EcoShip Fund

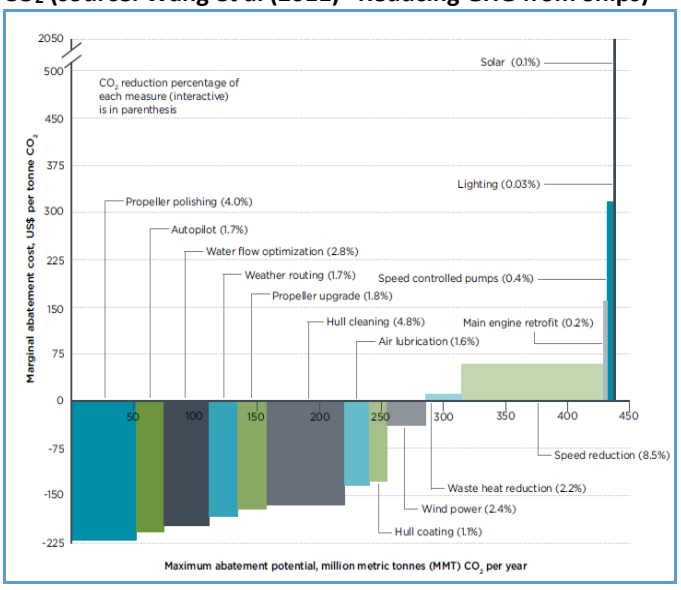
Save fuel. Save costs. Save the planet.

The Opportunity: Substantial CO_2 emission reduction at low cost

Carbon dioxide (CO_2) emissions from the shipping sector rose substantially in recent decades as global trade expanded. The International Maritime Organization (IMO), the governing United Nations agency of international shipping, predicts that the tonne-miles of goods moved globally will increase by 2-4% annually until 2050, nearly tripling the greenhouse gas (GHG) emissions from shipping[i].

Estimates show that existing technologies and operational measures could reduce CO_2 emissions from shipping by 450 million metric tonnes (mmt) by 2030[i,ii]. Around 300 mmt could be saved by implementing commercially viable technologies for which the fuel savings would exceed the investment in technologies. Figure 1 demonstrates the marginal abatement cost assessments of these energy-saving measures. For example, polishing ships' propellers, a simple maintenance measure, could reduce CO_2 emissions by 4% with a net saving of $220 per ton CO_2 reduced. Removing marine biological growth from hulls will contribute to another 5% reduction with a net saving of $175 per tonne CO_2 reduced.

Figure 1: The Marginal Abatement Cost Curve of Reducing CO_2 (source: Wang et al (2011) "Reducing GHG from Ships)



The Barrier: Split incentives inhibiting energy efficiency

The single biggest barrier to realizing the opportunity of reducing CO_2 emissions cost effectively is the financial incentive structure that does not reward investments in energy efficiency technologies. In the shipping industry, the ship owner controls capital spending including energy related investments, while the charterer bears the fuel costs. This split incentive structure primarily occurs when vessels such as bulk carriers, tankers, and containerships are hired for a specific amount of time.

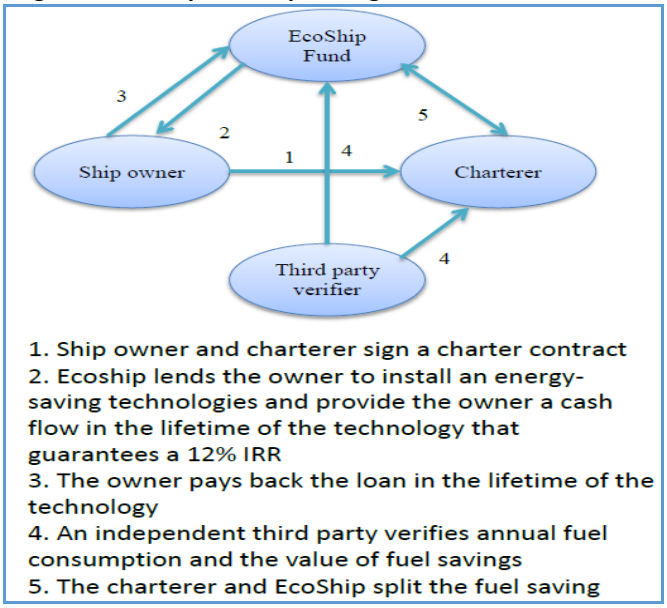
The Solution: EcoShip Fund

The EcoShip fund (EcoShip) will break the split incentive by offering financial incentives to both owners and charterers, providing a market-level return and substantial environmental benefits. EcoShip targets a 20% IRR with a 2.25% management fee (Table 1).

Table 1: FUND PROFILE
Target Fund Size: **$150 million**
Minimum investment: **$10 million**
Term: **15 years**
Target impact investors: **long term Institutional investors such as university endowments and pension funds**
Target IRR: **20%**
Fees: **2.25% management fee**

EcoShip will work with both the ship owner and the charterer when the owner leases a ship to the charterer. EcoShip will provide a loan to the owner to install an energy-saving technology that would earn Ecoship 8% interest throughout the lifetime of the technology. Ecoship will also provide the owner with a cash flow that guarantees the owner a 12% IRR for the lifetime of the energy-saving technology as an incentive for the owner to install the technology on the ship. Ecoship then splits the fuel savings, which are verified by an independent third-party, with the charterer. The fuel saving is based upon the ship's annual energy spending and a mutually agreed energy saving potential of the technology. Figure 2 below illustrates the operating model of Ecoship.

Figure 2: EcoShip Fund Operating Model



1. Ship owner and charterer sign a charter contract
2. Ecoship lends the owner to install an energy-saving technologies and provide the owner a cash flow in the lifetime of the technology that guarantees a 12% IRR
3. The owner pays back the loan in the lifetime of the technology
4. An independent third party verifies annual fuel consumption and the value of fuel savings
5. The charterer and EcoShip split the fuel saving

Table 2 shows the return and CO_2 reduction to Ecoship by applying the water flow optimization technology (WFO) to a 150,000 deadweight bulk carrier. WFO can reduce annual fuel consumption by 2-4%[i, ii]. As the sulfur content of the marine diesel oil is hundreds of times higher than on-road diesel, the reduction of sulfur dioxide is also significant.

Table 2: EXAMPLE
The cost of the technology**: $620,000**[i]
Annual fuel use of the bulk carrier: **14,133 tonnes**[i]
Fuel cost of 0.5% sulfur Marine Diesel Oil: **$700 per tonne**[ii]
Lifetime of water flow optimization technology: **9 years**[i]
IRR for EcoShip: **30%**
CO_2 reduction in 9 years: **10,017 tonnes**
SOx reduction in 9 years: **178 tonnes**

Importantly, we believe that this solution is scalable and capable of mobilizing a substantial amount of capital to help address the global challenge of rising carbon emissions. To address the split incentive problem and unlock the energy-saving potential, around $1 billion investing needs to be mobilized by 2030[iii].

Investment Criteria: Scope and Due Diligence

EcoShip Fund will target ship owners in the U.S. at the first stage, but has the scalability potential to expand to the international market. As shipping is in essence an international industry, expanding to the international market is also a necessity.

The fund will partner with the ship owners and charterers, and cooperate with third-party verifiers. Due diligence will include quantitative and qualitative assessments, third-party appraisals and an in-depth investment committee analysis.

Risk Factors: Industry and Fuel Risk

Industry Risk: If ship owners cannot find charterers willing to engage in this financing arrangement, they may feel compelled to lease ships to other charterers, as the opportunity cost of not leasing a ship is prohibitively high.

Lease default: The shipping industry is volatile. A period of weak international trade growth may cause ship owners and/or charterers to default. In the event of their default, EcoShip will have a claim against their assets.

Fuel Risk: The IRR to EcoShip is partially determined by the future fuel cost, which is highly volatile and uncertain. Lower fuel cost will reduce the IRR. In working with charterers, EcoShip can enter the futures market to lock in a target fuel price.

Impact: Economic & Environmental

Economic: Overcoming the current incentive structure that prevents investment in energy-efficiency would lead to $5 billion of fuel savings for ship owners and charterers by 2020[iv]. The economic returns are competitive and make the social impact that is much more achievable and scalable.

Environmental: Approximately 150 mmt of CO_2 emissions, or 70% of CO_2 emissions from fossil fuel consumption in Germany[v], could be reduced by 2020 if the split incentive structure inhibiting investment in energy efficiency technologies is addressed through this scalable solution. About 2.6 mmt of SOx emissions, equivalent to 27% of SOx emissions from the U.S. power generations, could be reduced as well.

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[i] Buhaug et al (2009) "The 2nd IMO GHG report" IMO

[ii] Wang et al (2011) "Reducing GHG from Ships" The International Council on Clean Transportation

[iii] Calculated based on SNAME (2011) "Marginal Abatement Costs and Cost Effectiveness of Energy-Saving Measures", IMO

[iv] Calculated based on Buhaug et al (2009) and Wang et al (2011)

[v] Department of Energy (2011) "Global, Regional, and National Fossil-Fuel CO_2 Emissions"