

SOLAR ENERGY IN MARINE FIELD

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ABSTRACT: The main economical background of many country is shipping industry but it stands the top most position in polluting the nature. It creates atmospheric pollution, sound pollution, wild life collusion, conventional pollution, green house gas pollutant, oil spills etc., by using solar panel we can convert solar energy into mechanical energy and can use the energy to run the propeller. By this way we can control some of the pollutions which are emitted by the ships during the voyage.

Keywords:- pollution, oil spills, solar panel, Nano technology.

1. Pollution caused by ship using Diesel engines:

Conventional pollutant:

Air pollution from cruise ships is generated by diesel engines that burn high sulphur content fuel oil, also known as bunker oil, producing sulphur dioxide, nitrogen oxide and particulate, in addition to carbon monoxide, carbon dioxide, and hydrocarbons. Diesel exhaust has been classified by EPA as a likely human carcinogen. EPA recognizes that these emissions from marine diesel engines contribute to ozone and carbon monoxide non-attainment (i.e., failure to meet air quality standards), as well as adverse health effects associated with ambient concentrations of particulate matter and visibility, haze, acid deposition, and eutrophication and nitrification of water. EPA estimates that large marine diesel engines accounted for about 1.6 percent of mobile source nitrogen oxide emissions and 2.8 percent of mobile source particulate emissions in the United States in 2000. Contributions of marine diesel engines can be higher on a port-specific basis. Ultra-low sulfur diesel (ULSD) is a standard for defining diesel fuel with substantially lowered sulphur contents. As of 2006, almost all of the petroleum-based diesel fuel available in Europe and North America is of a ULSD type.

Of total global air emissions, shipping accounts for 18 to 30 percent of the nitrogen oxide and 9 percent of the sulphur oxides. Sulfur in the air creates acid rain which damages crops and buildings. When inhaled, sulfur is known to cause respiratory problems and even increases the risk of a heart attack. According to Irene Blooming, a spokeswoman for the European environmental coalition *Seas at Risk*, the fuel used in oil tankers and container ships is high in sulphur

and cheaper to buy compared to the fuel used for domestic land use. "A ship lets out around 50 times more sulfur than a lorry per metric tonne of cargo carried." Cities in the U.S. like Long Beach, Los Angeles, Houston, Galveston, and Pittsburgh see some of the heaviest shipping traffic in the nation and have left local officials desperately trying to clean up the air. Increasing trade between the U.S. and China is helping to increase the number of vessels navigating the Pacific and exacerbating many of the environmental problems. To maintain the level of growth China is experiencing, large amounts of grain are being shipped to China by the boat load. The number of voyages are expected to continue increasing.

2. Greenhouse gas pollutant:

As one way to reduce the impact of greenhouse gas emissions from shipping, vetting agency RightShip developed an online "Greenhouse Gas (GHG) Emissions Rating" as a systematic way for the industry to compare a ship's CO₂ emissions with peer vessels of a similar size and type. Based on the International Maritime Organisation's (IMO) Energy Efficiency Design Index (EEDI) that applies to ships built from 2013, RightShip's GHG Rating can also be applied to vessels built prior to 2013, allowing for effective vessel comparison across the world's fleet. The GHG Rating utilises an A to G scale, where A represents the most efficient ships. It measures the theoretical amount of carbon dioxide emitted per tonne nautical mile travelled, based on the design characteristics of the ship at time of build such as cargo carrying capacity, engine power and fuel consumption. Higher rated ships can deliver significantly lower CO₂ emissions across the voyage length, which means they also use less fuel and are cheaper to run.

3. Small passenger ship built using solar panel:

The solar boat I toured, the Turanor (the name comes from J.R.R. Tolkien's fantasy books) weighs about 100 tons, and to provide enough power for an average cruising speed of just 5 knots, requires 29,124 of some of the most efficient silicon solar panels available, many of them cantilevered out past the edge of the boat. It's made from expensive, lightweight composite materials. Container ships transport as much as 150,000 tons of freight and travel much faster.



Fig. 1 passenger ship with solar powered motor

But while solar power likely won't replace fossil-fuel power outright in large cargo ships, it could work for some smaller ships, or to help lower fuel consumption on the big ones. solar panels might work well for small ferries—indeed a company called **Solar Sailor** already operates such ferries. **One option** is combining solar and wind power to produce some or all of the power for a ship.

A recent demonstration project used solar panels to provide about 10 percent of the electricity for a cargo ship to reduce emissions from the low-grade fuel such ships use. Such systems could also reduce shipping costs by reducing the amount of fuel consumed. Prices for fuel are so high now that some shipping companies are slowing down their ships to the point that they're travelling **slower than old sail-powered ships**. That could **open an opportunity for wind powered ships**, at least for some applications.

4.CARGO SHIP



Fig. 2 cargo ship using solar pannel

It seems everything from **rooftops** to **cell phones** come equipped with solar panels. Now, huge cargo ships are the latest entities to join the solar power fray. The M/V Auriga Leader, now docked at the Port of Long Beach in California, **recently unveiled an impressive array of 328 solar panels** that will power the ship's main electrical grid, making this the first ocean liner to be propelled in part by the sun's rays.

The ship's new solar array is part of a demonstration project organized by the **Port of Long Beach, Toyota** and Tokyo-based shipping company, **NYK Line**. The project aims to reduce ships' dependence on diesel, a dirty fuel that releases significant amounts of greenhouse gas emissions even while crafts are docked and unloading cargo at port.

While other ships have used solar panels before to power small electronics like auxiliary lights, the *Auriga Leader* is the first craft to direct solar power into the ship's main electrical grid. Energy from 328 panels is helping to power the ship's thrusters, hydraulics and steering gear, providing about 10 percent of the ship's total electricity usage.



Fig.3. Solar panel in cargo ship



5. Fuel Consumption of Solar Ships:

If the solar power ships are launched it could save 20% to 40%, or around USD\$3m (£2m; \$3.1m), off a ship's annual fuel bill when travelling at 16 knots (18mph), with the solar panels contributing an extra 3% to 6% saving.

"The systems were are installing are worth around A\$6 million and therefore the return of investment would be a couple of years at the current oil price

"It's not a matter of if we're going to do it, it's a matter of how - right now we are working out the details."

6. New Proposal:



Fig.4. Future generation solar powered ship

By using nano technology, nano solar panel can convert solar energy into mechanical energy and can use the energy to run the propeller. By this way we can control some of the pollutions which are remitted by the ship during the voyage.

7. Conclusion

Air pollution from cruise is generated by diesel engine that burn high sulphur content fuel oil also known as bunker oil, producing sulphur help and guidance di oxide, Nitrogen oxide, carbon di oxide, carbon monoxide can be control by employing this method in future generation ships.

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