COST IMPACT OF GREEN SHIP REQUIREMENTS

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ABSTRACT

The global economy has been propelled by a very large amount by sea having carried more than 90% of global trade volume. Holding the past trend of the last 150 years, it can be estimated that nearly 23 billion tonnes of cargo will be transported by ships by 2060 [1] [2]. This paper give insights into the costly future of green ship requirements. The obvious result of shipping based environmental impact has been known for decades. Today the adverse influences of shipping on human health and climate change have been felt alarmingly and thus regulatory measures imposed by IMO, EU on GHG result significant outfitting and or conversion costs on shipping companies. The paper reports practical examples of cost impacts of green ship requirements and gives advices while discussing good and bad experiences.

Keywords: Climate Change, Green Ship, Cost Impact

1. Introduction

The global economy has been propelled by a very large amount by sea having carried more than 90% of global trade volume. Assuming the past trend of the last 150 years, a quick estimation shows that nearly 23 billion tonnes of cargo will be transported by ship by 2060 that amounts to be 2.71 times of the score in the year of 2010 [1] [2]. The obvious result of shipping based environmental impact has been known for decades. Today the adverse influences of shipping on human health and climate change have been felt alarmingly and thus regulatory measures imposed by IMO, EU on GHG result significant outfitting and or conversion costs on shipping companies. This paper give insights into the costly future of green ship requirements. Some practical examples of cost impacts of green ship requirements and gives advices while discussing good and bad experiences.

2. Green Ship Technologies

Green Ship is a description of all activities involving environmentally sensitive technologies in building/operating ships and other marine structures [EMEC, 2009; Andersen 2012]. IMO (International Maritime Organization) has been implementing rules for prevention of pollution caused by marine vehicles through the MARPOL 73/78 Convention. Besides the mandates of the IMO rules, the Green Ship efforts in the global maritime industry has been continuing in an intensive way that result valuable profits regarding the human health, the environment and thus ship operation.
Considering a marine vehicles to whom Green Ship features to be adopted, all needed technical activities provide attractive improvements from concept design to detail design, from manufacturing process to operation, and naturally her lifecycle period.

The main components of Green Ship technologies concerning shipbuilding and operation are listed as follows [3]:

1. Reducing Gas Emissions (NOx, CO2, SOx, Ozone, soot, smoke and particulate matter)
2. Fuel, lube oil and other chemicals leaking to the environment as harmful pollutants
3. Ship wastes, black and gray waters
4. Underwater coatings
5. Recycling materials
6. Management and monitoring energy efficiency
7. Education-training of human resources including managers with adequate quality standards

3. Cost Impacts

Green Ship requirements obliges the marine transport companies to pay extra investment and operating costs. On the other hand, companies adopting proactive actions and forecasting regulatory requirements are generally better positioned to hold a competitive advantage over peers.

The regulations regarding marine environmental protection have been setting more and more restrictive because of the alarming dangers encountered over the years. Table 1 shows the IMO Marine Pollution regulations that has been timely more stringent and thus enforced the ship designers, shipbuilders, marine equipment manufacturers and operators to fit the regulations.

Recently published Schroders’ Report [1] has investigated the additional costs of the Green Ship sanctions on the basis of large-scale maritime transport companies. A company having one of the largest container fleet (Enterprise-1) additional fuel costs represent 3.2% of 2015 estimated earnings before interest and tax (EBIT) while another company operating a fleet of large cruise vessels (Enterprise -2) this figure is calculated to be about 3.4% before EBIT. For its existing fleet the Enterprise-1 preferred to equip the exhaust gas recirculation systems on its existing fleet in order to comply the NOx rules that resulted an additional investment up to 25% of the existing machinery cost, and for a large capacity of the Ballast Water Treatment System the retrofit cost per ship is estimated to be Turkish Lira (TRY) 4.18 million. Enterprise -2 decided to equip the 70% of its fleet with the exhaust gas cleaning systems with an additional cost of TRY 1.13 billion per annum, and for substituting low sulfur fuels in order to catch the possibility of the operation in the ECA regions the expected additional fuel costs to be around TRY 331 million, (exchange rate TL/Euro = 0.244).

Green Ship requirements constitute significant key elements for the companies when shaping their strategic planning. This amount corresponds to a considerable decline of CO2 emissions thanks to IMO's work done in the year 2012 (see Fig. 1). Besides the direct contribution to
lowering climate change issue, the Green Ship sanctions will increase the superiority of environmental competitiveness of maritime transport compared to other modes of transport (Fig. 2).

Table 1. IMO MARPOL Conventions [4] [5]

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Figure 1. 3rd GHG Study findings: GHG emissions per ship type for 2007 - 2012, (multiply 10^6 ton). [5].
Figure 2. GHG Study findings: Shipping relative efficiency (in CO$_2$ gr/ton$^\ast$km) [4].

4. Conclusions

The global economic downturn have been adversely effected by the virtue of introducing excessive supply of products other than balancing the required demand. The trend in shipbuilding and shipping trade shows to have overcapacity problems. The impact of the regulations on fuel quality, NOx and greenhouse gas emissions and ballast water treatment systems will continue to play its important role. As the regulatory sanctions will require immediate solutions and material challenges the shipping companies have to be proactive regarding the timeline of the regulations. The retrofitting activities will be intensive in the scene and will cost by high amounts, nevertheless solution based right strategies and correct decisions will result cost effective management of the green regulations. Manifestly, Green Ship efforts will lead reducing or removing harmful environmental emissions, and include investment into research and technological design to ensure ships safer and more sustainable.

7. References