

bunkerworld

www.bunkerworld.com

July/August 2009

Shipping and CO2: issues and costs

As the international community moves to put in place tougher restrictions on greenhouse gas (GHG) emissions, particularly carbon dioxide (CO2), to limit the effects of human activity on the global climate, shipping's contribution to global emissions has come under increasing scrutiny.

The International Maritime Organization (IMO) has a mandate to pursue reduction measures, with individual countries and/or the United Nations conference on climate change in Copenhagen in December prepared to act if the IMO is unable to reach agreement. A number of proposals have been put forward and the main debate is between a bunker tax and an emissions trading scheme - both of which could significantly raise the costs of compliance for shipowners and operators.

Trends in ship emissions

According to the International Maritime Organization (IMO), global shipping produced 1,046 million metric tonnes (or 1.046 gigatonnes (Gt), which is the common unit of volume in climate change analysis) in 2007, or 3.3% of manmade emissions. This was up from 1.8% in 2000 and the latest figures from the IMO were higher than previous estimates it had made.

The figures from the Intergovernmental Panel on Climate Change (IPCC) was that the transport sector produced some 6.3 Gt of CO2 in 2004, which was 23% of that year's emissions and was also one of the fastest growing sectors in terms of emissions. The IPCC used figures from the World Business Council for Sustainable Development and noted that shipping contributed around 9.5% of the transport sector's CO2 emissions. This put shipping just behind aircraft (11.6%), ahead of rail (1.5%), and behind heavy freight trucks (16.2%) and well shy of the largest polluters, light-duty vehicles (cars, vans etc.) at 44.5%.



What will shipping's place be in the future?

There is some dispute over the exact figures and a recent report by Germany's HypoVereinsbank put shipping's emissions slightly higher at 1,200 million tonnes of CO2, or about 4-5% of the global total, according to its figures. Despite the relatively small differences in percentage numbers, it is clear that shipping is still a notable contributor to global emissions - more than the 2006 output of Canada and South Korea individually (570 million tonnes and 460 million tonnes respectively) but behind Japan (1,230 million tonnes) and the US (5,790 million tonnes) and China (6,110 million tonnes), the latter two being the largest emitters.

Comparisons can be relative with international shipping (by the IMO's figures) emitting just less than total emissions from motor gasoline consumption in the US, which was 1,180 million tonnes in 2007, according to the government's Energy Information Administration (EIA).

Ship emissions are predicted to grow, however, with the IMO stating that it expects an increase in ship emissions by a factor of 1.1-1.3 by 2020, and 1.5-2.5 by 2050, absent any controls but "taking into account significant efficiency improvements resulting from long-term increases in energy prices". This is greater than the expected growth rate of

the transport sector as a whole, which is estimated by the IPCC to grow by a factor or around 2.3 by 2050. Other studies have given a variety of growth rates, depending on varying scenarios of economic growth (and consequent shipping expansion) with some ranges given as 1,300-1,800 million tonnes by 2025, and 1,600-4,000 million tonnes (the upper level well beyond the IMO's expectations) by 2050.

Whatever the levels, the important point to note is that the trend in ship emissions is upward. With expectations that countries will start reducing its GHG emissions in a meaningful way, there will be increasing

In this issue

**Lead story:
Shipping and
CO2: issues and
cost - 1**

**Sulphur limits
bring results - 4**



**Hamburg: North
Europe's other
bunker hub - 6**

**Rotterdam's
bunker sector
weathers the
storm - 8**

**VIP profile: An
experienced
player - 12**

**Bunker
summit
hears
'prospects are
pretty tough'
- 13**



**Regional news from:
Europe - 14**

Middle East - 16

Asia - 19

Americas - 21

**Sustainable
shipping section**

**A new era for
shipping in
California - 23**



**Arctic threatened by
black carbon - 25**

**Environmental
demands drive
lubricants
developments - 24**

PUBLISHER

Petromedia Ltd.
Gainsborough House
59/60 Thames Street
Windsor
Berkshire SL4 1TX
UK

EDITOR

Guy Wilson-Roberts
Tel: +1 604 692 2552
guy@bunkerworld.com

PUBLICATION MANAGER

Paul Davis
Tel: +44 (0)7899 886982
paul.davis@bunkerworld.com

**BUNKERWORLD
ANNUAL SUBSCRIPTION
RATES:**

Magazine: \$95
For online subscriptions
to Bunkerworld, see:
www.bunkerworld.com/store

**EUROPE & AMERICAS
SALES:**

David Post
Tel: +44 (0)1753 272 250
Fax: +44 (0)1753 272 251
sales@bunkerworld.com
Petromedia Ltd
Gainsborough House
59/60 Thames Street
Windsor, Berkshire SL4 1TX
United Kingdom

ASIA SALES:

Nic Tan
Tel: +65 6324 0920
Fax: +65 6327 8743
sales@bunkerworld.com
Petromedia Pte Ltd.
91B Tanjong Pagar Road
Singapore, 088512

PRODUCTION

Vivian Chee
Tel: +44 (0)20 8995 5540
chee@btconnect.com

No part of this publication may be reproduced or stored in any form by any mechanical, electronic, photocopying, recording or other means without the prior written consent of the publisher. Whilst the information and articles in Bunkerworld are published in good faith and every effort is made to check accuracy, readers should verify facts and statements direct with official sources before acting on them as the publisher can accept no responsibility in this respect. Any opinions expressed in this magazine should not be construed as those of the publisher.

pressure on the shipping industry to reduce its levels and there may well be concrete restrictions on ship emissions put in place.

CO2 targets

The scientific analysis of the implications of increasing CO2 in the atmosphere is set out in the Synthesis Report of the IPCC from the Fourth Assessment Report presented in 2007. "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures," according to the report. "Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations."

2000 would have to be achieved by 2050 – although this would still result in sea level rises of 0.4-1.4 metres.

In light of this analysis, the EU has adopted a target of a 20% reduction from 1990 levels by 2020, which the US has recently announced: but using 2005 as its baseline (and achieving a 83% reduction by 2050). Recent scientific papers have called for a 50% cut from 1990 levels by 2050.

Kyoto Protocol

The principal international mechanism for achieving GHG reductions is the Kyoto Protocol. There are differentiated responsibilities set out in the Protocol, for developed and developing countries, which are enshrined in the United Nations Framework

Convention on Climate Change (UNFCCC). These have proved to be one of the main stumbling blocks for progressing the Protocol process to achieve GHG emissions reductions. Developing countries have been reluctant to commit to reductions without financial support. At the UNFCCC Bali meeting in 2007, developing countries, including China and India, sought a reported increase of \$20 billion in subsidies from developed countries to help such countries with climate change. Developed countries have seen deep cuts in emissions as unlikely to be successful without bringing in developing countries that have high levels of emissions, particularly now that China is the largest emitter of CO2.

finance is contingent on a solid plan and implementation of that plan." A draft text for Copenhagen released in late May suggested that there were three options for shipping emissions to be dealt with, all working through the IMO. The options include yet-to-be-specified reduction targets; one option includes the date of 2011 for the IMO to agree to reduction programme; the strictest option notes that shipping's reductions should be "at least as ambitious" as other sectors, which could imply a figure of 80% by 2050.

If the circle can be squared at Copenhagen, and all countries – especially large emitters like China and the US, who currently have not taken on any Kyoto

Protocol obligations to make cuts – induced into a regime of reductions, there will be a profound impact on all sectors of the economy, shipping included.

The IMO and shipping

The IMO currently has the mandate under the Kyoto Protocol to develop measures to reduce shipping's CO2. But when countries meet in Copenhagen to (presumably) agree new targets for reductions, if the IMO is unable to achieve reductions then a number of countries have said that they would like to see shipping (and aviation) pulled into the the country-based framework. This could mean that shipping's CO2 will count in national targets and require stricter regulation.

The IMO is currently working on three 'pillars' for reducing GHG emissions from shipping, primarily CO2. All three pillars will be debated at MEPC 59 in July. The first two pillars are technical and operational measures. First is the Energy Efficiency Design Index (EEDI) for new ships "meant to stimulate innovation and technical development" making it possible to build "energy efficient" ships in the future, according to the IMO.

The IPCC, using research from Marintek in 2000, reported that "the potential of technical measures to reduce CO2 emissions was estimated at 5-30% in new ships and 4-20% in old ships" but

that: "The result of this analysis was that the estimated CO2 emission reduction potential of the world fleet would be 17.6% in 2010 and 28.2% in 2020. Even though this potential is significant, it was noted that this would not be sufficient to compensate for the effects of projected fleet growth." Second is the Energy Efficiency Operational Index (EEOI) for existing ships, "to gauge the effectiveness of any measures adopted to reduce energy consumption." As a possible example to date, A.P. Moller-Maersk Group last year put energy-efficiency measures into practice for its fleet and achieved a 9% reduction in CO2 emissions. The UK House of Commons, citing IMO research, noted that a speed reduction of 10% across the global fleet could reduce fuel consumption and emissions by 23%.

The IMO has yet to attribute specific CO2 reductions to either of these indexes. Its latest study in GHGs, to be considered at MEPC 59, reportedly concludes that there is "significant potential for reduction of GHG through technical and operational measures" and that "if implemented, these measures could increase efficiency and reduce the emissions rate by 25% to 75% below the current levels."

But the numbers from the IMO have already been criticised. The UK House of Commons, in investigating this issue this year, heard that the EEOI might not be mandatory and that the best that might be hoped for were fuel efficiencies of 10% by 2020 and 30% by 2050. As noted, the IMO has estimated that fuel use/emissions from shipping could increase by 250% by 2050.

For its third pillar, the IMO will discuss at MEPC 59 "possible market-based instruments" to reduce emissions – either a bunker levy or tax, or an emission trading scheme. "The Committee will have for its consideration proposals for two different market-based instruments: an international compensation fund generated through contributions by ships based on their fuel consumption, or rather, on their actual emissions, and an emission trading scheme for international shipping based on similar mechanisms currently in operation throughout the world," Miguel Palomares, the director of the IMO's Marine Environment Division was reported saying in April.

These two mechanisms are not unique to shipping and it seems likely that they will be the preferred method for the international community and individual countries to reduce their CO2 emissions across a number of sectors, if not whole economies.

Continued on page 10

A speed reduction of 10% across the global fleet could reduce emissions by 23%.

Because CO2 already emitted will have long-term effects on the earth's climate, even significant reductions in emissions will not stop at least some global temperature and sea level rises from taking place. Along with a host of environmental impacts, the Stern Review in the UK, presented to the UK Government in 2006 by Lord Stern, the then Head of the Government Economic Service and a former World Bank Chief Economist, set out the implications of global warming in economic terms: "Most formal modelling in the past has used as a starting point a scenario of 2-3°C warming. In this temperature range, the cost of climate change could be equivalent to a permanent loss of around 0-3% in global world output compared with what could have been achieved in a world without climate change. Developing countries will suffer even higher costs."

The official target of the EU is to secure CO2 emissions reductions to keep the average temperature rise to a maximum of 2%, which has been widely considered as an acceptable threshold. Based on its analysis, the IPCC concluded that to limit the global average temperature rise to 2-2.4 degrees, GHG emissions would have to peak by 2015 to stabilise GHGs at 450 parts-per-million (ppm) CO2 equivalent by 2050. Reductions of 50-85% of levels in the year

2000 would have to be achieved by 2050 – although this would still result in sea level rises of 0.4-1.4 metres.

Ahead of the scheduled meeting in Copenhagen in December this year, the UN reported in March that there had been progress towards a 'registry' of actions that would commit developing countries to a schedule of "nationally appropriate mitigation actions" by developing countries such as China and India, and match them with pledges of financial and technological support by developed nations, reports noted. "There seems to be a growing consensus that nationally appropriate mitigation actions should be captured in some kind of registry," said Yvo de Boer, executive secretary of the UNFCCC. "The

Shipping and CO2: continued

The costs for shipping will depend on the decision between taxes and caps to reduce ship emissions.

Taxes versus caps

A number of domestic jurisdictions already have carbon taxes in place. The rationale is fairly simple: a tax is imposed on fuel sales, which increases the cost of fuel thereby adding an incentive to users to reduce their costs. The tax also raises revenue for the levying authority, which can be used for other purposes.

The Danish proposal to the IMO has called for a tax on bunker fuel that would be administered by the IMO, rather than individual countries. The proposal suggests a levy between \$7.50 to \$45 per tonne of bunker fuel and claims that the upper end of the tax rate would reduce emissions by around one third. It also notes that the revenue would be used for "mitigation" in "developing countries", which is broadly consistent with differentiated responsibilities in the Kyoto Protocol.

As well as support from Denmark for the idea of a bunker tax, others that have stated their public support have included the Hong Kong Shipowners' Association, the German Shipowners' Association, and A.P. Moller-Maersk.

Given that ships are managed by companies with domestic identities and administered by national authorities through flag states, the idea of the IMO imposing and collecting a tax would be contentious. But the criticism of the carbon tax idea goes much further and critics have argued that a tax does not necessarily lead to a reduction in consumption – at least not to the magnitude likely to be required by post-Copenhagen targets.

A \$7.50 per tonne tax would raise, using a low figure of 350 million tonnes of global bunker consumption, some \$2.6 billion annually – a not insignificant sum; at \$45 this would increase to nearly \$16 billion, which would no doubt support numerous mitigation activities elsewhere. But the question remains on the impact it would have on shipping emissions.

Price increases in bunker fuel, particularly in 2008 when prices were nearly double average levels in 2005, have prompted shipowners and operators to pursue fuel efficiency measures, such as those employed by Maersk and already noted. But during this four-year period of a steady rise in fuel costs, global bunker fuel consumption increased. Although estimates vary greatly, consumption probably increased by around 100 million tonnes. As an example, fuel sales in Singapore between 2005 and 2008 increased from 25 million per annum to 35 million tonnes. As well, and while ship operators might not be expected to respond instantly to bunker price increases, the highest monthly sales total in Singapore in 2008 was in August, the same month as key grade IFO380 averaged \$670 per mt.

This year, in Singapore, the price of



Ships will face increased carbon costs in the future.

IFO380 increased by \$20 per tonne January through March, while bunker sales increased their monthly total by around 100,000 mt. It therefore seems likely that bunker consumption is not closely correlated with price, independent of other factors. This would make reducing ship emissions by a third using a bunker tax a major challenge – unless shipping's emissions could be off-set by the revenue from the tax being used elsewhere, which is in a way what a cap-and-trade system seeks to do.

Emissions trading

Proponents of a cap on shipping's emissions have argued that a tax on bunker fuel would be absorbed into the cost of doing business for shipping. The UK House of Commons, in its 2008-2009 report, noted the value of a trading scheme because, unlike a tax or levy, does put actual restrictions on ship emissions – the 'cap' of cap and trade – although the report was critical of the absence of definite figures for what a cap might be in the policy positions of the UK Government.

"The main advantage of a bunker levy scheme is that it is a simple concept. Its drawback is that it does not define an emissions reduction trajectory for the industry," John Garner, chairman of the emissions trading industry group SEAA, was reported saying this year. "Nor does the bunker levy scheme positively reward shipping's environmental performance improvements over and above fuel consumption savings."

SEAA has proposed a trading scheme based on the idea of a cap-and-trade system being considered by many national authorities and already in place in some industrial sectors, such as in Europe. Under such a system, and emissions cap would be set for shipping that limited the amount of CO2 that the industry could emit. SEAA has favoured a progressive reducing of the cap level to achieve a 50% reduction in emissions levels by 2050.

Credits to emit above this cap would have to be purchased on 'carbon exchanges'. If shipping could emit below its targets, the industry would be able to sell credits on such exchanges. If linked to other trading schemes, based on other industrial sectors that also had carbon caps, overall CO2 emissions across the globe could be closely regulated.

Emissions trading has garnered much industry support. In a poll this year on Sustainable Shipping, it received 41% support compared to 29% or respondents who favoured a bunker tax. An emissions trading scheme could be administered at an international level (although harmonisation could prove challenging), or if shipping was included in national CO2 totals it would trade with other industries within a particular country or jurisdiction – like the EU, which has looked at including shipping in the EU Emissions Trading Scheme (which already covers just over 50% of the EU's emissions).

Trading schemes, however, have been criticised as sending mixed price signals to

industry because the cost of carbon credits is always changing. This, it is argued, makes it difficult for industry to make long-term planning decisions on emissions reductions. In the EU's trading scheme, it was estimated that the price of carbon per tonne would have to be above \$30 for firms to invest in savings, but that carbon typically traded below this level. Carbon credit 'giveaways' in Europe for certain industries were also criticised with reports suggesting that the total number of credits made available was too high. As well, the effectiveness and costs would depend on the availability of carbon credits and their cost.

Carbon costs

At the Sustainable Shipping Forum in Washington, D.C. in October last year, Robin Meech, Managing Director of Marine and Energy Consulting, presented analysis of the cost to shipping of meeting a Kyoto Protocol-level target of a reduction of emissions by 5% of 1990 totals. Based on these assumptions, and a \$50 per tonne cost for carbon, Meech found that shipping would have to buy credits for 725 million tonnes of CO2; based on expected fuel use in 2012, and this would equate to an additional cost of around \$95 for every tonne of fuel purchased across the board – a not immodest amount but also not a significant cost to operators.

Bunkerworld extended this analysis for a variety of reduction scenarios in a 'Copenhagen Protocol' environment and

The cost of meeting carbon targets through cap and trade could cost the shipping industry billions of dollars.

based on different fuel consumption estimates for the future of shipping. In one scenario, a median approach was taken where shipping would be expected to reduce emissions from a 2000 baseline by 25% by 2025 and 50% by 2050 (in line with the SEAAAT proposal). Modest growth in bunker use was used: 420 million tonnes in 2025 and 535 million tonnes in 2050.

Using this approach the shipping industry would have to purchase just over 600 million tonnes worth of carbon credits in 2025 and over a billion in 2050. At a price of \$50 per tonne, this would be a substantial amount for the industry but, based on consumption, would be \$80 per tonne of fuel in 2025 and \$115 in 2050.

Estimates of future costs of carbon credits have varied. The Canadian government has based its calculations for a national cap-and-trade scheme on \$20 per tonne, around levels that the EU has seen on its trial exchanges. But a Canadian policy group report estimated that the cost would need to be more like \$100 per tonne to achieve meaningful reductions closer to expected future CO2 reduction

targets. With across-the-board reductions of CO2 in the range of 50-85% by 2050, there could well be too few credits for too many buyers, thus inflating the cost of carbon credits for those industries that cannot emit less.

In Bunkerworld's analysis, therefore, the per metric tonne cost of buying carbon credits could add \$160 per tonne to fuel bills in 2035 and \$230 by 2050. Other scenarios were run, using 1990 baselines, as well as more aggressive emissions reduction targets - up to 80% by 2050 - and various consumption scenarios. These higher targets increased the per tonne cost of bunker fuel by \$280-300 using a carbon credit cost of \$100.

Depending on the structure of a cap-and-trade scheme, however, the burden of purchasing carbon credits could fall on individual shipowners. This would create strong incentives to reduce fuel consumption and emissions. Based on average consumption figures, an individual ship not making any fuel savings could have to purchase anywhere from 2,000-8,000 tonnes of credits per annum in the future.

Challenges

In 2008, bunker prices were in the \$600 per tonne range in many ports before their return to half these levels this year. At the time, though, these high costs had a profound effect on the bottom lines of shipowners who were caught with escalating fuel bills and the unpopularity of implementing new surcharges for customers to pay.

Based on Bunkerworld's analysis, and using an average price of bunker fuel of \$300 per tonne, the cost of meeting carbon targets through cap and trade could cost the shipping industry billions of dollars and add anywhere from \$100 to \$300 to the cost of bunker fuel by 2050 - taking fuel prices back to 2008 levels. And this assumes that bunker prices will stay relatively flat in the interim, which seems increasingly unlikely; the IMO, in its GHG study, reportedly uses \$500 as its per tonne fuel cost in 2020 when assessing efficiency measures.

The challenge for shipping, therefore, is to embrace the coming carbon emissions cuts. If the IMO is not able to agree on an

international framework of cap-and-trade or bunker taxes, then the UNFCCC may act at Copenhagen at the end of this year with its own international system, or see shipping emissions included in individual country totals (as the UK, for example, has done).

Even at modest levels, carbon costs in the future will add to shipping's baseline fuel bill to the tune of hundreds of millions of dollars in total. This should be a powerful business incentive towards greater fuel and emissions efficiencies in international shipping.

Still, with any 'pricing' for CO2 emissions, whether through taxes or cap-and-trade schemes, relies on a certain inability of shipowners to be able to pass the costs of carbon onto, ultimately, consumers. It has been suggested that a suggested that a 5% levy on shipping fuel would translate into an increase in final prices of goods transported by sea of only 0.1%, so even a 20% tax would add little to the cost of goods. To actually reduce emissions from shipping might require these costs to be unable to be passed on.

Interestingly, the US found that its transport-related emissions declined by 5% in 2008, largely a result of the economic downturn. It might therefore be the case that shipping emissions, carbon costs, technological solutions, and shipowner cost structures are more dependent on the wider global economy. ■

Guy Wilson-Roberts

OUR BUNKERING SERVICES ARE FAR FROM CHILD'S PLAY

But our dedication towards performance and delivery will have you singing to a new tune.



WEST & EAST AFRICA
ATLANTIC/INDIAN OCEAN
CANARY ISLANDS
GREECE
WORLDWIDE TRADING



Addax Bunkering Services

A division of
Addax Energy S.A.

AN AFFILIATE OF THE ADDAX AND ORYX GROUP

12, rue Michel-Servet P.O. Box 404 1211 Geneva 12 Switzerland

Tel: (41-22) 702 90 40 **Fax:** (41-22) 702 91 40 **Telex:** 412 174 **e-mail:** abs@aoglt.com **website:** www.addax-oryx.com