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**Report of the Multi-year Expert Meeting on
Transport and Trade Facilitation on its first session**

Held at the Palais des Nations, Geneva, from 16 to 18 February 2009

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I. Chair's summary

A. Summary of proceedings

1. At the opening session, the Acting Deputy Secretary-General of UNCTAD stressed that, unless action were taken urgently, climate change would pose an enormous threat and challenge for humankind, particularly for the poorest populations, with Africa and small island developing States (SIDS) being probably the hardest hit. In the light of compelling scientific evidence and potential economic, social and environmental losses that might be caused by climate change, the potential costs of inaction in relation to climate change were difficult to contemplate. International maritime transport, a backbone of the world's globalized economy, was playing a part in contributing to climate change but, importantly, was also itself likely to be directly and indirectly impacted by the various climate change factors such as rising sea levels, extreme weather events and rising temperatures.

2. The Acting Deputy Secretary-General further noted that adaptation in maritime transport was crucial and in this context, a better understanding of the potential climate change impacts and of the associated costs and funding mechanisms was necessary. Measures to address the global economic slowdown and financial crisis could be framed to meet the twin objectives of helping the world economy recover as well as spur a "green new deal" in support of climate change policy action, including in maritime transport. Experts were called upon to consider the various challenges arising from the global economic, financial, environmental, and development context, as well as from a maritime transport perspective. Given the time-frame for the adoption of a comprehensive deal on climate change at the Fifteenth Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) in Copenhagen and in support of the current work on a maritime transport regime under the International Maritime Organization (IMO), experts were invited to give thoughtful consideration to the various perspectives that may be presented at the meeting, so as to gain a clearer understanding of relevant actions required.

3. In his keynote address, the Secretary-General of the Club of Rome presented an overview of the difficult international context in which the current debate on climate change, including from the maritime transport perspective, was taking place. He noted that the world was faced with a number of interconnected challenges spanning three main areas, namely (a) climate, environment and resources; (b) poverty and world development; and (c) problems in the global economic and financial systems. However successful climate change mitigation action may be, developing countries would be forced to adapt to the irreversible climate change which was already taking place and was affecting the chances of achieving the Millennium Development Goals (MDGs). To accelerate mitigation and adaptation efforts, predictable sources of financing and technology transfer to developing countries were required. The various interconnected issues could not be resolved separately, and called for a coherent and systemic approach, with economies being restructured onto a low carbon path, and a fairer and more inclusive process of world development being established. Despite the challenge, there remained an opportunity to reform institutions and policies and spur a new economic revolution. The connections between maritime transport, global trade, climate change, global economic and financial systems – as well as development and sustainability imperatives – highlighted the importance for the maritime transport industry to play a central and leading role in addressing the climate change challenge, in terms of both mitigation and adaptation.

4. The meeting included six substantive sessions, animated by 18 panellists who had been asked to bear in mind matters of concern to developing countries, in particular the Least Developed Countries (LDCs) and SIDS. The panellists represented academia, research institutions, international organizations, national Governments and the private sector, including representatives of the global shipping and port industries. Papers were also submitted by a number of experts, and a background note was prepared by the UNCTAD secretariat (all relevant documents, presentations and audio-files are available on UNCTAD's website¹). The Chair moderated the sessions and raised some broad questions to clarify the various complex issues that were at the interface of maritime transport and the climate change challenge and help frame discussions and structure the debate.

1. Understanding the challenge

5. The panellists were Professor Martin Beniston, Head of Research Group on Climatic Change and Climate Impacts, University of Geneva (Intergovernmental Panel on Climate Change (IPCC) 2007 contributing author); and Mr. Florin Vladu, Manager, Adaptation, Technology and Science Programme, UNFCCC secretariat.

6. Bearing in mind the particular concerns of SIDS and LDCs, that session helped set the scene by presenting the overwhelming scientific evidence that climate change was a fact and that delaying action was not an option. Some key implications of climate change for our economies and societies – in particular for development prospects of developing regions as well the attainment of the MDGs – were highlighted. Experts at this session were also briefed on the existing international regulatory framework set up to deal with climate change, namely the UNFCCC and the subsequent Protocol adopted in Kyoto in 1997.

7. Relevant issues highlighted could be summarized as follows:

(a) Climate change posed a serious threat to our economies and societies and needed to be addressed urgently. It would impact countries in different ways and magnitude with the most vulnerable countries likely to be the hardest hit;

(b) There was a need for a balanced approach where countries responsible for the largest share of emissions were made subject to a strict regulatory and control regime. In this respect, the “polluter pays” principle should be upheld to the benefit of the most vulnerable, in particular in Africa and in LDCs. Studies – including within the regional chapters of IPCC assessment reports – highlighted the vulnerability of Africa to climatic effects. That vulnerability was caused by, inter alia, the fragility of its ecosystems and its economies;

(c) In view of the potential significant monetary and non-monetary costs of climate change – in particular the consequences of “tipping points” and abrupt climate change – inaction was not an option. Dealing with the climate change challenge was a priority which should not be undermined by other concerns, including the current global economic and financial constraints;

(d) Global action was needed to address the causes of climate change, with national and regional actions being useful complements. Localized and sector-specific approaches (e.g. in maritime transport) – together with regional cooperation – were also needed to deal with the impacts and consequences of climate change;

(e) Increasingly improved scientific understanding of the causes and potential implications of climate change had been and remained crucial for increasing awareness and helping formulate sound and effective policies and response measures. There was also a need to bridge the gap between science and

¹ <http://www.unctad.org/Templates/webflyer.asp?docid=11044&intItemID=3492&lang=1>.

policymaking, and to reflect on how best to link the current and the evolving scientific knowledge with policy and decision-making processes;

(f) There was an inherent uncertainty associated with current climate predictions. Natural systems were complex and non-linear, and involved climate variability (cooling–warming effect). From a risk management perspective, it was important to note that a perfect scientific answer to a complex system was not possible. It was sufficient to note that the warming effect was accelerating, driven mainly by human activity, and that natural systems would not be able to counteract those effects;

(g) Addressing the climate change challenge did not necessarily require in all cases new technologies, but rather, in many instances, a full deployment of existing technologies. Predictable energy technology transfer and financial assistance to developing countries were required for effective mitigation and adaptation;

(h) Maritime transport, a key economic sector and a trade enabler, had a role to play in climate change mitigation and adaptation. While international shipping contributed a relatively small share of global greenhouse gas (GHG) emissions, emissions from this sector were forecast to grow significantly over the coming decades and at a fast rate. In that context, urgent efforts were needed to agree on a global regulatory mechanism to address emissions from international shipping;

(i) Shipping needed to factor in new and variable problems such as coastal flooding and restricted access to ports, shifting zones of storminess and potentially more frequent and stronger hurricanes;

(j) The impact of climate change on the maritime transport sector – including through rising sea levels, and changes in ocean circulation and weather patterns – was likely to be particularly detrimental for low-lying coastal areas and SIDS. The potential for new shorter maritime routes and resource exploration through the melting of ice in the Arctic could provide opportunities as well as challenges. The net effect, however, was expected to be very large and negative;

(k) Climate action in the transport sector was challenged by the up-front high capital costs that were mainly borne directly by investors, while benefits to society were usually accrued in the long term;

(l) In view of the principle of “common but differentiated responsibilities” (CBDR) under UNFCCC, it was thought to be useful to examine the disadvantages/costs and benefits for different countries resulting from the application of potential uniform measures discussed at the IMO that could be applied globally;

(m) Improving understanding of how climate change could affect maritime transport was important, including through studies assessing the climate change challenge from a maritime transport perspective.

2. GHG emissions from international shipping and the potential for control and reduction

8. The panellists were Mr. Eivind Vagslid, Head, Chemical Air Pollution Prevention Section, Marine Environment Division, IMO; Mr. Philippe Crist, Administrator, International Transport Forum Research Centre, Organization for Economic Cooperation and Development (OECD); and Mr. Paul Gunton, Managing Editor, Lloyd’s Register/Fairplay Ltd.

9. The session helped highlight the extent of the challenge, initially by describing in quantitative terms the contribution of international shipping emissions to global

CO₂ emissions and climatic changes. Various estimates of GHG emissions from international shipping, in particular the most recent estimates by the IMO, were presented. While the relative efficiency and environmental-friendliness of maritime transport were noted, emissions from international shipping called, however, for urgent mitigation action. The potential for reducing emissions from international shipping and the role of technology as a main source for such reduction were underscored.

10. Relevant issues raised could be summarized as follows:

(a) Despite the current unfavourable economic conditions, projected growth in international trade suggested that GHG emissions from international shipping would also continue to increase, unless radical regulatory, technical and operational measures were implemented;

(b) Under a business-as-usual approach, CO₂ emissions from international shipping would increase between 125 per cent and 220 per cent from 2007 to 2050. The potential emission reductions of fuel intensive and high speed shipping services such as container shipping was likely to be significantly influenced by developments in fuel prices;

(c) It was noted that a study on maritime transport and greenhouse gases other than CO₂ and other relevant substances in accordance with the methodology adopted by UNFCCC was currently underway at IMO and was expected to be finalized in the summer of 2009;

(d) Any future initiatives in the field of pollutant reduction from shipping, including reduction of GHG emissions, should fall within the auspices of IMO;

(e) Some experts believed that future solutions must be based on a flag-neutral approach. However, other experts were of the view that UNFCCC and the Kyoto Protocol had set the principles and the legal framework on climate change, which should also form the legal basis for IMO's work on GHG emissions from international shipping. In their view, the principle of CBDR should guide all international negotiations and cooperation on climate change;

(f) The view was expressed that developed countries had to accept clear targets while developing countries had to reduce emissions, taking into account their respective capacities and the assistance available from developed countries. In that context, it was important to consider how the financial system reform could assist in climate change improvements as issues such as externalities necessarily must be included in the climate change equilibrium;

(g) For some developing countries, technology transfer in relation to future introduction of more stringent international regulations on GHG emissions was an important consideration;

(h) Knowledge sharing, possibly from other industries, with regard to the use of regulatory and market-based instruments, was important to stimulate behavioural change in respect of emissions reduction in the maritime industry;

(i) Data availability and reliability regarding the maritime industry's contribution to CO₂ and GHG emissions were crucial to ensuring better impact assessments for appropriate policy response and action;

(j) More detailed market-based data (experts, in general, agreed that the most reliable data could only be collected directly from individual ships) was needed, although existing data provided enough information about the overall trend, which was compelling enough to trigger requisite mitigation action;

(k) Hull and vessel design, engines, propulsion systems, other energy-using systems and operational changes were likely to be the main tools for potential emission reductions in shipping. The range of potential emission reductions, were dependent on the specific measure and varied, in general, between 5 to 40 per cent. In that respect, it was noted that reduction potentials depended on the specific deployment of vessels and that those varied largely between vessel types. With regard to technical and operational measures, the work of IMO had already advanced significantly;

(l) Regarding vessel speed reduction as a means of cutting emissions, the more accurate indicator was optimal operating speed, as speed reduction could actually lead to an increase in CO₂ emissions;

(m) A major obstacle to realizing global emissions reduction was that the global fleet turnover over recent years had increased from 27 to 32 years, meaning that technological improvements might not happen quickly in the market.

3. Potential approaches to mitigation in maritime transport

11. The panellists were Mr. Andreas Chrysostomou, Chair, IMO Marine Environment Protection Committee (MEPC); Dr. Andre Stochniol, Founder, International Maritime Emissions Reduction Scheme (IMERS); Dr. Jasper Faber, Coordinator, Aviation and Shipping, CE Delft; Mr. Peter Hinchliffe, Marine Director, International Chamber of Shipping; and Dr. Satoshi Inoue, Secretary-General, International Association of Ports and Harbour.

12. This session covered potential approaches to mitigation in maritime transport and the currently evolving regulatory and institutional framework dealing with GHG emissions from the sector. An update on the current work at IMO – including on the various technical, operational and market-based measures currently under consideration – was provided. The meeting was also informed, as an example, of a particular market-based scheme, IMERS. Focusing in particular on issues of relevance to developing countries, a policy assessment of various climate policy instruments for shipping, including their potential impacts on trade, and of ways to mitigate any undesired impacts, was presented. An industry perspective on climate change mitigation action by shipping and port industries highlighted actions taken at the industry level, with a view to reducing GHG emissions.

13. Relevant issues raised could be summarized as follows:

(a) Global regulation of maritime transport was necessary because of the inherently international nature of shipping. A regulatory scheme for maritime transport needed to be simple and acceptable to both developed and developing countries;

(b) The complexity of regulating CO₂ emissions from international shipping stemmed from the global nature of the industry. The main issue to be addressed was where carbon emissions from international shipping should be accounted for and at which level (e.g. flag State/port State, importing country/exporting country, ship level/fleet level). An added element of complexity related to the practice in container trade where ships loaded and unloaded containers at different ports of call on their journey;

(c) From the perspective of the maritime industry, a global solution which took into account the efficiency of international shipping as compared to other modes of transport and its role as the prime mover of international trade was important. While the maritime industry was not ready yet to make a choice between a levy and carbon trading scheme, it was assessing the merit of all measures under

consideration to ensure that any option potentially selected effectively delivered on carbon emission reductions and did not hinder trade;

(d) A key point of divergence of views about a global regime to regulate GHG emissions from shipping related to the principle of CBDR under UNFCCC and the uniform global application approach under IMO;

(e) IMO work on an international regulatory scheme on GHG emissions from shipping was undertaken taking into account nine criteria set out under MEPC at its fifty-seventh session (e.g. no distortion of competition);

(f) The shipping industry had supplemented the MEPC criteria with three additional requirements that it regarded as important, namely credibility to stakeholders, giving credit for actions already taken to reduce GHG emissions and providing a high degree of certainty for investment purposes;

(g) A wide range of policies was conceivable to limit or reduce GHG emissions from maritime transport. They differed in environmental effectiveness and cost-effectiveness. A suggestion was made that, in general, market-based instruments addressing GHG emissions directly, such as emissions trading or an emissions levy, appeared to be the most environmentally effective as well as the most cost-effective instruments;

(h) Experts discussed whether regulation should be market-based or standard-based, whether emissions trading schemes or levies were superior and whether they should apply to all ships uniformly (be “flag-neutral”), be differentiated by route of the vessel or country of destination of the cargo, or a combination of both;

(i) The concept of IMERS provided for a levy on fuel sold for international shipping and offered to reconcile the principle of CBDR under UNFCCC with that of global uniform application under IMO. That scheme provided that a centrally-collected levy could be applied to all ships while differentiating by destination in line with CBDR. It suggested that at least \$6 billion could be raised annually for climate change action, including adaptation in developing countries. Questions remained, however, as to how that concept compared to other market-based proposals under consideration;

(j) With a view to later enforcement, a balance of responsibilities was needed between flag and port States, respectively, and that of the entire transport chain;

(k) The impacts on developing countries of various policy instruments under consideration related mainly to potentially higher import and export costs and consequences for the demand for tourism by cruise ships, along with potentially higher demand for new fuel efficient ships and ship maintenance. Undesirable impacts of various policy instruments could be mitigated through differentiated treatment, either by responsibilities, targeted use of revenues from regulation, or a combination of both;

(l) Further work and analysis was needed to assess market-based proposals, including their added value in terms of energy efficiency, to be achieved by the world fleet and their impact on international shipping;

(m) Assistance, including financial and technical, and capacity-building were necessary for many developing countries, especially if uniform standards were to be adopted, which would imply a corresponding need for enforcement capabilities by those countries;

(n) The port industry was actively involved in addressing GHG emissions, as was illustrated by the adoption of the World Ports Climate Declaration in July 2008 and the launching of the World Ports Climate Initiative in November 2008. The declaration promoted an integrated, sustainable and innovative approach to CO₂ reduction and improvement in air quality by ports;

(o) Ports also had to address wider transport chain issues related not only to ship transport but also ground transport;

(p) On the issue of adaptation measures by ports, there was considerable scope for increased information sharing of the experiences of countries, in particular Japan and some advanced countries, which had already witnessed substantial port activity for natural disaster preparedness.

4. Potential climate change impacts and approaches to adaptation in maritime transport

14. The panellists were Mr. Michael Savonis, Senior Policy Adviser, United States Department of Transportation; Mr. Marius Rossouw, Council for Scientific and Industrial Research, South Africa; Mr. Peter W. Mollema, Director of Port Planning and Development, Port of Rotterdam; and Mr. Richard Newfarmer, Special Representative of the World Bank to the United Nations and the World Trade Organization.

15. The results of a compelling case study on climate change impacts on transportation systems, carried out in the United States in the Gulf Coast region, were presented and highly commended. Another presentation focused on the preliminary study of effects of weather variability, intensity and climate change on southern African coasts. The presentation by the Port of Rotterdam, with its long-standing experience as a low-lying area port, provided an opportunity to learn about potential adaptation solutions that could be adopted at the port level and highlighted the important capital investment required to implement similar measures. While providing some estimates of the potential adaptation costs, including for infrastructure purposes, the World Bank argued the importance of stepping up efforts on the adaptation front, and highlighted the large gap between the adaptation needs and existing funding levels.

16. Discussions highlighted the potential implications of various aspects of climate change for maritime transport, the backbone of international trade. As that issue had so far received inadequate consideration in existing literature and at international forums, the session was very informative and instrumental in raising awareness about the potential impacts of various climate factors on transport infrastructure and coastal zones, as well as their broad ramifications for human settlement, trade and development. It further underscored the need for adaptation, including through adequate planning and integration of climate change considerations into transportation design, as well as into broader economic and development policies.

17. Relevant issues raised could be summarized as follows:

(a) A key message that emerged from this session was “prepare for known impacts”. Raising awareness was instrumental. Investments and decisions made on one day could prove wise or otherwise in the future, but planning for what was already known to us made good sense. It was important that approaches to climate change from a transportation perspective be based on continuous risk management, so that adequate response measures be adopted, which enhanced the resilience of transport systems;

(b) Adaptation fell within the purview of UNFCCC, which contained various relevant mechanisms. Those included the Adaptation Fund under the Kyoto Protocol, national plans at the country level, the Nairobi Work Plan and the Bali Action Plan. Inclusion of different sectors should be pursued;

(c) Climate change would have adverse effects, especially for countries that were already experiencing higher precipitation variability and more frequent storms, as well as water scarcity. As a result, adaptation costs were expected to be significant, especially for these countries;

(d) Climate change posed a serious threat to maritime transport, especially ports, even when catastrophic scenarios were not taken into consideration. While the global mean sea level rise could certainly pose serious problems to ports, there were other major concerns about the increased intensity of the extreme events (e.g. storm surges) and the compounded effect of local environmental conditions, such as the subsidence of port cities built on low-lying and subsiding coasts;

(e) It was noted that climate change would affect weather patterns, which would change ocean storm patterns. For example, an increase in storm intensity could lead to an increase in long-period waves and subsequently an increase in ship motions, thereby adversely affecting mooring or berthing of large vessels. Thus, the issue of down-time would be of concern. Changes in waves could also lead to increased dredging of ports and waterways which in turn could increase costs;

(f) In addition to direct impacts of climate change, there could be indirect effects, including potential changes in trade flows as a result of climate change and subsequent changes to transportation infrastructure;

(g) Scientific research based upon accurate and relevant data was essential for better predictions of climatic impacts on maritime transport and coastal infrastructure, especially in more vulnerable regions, such as SIDS and low-lying areas. In that respect, cooperation and concerted efforts among the relevant parties – including the scientific community, Governments and industry – were required. More importantly, the evolving scientific information needed to be effectively conveyed to policymakers for better integration into policymaking processes and decisions;

(h) Studies on the vulnerability of the maritime industry to the impacts of climate change would strongly benefit from the availability of information on climate variability and change, both at the global and regional scales. Efforts to develop a system to provide such information should be encouraged and supported;

(i) With respect to ports, vulnerability studies would be required, with specific focus on developing countries, especially since insight gained from localized case studies could not be easily extrapolated to other regions. Funding of relevant vulnerability studies in particular in developing regions was urgently required;

(j) Further exchange of information on vulnerability and impacts were important to raising awareness, including in the context of planning disaster preparedness. In that respect, the United States study, the work undertaken by the Environmental Working Group of the World Association for Waterborne Transport Infrastructure and the insight gained through the study on climate change risks of the six pilot countries currently underway at the World Bank should be further expanded and their results widely disseminated;

(k) To better prepare for climate change, robust transportation systems, including maritime transport systems, were required. For that, climate change considerations needed to be taken into account in transportation planning, while a

risk assessment-based approach should be used as an integrated tool for adaptation to obtain greater resilience in transport infrastructure. Authorities at all levels and the private sector should be involved in the planning work to ensure long-term planning, e.g. in relation to land use. It was also important to ensure that timeframes for investment planning decisions including in transport infrastructure take into account climate change considerations;

(l) Port planning and emergency planning were key, especially for port cities;

(m) In addition to the World Ports Climate Initiative, the port industry has also launched the Environmental Ship Index, which aimed to encourage emission reduction by the shipping industry through incentive-based port policies (e.g. through tariff incentive schemes). The Port of Rotterdam suggested that there could be a possibility for the World Port Climate Initiative to be expanded to include not only mitigation efforts by the port industry, but could also focus on impacts and adaptation aspects;

(n) Financing gaps for mitigation and adaptation in relation to climate change were significant. More resources were required for adaptation from both the private and public sectors. Existing funding mechanisms under the World Bank – including loans and grants as well as dedicated climate change assistance facility and the disaster relief mechanism – had the potential to support countries in relation to climate change impacts, and should be further leveraged;

(o) Trade was an engine for development and could therefore generate the requisite funding to support climate change action. Accordingly, it was felt that efforts should be made to promote further trade and to ensure that trade facilitation gains were capitalized upon, including in view of climate policy objectives. It was also noted that there was an opportunity to reduce costs with green development and trade;

(p) The question of generating adequate funding for climate change action was currently being addressed as part of the ongoing UNFCCC negotiating process;

(q) Technology and knowledge transfer were crucial. In that respect, specific education and learning packages and modules could prove useful. Also, cooperation between national innovation centres, such as existing centres in the Netherlands, could help promote much-needed knowledge transfer;

(r) The International Organization for Standardization (ISO) suggested that it could contribute to devising environmental standards in maritime transport as a tool for risk management. The view was that a holistic approach was needed and could draw from the experience acquired in the context of maritime transport security;

(s) The role of the insurance industry should further be defined and its contribution further leveraged;

(t) It was important to adopt a supply chain perspective, since landlocked countries would also be affected by climate change effects on ports and coastal zones, as well as port access networks;

(u) The meeting on maritime transport was considered as a good beginning, but there remained a need to improve understanding of impacts, compile more data, conduct relevant studies and promote information exchange.

5. Cross-cutting issues: costs and financing, technology and energy

18. The panellists were Ms. Raffaella Centurelli, Energy Analyst, International Energy Agency (IEA); Mr. Paul Clements-Hunt, Head of Unit, United Nations Environment Programme (UNEP) Finance Initiative; Mr. Mark Lewis, Global Head of Carbon Research, Deutsche Bank Climate Change Investment Research; and Dr. Awni Behnam, President, International Ocean Institute.

19. Panellists at this session addressed some of the cross-cutting issues which involved all countries, developed and developing alike. They reiterated the need for urgent action to ensure that climate policy, including in relation to maritime transport, was enabled by adequate financing and investment, technology development as well as through greater energy efficiency and security. The panellist from the IEA presented the results of the 2008 World Energy Outlook highlighting the two climate scenarios necessary to stabilize the concentration of carbon emissions at “manageable” levels, as well as underscoring the unsustainable path associated with the reference scenario. An urgent call was made for climate action that would help achieve carbon concentration levels of 450 parts per million (ppm) CO₂ equivalent or lower. On the whole, the cost of inaction outweighed the cost of the two emission reduction scenarios considered in the IEA report. The UNEP Finance Initiative (partnership with the financial sector) was presented and the need to seize the current momentum – including of the opportunities offered by various stimulus packages to mobilize funds for climate change action – was emphasized. The panellist from Deutsche Bank Climate Change Investment Research highlighted some lessons to be drawn from the European Union Emission Trading Scheme (EU ETS) as a way of controlling emissions and raising necessary funds to support climate change action; he also addressed the particular case of carbon capture and storage technologies. The International Ocean Institute drew attention to the difficulties associated with managing global public goods such as oceans and dealing with a global challenge such as climate change in the context of an inherently globalized maritime industry.

20. Relevant issues raised could be summarized as follows:

(a) IEA’s reference scenario under continued current trends for energy consumption and GHG emissions remained unsustainable and would create large temperature rises beyond levels considered sustainable by IPCC;

(b) Forecasts of energy consumption revealed that oil, coal and gas would, in 2030, continue to account for 80 per cent of global energy consumption;

(c) The reference scenario considered in the IEA’s World Energy Outlook became even more unsustainable each year, because policy action had remained inadequate to date and the situation continued to deteriorate;

(d) Time-frame was a real concern. Current trends in terms of energy consumption and carbon path suggested that, if no action were taken within the next two years – including relevant investment decisions which would determine the type of technologies that would be locked in – the world would forever miss the opportunity to stabilize emissions at “manageable” levels along either the 450 ppm or the 550 ppm CO₂ equivalent scenario;

(e) It was crucial that information was expeditiously available as to which scenario would be realistically achievable. This information was of the essence for adaptation planning;

(f) There was an urgent need for targeted energy policy action within OECD countries as well as in other major non-OECD economies whose share in emissions was increasing;

(g) It was critical that both OECD and non-OECD countries collaborate to achieve deep emission reductions. It was pointed out that while OECD countries accounted for the bulk of energy consumption and emissions, 87 per cent of the forecasted future incremental energy demand would stem from non-OECD countries. The potential for emissions reductions by these countries was growing;

(h) It was felt that the Copenhagen conference on climate change, in December 2009, must establish clear international agreement on reduced future GHG emissions and policies to promote energy efficiency and low carbon energies (including renewable and potentially nuclear). Missing this opportunity could nullify the possibility of reaching either of the two IEA target scenarios (550 ppm or 450 ppm CO₂ equivalent);

(i) The current economic crisis should be seen as an opportunity to retool economies onto sustainable lower carbon production paths, through their various economic stimulus packages. Clear decisions were urgently needed in order to promote investments in those areas in time to allow deep reductions (enabled by current investments) in the future;

(j) While, in general, the accuracy of modelling exercises depended upon the accuracy of both assumptions and oil price projections, the fundamental assumptions remained reasonable. IEA and UNFCCC collaborated closely and regularly, including in relation to modelling exercises;

(k) According to UNEP, in 2002, climate change losses amounted to about \$150 billion per year, with that sum possibly rising to about \$1 trillion per year by 2040. Indeed, climate change impacts dwarfed those of the present global financial crisis. To mitigate these risks, policy action was needed to promote private investment, since the investments needed could not be covered by the public sector alone;

(l) Investors were mainly attracted by the potential profitability of sustainable energy technologies (such as clean and green energy) and interested in investing, if Governments provided clear signals that they were committed to establishing effective frameworks for GHG emissions reduction and establishing a real global market for carbon that would grow in size;

(m) The momentum in clean energy investment should be seized, including through national stimulus packages;

(n) The commercial feasibility of sustainable technologies depended upon the specific technology and company in question. The problem of split incentives among those investing and those benefiting from reduced energy costs was probably a major problem in exploiting potential gains in energy efficiency;

(o) Creating a well-functioning carbon market was important for climate policy. The key issue was whether the price signal was working properly. The EU ETS had some strong features, but a number of its structural deficiencies had been brought to light by the recent economic meltdown. The experience acquired since its establishment provided some lessons to be drawn. Policymakers should ensure that such weaknesses were better understood and effectively addressed to send the right market signals and create a functional global carbon market;

(p) It was suggested that the current institutional structure for ocean governance was not adequate to effectively address new and emerging challenges such as climate change. In that context, reference was made to initiatives that had been agreed internationally and provided concrete approaches for an effective international maritime regime;

(q) A brief description of the International Oil Pollution Compensation (IOPC) funds was provided. Established under an IMO convention and operational for over three decades, the Funds could provide an example to draw from with respect to a potential global fund related to GHG emissions from international shipping.

B. Discussions at the final session

21. The session aimed to ascertain the outcome/results of the meeting and how those might best be conveyed to UNCTAD's governing body, as well as the international community as a whole. It was hoped that deliberations at the meeting would help ensure that better account was taken of the specificities of maritime transport when considering a global climate policy action and that issues of particular interest for developing countries would be duly reflected. In that respect, a key question posed by the Chair was how the results of the meeting could serve as substantive input to inform the debate and help contribute positively to the current IMO and UNFCCC processes.

22. In addition to the draft Chair's summary of the first four sessions, a draft two-page note setting out some possible key points was circulated for experts' consideration. The aim was to structure discussions. A number of drafting suggestions were made reflecting mainly the desire to provide a comprehensive account of the deliberations and a technically sound document.

23. A large number of experts commended UNCTAD for organizing the meeting to address maritime transport and the climate change challenge, highlighting that the meeting was particularly useful in reaffirming the need for urgent control of GHG emissions from maritime transport as well as in raising awareness about the critical importance of focusing future efforts on impacts and adaptations aspects.

24. Relevant issues raised could be summarized as follows:

(a) A key value added of the meeting lay in the fact that it allowed for a broader analysis of the potential implications of the climate change challenge for the maritime industry and helped gain a better understanding of the various maritime industry approaches to mitigation as well as the evolving regulatory and institutional framework dealing with GHG emissions from the international maritime sector;

(b) The Chair's summary should include concrete issues related to, inter alia, the need to further raise awareness and to promote capacity-building as well as the importance of addressing the complex issue of securing concrete financing, to be used for the purposes of the maritime transport sector;

(c) Further timely and concrete analysis was required and desirable to assess the implications for shipping of market-based GHG mitigation proposals such as a levy or an ETS. Such analyses should also ascertain the value added of these proposals for energy efficiency to be achieved by the world fleet and their impact on international shipping, bearing in mind their non-discriminatory and smooth implementation as well as the scientific, technical, operational and political context;

(d) IMO is encouraged to approach the issue of the reduction of GHG emissions through real, measurable and accountable actions;

(e) There was a need to define an efficient and predictable financial mechanism for climate action purposes within the framework of current negotiations. In that context, one expert referred to a global green fund for developing countries. It was also suggested that IMO's Integrated Technical

Cooperation Fund be used to provide resources for research and development in the field of GHG emissions from maritime transport;

(f) Some experts emphasized the need to focus on IMO as the relevant specialized agency within the United Nations system with a concrete mandate to deal and adopt international solutions applicable to all ships regardless of flag. A number of other experts were of the view that UNFCCC and the Kyoto Protocol provided the legal framework on climate change, which should form the legal basis for IMO work on GHG emissions from international shipping. According to that view, the principle of CBDR under UNFCCC provided the basis for international negotiations and cooperation on climate change. In that respect, some experts felt that IMO and UNFCCC should work together on addressing greenhouse emissions from maritime transport;

(g) Climate change mitigation in maritime transport and the need to adapt to climate change impacts posed a particular challenge for geographically disadvantaged landlocked countries with significant population size, especially for their already volatile trade as well as development prospects. Further studies were required to quantify the extent of those impacts;

(h) Current mitigation and adaptation measures seemed to focus so far on technical aspects and did not adequately cover impacts on the trade and sustainable development agenda of developing countries. Also, awareness should be raised among exporters and importers who were likely to be the most affected;

(i) Unilateral and regional approaches to addressing the climate change challenge in maritime transport could potentially undermine the sustainable development aspirations of many countries;

(j) Technology transfer as well as operational measures and energy efficiency should be promoted and facilitated. Possible measures included, inter alia, direct technical assistance, capacity-building, financing through differentiated levies, or other alternatives, as well as direct investment in infrastructure development;

(k) It was thought that IMO might wish to consider an approach for action that took into account the impact of the regulatory requirement on the development prospects of, especially, LDCs;

(l) UNCTAD was urged to further deal, within the boundaries of its mandate, with issues of policy and commercial relevance for the international shipping industry and maritime trade. Potential areas requiring further work included port congestion, restrictive measures in shipping (including preparing an inventory of such measures) and maritime transport security;

(m) UNCTAD was encouraged to make use of its expertise to help developing countries assess the impact of the potential marine emission reduction proposals on their economies, trade and development prospects;

(n) While supportive of the essence of the meeting, the outcome should be referred to as “key points made or raised by experts” and avoid using more committing terms such as “recommendations”, “agreed”, “common understanding” and the like;

(o) It was important that the Chair’s conclusions, including in the form of key points, not prejudice current negotiations under IMO and UNFCCC. In that respect, the meeting should not result in the adoption of a binding negotiated text or far-reaching recommendations that could upset the current negotiations of a global climate regime for maritime transport;

(p) One expert was strongly of the view that the meeting should not adopt an outcome or recommendations as such and that any recommendations on the way forward, including actionable outcomes within the meaning of the Accra Accord, could only be addressed under UNCTAD's Trade and Development Commission and its Trade and Development Board. Also, reference to the crucial role of adequate and additional financial resources, increased donor support and transfer of technology should be toned down or alternatively not be included as part of a meeting outcome;

(q) One expert questioned whether the issue of climate change in the context of maritime transport was consistent with the terms of reference of the Multi-year Expert Meeting on Transport and Trade Facilitation;

(r) The UNCTAD secretariat provided clarification, recalling the broad terms of reference of the meeting and the explicit reference to "emerging challenges affecting transport costs and connectivity, in particular the impact of [...] climate change". The secretariat further clarified that its member States at UNCTAD's last quadrennial conference in Accra, in April 2008, had specifically requested that multi-year expert meetings be held, to foster considered substantive discussions by experts, and that it would be desirable for discussions at those meetings to result in non-negotiated "actionable outcomes". While the exact form of such outcomes was yet to be clearly understood, it was important for the experts to note that discussions at the meeting were informal and that any suggestions or emerging key points setting out the way forward for all stakeholders were not binding and would be submitted to UNCTAD's Trade and Development Commission and to the Trade and Development Board for further consideration;

(s) One expert noted that the aims of the meeting were set out in the notification letter sent by the UNCTAD secretariat and quoted the following: "Against this background, the expert meeting provides a platform for the exchange of views and experiences, both to improve understanding of the implications of climate change for maritime transport and to help contribute substantively to discussions on possible regulatory options under the auspices of the International Maritime Organization (IMO) and the UNFCCC process." It was felt that this should be sufficient to guide discussions at the meeting;

(t) Another expert quoted the text of paragraph 207 of the Accra Accord, in which reference to the possibility of adoption of concrete outcomes as part of the multi-year expert meetings was expressly referred to: "Expert meetings will continue to be held under the auspices of the commissions. Expert meetings should be strengthened so that experts make a greater contribution to UNCTAD's programme of work in all three pillars. Expert meetings will be held in single sessions or in multi-year sessions. There will be no increase in the total number of expert meetings per year (eight), and individual sessions will not last more than three days. All expert meetings will comprise experts designated by member States but serving in their personal capacities. Balanced participation from capitals in different regions should be encouraged. Expert meetings should be interactive and enable all experts to participate fully; they should encourage sharing of experience and best practices; and they should facilitate networking among experts. They may generate, as part of the report of the Chair, practical options and actionable outcomes for consideration by the commissions, such as inventories of best practices, checklists, indicative guidelines, sets of criteria or principles, and model frameworks."

(u) Two experts requested that the draft two-page note circulated by the Chair be translated into French to ensure meaningful contribution to the discussions.

The secretariat noted that, given the limited resources and the time constraint, it was not possible to make the document available in French.

25. The Chair concluded the meeting by noting that, on a personal level, the meeting was an eye-opener and provided a clear and effective call for action. A key value added of the meeting was to raise awareness about the climate change challenge, in particular as regards the potential impacts of climate change on transport systems, the urgent need for adaptation and the broader implications climate change may have for international trade. He also noted that an important next step would be to further increase awareness in other arenas. In this context, he expressed his intention to pursue the possibility of including in the curriculum for the 1,500 undergraduate students at the Cass Business School of City University (London, United Kingdom) a compulsory subject on the economic implications of climate change, as well as a series of lectures. It was important that insights gained from the meeting be used to raise awareness and influence policymakers as well as individuals to ensure that the climate change challenge was better understood from a maritime transport perspective and could be effectively taken into account as appropriate. The Chair agreed, to the extent possible, to reflect any comments provided by experts.

C. Chair's conclusions

26. As many of the experts emphasized, the three-day meeting provided the background for extremely useful and fruitful substantive discussions. It provided an opportunity to address, in an informal setting, the implications of climate change for maritime transport from a broader economic and commercial perspective, thus supporting and complementing the current work carried out under the auspices of IMO and UNFCCC. The considered and thoughtful discussions helped to significantly raise awareness among experts from different backgrounds about the complex implications climate change may have for maritime transport systems – and more generally international trade – and the urgency of developing appropriate climate policy action, as well as practical responses and solutions. To this end, the meeting should be considered a starting point for further consideration of the important issues raised and discussed.

27. Key points that emerged from the three-day discussions could be summarized as follows:

(a) The available scientific evidence suggested that growing concentrations of GHG in the atmosphere had already resulted in significant climatic changes, which were predicted to increase in the future. The scale of the global challenge was enormous and, as climate change accelerated, there was an increasingly urgent need for action;

(b) Although predictions based on current trends already suggested an enormous challenge, it must be stressed that there was an inherent degree of uncertainty associated with those predictions. Natural systems were complex and non-linear, and there was a very real risk that growing GHG concentrations could trigger various feedback mechanisms that would drive climatic changes and their consequences to levels that were extremely difficult to manage. From a risk-management perspective, it would be unwise to wait for perfect scientific predictions concerning the response of the non-linear natural system before taking action. In view of the potential very substantial monetary and non-monetary costs of climatic change, particularly the very worrisome consequences of “tipping points”/abrupt climatic changes, inaction and business-as-usual approaches were not viable options. Dealing with the climate change challenge was a priority, which

should not be undermined by other concerns, including the current global economic and financial constraints;

(c) Time-frame was a real concern. Current trends in terms of energy consumption and carbon path suggested that if no action were taken within the following two years, including relevant investment decisions which would determine the type of technologies that would be locked in, the world would forever miss the opportunity to stabilize emissions at “manageable” levels along either the 450 ppm or the 550 ppm CO₂ equivalent scenarios. It was crucial that the world be informed very soon of which scenario would be realistically achievable. This information was of the essence for adaptation planning;

(d) Despite the current unfavourable economic conditions, projected growth in international trade suggested that GHG emissions from shipping would continue to increase, unless effective regulatory, technical and operational measures were agreed and implemented without delay. Thus, there remained an urgent need to address GHG emissions from the maritime transport sector and to step up mitigation efforts. In view of the global dimension of international maritime transport and the climate change challenge, a global and concerted solution was urgently required. To this end, negotiations towards regulation of CO₂ emissions from international shipping should be pursued with all due speed;

(e) Various technical, operational and market-based mitigation measures were currently under consideration under the auspices of MEPC at IMO. While the reduction potential and the effectiveness of each measure were yet to be fully established, there remained a need to improve the understanding of the respective merits of different options and to assess the potential implications of the proposed mitigation measures for global trade and market distortions. UNCTAD was encouraged to make use of its expertise and conduct relevant work in this area, especially regarding the trade and development of developing countries. There was also a need to ascertain the added value of these proposals in terms of energy efficiency to be achieved by the world fleet and their impacts on international shipping;

(f) The meeting was an eye-opener in that it helped raise awareness about the importance of climate change impacts and adaptation in relation to maritime transport systems. While international maritime transport was responsible for around 3 per cent of global CO₂ emissions from fuel combustion, it was important to note that more than 80 per cent of global trade (by volume) was carried by sea, from port to port. Given the potential impacts and implications of climate change for transportation systems, and in particular for ports – key nodes in the supply-chain, and vital for global trade – maritime transport should be seen much less as a culprit than as a victim. Thus, increased focus on responding to the challenge was important for the long-term prospects of the maritime transport sector and, more generally, global trade. Planning for the already-predicted impacts should be pursued without delay;

(g) Further studies were required to improve the understanding of potential climate change impacts for the maritime transport sector and the hinterland. For ports and transport infrastructure in coastal zones, especially in developing countries, appropriately funded, well-targeted vulnerability studies based on adequate data – as well as better data and dissemination of existing information – were required to assess potential climate change impacts and to develop appropriate adaptation responses;

(h) Studies on the vulnerability of the maritime industry to the impacts of climate change would strongly benefit from the availability of information on

climate variability and change both at the global and regional scales. Efforts to develop a system to provide such information should be encouraged and supported;

(i) Scientific research based upon accurate and relevant data was essential for better predictions of climatic impacts on maritime transport and coastal infrastructure, especially in more vulnerable regions such as SIDS and low-lying areas. In this respect, there was an important need for cooperation among scientists and engineers, industry, international organizations and policymakers to ensure that up-to-date relevant information on climate change impacts and adaptation measures was available, widely disseminated and taken into account by policymakers, transportation planners and development strategists;

(j) Further awareness-raising, knowledge sharing, education and information dissemination was needed. The intention to pursue the possibility of including a compulsory subject on climate change in the undergraduate curriculum at the Cass Business School of City University, London – as well as a series of lectures for postgraduate students – was a step in this direction. As noted by experts, other approaches in this respect could include capacity-building and technical assistance initiatives, especially with a view to helping developing countries and the most vulnerable gain an improved understanding of the climate change challenge from a maritime transport perspective to ensure that they were better prepared to cope with its various effects;

(k) Assessing the costs of climate change impacts on ports and, more generally, supply chains, was seen as important. Understanding the implications for trade and development especially for developing countries needed to be enhanced and relevant studies should be carried out;

(l) Climate change mitigation in maritime transport and the need to adapt to climate change impacts posed a particular challenge for geographically disadvantaged landlocked countries with significant population, especially for their already-volatile trade and development prospects. In that context, further attention should be focused on the impact of potential mitigation measures and adaptation requirements for the trade and development prospects of landlocked developing countries, as well as LDCs. In that context, financial and technical assistance, as well as capacity-building, were important;

(m) Adequate funding was paramount for successful climate action in maritime transport and the wider supply chain, in particular for adaptation purposes. In that context, it was important to explore ways in which financial resources could be generated as part of mitigation efforts in relation to maritime transport and ensure that any proceeds were reinvested within the industry for climate change action, in particular for the purposes of effective adaptation, especially in developing countries;

(n) Taking advantage of existing technology and development of new technologies would go a long way in helping address the climate change challenge in maritime transport. For developing countries, being able to access and benefit from such technologies and advances would be crucial;

(o) The international shipping and port industries were already active in addressing the climate change challenge and were committed to stepping up their efforts to ensure that broader climate change implications for maritime transport were taken into account. In that respect, indications by representatives of the global port industry of their willingness to explore the possibility of including considerations on impacts and adaptation in work under the World Ports Climate Initiative constituted an important step in the right direction;

(p) It was felt that it would be useful to preserve some continuity to these deliberations and plan for a follow-up meeting in a year's time to assess progress with respect to the key issues raised and take stock of achievements made, as well as reflect on potential next steps.

II. Organizational matters

A. Election of officers

28. At its opening plenary meeting, the multi-year expert meeting elected the following officers:

Chair:	Mr. Costas Grammenos (Greece)
Vice-Chair-cum-Rapporteur:	Mr. Joannes Tandjung (Indonesia)

B. Adoption of the agenda and organization of work

29. At its opening plenary, the multi-year expert meeting adopted the provisional agenda for the session (contained in TD/B/C.I/MEM.1/1). The agenda was thus as follows:

1. Election of officers
2. Adoption of the agenda and organization of work
3. Maritime transport and the climate change challenge
4. Adoption of the report of the meeting

C. Outcome of the session

30. At its closing plenary meeting, on Wednesday, 18 February 2009, the multi-year expert meeting agreed that the Chair should summarize the discussions (see chap. I).

D. Adoption of the report

31. Also at its closing plenary meeting, the multi-year expert meeting authorized the Vice-Chair-cum-Rapporteur, under the authority of the Chair, to finalize the report after the conclusion of the meeting.

Annex I

Provisional programme – Multi-year Expert Meeting on Transport and Trade Facilitation

Palais des Nations, Geneva
16–18 February 2009
Room No. XXVI

Day 1: 16 February 2009	
Time	Session
10.00–10.45	<p>Opening statement by Ms. Lakshmi Puri, Acting Deputy Secretary-General of UNCTAD</p> <p>Item 1: Election of officers Item 2: Adoption of the agenda and organization of work Item 3: Maritime transport and the climate change challenge</p> <p>Keynote address by Dr. Martin Lees, Secretary-General, Club of Rome</p>
10.45–13.00	<p>Understanding the challenge</p> <p>The main objective of this session is to set the scene by providing an overview of the causes of climate change, its manifestations and broader implications, especially for developing countries – including the most vulnerable, namely the least developed countries (LDCs) and the small island developing States (SIDS) – as well as the relevant international regulatory framework and current climate negotiations process.</p> <p style="text-align: center;">Interactive debate</p> <p style="text-align: center;">-----</p>

15.00–18.00	<p>Greenhouse gas emissions from international shipping and the potential for control and reduction</p> <p>The session will focus on greenhouse gas emissions from international shipping, some of the challenges associated with monitoring, measuring and reporting GHG emissions from international shipping; industry approaches to mitigation, as well as relevant technology.</p> <p style="text-align: center;">Interactive debate -----</p>
Cocktail reception offered by the Secretary-General of UNCTAD	
Day 2: 17 February 2009	
Time	Session
10.00–13.00	<p>Potential approaches to mitigation in maritime transport</p> <p>The session will focus on the evolving regulatory and institutional framework dealing with GHG emissions from the international maritime transport sector. The main measures and proposals currently being considered under the auspices of the International Maritime Organization will be discussed and their potential implications, especially for developing countries, will be considered.</p> <p style="text-align: center;">Interactive debate -----</p>
15.00–17.45	<p>Potential climate change impacts and approaches to adaptation in maritime transport</p> <p>This session concentrates on the potential implications of climate change for maritime transport and the required adaptation measures. Issues to be addressed include climate change impacts on coastal infrastructure and ports, in particular in vulnerable developing regions.</p> <p style="text-align: center;">Interactive debate -----</p>

Day 3: 18 February 2009	
Time	
10.00–13.00	<p>Cross-cutting issues: costs and financing, technology and energy</p> <p>This session will address some cross-cutting issues underlying any effective climate policy action, including costs of mitigation and adaptation, the need for requisite funding and investment, synergies that may prevail between energy security objectives and environmental sustainability imperatives, and the crucial role of technology.</p> <p style="text-align: center;">Interactive debate</p> <p style="text-align: center;">-----</p>
15.00–17.45	<p>The way forward</p> <p>This session aims to develop a consensus on the way forward, to help advance the current climate change negotiations and to ensure effective climate policy action in maritime transport while furthering other objectives such as transport efficiency, trade facilitation and sustainable development. The session also aims to identify gaps and areas for further work.</p> <p>Chair's summary of discussions and open interactive debate</p> <p style="text-align: center;">-----</p>
17.45–18.00	Closing and adoption of outcome

Annex II

Attendance*

1. Representatives of the following States members attended the session:

Afghanistan	Italy
Algeria	Japan
Angola	Kenya
Argentina	Kuwait
Australia	Lao People's Democratic Republic
Azerbaijan	Liberia
Bangladesh	Mali
Belarus	Mexico
Brazil	Morocco
Bulgaria	Myanmar
Canada	Norway
Chile	Panama
China	Philippines
Colombia	Qatar
Comoros	Romania
Côte d'Ivoire	Russian Federation
Cuba	Saudi Arabia
Czech Republic	South Africa
Denmark	Spain
Djibouti	Sudan
Dominican Republic	Suriname
Ecuador	Syrian Arab Republic
Ethiopia	Tajikistan
Gabon	Thailand
Germany	The former Yugoslav Republic of Macedonia
Greece	United Kingdom of Great Britain and Northern Ireland
Haiti	Venezuela (Bolivarian Republic of)
India	Viet Nam
Indonesia	Yemen
Iran (Islamic Republic of)	
Iraq	

2. The following observer State was represented at the session:

Palestine

3. The following intergovernmental organizations were represented at the session:

European Community
Organisation Internationale de la Francophonie
South Centre

4. The following United Nations organizations attended the session:

United Nations Development Programme
United Nations Economic Commission for Europe

* For the list of participants, see TD/B/C.I/MEM.1/Inf.1.

5. The following specialized agencies or related organizations attended the session:

Food and Agriculture Organization of the United Nations
International Maritime Organization
United Nations Framework Convention on Climate Change
United Nations Industrial Development Organization
World Bank
World Meteorological Organization
World Trade Organization

6. The following non-governmental organizations were represented at the session:

General category

International Organization for Standardization
International Centre for Trade and Sustainable Development

Special category

Centre of Concern
International Association of Independent Tanker Owners
International Association of Ports and Harbours
International Chamber of Shipping
International Ocean Institute

7. The following representatives of academies, organizations and the private sector were represented at the session:

(Listed as per last name in alphabetical order)

Ms. Catherine **Grey**, Head, External Relations and Conference, International Oil Pollution Compensation Funds, London
Mr. Bernd **Hackmann**, University of Oldenburg, Germany
Mr. John **Heintz**, University of Leiden, Netherlands
Mr. Willem **Oosterveen**, Director, International Oil Pollution Compensation Funds, London

8. The following panellists were invited to the expert meeting:

(Listed in chronological order of intervention)

Mr. M. **Lees**, Secretary-General, Club of Rome
Mr. M. **Beniston**, Professor, Head of Research Group on Climatic Change and Climate Impacts, University of Geneva
Mr. F. **Vladu**, United Nations Framework Convention on Climate Change Secretariat
Mr. P. **Crist**, International Transport Forum Research Centre, Organization for Economic Cooperation and Development
Mr. E. **Vagslid**, Marine Environment Division, International Maritime Organization
Mr. P. **Gunton**, Managing Editor, Lloyds Register/Fairplay Ltd.
Mr. A. **Chrysostomou**, Chair, International Maritime Organization Marine Environment Protection Committee
Mr. A. **Stochniol**, International Maritime Emissions Reduction Scheme
Mr. J. **Faber**, CE Delft
Mr. P. **Hinchliffe**, Marine Director, International Chamber of Shipping
Mr. S. **Inoue**, Secretary-General, International Association of Ports and Harbours

Mr. M. **Savonis**, United States Department of Transportation
Mr. A. **Theron**, Council for Scientific and Industrial Research, South Africa
Mr. M. **Rossouw**, Council for Scientific and Industrial Research, South Africa
Mr. P. **Mollema**, Port of Rotterdam
Mr. R. **Newfarmer**, World Bank
Ms. R. **Centurelli**, International Energy Agency
Mr. P. **Clements-Hunt**, United Nations Environment Programme
Mr. M.C. **Lewis**, Deutsche Bank Climate Change Investment Research
Mr. A. **Behnam**, International Ocean Institute

9. The following resource persons were invited to the expert meeting:

Mr. H.C.C. **Derwent**, President and CEO of the International Emissions Trading Association
Mr. Michael **Grubb**, Chair, Climate Strategies, University of Cambridge
Mr. Benjamin **Landreau**, Chief Operating Officer, Carbon Management Consulting Group
Mr. Vladimir **Ryabinin**, Joint Planning Staff for World Climate Research Programme, World Meteorological Organization Secretariat
Mr. J.L. **Valdes**, International Oceanographic Commission, United Nations Educational, Scientific and Cultural Organization
Ms. Anne-Marie **Warris**, Lloyds Register
