



UNDP Submission to

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Process on Oceans and the Law of the Sea (UNICPOLOS)

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Topic: Impacts of Ocean Acidification on the Marine Environment

WOS

Investigate the impacts of

the atmosphere to a sizeable degree, it has resulted in a change to ocean carbonate chemistry through lowering the average pH of the ocean by 0.1 units, this represents an increase in ocean acidity of about 30% (pH uses a logarithmic scale). In a business as usual fossil fuel use scenario, by the late 21st century ocean pH would drop by another 0.3-0.4 pH units, or an increase in acidity of over 200%. Marine organisms spend a lot of their energy maintaining their internal pH and as external seawater pH decreases,

areas. Toward the end of this century, saturation levels of calcium carbonate will not yet be corrosive to calcium carbonate on coral reefs. However it is likely that the rate of reef calcification will decline to a level such that coral reef erosion will exceed reef growth and reef habitat and

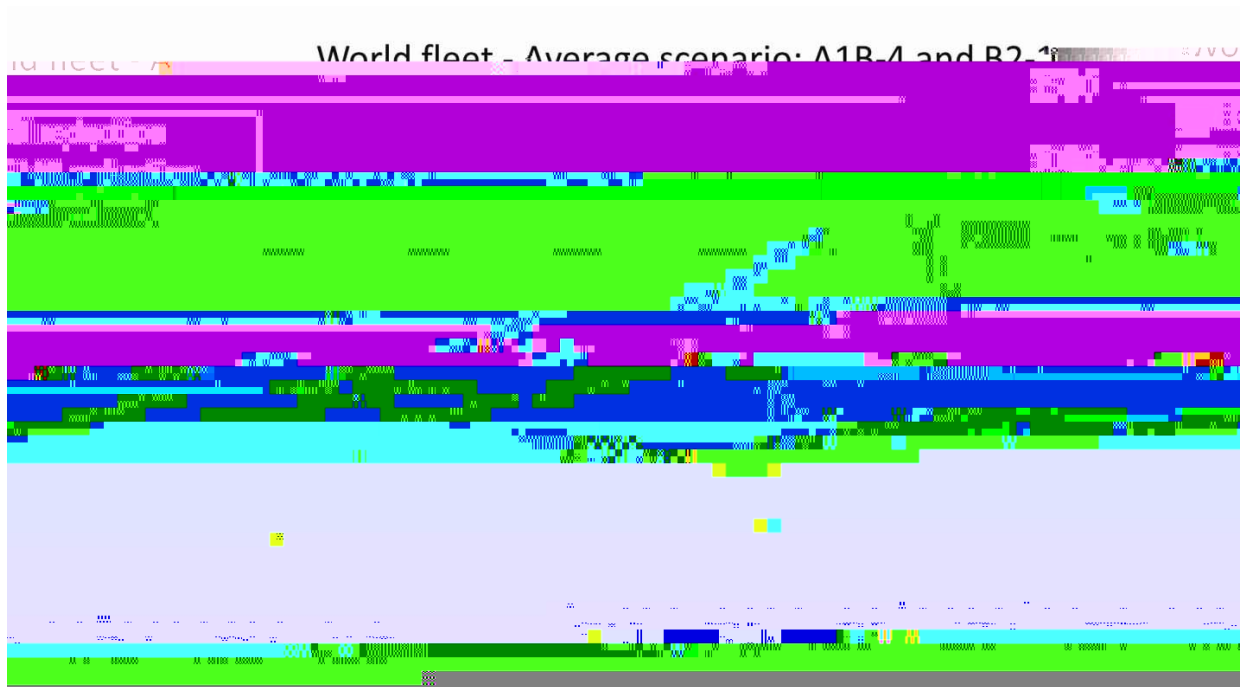


Figure 2: Impact on shipping CO₂ emissions of implementation of IMO Ship Energy Efficiency Management Plans (SEEMP) and Energy Efficiency Design Index (EEDI) measures, 2010-2050 (IMO, 2011)

Developing countries account for the largest portion of the world's fleet by tonnage, the majority of the world's shipyards and 90% of the busiest ports. At the same time, the knowledge base, legal/policy framework and technical and institutional

emerging global legal frameworks presents an excellent opportunity to deliver transformational impact towards environmental sustainability in the shipping industry. Costs, benefits and total catalysed finance for such a global initiative are estimated below.

Public Costs Shipping: Building on similar experiences (such as the GEF/UNDP/IMO GloBallast programme on reducing risk from invasive species carried in ship ballast water) for grant finance needed to catalyse shipping sector transformation, initial public costs are estimated at \$20 million for GEF or other financed Climate Change Mitigation project(s) to assist developing country and private sector shipping stakeholders in adopting and implementing IMO ship energy efficiency guidelines through development and promulgation of tools, methodologies, standards and guidelines for EEDI/SEEMP compliance.

Benefits/Avoided Costs Shipping: In a balanced fossil fuel growth scenario (UNFCCC SRES A1B illustrative scenario; IPCC(2000)), by 2050 shipping grows to about 5% of global GHG emissions vs. 3.3% under energy efficiency measures, so we assume 1.7% reduction in total climate change impacts by 2050 due to implementation of ship energy efficiency measures. Recent estimates (Stern, 2007) of the net projected global economic impacts of climate change in business as usual (BAU) 'high climate impact' scenario are 5% of global GDP or $.05 \times \$104 \text{ trillion} = \$5.2 \text{ trillion/year (2050)}$. This delivers a benefit estimate of $0.017 \times \$5.2 \text{ trillion} = \88 billion/year in avoided global climate change costs from ship energy efficiency by 2050. Additional benefits (avoided costs) of SEEMP/EEDI compliance realised by the shipping sector have been estimated as \$90-\$10 billion/year in fuel savings by 2030 (Bazari 2011).

Catalysed Private Sector Finance – Shipping: New IMO EEDI requirements are expected to catalyse sizeable investments in design of more efficient new ships including expected features such as more efficient engines, efficiency optimised auxiliary machinery, waste heat recovery systems, new lightweight construction, hybrid electric power, shaft propulsion generators, solar power, decreased design speed (power), advanced hull coatings, etc.; no estimates are yet available of projected new net investment in the sector but clearly it will be from multiple billions of dollars' stimulated by the new EEDI requirements; this is conservatively estimated at \$20 billion one time private sector finance. This is underscored by the fact that annual capital costs associated with new ships relative to annual fuel costs has changed $\Delta \text{TD} = .0001 \text{ Tc (SEEMP/EEDI)}$ / T

into services that can be bought and sold in functioning markets. Selected coastal habitats, particularly seagrass and

about three fourths of the world's 153 coastal nations; the World

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