

Sustainability of the heat energy generation process of a leading textile manufacturing industry in Sri Lanka

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According to the Sustainable Energy Authority of Sri Lanka, the nation is encouraged to embrace best sustainability practices on its journey to national development. Currently, the apparel export industry is one of the most prominent and valued contributor for Sri Lanka's economy. In a leading textile manufacturing industry where the research was carried out, three different types of boilers are used to generate steam to get the heat energy required for the fabric manufacturing process. These boiler types are coal fired boiler, furnace fuel fired boiler and a fossil fuel gas fired boiler. The research was conducted by thorough monitoring of the above mentioned boilers, by structured interviews with the engineers of the plant over a time period of 4 weeks and by comparing calculations made for efficiency of steam generation and the total cost for each boiler. Furthermore, environmental impacts caused by each boiler were also considered. From the cost point of view coal fired boiler is the most suitable. Cost of 1kg of coal is Rs.16.00, 1 L of furnace fuel is Rs.60.00 and 1 kg of gas is about Rs. 210.00. From the efficiency point of view furnace fuel fired boiler is the most suitable out of the three types of boilers. Coal fired boiler produces $12,000 \text{ kJ kg}^{-1}$, furnace fuel boiler produces $27,000 \text{ kJ kg}^{-1}$ and gas fired boiler produces about $21,000 \text{ kJ kg}^{-1}$. All three types of boilers cause environmental impacts, which can be minimized by taking suitable measurements. After considering all facts, it was concluded that the coal fired boiler fulfils the industrial purpose the most. This was because it can produce more energy by the least amount of cost. Also it is easy to maintain and easy to control the environmental impacts caused by it. Simple methods such as wet scrubbers can be used to minimize the environmental impacts caused by it. The coal fired boiler, is in fact used as the main boiler in the leading textile manufacturing industry, where the research was carried out.

Key words: Sustainable energy, industrial boilers, coal fired boiler, environment