

Climate change risks and impact costs for the Mediterranean Shipping Company

Introduction

The impact of climate change cannot be ignored whether it be nature taking its course but us as humans we play a role in its influence of speeding up global warming. Global warming is the very essence of the climate change we see today. Gases such as carbon dioxides, chlorofluorocarbons, methane, nitrous oxides, hydrofluorocarbons...etc. exposed to the atmosphere in abundance serve as a catalyst in global warming. The scorching temperatures are causing an upset to nature hence we witness irregularities in our climate resulting in unpleasant weather such as heat waves, droughts, floods, tsunamis, landslides, cyclones...etc. The industrial revolution is said to have kick-started global warming. With the production processes requiring energy to run and the only viable energy sources then being fossil fuels caused unforeseen drastic changes to our climate. Since then we have been forced to seek green energy to use rather and make it as effective, if not more, as fossil fuels. Reducing the content of greenhouse gases in fossil fuels is the first step in the right direction of slowing down the escalating process of global warming, then eventually eliminating the use of fossil fuels to counter the process.

The Mediterranean Shipping Company is the second largest shipping company in the world with a fleet of 480 container ships which totals 2.6 million TEU's and 12 cruise ships. That means an extensive amount of fuel is used to power these ships. The problem with the fuel ships use is its Sulphur content, the shipping industry has been put under pressure of using fuel with a lower Sulphur content over the years. The UN International Maritime Organization has introduced a summit for Sulphur content used trading vessels worldwide, from the 1st of January 2020 they require that all ships use fuel of a 0.5% Sulphur content ,rather than the current 3.5%, aim being to minimize the Sulphur oxide emissions into the atmosphere (Anon. 2018).

The effects of Sulphur oxides in atmosphere

Bunkers used on vessels cause multiple gas emissions, mainly CO₂ (carbon dioxide), SO_x (sulphur oxides), NO_x (nitrogen oxides), PM (particle matter) (Webmaster 2018). Sulphur oxides are more of a concern to the impact they have on the environment. When sulphur oxides combines with water and air, it forms sulphuric

rain, a main component of acid rain. Acid rain can cause deforestation, acidify waterways to the detriment of aquatic life and corrode building materials and paints. When sulfur dioxide is released into the atmosphere it can pose a risk to our health as it affects the respiratory system, particularly lung function, and can irritate the eyes (Queensland Government 2018).

Controlling sulphur emissions

Sulphur oxide emissions can be controlled by either eliminating the use of fossil fuels or using fuels with less sulphur as possible. The current sulphur content used by ships for their bunkers is at 2.45% average outside the Emission Controlled Areas. The Marine Pollution Convention, under the International Marine Organization, Annex VI Regulation 14 enforces the use of low sulphur fuel. Reduction of reducing sulphur oxides from bunkers first came into force in 2005. From the 1st of January 2020, the limit for sulphur in fuel oil used on board ships operating outside designated emission control areas will be reduced to 0.50% m/m (mass by mass) (Anon 2018).

Outside an ECA established to limit SO_x and particulate matter emissions	Inside an ECA established to limit SO_x and particulate matter emissions
4.50% m/m prior to 1 January 2012	1.50% m/m prior to 1 July 2010
3.50% m/m on and after 1 January 2012	1.00% m/m on and after 1 July 2010
0.50% m/m on and after 1 January 2020*	0.10% m/m on and after 1 January 2015

Table 1: SO_x emissions outside and inside of an Emission Controlled area (IMO MARPOL Annex VI).

In table 1 we see the gradual progress over the years of limiting the sulphur content on bunker and this has made quite a stir in the trade industry as ship owners are forced to change into lighter bunkers which has cost implications. When ships are bound for a deep sea voyage they normally use heavy fuel oil, which has a higher sulphur content than light bunkers. Light bunkers are normally used for coastal navigation so the ship may maneuver efficiently and effectively, also used to achieve max speed if a ships is to escape a Tropical Revolving Storm out at sea. Emission Controlled areas would then resulting rather more expensive sea areas to navigate through. The reason that the ECA's have lower limits in because of the narrow channels in which the navigate through, the land surrounding those waters are inhabited and if not monitored strictly of the sulphur content of fuel ships use would result in devastating health of inhabitants and environment.

Countries that have ships navigating up rivers to get to the harbour have been established as ECA's. Here is a list of the ECA's established:

1. Baltic Sea area – as defined in Annex I of MARPOL (SO_x only) (IMO MARPOL Annex VI) ;
2. North Sea area – as defined in Annex V of MARPOL (SO_x only) (IMO MARPOL Annex VI);
3. North American area (entered into effect 1 August 2012) – as defined in Appendix VII of Annex VI of MARPOL (SO_x, NO_x and PM) (IMO MARPOL Annex VI).; and
4. United States Caribbean Sea area (entered into effect 1 January 2014) – as defined in Appendix VII of Annex VI of MARPOL (SO_x, NO_x and PM) (IMO MARPOL Annex VI).

Brief introduction on Mediterranean Shipping Company

MSC is the only organic, and at some point was solely own by Gianluigi Aponte, who founded the company in 1970 by buying his first ship *Patricia* then followed by *Rafaela*. MSC operates globally transporting a wide range of commodities, and specialized shipping services such as dry cargo, reefers, foods and beverages, agriculture, mining, automotive...etc. (Maritime Injury Center. 2018).

Cost implications due to climate change for MSC

The 2020 cap said to be effective as from the 1st of January 2020 will be one of the most anticipated nightmare financially when the sulphur content on fuel is once again lowered to 0.5% from 3.5%. MSC S.A.'s running costs are expected to rise significantly (Anon. 2018). MSC ships a large percentage of S.A.'s imports and exports, this will definitely have a negative impact on the country's currency as it still plunges due to other short comings. Trade as we know it today is mostly due to shipping, if fuel prices hike for ships due to them forced to use more refined fuel, will have us as consumers having to dig deeper into our pockets to maintain our lifestyles or else getting our priorities reviewed. This will have a ripple effect on almost every product we buy off the shelves as shipping is the most reasonable way of transporting goods from one country to the other. This then calls for strategies of changing the way we are trading as a country.

Strategies

South Africa imports more than it exports which means we rely more on other countries for products we use daily, be it furniture, foods, clothes...etc. S.A. has become more of a consumer based than being productive, our agriculture sector, although it's still one of our strongest, has diminished over the last two decades. People

have become more urbanized due to development post-apartheid era and more opportunities opening for the previously disadvantaged. With the jobs being saturated people have awoken to realize the importance of agriculture and how lucrative it is. Agriculture is one of many to be mentioned and it too faces climate change challenges. According to Luyolo Mkentane (2018:6), The National Department of Agriculture, Forestry and Fisheries (Daff) has warned that the devastating effects of climate change would be massive if global warming is not adequately addressed in the country. Daff director-general Michael Mlengana said the department had adopted Climate Smart Agriculture as a flagship programme to promote and upscale sustainable agriculture production while reducing greenhouse gas emissions. Perhaps agriculture has a lot of challenges to be pursued by people how have very little knowledge about it because even well-established farmers are finding it hard to sustain themselves.

Mining would be a great idea too if it weren't for the minerals that are almost exhausted in our mines or just simply not cost effective to extract as they are very deep down below the surface. Some of our most fertile grounds that could be used to farm crops and produce high yields are used for mining. According to Luyolo Mkentane (2018:6) "Another sizeable part of the province's fertile agricultural land is used by mining conglomerates for extensive coal and platinum production operations."

In Asia we find that countries are thriving through innovation which we find little of in our country. Perhaps we are too look into innovating products which promote green living which would be seems to be very attractive to the world since we face challenges of climate change due to global warming. Clean energy is what everyone talks about these days, preserving resources...etc. Many ways of producing clean energy has been experimented on but yet one of the challenges of them are the costs of running. Clean energy is by means of converting natural energy into electricity. Here are examples of clean energy currently being used in S.A.:

Solar Energy

Solar energy is used to power equipment such as watches, calculators, cookers, water heaters, lighting, water pumping, communication, transportation, power generation, and many more. Solar energy, like all other renewable energies, is very safe and environmentally friendly. There are no emissions as the source of fuel is the sun, unlike coal-powered stations (Anon. 2018.2).

Most areas in South Africa average more than 2 500 hours of sunshine per year, and average solar-radiation levels range between 4.5 and 6.5kWh/m² in one day.

The southern African region, and in fact the whole of Africa, has sunshine all year round. The annual 24-hour global solar radiation average is about 220 W/m² for South Africa, compared with about 150 W/m² for parts of the USA, and about 100 W/m² for Europe and the United Kingdom. This makes South Africa's local resource one of the highest in the world (Anon. 2018.2).

The use of solar energy is the most readily accessible resource in South Africa. It lends itself to a number of potential uses and the country's solar-equipment industry is developing. Annual photovoltaic (PV) panel-assembly capacity totals 5MW, and a number of companies in South Africa manufacture solar water-heaters (Anon. 2018.2).

A pilot programme has been launched to establish a limited number of public-private sector institutions in conjunction with the relevant municipalities to provide electricity services on an integrated basis. The service-provider will own and maintain the systems, allowing longer-term financing to ameliorate monthly payments. It will provide the service against a monthly fee (Anon. 2018.2).

Once the underlying managerial and funding issues have been resolved, the process will be expanded to cover all rural areas. Solar power is increasingly being used for water-pumping through the rural water-provision and sanitation programme of the Department of Water and Sanitation (Anon. 2018.2).

Hydro-power

Energy from water can come from waves, tides, waterfalls and rivers and will never be finished as long as we have water. In South Africa, we have a mix of small hydroelectricity stations and pumped water storage schemes. In a pumped water storage scheme, water is pumped up to a dam (Anon. 2018.2).

Pumping the water uses some electricity but this is done in off-peak periods. During peak hours, when extra electricity is needed, the water is released through a turbine that drives an electric generator. Peak hours are usually between six and eight in the morning and evening (Anon. 2018.2).

South Africa used to import electricity from the Cahora Bassa hydropower station in Mozambique and will do so again when the transmission line is repaired. There is also the potential to import more hydropower from countries such as Zambia, Zimbabwe and Zaire. If this happens, South Africa could become less dependent on coal-fired power stations (Anon. 2018.2).

However the generation of hydroelectricity is not without environmental effects. Large areas of land may be flooded when dams are built. This will disrupt wildlife habitats and residential and farming areas. Another problem is that cold water released from deep in a dam may have little dissolved air in it. If large amounts of this water are released into rivers, fish may be killed. But proper management can avoid this (Anon. 2018.2).

Global pressures regarding the environmental impact and displacement of settlements by huge storage dams will likely limit the exploitation of hydropower on a large scale. Irrespective of the size of installation, any hydropower development will require authorisation in terms of the National Water Act 1998, Act 36 of 1998(Anon. 2018.2).

Conclusion

I believe that if our education were to be structured in a way that we focus on fields that would develop interest in innovation of products and that promote green living in each and every aspect would be ideal to counter global warming whilst improving our economy. For example we see China thriving because of the way they're education system is structured. We have thousands of qualified graduates sitting at home which proves that our not effective at all when we compare it on a global scale. Companies are now looking for people who have the mentality of changing our world for the better and making a huge turnover by doing so. If we were to achieve such then we be competent globally as we would share a common vision and goal. Preserving our natural resources while we sustain our way of living would be the greatest achievement as we are putting ourselves along with the earth to a verge of extinction.

References

Anon. 2018. 2020 Sulphur Cap, MSC news, 24 September. Available: <https://www.msc.com/gbr/news/2018-september/2020-sulphur-cap?lang=en-gb#> (Accessed 09 October 2018)

Queensland Government. 2018. Sulfur dioxide, Environment, land and water, Queensland Government. [ONLINE] Available: <https://www.qld.gov.au/environment/pollution/monitoring/air-pollution/sulfur-dioxide> (Accessed 10 October 2018).

Webmaster. 2018. Air Emissions - Air pollution - Air Emissions - EMSA - European Maritime Safety Agency. [ONLINE] Available: <http://www.emsa.europa.eu/main/air-pollution.html> (Accessed 11 October 2018).

Anon. 2018. Sulphur 2020 – cutting sulphur oxide emissions – Marine Exhaust Solutions. 2018. Sulphur 2020 – cutting sulphur oxide emissions – Marine Exhaust Solutions. [ONLINE] Available: <https://marineexhaustsolutions.com/sulphur-2020-cutting-sulphur-oxide-emissions> (Accessed 12 October 2018).

IMO MARPOL Annex VI. 2018. Sulphur oxides (SOx) – Regulation 14. [ONLINE] Available: [http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Sulphur-oxides-\(SOx\)-%E2%80%93-Regulation-14.aspx](http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Sulphur-oxides-(SOx)-%E2%80%93-Regulation-14.aspx) (Accessed 12 October 2018).

Maritime Injury Center. 2018. Mediterranean Shipping Company | Maritime Injury Center. [ONLINE] Available: <https://www.maritimeinjurycenter.com/maritime-companies/mediterranean-shipping-company/> (Accessed 12 October 2018).

Luyolo Mkentane (2018). IOL Business Report. 2018. Devastating effects of climate change in SA, IOL Business Report. [ONLINE] Available: <https://www.iol.co.za/business-report/economy/devastating-effects-of-climate-change-in-sa-15555741> (Accessed 12 October 2018).

Anon. 2018.2 | Department: Energy | REPUBLIC OF SOUTH AFRICA. 2018. Renewable Energy | Department: Energy | REPUBLIC OF SOUTH AFRICA. [ONLINE] Available at: http://www.energy.gov.za/files/esources/renewables/r_solar.html (Accessed 12 October 2018).