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Reduction in Carbon Footprint by Saving Power and Fuel

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***Abstract*: Current development in boiler operation is focused on improving energy efficiency, reducing energy consumption and reducing greenhouse gas emissions. In light of increasing fuel costs and awareness in environmental concerns, improvements in boiler efficiency have been an important issue for achieving the optimization of energy consumption. Performance quantification is the important result of system evaluation and provides a useful index to assess and improve performance and future designs, technologies and applications. This research uses furnace oil to design special combustion optimization methods by using an Oxygen-Hydrogen mixed additives supplemental injection for combustion to provide boilers with improved thermal energy, and tests potential energy saving efficiency, with a targeted result of expected 15% to 20% savings. The waste gas emitted by boilers, (including HC, CO, CO2, NOx, SOx, etc.), seriously damages the environment and creates a negative impact on air quality. This research measures and investigates changes in emissions of waste gases produced by furnace oil with different Oxygen-Hydrogen mixtures. The results indicate that 4 TPH steam boiler using Furnace oil with an introduction of 5000L/Day of Furnace oil & fluid water required is 60,000 liter/day. Thus, the introduction of Oxy-Hydrogen can effectively inhibit soot and other emissions.**

***Keywords*: Boiler Operation, Carbon Reduction, energy saving, efficiency of boiler, Additives.**

1. Introduction

Environmental focus is an integrated part of Areas business strategy towards customers and within their own organization. The aim of this report is to get an overview of Areas greenhouse gas (GHG) emissions and to facilitate the identification of concrete measures in order to reduce energy consumption and GHG emissions contributed from own operational activities. The data collection involves the commitment from employees from various group levels. The annual carbon footprint accounting report allows the organization to benchmark performance indicators and judge progress over time. The carbon accounting offers a general summary of the company's gas emissions, reborn into greenhouse gas equivalents, supported according information from internal and external systems.

A. Carbon footprint

Product carbon footprints provide an estimate of the total amount of greenhouse gases (GHGs) emitted during the life cycle of goods and services, i.e. from the extraction of raw materials, production, transportation, storage, use and waste disposal. They are calculated by businesses, governments and others in order to understand the emissions of GHG from consumer products, including food. Carbon footprints can also be calculated for e.g. nations, individuals, events or organizations.

B. Carbon label

A carbon label is a public declaration of the carbon footprint of a given product. This can appear on the packaging of the product, or alternatively it can be made available to interested stakeholders by other means, such as on a website or in company literature. Each of the greenhouse gases has different impacts on the atmosphere, termed their global warming potential (GWP). The level of GWP depends on how long they survive in the atmosphere, their current concentration in the atmosphere and their ability to capture infrared radiation. In order to simplify discussion of the impacts of different mixes of GHGs the global warming potential of 1 kg of each gas is compared to that of 1 kg of carbon dioxide. The latest estimates suggest that the impact of 1 kg of methane on global warming is equivalent to that of 25 kg of carbon dioxide, while 1 kg of nitrous oxide is equivalent to 298 kg of carbon dioxide (IPCC 2007b). After making the impact of all the GHGs equivalent to that of carbon dioxide, their impacts can be summed and the overall impact can be expressed as kg of CO2-equivalent

2. Study of carbon emission and rise in temperature

Reducing emissions in boiler and to achieve maximum efficiency, a comprehensive approach is necessary. By understanding of the steam operating system, and its processes, most powering plants can greatly increase efficiency while reducing emissions. Boiler efficiency represents the difference between the energy input, and energy output. Typical boiler will consume large initial capital expense in fuel usage annually. A difference of just a few percentages in boiler efficiency between units can translate into substantial savings. The data of efficiency used for comparison between boilers must be based on parameters to produce an accurate comparison of fuel usage. Reduction of carbon emission is achieved by saving coal by condensate recovery, correcting insulation, arresting leakage,

regular clearing of fire side and water side, Additives- Fire side-Water side and by using water scrubber.

A. Condensate recovery

Is Any process that allows energy contained in Steam condensate to go unutilized, is losing money in terms of fuel costs. Steam condenses to water at saturated temperature and so, depending on the pressure during condensation, the temperature of water may be 100 C or more. Content of heat in condensate is about 20% of the energy burnt in the boiler. This usable heat energy if not recycled for reuse as boiler feed water or any process hot water requirement. Forbes Marshall Thermo compressor systems, condensate contaminate detection systems, Pressure powered pumps & condensate heat recovery systems are some of the specialized equipment that help make the best use of the energy available in condensate.

B. Importance of insulation

Significant heat loss will occur through the boiler shell. Proper insulation is important to keep these losses to a minimum. The refractory material lining the boiler is that the primary building material. When replacement refractory materials at existing plants, structural considerations must be taken into account to assure the boiler can support the weight of the new refractory material. New construction will account for the load of the refractory material within the industrial boiler style. The quantity of heat lost in this manner is fairly constant at different boiler firing rates and, as a result, becomes an increasingly higher percentage of the total heat losses at the lower firing rates. The radiation loss at high firing rates varies from a fraction of 1 p.c up to 2 p.c, depending on the capacity of the boiler. Insulation is any material that is employed to restrict the transfer of heat energy. It will usually be categorized as either mass or reflective sort counting on whether or not it's geared toward reducing semiconducting or radiative heat transmission, respectively. Properly applied insulation may result in giant savings in energy losses counting on sort, thickness, and condition of the existing insulation. Radiation losses tend to extend with decreasing load and might be as high as seven p.c for tiny units or larger units operative at reduced hundreds.

C. Arresting Leakages

As there are certain lines for transferring steam, as it could have minute holes or small crack which can cause leakage of steam and also condensate leaks from pumps where it does not have correct maintenance.

D. Additives

The primary operation of a boiler is to transfer heat from hot gases generated by the combustion of fuel into water tallit becomes hot or turns to steam. The steam or predicament is then utilized in a range of facility processes. Boiler feedwater typically contains impurities, that impair boiler operation and potency. To improve feedwater quality and steam purity, moreover as correct different issues caused by impurities, chemicals is injected directly into the feedwater or steam. Chemical additives increase boiler potency, scale back fuel, operative and maintenance prices, minimize maintenance and period, and shield instrumentation from corrosion and extend instrumentation life. Types of Additives Boiler Water Treatment Chemicals and Additives from Rohmer and Fernox Accurate chemical water treatment and skillful maintenance are key elements to attain optimal hydronic boiler operation. Some boilers require yearly chemical maintenance as part.

E. Wet scrubber

Wet Scrubbers are a effective pollution management devices for removing particles and/or gases from industrial exhaust streams. A Wet Scrubber operates by introducing the dirty gas stream with a scrub liquid usually water. Particulate or gases square measure collected within the scrub liquid. Wet Scrubbers square measure typically the foremost acceptable pollution management device for collection each particulate and gas in a very single system. Pollution Systems offers a range of Wet Scrubber systems specifically designed for your method application. Many vital in operation variables square measure thought of once evaluating the dimensions and sort of scrubber for any specific application, and your point in time is often an element in our responsiveness.

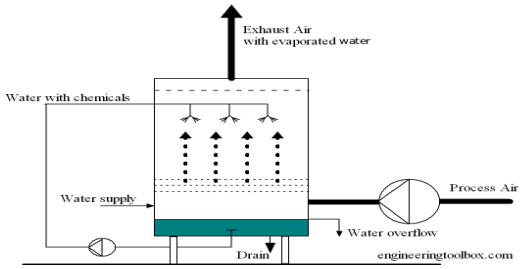

Fig. 1. Wet scrubber

F. Advantages & disadvantages

For particulate management, wet scrubbers (also stated as wet collectors) square measure evaluated against material filters and electricity precipitators (ESPs). Some blessings of wet scrubbers over these devices square measure as follows:

- Wet scrubbers have the ability to handle high temperatures and moisture.
- In wet scrubbers, flue gases are cooled, resulting in smaller overall size of equipment.
- Wet scrubbers can remove both gases and particulate matter.
- Wet scrubbers can neutralize corrosive gases.

Some disadvantages of wet scrubbers embrace corrosion, want the necessity |the requirement} for entrainment separation or mist removal to get high efficiencies and therefore the need for treatment or recycle of spent liquid.

G. Wet scrubber repairs

Various factors additionally to time and use will cause a

chemical or particulate scrubber to degrade and operate less with efficiency. Unfortunately, if your instrumentality isn't operating properly, your operations may well be negatively affected, and since of this, it's very vital to conduct scrubber repairs, retrofits and upgrades as soon as they are needed.

Here square measure the foremost common problems for wet scrubbers:

- Corrosion removal/repair
- Instrumentation replacement, calibration, tuning
- Motor, fan, pump, and metering pump maintenance/repair
- Equipment wash-outs.

3. Conclusion

Reduction in Carbon Footprint by Saving Power and Fuel. With objective of saving power & fuel that is converted into CO_2 and to compare how much carbon reduction can be achieved to produce same product per M^3

4. Future scope

To reduce the GHG and improve the environmental area and also improve the efficiency of boiler.

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