each region. He thanked the participants for their constructive input to the group and plenary discussions. He informed the participants that the results will be fed back into the work of the AHEWG-TT in its January 2015 meeting and encouraged the countries present to take a more active role in this working group. He then declared the end of the technical deliberations.

Evaluation Forms

4.45 The "Workshop evaluation forms" were circulated to attendees early in the Workshop and collected at the end of the Workshop. The feedback from attendees was analysed, a summary of which is given in **Annex 7** of this report. The feedback was quite positive and shows that the Workshop fully achieved its objectives and the participants' expectations.

5 CLOSING REMARKS

5.1 Mr Pace gave the final remarks. He thanked the Republic of Turkey, Ministry of Transport, Maritime Affairs and Communications, General Directorate for Maritime and Inland Waters Regulation for hosting the Workshop, supporting the organisational work, making presentations and for the social evening. He also thanked IMO and in particular Dr Karayannis for his dedication in supporting the process. He also thanked the Workshop facilitators, the presenters from the Turkish side and the interpreters. Finally he thanked the participants for their active involvement and very good interactions. He made a statement reflecting the sentiment that "this Workshop has been a very good one based on his long experience of previous Workshops".

5.2 Dr Karayannis, on behalf of the IMO, thanked the participants for taking part actively in the three day event. He expressed thanks once again to all those who contributed to the smooth organisation and running of the Workshop including the Government of Turkey and REMPEC and the participants for their technical interventions. He expressed his satisfaction with the outcome and in particular the debate on technology transfer.

5.3 The Workshop certificates were then handed over to individuals by the facilitators. At the end, **Mr Pierre Zammit Endrich** from Malta, on behalf of the participants, thanked the IMO, facilitators, the Government of Turkey and REMPEC for organising a very informative Workshop. The Workshop closed at 16:15 on 5 November 2014.

6 CONCLUSIONS

6.1 The IMO Workshop entitled "Regional Workshop on MARPOL ANNEX VI – Ship Energy Efficiency and Technology Transfer" was organised and successfully delivered in Istanbul, Turkey, from 3 to 5 November 2014.

6.2 A total number of 27 people from 15 regional countries took part. The Workshop was preceded by an opening ceremony and finished with some closing words of thanks.

6.3 The Workshop covered at its core the new MARPOL Annex VI, Chapter 4 regulations on energy efficiency specifically including technology transfer.

6.4 As part of the Workshop deliberations, all energy efficiency related MARPOL Annex VI regulations were described, new Regulations 19 to 23 on energy efficiency were fully covered together with all the relevant supporting guidelines on EEDI, SEEMP and EEOI. Also, methods for mitigation of GHG emissions from international shipping, both technical measures and operational measures, and alternative fuels were covered. Additionally, issues related to flag State survey and certification, port State control and IMO working practices were included.

6.5 A full day was devoted to debates on technology transfer in the context of MARPOL Annex VI, which included fundamentals of technology transfer and the identification of the regional requirements and barriers. As part of this, three local presentations were made, various participants took part in brainstorming on technology transfer and expressed their views.

6.6 Interactions with participants were encouraged via question & answer sessions and exercises to deepen in-Workshop learning by the attendees.

6.7 The Workshop was evaluated using feedback forms and questionnaires. The great majority of the participants expressed their satisfaction with the deliberations including content, venue and performance of the facilitators. Based on the feedback received, it is concluded that the Workshop was successfully completed and that all its objectives were met.

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Annexes to the Report

ANNEX 1 - WORKSHOP PROGRAMME
Regional Workshop on MARPOL Annex VI - Ship Energy Efficiency and Technology Transfer, Istanbul, Turkey, 3-5 November 2014

Day One	Monday 3 November 2014	Speaker
08:30-09:00	**Arrival and registration of participants**	
09:00-09:30	**Official opening** • Welcome by host • Opening remarks by IMO • Photo session	N. Kaya (Turkey) T. Karayannis (IMO)
09:30-09:45	**Break for room preparation**	
09:45-10:00	**Introduction to the programme and facilitators**	T. Karayannis (IMO)
10:00-10:30	**The international regulatory framework for preventing pollution from ships** • Introduction to the IMO, structure, decision making process • Roles and responsibilities of Administrations • Brief overview of MARPOL Annexes • Introduction to IMO's Integrated Technical Co-operation Programme	T. Karayannis (IMO)
10:30-11:00	**Overview of the GHG issue and the role of international shipping** • Role of international shipping in GHG emissions • Work by IMO to address GHG emissions and Resolution A.963(23) • 3rd IMO GHG study – key findings and conclusions • Link with UNFCCC	R. Baumler (IMO consultant)
11:00-11:30	**Refreshments**	
11:30-12:30	**MARPOL Annex VI, Chapter 4 - Regulations for Ship Energy Efficiency** • Resolution MEPC.203(62) on MARPOL Annex VI, Chapter 4 • Energy Efficiency Design Index (EEDI) • Ship Energy Efficiency Management Plan (SEEMP) • Survey and certification requirements	Z. Bazari (IMO consultant)
12:30-13:30	**Lunch**	
13:30-15:00	**Guidelines supporting Chapter 4 of MARPOL Annex VI on EEDI** • Calculation of attained and required EEDI • Guidelines on survey and verification procedures • Other issues: minimum power, survey and verification of energy saving technologies	Z. Bazari (IMO consultant)
15:00-15:30	**Refreshments**	
15:30-16:30	**Guidelines supporting Chapter 4 of MARPOL Annex VI on SEEMP** • SEEMP framework, development of a SEEMP and implementation • Survey and certification requirements • Energy Efficiency Operational Indicator (EEOI)	R. Baumler (IMO consultant)
16:30-17:30	**Alternative fuels** • The likely changes to marine fuels in the future • LNG as marine fuel – Technical aspects and status • Progress so far and introduction to relevant pilot studies	Z. Bazari (IMO consultant)
17:30	**End of day one**	

Day Two	Tuesday 4 November 2014	Speaker(s)
09:00-09:30	**Review of Day 1 proceedings**	Z. Bazari (IMO consultant)
09:30-10:30	**Energy efficient ship design and technical energy efficiency measures** • Introduction to ship deign and ship resistances • Identification of key technical measures for improving energy efficiency and their impact on EEDI • Likely impact of EEDI on future ship designs	Z. Bazari (IMO consultant)
10:30-11:30	**Energy efficient ship operation and operational energy efficiency measures** • Introduction to ship operation for energy efficiency • Identification of key operational measures for improving energy efficiency and input to SEEMP • Example SEEMP for an oil tanker	R. Baumler (IMO consultant)
11:30-12:00	**Refreshments**	
12:00-13:00	**Further measures to enhance the energy efficiency of ships** • Overview of proposals for data collection and monitoring of fuel consumption of ships • Future considerations of energy efficiency improvements	R. Baumler (IMO consultant)
13:00-14:00	**Lunch**	
14:00-14:45	**Port State control and enforcement of MARPOL Annex VI** • Port State control under MARPOL Annex VI • Reference to and use of relevant IMO guidelines	T. Karayannis (IMO)
14:45-15:30	**MARPOL Annex VI – potential impact on reduced GHG emissions and fuel consumption** • Estimated effect of amendments to MARPOL Annex VI • Estimated reductions in GHG emissions and fuel savings	Z. Bazari (IMO consultant)
15:30-16:00	**Refreshments**	
16:00-16:45	**Introduction to capacity building and technology transfer** • MARPOL Annex VI Regulation 23 and identification of Member State needs associated with the provision of support with a view to ratification by non-Parties and implementation by Parties • Resolution MEPC.229(65) on promotion of technical co-operation and transfer of technology relating to the improvement of energy efficiency of ships	T. Karayannis (IMO)
16:45-17:30	**Country presentations on ship energy efficiency** • The host country's perspective on GHG emissions from international shipping • Further discussion by participants from the region	Nominated participants
17:30	**End of day two**	

Day Three	Wednesday 5 November 2014	Speaker(s)
09:00-09:30	**Review of Day 2 proceedings**	Z. Bazari (IMO consultant)
09:30-10:00	**Introduction to Day 3 programme and expected outcomes** • Outline of the structure and objectives of the programme • Brief introduction of the representatives of the regional Member States and their expectations	T. Karayannis (IMO) and nominated participants
10:00-10:45	**Introduction to technology transfer for ship energy efficiency and maritime GHG emissions reduction** • Fundamentals of technology transfer • Major requirements for effective technology transfer • Technology transfer for ship energy efficiency: compliance to regulation and beyond compliance	Z. Bazari (IMO consultant)
10:45-11:15	**The Ad Hoc Expert Working Group on the Facilitation of Transfer of Technology for Ships** • Brief overview of the objectives and the ongoing work of the AHEWG-TT • Feedback from the Regional Workshops to the AHEWG-TT	T. Karayannis (IMO)
11:15-11:45	**Refreshments**	
11:45-12:30	**Turkish Shipbuilders' Association perspective on the implementation of MARPOL Annex VI** • A general overview of the Turkish shipbuilding industry • Key information on implementation of MARPOL Annex VI in the Turkish shipbuilding industry • Potential implications of MARPOL Annex VI future requirements and information need for new technologies	M. Özdemir (GISBIR)
12:30-13:30	**Lunch**	
13:30-14:15	**Energy efficiency measures on the Turkish maritime fleet** • Current Turkish maritime fleet composition • Energy efficiency measures applied in the Turkish maritime fleet • Research & development on shipboard energy efficiency in Turkey	M. Insel (IMEAK-DTO)
14:15-15:00	**Group discussions** • Identification of the needs and barriers to technology transfer from the regional perspective	Moderator: T. Karayannis
15:00-15:30	**Refreshments**	
15.30-16:30	**Plenary discussion** • Report on the outcomes and findings of the group discussions and preparation of recommendations	Moderator: T. Karayannis
16:30-17:00	**Course close-out session** **Presentation of certificates**	IMO and host
17:00	**Close of Workshop**	

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ANNEX 3 – SHORT BIOGRAPHIES OF THE LOCAL PRESENTERS

Prof Dr Mustafa Insel is advisor to the Turkish Chamber of Shipping on technical affairs. He has graduated as a Naval Architect and Marine Engineer from Istanbul Technical University, and was awarded PhD from University of Southampton, UK. He has worked as a lecturer in Istanbul Technical University for 23 years and retired from ITU in 2014. He had participated in EU FP6 and FP7 projects SMOOTH, TEFLES, TARGETS for improvement of shipboard energy efficiency and shipboard emissions. He has participated in various international committees/workgroups such as ITTC ship powering performance committee and EU FP7/Horizon 2020 program committee. He has acted as board member and chairman in Turkish Lloyd between 2005 and 2011. He is currently partner in Hidroteknik Design Technologies Ltd mainly engaged in ship powering and energy. He is also a part-time lecturer in World Maritime University giving courses on shipboard energy efficiency. He is also IMO auditor for Goal Based Standards.

Mrs Mehtap Karahalli Özdemir is Head of the Safety, Environment and Quality Department and QMS Lead Auditor at Türk Loydu. She graduated from Istanbul Technical University as a Naval Architect and Marine Engineer and she has an MBA degree. She has been working at Türk Loydu since 1998. She is responsible for coordinating the implementation of new IMO, EU and flag State requirements in Türk Loydu. She is also responsible for carrying out approval of some statutory documents such as SOPEPs, SMPEPs, Cargo Securing Manuals, Ballast Water Management Plans, SEEMPs and Hazardous Materials Inventories. She has been representing Turkey as a delegate in MSC and MEPC meetings since 2005 and attends OECD, EU and other relevant meetings. She is a member of the Chamber of Naval Architects and of the Technical Works and R&D Commission of Turkish Shipbuilders' Association. She provides training to the maritime sector and Türk Loydu technical staff about various subjects such as MARPOL, ISGOTT, Hazardous Materials Inventory and Carriage of Dangerous Goods (as an authorized IMDG Code, ADR, RID DGSA trainer).

ANNEX 4 - WELCOME ADDRESS AND OPENING SPEECH BY MR NACI KAYA, DEPUTY OF GENERAL DIRECTOR, GENERAL DIRECTORATE FOR MARITIME AND INLAND WATERS REGULATION, MINISTRY OF TRANSPORT, MARITIME AFFAIRS AND COMMUNICATIONS, REPUBLIC OF TURKEY

Dear distinguished delegations from valuable countries, dear distinguished guests from International Maritime Organization (IMO) and the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC), dear representatives of universities and maritime sector and dear colleagues.

I would like to welcome all of you to the IMO Regional Workshop on MARPOL Annex VI – Ship Energy Efficiency and Technology Transfer, organized by IMO in close co-operation with REMPEC and hosted by the Ministry of Transport, Maritime Affairs and Communications of Turkey.

Turkey has been member to IMO since 1958 and party to majority of the IMO Conventions including MARPOL Convention within all annexes and implementing them through national legislation adopted specifically to implement these Conventions.

With a big pleasure, I would like to highlight a point that our government has ratified the Annex VI of MARPOL on air pollution and The National Law approving our accession to the 1997 Protocol was issued and entered into force on 4th of February 2014, giving us the opportunity to inspect all ships calling to Turkish ports regardless of their flags flying which we deeply believe to be a concrete step to provide our citizens much more clean and healthier environment. This ratification will also contribute for the improvement of our ship fleet which is taking place in the white list under The Paris Memorandum of Understanding.

We would like to underline a fact that the protection of the environment is our pre-eminent priority within the target of the Ministry to create a qualified transport sector. Within this framework, our efforts continue so as to secure our transport system sustainable and sensitive to the environment by reducing the air pollution caused by all modes of transportation.

As you know well, combating with the climate change and control of green-house gases is one of the upmost titles on the agenda of the world. In this context, while the negotiations are going on under the umbrella of “The **United Nations Framework Convention on Climate Change” (**UNFCCC), every country is carrying on their sectorial emission mitigation efforts with an increasing acceleration.

Beyond any doubt, maritime sector is the cleanest transport mode in terms of work done, meaning the least emission produced per amount of cargo carried. However, still, mitigation of emission caused by ships constitutes a considerable part of these global efforts. In this regard, energy efficiency in ships, which is one of the important topics of the recent history of IMO and popular amendment of MARPOL Convention, is crucial in order to tackle with these targets and provide cleaner ambient air.

Therefore, as the Turkish maritime administration, we do give much importance to efficient fuel consumption in shipping and port management as well as the technology transfer issue.

As you all now well, IMO has introduced and enacted new instruments, such as Energy Efficiency Design Index for new ships, Ship Energy Efficiency Management Plan for all ships and also discussing new tools as Energy Efficiency Operation Index implementation.

Today here, we are all gathered with a view to focus on these important subjects, to update our knowledge and create a platform for an interactive discussion with exchange of opinions among the seminar lecturers, professionals and all participants.

Lastly, while ending my speech, I would like to represent my best wishes for a successful and worthwhile Workshop for all of us and would like to thank to distinguished representatives of IMO and REMPEC for their big efforts and supports to realize this Workshop.

I wish you a very nice stay in our country, in İstanbul, one of the most beautiful and historical cities in the world.

Thank you very much for listening me and for your time.

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ANNEX 5 – OPENING STATEMENT BY THE IMO REPRESENTATIVE, DR THEOFANIS KARAYANNIS

Good morning ladies and gentlemen,

It gives me great pleasure to be here today to welcome you on behalf of the International Maritime Organization to this Regional Workshop on "MARPOL Annex VI – Ship Energy Efficiency and Technology Transfer".

It is also a great pleasure at a personal level for me to be in this particular region, which is where I come from.

Ladies and gentlemen, the focus of this Workshop is MARPOL Annex VI, and in particular its latest Chapter 4 - Regulations for Ship Energy Efficiency. The control of emissions of air pollutants from ships and the increasing need for international shipping to address greenhouse gases are, as you are certainly aware, a hot topic at IMO.

And, as you may also be aware, the international community continues to stress the importance of us working together to address climate change. International shipping, as a lynchpin for global trade, has a role to play as part of a global response.

This Workshop is only the third of its kind and it is an important part of IMO's efforts to support developing countries. It takes a new approach, by not only training the participants on Chapter 4 of Annex VI of MARPOL, but also, and very importantly, allowing the participants to feed back views and information to an on-going process at IMO and thereby be part of IMO's global response to address climate change.

Therefore, the first two days of training on energy efficiency measures for ships will be followed by a third day, which intends to focus on the identification of barriers for the implementation of Chapter 4 of Annex VI in this region, in particular issues regarding technology transfer. On this third day your views and your experiences will form the backbone of our discussions – in essence our roles will be reversed to a great extent, with you being the speakers and us being the audience.

This Workshop has so far taken place twice, in the West and Central Africa and the South Asia regions, respectively. The results of those two Workshops were fed back to the Ad Hoc Expert Working Group on the Facilitation of Transfer of Technology for Ships, which has been established by IMO's Marine Environment Protection Committee, and which held its second meeting last month. The results of this Workshop, which is the last one for 2014, will feed back to the third meeting of the Ad Hoc Expert Working Group, which will take place on 15 and 16 January 2015. Further similar Workshops that will follow in other regions around the world in 2015 will feed back to future meetings of the Ad Hoc Expert Working Group.

IMO's Regional Workshops, and perhaps even more this series than any previous ones, are an opportunity for maritime Administrations to benchmark themselves and assess their credibility, as international shipping is under increasing scrutiny, making it imperative that flag States demonstrate a clear willingness to fully implement international maritime regulations. This is particularly relevant this year, as the chosen IMO World Maritime Day 2014 theme was "IMO Conventions - Effective Implementation".

Ladies and gentlemen, before concluding I would like to take this opportunity to extend IMO's appreciation to our hosts, the Government of Turkey, in particular the Ministry of Transport, Maritime Affairs and Communications, for kindly agreeing to host this Workshop, as well as to

the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC), for organizing the Workshop, as well as providing additional own funds. The preparations have been very efficient, the facilities are excellent and we have already been made to feel welcome.

I should also thank the Government of Malta for generously providing a voluntary contribution to finance the participation at this Workshop of the Contracting Parties to the Barcelona Convention that are not funded by the IMO ITCP funds, namely France, Greece, Italy and Spain. This is important for us as this region offers a rare opportunity for interaction with both Annex I and non-Annex I countries, which is significant in the context of the discussion on technology transfer.

I would particularly like to thank Mr Pace and his staff at REMPEC, for their untiring efforts in handling the complex aspects of the organization of this Workshop over the past several weeks and months. I would also like to thank our Consultants and main lecturers for this Workshop, Dr Bazari, for his continued dedication in contributing his extensive expertise to IMO activities over the past several years, and Dr Baumler, who is joining with his own valuable and relevant expertise for this particular Workshop.

Very importantly, as a main objective of this Workshop is to elicit the regional perspective, I would like to thank the esteemed speakers who will be contributing to our discussions on day three: Prof Insel on behalf of the Turkish Chamber of Shipping and Mrs Özdemir on behalf of the Turkish Shipbuilders' Association. They are well-known local experts in this topic and they will no doubt offer valuable insights coming from major stakeholder groups in this region.

Last but not least, I should thank all of you, the delegates, for taking the time to attend. I would urge you to fully contribute to making this Workshop a success through being prepared to share your views and experiences. Don't forget, we are here to hear from you as much as to talk to you! I look forward to three exciting and fruitful days.

Thank you.

ANNEX 6 – Pictures from the event

Group Picture

Dr Karayannis makes a presentation at the Workshop

ANNEX 7 – Summary of Evaluation Questionnaires

Total number of participants: 27 Total number of completed questionnaires: 25

Q1: Was the invitation received in good time?

YES: 23
NO: 1
No answer: 1

Q2 - Did you receive the information listed below about the event before your participation?

- **on its objective and scope**

YES: 24
NO: 0
No answer: 1

- **subject areas and programme**

YES: 24
NO: 0
No answer: 1

Q3 - Were the instructions on the following clear and easy to understand?

- **profile required of participant**

YES: 20
NO: 1
No answer: 4

- **completion and submission of the nomination form**

YES: 21
NO: 1
No answer: 3

Q4 - Did you receive logistical information on?

- **Venue**

YES: 18
NO: 2
No answer: 5
NA: 0

- **travel arrangements**

YES: 16
NO: 1
No answer: 3
N/A: 5

- **DSA payments**

YES: 15
NO: 2
No answer: 3
N/A: 5

- **Accommodation**

YES: 16
NO: 1
No answer: 3
N/A: 5

Q5 – If you were given any pre-event assignment, was it useful?

YES: 18
NO: 1
No answer: 3
N/A 3

Q6 - To cover the topics fully, was the event (please check the appropriate box)?

	Too long	Just right	Too short	No answer
The event was	1	18	5	1

Q7 – How do you rate the event with regard to the following? (tick one box in each case)

	Excellent	Good	Satisfactory	Poor	No Answer
Venue	15	10	0	0	0
Facilities	12	12	1	0	0
Equipment	12	12	1	0	0

Q8 - How do you rate the following aspects of the materials?

	Excellent	Good	Satisfactory	Poor	No Answer
Presentation	13	12	0	0	0
Clarity	14	11	0	0	0
Technical content	13	11	1	0	0
Comprehensiveness	12	10	3	0	0
Quantity	11	12	2	0	0

Q9 - How would you rate the following aspects of presentations?

	Excellent	Good	Satisfactory	Poor	No Answer
Design and structure	13	10	2	0	0
Clarity	14	10	1	0	0
Technical content	12	13	0	0	0
Comprehensiveness	14	11	0	0	0

Q10 - How would you rate the use of the following?

	Excellent	Good	Satisfactory	Poor	No Answer
Course material	12	11	1	0	1
IMO reference material	13	11	0	0	1
Other resource materials	9	13	1	0	2
Group and practical activities	9	8	3	1	4

Field trips	NA	NA	NA	NA	NA

Q11 - Please rate each lecturer with regard to the following

Dr Zabi Bazari

	Excellent	Good	Satisfactory	Poor	No Answer
Content of lecture	20	5	0	0	0
delivery of presentation	17	7	0	0	1
ability to guide discussion	18	6	0	0	1
Effectiveness in answering questions	19	4	1	0	1
Effectiveness in suggesting solutions to problems	17	7	0	0	1

Dr Theofanis Karayannis

	Excellent	Good	Satisfactory	Poor	No Answer
Content of lecture	13	11	1	0	0
delivery of presentation	12	11	1	0	1
ability to guide discussion	12	11	1	0	1
Effectiveness in answering questions	13	10	1	0	1
Effectiveness in suggesting solutions to problems	12	9	3	0	1

Dr Raphael Baumler

	Excellent	Good	Satisfactory	Poor	No Answer
Content of lecture	16	9	0	0	0
delivery of presentation	15	9	0	0	1
ability to guide discussion	13	11	0	0	1
Effectiveness in answering questions	15	9	0	0	1
Effectiveness in suggesting solutions to problems	13	10	1	0	1

Q12 - What topics were of most interest and relevance to your Administration?

- The EEDI and SEEMP Details.
- EEDI requirements application to small ships about 600 GT.
- The calculation of EEDI.
- Alternative fuels.
- The ways to comply with legislation, use of scrubbers, LNG and speed reduction.
- All of Chapter 4, EEDI, SEEMP and alternative fuels.
- EEDI calculation and certification.
- Technical measures for improving energy efficiency (ship design).
- Background and research for establishing the various EEDI limits for EEDI's phases 0, 1, 2 and 3.
- Transfer of technology, Turkey country presentation and calculation of EEDI.
- Alternative fuels, energy efficiency measures, EEOI and EEDI calculations, technology transfer concepts.
- SEEMP.
- Topics regarding new technologies that will help reduce GHG emissions.
- EEDI, SEEMP, EEOI and technology transfer.

- PSC implementation.
- Alternative energy systems.
- Measure for energy efficiency of ships; technology transfer; implications of the regulations.
- Enforcement and technology transfer.
- Technology transfer and alternative fuels.

Q13: Are there any topics which should be added?

- To go in depth about how to choose the correct scrubber, this is a question that ship-owners always ask us.[1]
- More emphasis on how major Flag Administrations (not involved actually in the maritime technology industry) can play a more efficient and major role within improving EEDI framework.
- Technology transfer subject is new and need to be covered in detail; I think.
- Measures to enhance the energy efficiency of ships.
- More information on MARPOL Annex VI- Chapter 3.[1]
- Could there be a practical new build of a ship with new efficiency measures, if available, as a case study (as they are new). The presentation should be blended with the ship design one.

Q14: Do you consider that the objective of the event was met?
YES: 24
NO: 0
No answer: 1

Q15: Are the outcomes achieved likely to be useful to your Administration?
YES: 24
NO: 0
No answer: 1

Q16: Will you have the opportunity to transfer the knowledge gained to your colleagues at work?
YES: 24
NO: 0
No answer: 1

Comments given

- I personally appreciate your efforts more for implementation of Chapter 4 of MARPOL Annex VI.
- Thanks a lot; it was very useful Workshop for me.
- In my opinion as a whole, the aim of the Workshop was accomplished. But I have no idea what I can do in practical way to transfer technology between states. I like it would be very good to go a little in depth in this matter. I want to thank the host and REMPEC for their excellent work.
- An excellent opportunity to grasp the overall concept of Annex VI Chapter 4 - Not an easy requirement. The maritime world community is on the correct and proper

[1] These two comments ask for topics that are outside the scope of this workshop. They are included here in order to reflect the obtained feedback, but they should not be considered for the future planning of this workshop. If anything, the scope of this workshop may need to be clarified in more detail in the future.

path to achieve the required goals - hopefully with more efforts and will power from all stakeholders this can be achieved within a shorter timeframe.

- Some countries have been reported.
- Many thanks to IMO for this event.
- Very good short course Workshop throughout. Well-presented and explained. The message was clear.

ANNEX 8 – TEXT OF PRE-WORKSHOP ASSIGNMENT ON SHIP ENERGY EFFICIENCY REGULATIONS

Regional Workshop on "Ship Energy Efficiency and Technology Transfer for International Shipping"

Pre-Workshop Assignment

Multiple Choice Questions

NOTE

Those who are going to take part in the workshop should read the IMO MEPC Resolution 203(62) and answer this questionnaire. The completed questionnaire will be collected at the start of the workshop.

About You:

You Name: …….
Organisation: ……..
Email Address: ……..

The completed Questionnaires to be handed-in at the start of Workshop

Use **IMO MEPC Resolution 203(62)** to answer the questions

- ***Please tick only one box for each question.***

MARPOL Annex VI Regulations deal with:

☐ Air pollution ☐ Ballast water ☐ Water pollution ☐ Oil pollution

Chapter 4 of MARPOL Annex VI deals with Regulations on:

☐ NOx ☐ SOx ☐ Energy Efficiency ☐ Fuel quality

Chapter 4 of MARPOL Annex VI was adopted on:

☐ 17 August 2009 ☐ 1st March 2012 ☐ 1st January 2010 ☐ 15 July 2011

Regulation 22 of MARPOL Annex VI deals with:

☐ Attained EEDI ☐ EEOI ☐ SEEMP ☐ Required EEDI

Attained EEDI means:

☐ The actual EEDI of a ship as calculated according to IMO Guidelines and verified by Flag Administration or a Recognised Organisation on its behalf.

☐ The reference EEDI value for a specific ship.

☐ The regulatory limit for EEDI of a vessel as calculated from the Reference Line and Reduction Factor

☐ None of the above

Required EEDI means:

☐ The actual EEDI of a ship as calculated according to IMO Guidelines.

☐ The “reference EEDI value” for a specific ship.

☐ The regulatory limit for EEDI of a vessel as calculated from the mandated Reference Line and Reduction Factors.

☐ None of the above

The unit of EEDI for cargo ships in relevant Regulations is:

- ☐ gGHG emissions/tonne.nm (nm stands for nautical mile; tonne refers to tonne DWT)
- ☐ gCO2/tonne
- ☐ gCO2/tonne.nm
- ☐ Tonne CO2/voyage

The "Reference EEDI Value" for a VLCC of 300,000 DWT is:

- ☐ 10.12 gCO2/tonne.nm
- ☐ 6.62 gCO2/tonne.nm
- ☐ 2.59 gCO2/tonne.nm
- ☐ 1.95 gCO2/tonne.nm

The "Required EEDI" for a new building VLCC of 300,000 DWT with a contract date of 30th January 2015 will be:

- ☐ 4.46 gCO2/tonne.nm
- ☐ 8.92 gCO2/tonne.nm
- ☐ 2.11 gCO2/tonne.nm
- ☐ 2.33 gCO2/tonne.nm

The "Required EEDI" for a new building VLCC of 300,000 DWT with a contract date of 30th January 2025 will be:

- ☐ 7.21 gCO2/tonne.nm
- ☐ 5.18 gCO2/tonne.nm
- ☐ 1.81 gCO2/tonne.nm
- ☐ 0.52 gCO2/tonne.nm

The IEE Certificate refers to:

- ☐ International Air Pollution Prevention Certificate
- ☐ International Engine Air Pollution Prevention Certificate
- ☐ International Energy Efficiency Certificate
- ☐ International Environmental and Energy Certificate

The EEDI Reduction Factor for a Refrigerated Cargo Carrier of 10,000 DWT with a building contract date of 16 July 2020 is:

- ☐ 10%
- ☐ 20%
- ☐ 30%
- ☐ 15%

For "Existing Ships" compliance with requirements of Chapter 4 of MARPOL Annex VI means:

- ☐ Verification that a SEEMP is on board the ship.
- ☐ Have a verified Attained EEDI.
- ☐ Have an EEDI that is below the Required EEDI.
- ☐ Certified to relevant ISO standards.

For "Existing Ships" compliance with the requirements of Chapter 4 of MARPOL Annex VI will be checked by verification on:

- ☐ 1st January 2015.
- ☐ At First intermediate or renewal survey, whichever is First, on or after 1 January 2015
- ☐ At First intermediate or renewal survey, whichever is First, on or after 1 January 2013.
- ☐ None of the above.

A Recognised Organisation is:

- ☐

Organisations that are part of Flag State establishment.

☐ Organisations recognised by Classification Societies.

☐ Organisations recognised by Flag State Administration to perform Survey and Certification on their behalf.

☐ Organisations that do the Port State Control.

A "Record of Construction Relating to Energy Efficiency":

☐ Is a checklist that must be completed and permanently attached to IEE Certificate.

☐ Must be completed by shipyards before the delivery of different types of vessels.

☐ Must always show values for the Attained and Required EEDI of the vessel.

☐ None of the above.

On promotion of technical co-operation and transfer of technology relating to energy efficiency of ships:

☐ There is a Regulation on the above subject that encourages the active cooperation of Flag Administrations with other Parties on the subject.

☐ There is no regulation on the subject.

☐ There is scope only for cooperation between developing and developed countries.

☐ None of the above.

A ship with an IAPP (International Air Pollution Prevention) Certificate:

☐ Does not need an IEE Certificate.

☐ The IAPP and IEE Certificates both are needed when applicable and existence of one does not eliminate the need for the other one.

☐ Both IAPP and IEE certificates should be issued by the same Recognised Organisation.

☐ None of the above.

MARPOL Annex VI applies:

☐ Only to ships that fly the flag of a State that is Party to MARPOL Annex VI.

☐ Only to ships that visit ports of a State that is Party to MARPOL Annex VI.

☐ To ships with both of the above.

☐ All ships irrespective of flag or port state control requirements.

Chapter 4 of MARPOL Annex VI stipulates that (waiver clause):

☐ An Administration could delay the Chapter 4 implementation for 4 years.

☐ An Administration could exempt some of their ships from Chapter 4 compliance.

☐ An Administration may delay imposing the requirements of MARPOL Annex VI Regulations 20 and 21 on a ship by a maximum of 4 years from the date that Chapter 4 comes into force.

☐ None of the above.

The IEE Certificate validity:

☐ An IEE Certificate is valid for 5 years after which it must be renewed.

☐ The IEE Certificate is valid throughout the life of the ship unless the ship is withdrawn from service or undergone a major conversion or the flag is changed.

☐ The Flag state decides on the duration of validity of the IEE certificate.

☐ None of the above.

ANNEX 9 – TEXT OF PRE-WORKSHOP QUESTIONNAIRE ON TECHNOLOGY TRANSFER FOR SHIP ENERGY EFFICIENCY

As part of the Regional Workshop on Ships' Energy Efficiency and Technology Transfer, a one-day segment on Technology Transfer in the context of Energy Efficiency for Ships will be held. The outcome and recommendations from this segment is intended to feed into the work of the Ad Hoc Expert Working Group on Facilitation of Transfer of Technology for Ships (AHEWG-TT), which will hold its next meeting at IMO Headquarters, London, from 15 to 16 January 2015.

More specifically, the one-day segment aims to assist the AHEWG-TT by providing the regional views on the potential implications and impacts of the implementation of the regulations in chapter 4 of MARPOL Annex VI, including the identification of barriers to transfer of technology, in particular to developing States.

To prepare for the discussions during the Workshop, please discuss the following questions within your administration, and with related stakeholders, as necessary. The questions will be discussed on the third day of the Workshop, and the outcome will form the basis of the recommendations from the Workshop. It is therefore imperative that we capture the needs and views of the region, to support the work of the AHEWG-TT.

Name of participant: _____
Country: _____

Question 1: Looking at your country/region, and more specifically your current institutional capabilities as port, coastal and flag State, do you believe that you are able to implement the regulations in chapter 4 of MARPOL Annex VI?

_____
_____
_____

Question 2: If not, then why? Are you able to identify any *specific barriers* in your country/region to the implementation of chapter 4 of MARPOL Annex VI?

_____
_____
_____

Question 3: What would the effects be when implementing chapter 4 of MARPOL Annex VI in your country? Can you identify any potential implications and impacts? Please specify.

_____
_____
_____

Question 4: Technology transfer can for example include hardware as well as knowledge, know-how, and software (both technical and management related). Do you foresee any specific needs within your country with respect to technology transfer in relation to the implementation of chapter 4 of MARPOL Annex VI? Please specify these needs. Can you identify any specific barriers to the transfer of technology?

_____
_____
_____