LIFE CYCLE ANALYSIS OF THE PROPOSED MUNICIPAL SOLID WASTE MANAGEMENT – WASTE TO ENERGY INCIENRATION SYSTEM IN GAMPAHA DISTRICT

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Degree of Master of Engineering

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Thesis/Dissertation submitted in partial fulfillment of the requirement for the Master of Engineering

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…… ……..

Signature of the supervisor: Date

Acknowledgment

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…….

Danisha Sammani

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ABSTRACT

Municipal Solid waste ,which is generated from different activities has become a major crisis not only in Srialanka ,but also to the rest of the world . In Sir lanka, we have been struggling with this problem since Avery long time, which we are still failed to adopt a sustainable solid waste magnet system in our country.

There are different waste management methods adopted in different parts of the world to manage this national problem in a sustainable way. Open Dumping, OceanDumping, Sanitary Landfilling ,Composting and recycling, Incineration are the common methods of managing the Municipal

In Srilanka ,Open Dumping is the main and highly adopted method of disposing the waste form their household premises which they called “Managing “.Due to lack of knowledge in waste management and its negative environmental impact to society people tend to dispose there waste even in roads, bare lands etc .Also there are specific locations where garabage is been dumped legally by the local authorities which are now turned in to garbage mountains of large heights.. Meethotamulla,Bluemendal,Karadiyana , are well-known garbage dumping locations which is fed by MSW s every day .

The improper management of waste has created lots of negative impacts in Srilanka in the recent past years. Among them the incident of collapse ”Meethotamulla “ garbage which was collapsed on 14th April 2017 has lost lives of 30 human and destroyed the homes of lot of people lived nearby. So it is no doubt that it is a national problem which all the responsible authorities should address it with a sustainable solution.

The generation of Solid Waste is calculated as 7000-8000 of tons per day in Srilanka, among this amount approximately 3500 tons of MSW is collected per day as rest of the waste is undergone through the different waste disposing methods. According to statistics it is calculated that 58 % of collected waste is from the western province or the waste from Kaluthara,Colombo and Gampaha districts.

As shown by the statistics a higher proportion of waste generation is from the Western Province of the country and due to increasing population it is important to implement sustainable solution to this problem.

After discussing on different feasible options as a solution to this problem government has decided to convert the waste in to energy by waste incineration technology .They have decided to build three waste to energy plants one in Muthurajawela ,Kerawalapiyita, which will manage all the MSW s from Colombo municipal council area which is about 700 MT per day ,also the plant generate 10MW of power and it is fed to the national grid. The other plant will be located in "Muthurajawela" which will convert the 650MT of Solid Waste from the Gamapaha district also add 10MW of electricity power to the national grid. The third plant is to be built in "Karadiyana"to treat 500MT of waste which is also a 10MW plant.

The overall process of the conversion of this MSW in to energy contains bunch of activities which has its own impact to the environment .To identify the impact on the environment by this proposed process can be analysed using well known method ;Life Cycle Analysis .

The Life Cycle Analysis is a good concept of analysing any system to evaluate its overall environmental impact. It shows the areas of impact generation and contribution of each activity for an identified impact. Then a detail analysis can be used to identify the impacts and take necessary actions to reduce them.

Since there is no any life cycle analysis has done for the proposed incineration system which is going to be adopted in Srilanka in the near future this has identified as the knowledge gap which I am going to address in this of research thesis.

For this assessment I have selected the proposed waste to energy incineration system in Muthurajawela which will treat the MSW s in Gamapaha district. Among many available software tools to analyse the LCA, I will be using the" OPEN LCA" with limited to certain boundary conditions.

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LIST OF ABBRHIVIATIONS

LCA Life Cycle Assessment

LCI Life Cycle inventory

LCIA Life Cycle Impact Assessment

CO2 Carbondioxide

NOx Nitrogen Oxides

PM Particulate matter

SOx Surfur Oxides

MSW Municipal Solid Waste

MT Metric Ton

Kg Kilo Gram