

## **European Climate Change Programme – WG Ships**

**15-16 November 2011**

### **Background document:**

#### **The level of reduction in the maritime sector**

##### **Introduction**

The EU has reduced its greenhouse gas (GHG) emissions by 379,8MtCO<sub>2</sub>eq between 1990 and 2007<sup>1</sup>. During the same period, the CO<sub>2</sub> emissions from international shipping have increased by 402MtCO<sub>2</sub>eq<sup>2</sup>. For the international shipping, the base scenarios indicate CO<sub>2</sub> emission growth in the range of 220-310% for the period 2007-2050<sup>3</sup>, whereas at the same time the EU aims to reduce its greenhouse emissions by at least 80%<sup>4</sup>.

In the event of a Commission proposal is coming next year, it is therefore necessary to consider the level of reduction in the maritime sector that can be considered. This level of reduction must be fair, especially regarding the necessity of maintaining the competitiveness of the maritime sector, and coherent with other policy implemented at the EU level.

To that extend, it is important to recall that, at the EU level, all transport modes, including domestic shipping but excluding international shipping, are covered by emission reduction targets. Indeed, all sectors of the economy, except international shipping, are covered by the directive 2003/87/EC which set the European emission trading scheme (EU-ETS) or by the decision (EC) n°406/2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020. Moreover, some specific measures are used to help the internalisation of the carbon cost, such as the regulation (EC) n°443/2009 and 510/2011 setting CO<sub>2</sub> emissions standards for cars and vans.

Last but not least, it can be also recalled that the Commission consider that the GHG emissions from the EU shipping sector can be reduced by 40% (50% if feasible) by 2050 compared to 2005<sup>5</sup> and the Council of the EU set an objective for the global maritime sector at -20% by 2020 compared to 2005<sup>6</sup>.

##### **The marginal abatement cost curves**

Recent work by the International Maritime Organisation (IMO), CE Delft, Det Norske Veritas (DNV) and others has identified significant cost effective CO<sub>2</sub> reduction measures in the maritime transport sector which are not being implemented, such as slow steaming, weather routing, contra-rotating propellers, propulsion efficiency devices, etc.

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<sup>1</sup> EU energy and transport in figures - Statistical pocketbook 2009, DG TREN

<sup>2</sup> Second IMO GHG study 2009 – table 3.8

<sup>3</sup> Id. p106

<sup>4</sup> Environment Council conclusion, October 2009

<sup>5</sup> White paper on transport, 2011

<sup>6</sup> Environment Council conclusion, October 2009

## 1. The Second IMO greenhouse gas study 2009

The Second IMO greenhouse gas study 2009, endorsed by government, demonstrates that some technical and operational measures can already be implemented by the maritime sector to reduce their greenhouse gas emissions.

According to the IMO, the maximum abatement potential of measures that are taken into account in the study lies with a range of 210 to 440Mt of CO<sub>2</sub> for 2020<sup>7</sup>, which is about 15-30% of the projected total emission of the vessels types taken into account<sup>8</sup>. Considering that all these measures will be implemented, the absolute emissions of the international maritime sector could reach between 810 and 1040Mt by 2020, which is between -10.5% and + 8.9% of the 2005 CO<sub>2</sub> emissions from total shipping.

There is a range of measures whose cost efficiency is negative. That means that these measures are profitable even when CO<sub>2</sub> emissions have no price. The range of maximum abatement potential of these measures is 135 to 365Mt of CO<sub>2</sub> and lies, for the central estimate, at about 255Mt. Considering that all these measures will be implemented, the absolute emissions of the international maritime sector could reach between 885Mt and 1115Mt by 2020, which is between -7.3% and + 16.7% of the 2005 CO<sub>2</sub> emissions from total shipping.

The maximum abatement cost curve set by the IMO has been derived for a bunker fuel price of US\$500/t. An increase of the fuel price above this threshold will allow reaching each level CO<sub>2</sub> abatement at lower cost. It is therefore important to consider that the bunker fuel price is now around US\$650/t<sup>9</sup> and there is no clear signal indicating that this price would decrease in the following years.

Moreover, according to the IMO study, the range of maximum abatement cost of measures whose cost efficiency is negative has a low sensitivity to the interest rates.

## 2. The Det Norske Veritas (DNV) maximum abatement cost curve

In February 2010, DNV published a study related to the abatement potential towards 2030 in the maritime sector. This study demonstrates that CO<sub>2</sub> emissions by 2030 can be reduced by 30% below baseline in a cost-effective way and by almost 60% if all the identified measures are included<sup>10</sup>.

Considering that all measures identified will be implemented, the emissions could reach 670Mt by 2030, i.e. -30% compared to the 2005 CO<sub>2</sub> emissions from total shipping.

Considering that all measures with negative abatement costs will be implemented, this means that the emissions could reach 1030Mt by 2030, i.e. +7.8% compared to the 2005 CO<sub>2</sub> emissions from total shipping.

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<sup>7</sup> For a fuel price of US\$500/t and an interest rate of 4%

<sup>8</sup> As a baseline, the IMO used the A1B scenario. This means that the amount of emissions considered in 2020 is about 1250Mt.

<sup>9</sup> IFO380, source : bunkerworld.com

<sup>10</sup> For a fuel price of US\$300/t for heavy fuel and US\$500/t for diesel fuel

### 3. The CE Delft report 2009

In 2009, the European Commission gave a mandate to a consortium led by CE Delft to provide technical support for European action to reducing GHG emissions from international maritime transport.

For a bunker fuel price of US\$700/t and an interest rate of 9%, CE Delft came to the conclusion that the abatement measures could maximally, when all the measures were taken, reduce total 2030 emissions by 27-47% compared to a frozen technology scenario. 23-45% of the total 2030 emission could be abated with measures that have negative marginal abatement costs, with 33% being the central estimates.

Considering that the 2030 emissions would be 1447Mt<sup>11</sup>, these figures means that the possible emissions target would be between 767 Mt and 1056Mt, i.e. between -29.7% and +10.6% compared to the 2005 CO2 emissions from total shipping. Considering only the measures with negative abatement costs, the emissions could reach between 796Mt and 1114Mt, i.e. between -26.7% and +16.6% compared to the 2005 CO2 emissions from total shipping

#### **Summary of possible level of reduction compared to 2005 CO2 emissions from total shipping**

	2005	2020	2030	
<i>Source</i>		<i>IMO 2009</i>	<i>DNV 2010</i>	<i>CE Delft 2009</i>
Maximum abatement potential of all measures		-10.5% to +8.9%	-30%	-29.7% to +10.6%
Maximum abatement potential of measures whose cost efficiency is negative	955 Mt	-7.3% to + 16.7%	+7.8%	-26.7% to +16.6%

#### **Possible benefits according to the level of reduction**

According to the IMO, the implementation of the EEDI and the SEEMP will lead to a reduction of CO2 emissions between 100 and 180Mt. This would provide a US\$ 34 – 61 billion of annual fuel cost savings.

Therefore, using the data providing by LR/DNV for the above calculation<sup>12</sup>, it can be assumed that reducing the CO2 emissions by 2020 in the range of maximum abatement potential of measures whose cost efficiency is negative could provide a net benefit for the sector between US\$ 46.1 and 124.8 billions per year from fuel savings.

For 2030, the net benefit could be US\$ 195 billions per year, using the DNV scenario, or between US\$ 129.9 and 253.9 billions per year.

#### **Disclaimer**

The purpose of this background paper is to indicate possible areas for discussion and assist participants with their preparation. This document should not be seen in any way to limit the

<sup>11</sup> CE Delft made an extrapolation of the A1B scenario developed for the IMO report.

<sup>12</sup> Fuel consumption : 20% HFO and 80% MGO; Fuel price : HFO - US\$628 / MGO US\$1205

scope of discussion or to exclude any relevant aspect. ECCP participants are requested to raise and address all relevant aspects. This document is not intended to indicate any preferences or views of the Commission.