Air pollution generated by cruise ships at berth

With a focus on reduction technologies

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Abstract

Air pollution consists of a variety of substances, which may not be harmful when emitted, but when reacting with other substances it may become harmful. Some of the substances in air pollution is known to cause eutrophication, acidification and is a threat to the human health.
The shipping industry is one of the most environmental friendly methods for transportation and traveling.
Over the last two decades the number of cruise ships visiting the Baltic Sea has increased, and this increase is expected to continue. Cruise ships at berth contributes to air pollution in the cities they visit and their surroundings areas when producing their own energy.
The air pollution is induced in order to comply with the energy demand from passengers and crew members.
This present thesis investigates how the emissions has been managed so far, and investigated which technology or technologies should be implemented in order to reduce the sir emissions when at berth
The investigation leads to the choice the use of a shore line to supply the cruise ships with electricity, due to the more efficient reduction in the air emissions when compared with the other examined technologies.
A case study is conducted in order to examine the viability of the shore line. The cost-effectiveness and a calculation of the investment when solely the using the reduction of CO_2 as the effect is conducted. When solely using the reduction CO_2 emissions as the effect the investment in a shore line is not economically viable at current time. However these calculations are subject to significant uncertainties.
Further examinations are made. By estimating the approximate annual emission from cruise ships at berth the emissions are monetized by using the shadow prices of each substance. Thereby another estimation of the economic impact is conducted, and by monetizing the emission, the investment becomes economic viable, the avoided cost for the society by installing a shore line is higher than the cost.