Efficient CO2 regulation requires even pricing, not even cutbacks.

Last revision: 2011-05-26

Jack Devanney
Center for Tankship Excellence, USA, djw1@c4tx.org

When it comes to regulating ship-borne CO2 emissions, it all comes down to:

1. The atmosphere is a public good. It belongs to all of us.
2. As far as ships are concerned, we are giving away this public good. We are charging ships zero for the use of our atmosphere.
3. Unless we want to waste the planet's limited resources, we must cut back efficiently, that is, in the least costly way possible.
4. We need to balance the cost of pollution versus the cost of reducing pollution. If we charge each polluter the social cost of his pollution, then we will end up with the optimal amount of pollution and do it in the least costly way possible.

There are a number of obvious implications of these elementary principles:

The current level of pollution is irrelevent.

The fact that ocean transportation has much lower CO2 emissions per ton-mile than trucks or planes is irrelevant. What counts is what's the cost of cutting back? If it's cheaper to cut back on the ship side than the land side, then that's where the cut back should take place.

There is no requirement to cut back evenly.

The fact that the current level of pollution is irrelevent cuts both ways. There is no need to give a big polluter a break just because he is a big polluter. This is the philosophy of regulatory schemes that work from baselines based on the pre-regulation amount of pollution.

EEDI is such a scheme, proposing the same percentage reduction in EEDI (not CO2 emissions) over all ship types and sizes. Currently, IMO is discussing a 30% reduction by 2023. Under EEDI, the main way this will be accomplished is to build ships with lower speed capability. To meet the 30% requirement instead of building a 24 knot capable containership, the owner will have to build a 20 knot capable ship, a speed reduction of about 18%. For a 14 knot bulk carrier, the required speed reduction is also 4 knots, a 30% reduction, ending up with a ship that can only do 10 knots in calm water. This rewarding the big polluter may not be unethical, but it sure is wasteful.

Cariou finds that when bunker prices skyrocketed in 2008 and box rates plummeted in 2009, containerships on the Asia to Europe route slowed down much more than containerships on the South America to Europe route. The reason was obvious. There is almost no perishable cargo going from Asia to Europe and little reefer cargo. 30% of the cargo from South America to Europe is perishable and another 30% is reefer. The cost to society of slow-steaming South America to Europe is much higher than the cost to society of slow-steaming Asia to Europe. What happened is exactly what should have happened, except neither trade was being charged for its use of the atmosphere.

The social cost of cutting back can vary not only by trade but also with time. The tanker and dry bulk markets offer dramatic examples. These markets cycle between boom and bust. In boom, when ships are scarce the value of a marginal ton-mile to society is an order of magnitude or more higher than in slumps when ships are in surplus, and this is reflected in the spot rate. To efficiently reduce emissions, ships should reduce speed far more in a slump than in a boom.

There is a requirement to price evenly.

In the case of CO2 pollution, it is appropriate to assume that the social cost of each unit of CO2 is the same.[1] In such a case, each polluter must be charged the same price for his pollution. The obvious way to do this is with a tax. This eliminates the need for some regulator to guess how costly it is for each polluter to cut back. Those polluters for whom it is cheaper to cut back than pay the tax will cut back and those for whom it is cheaper to pay the tax than cut back will pay the tax.

Eventually, everybody gets to the point where the cost of cutting back one more unit is equal to the tax. At that point we will have reached the optimal level of pollution, and we will have done so efficiently.

[1] This is not necessarily true of all emissions. For example, the social cost of SO2 and NOx emissions depends on location, and in the case of NOx on local weather.