



# REDUCTION IN CARBON FOOTPRINT BY SAVING POWER AND FUEL

ANIKET VANJARI<sup>1</sup>, JAYESH PATIL<sup>2</sup>, MAHESH SANGOLIKAR<sup>3</sup>, JAYESH KAMBLE<sup>4</sup>

MECHANICAL ENGINEERING, SUMAN RAMESH TULSIANI TECHNICAL CAMPUS-FACULTY OF ENGINEERING, KAMSHET, PUNE, INDIA<sup>1-4</sup>

**Abstract:** Prasol is a top producer of speciality chemicals, serving more than 50 countries with products for Paints & Coatings, Agrochemicals, Personal Care, Lubricants, Surfactants, Pharmaceuticals, and other industries. By combining our efforts to provide consistently high-quality products and first-rate after-sales support, we want to bring success to our customers. Our humble beginnings are anchored in the production of chemicals based on phosphorous, from which we further diversified into chemistry based on acetone, with a fully integrated value chain across the product line.

## I. INTRODUCTION

The purpose of this study is to provide an overview of the area's greenhouse gas (GHG) emissions and to identify practical steps to cut down on energy use and GHG emissions from own operational activities. Employee participation at various group levels is required for the data gathering.

The organisation can measure performance indicators and assess development over time with the use of the yearly carbon footprint accounting report. The Greenhouse Gas Protocol Initiative (GHG-protocol) was created to control greenhouse gas emissions. Carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF<sub>6</sub>) are the six most significant greenhouse gases taken into account by the technique.

The carbon accounting report should provide useful data that may be used to make decisions for both internal and external operations. The operational control approach specifies what should be included in the carbon inventory and how the emissions are divided into direct and indirect emissions.

## II. LITERATURE REVIEW

Product carbon footprints provide an estimate of the total amount of greenhouse gases (GHGs) emitted during the life cycle of goods and services. Carbon labels are a public declaration of the carbon footprint of a given product. Each of the greenhouse gases has different impacts on the atmosphere, termed their global warming potential (GWP). 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. Energy use continues to rise and with it the emissions of CO<sub>2</sub>.

Energy efficiency methods have been applied across sectors, but residential, work place, leisure, and service sectors still use large amounts of energy and produce large emissions of CO<sub>2</sub>. Successful strategies used in the processing industry for integrating energy systems, namely Total Site targeting, have been applied to locally integrated energy sectors.

Carbon capture and storage (CCS) facilities coupled to coal-fired power plants provide a climate change mitigation strategy that potentially permits the continued use of fossil fuels while reducing the carbon dioxide (CO<sub>2</sub>) emissions. Potential design routes for the capture, transport and storage of CO<sub>2</sub> from United Kingdom (UK) power plants are examined. Energy and carbon analyses were performed on coal-fired power stations with and without CCS.

Cost estimates are reported in the context of recent UK industry-led attempts to determine opportunities for cost reductions across the whole CCS chain. Possible key advances for CO<sub>2</sub> capture technology over the next 50 years are also identified. Understanding the impact of your carbon footprint is an important step towards reducing greenhouse gas emissions, one of the leading causes of climate change. There are many ways to reduce your carbon footprint and contribute to a more sustainable future.

**III. PROBLEM STATEMENT**

Study of carbon emission and rise in temperature from

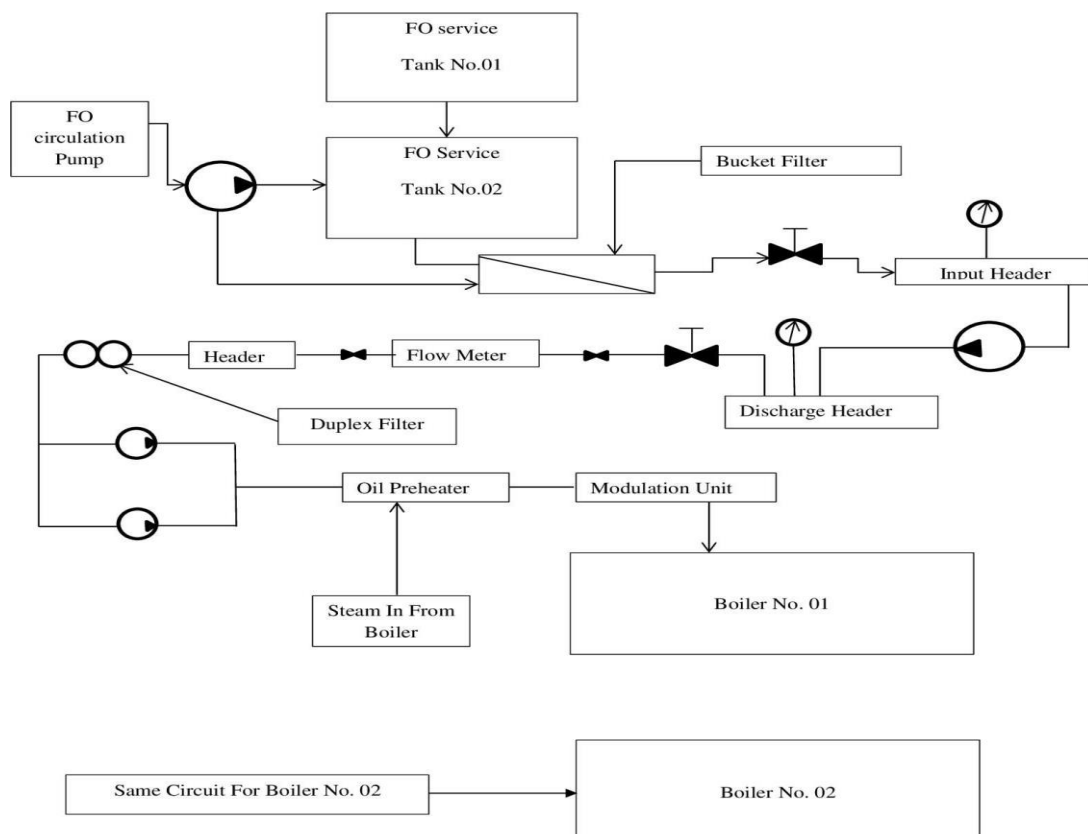
1. Furnace oil
2. Power
3. Emission of gases & rise in temperature (Generation of number of kcal. From 1kg offurnace oil)
4. Emission of carbon & rise in temperature while generating 1kwh of electrical power.

To reduce carbon emission by saving furnace oil. What is furnace oil?

Fuel oil (also known as heavy oil, marine fuel or furnace oil) is a fraction obtained from petroleum distillation, either as a distillate or a residue. In general terms, fuel oil is any liquid fuel that is burned in a furnace or boiler for the generation of heat or used in an engine for the generation of power, except oils having a flash point of approximately 42 °C (108 °F) and oils burned in cotton or wool-wick burners. Fuel oil is made of long hydrocarbon chains, particularly alkanes, cycloalkanes and aromatics. The term fuel oil is also used in a stricter sense to refer only to the heaviest commercial fuel that can be obtained from crude oil, i.e., heavier than gasoline and naphtha.

Each gas's effect on climate change depends How much is in the atmosphere ? Concentration, or abundance, is the amount of a particular gas in the air. Larger emissions of greenhouse gases lead to higher concentrations in the atmosphere. Greenhouse gas concentrations are measured in parts per million, parts per billion, and even parts per trillion. One part per million is equivalent to one drop of water diluted into about 13 gallons of liquid (roughly the fuel tank of a compact car). Some gases are more effective than others at making the planet warmer and thickening the Earth's blanket. Carbon dioxide (CO<sub>2</sub>) is the primary greenhouse gas emitted through human activities. In 2023

For each greenhouse gas, a Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO<sub>2</sub>). Gases with a higher GWP absorb more energy, per pound emitted, than gases with a lower GWP, and thus contribute more to warming Earths.

**IV. PROCEDURE**

### Polymer Plant

Previously in the polymer plant, as shown in fig. to recover the condensate there was a condensate pump. But that system was gone, failed, due to the number of lines connected & flash steam pressure was high i.e. 3kg/cm<sup>2</sup> and a lot of condensate was going wasted.



### Tank installation

Thus we decided by consulting an authorized person to install a big size capacity tank of 1.5 m<sup>3</sup> at a suitable level with a centrifugal pump & electrically operated level switch for transferring condensate to a boiler feed water tank. Flash steam wastage



For flash steam recovery, a flash vessel will be connected, and that flash steam will also heat the feed water. As shown in fig

## V. METHODOLOGY

Condensate forms as the steam transfers its heat and condenses. It is irresponsible to waste this by-product. The clean water is without dissolved solids or gases that are ready for use again in your boiler.

### Correcting Insulation

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

### Regular cleaning of fire side and water side of boiler

Cleaning boiler fire sides: Excessive fireside deposits of soot, scale, and slag cause the following conditions: reduced boiler efficiency, corrosion failure of tubes and parts, reduced heat transfer rates and boiler capacity, blocking of gas passages with high draft loss and excessive fan power consumption.

**VI.CONCLUSION**

Our group project is Reduction in Carbon Footprint by Saving Power and Fuel. We saved power & fuel that we converted in CO<sub>2</sub> and tried to compare how much carbon used less to produce same product per M<sup>3</sup>.

But numbers of factors are affecting to produce same product with standard yield that are:

1. Failure of electricity while reaction.
2. Quality of raw material.
3. Wastage of batch.
4. Environmental issues like humidity.
5. Heavy water.
6. Human negligence, etc.

Due to these factors it can be seen in graph 5.5.1 that there are variations in production but after completion of our project the range of CO<sub>2</sub> emission is less and there is some consistency. To produce products in any manufacturing unit numbers of activities are carried out like, producing its raw material up to that units, transport facilities for employees, pumping of water for process, burning of fuel for steam and electricity generation, transportation of steam and water for reaction, running of machineries for operations collection and transportation of generated waste, transportation of finished goods up to cooking of food for employees.

From all these activities numbers of gases are emitting which are affecting environment all these gases collectively called Greenhouse gases and converted in the form of CO<sub>2</sub> by device called GH protocol.

**REFERENCES**

- [1] Design of a load carriage system oriented to reduce acceleration forces when carrying a backpack by camilo eduardo perez and oscar ivan campo in feb 2008
- [2] Soldier load carriage : historical , physiological , biomechanical and medical aspects by joseph j. Knapik , katy l. Reynolds and everett harman in aug 2010
- [3] Suspended load backpack final report by mathew esper , mathew vanderpool , megan van weiren , prof r. Brent gillespi and melinda sedon in april 2006
- [4] Biomechanical analysis on human gait and posture for development of floating backpack- putra, n. K. ;khagi in april2022
- [5] Suspended-load ergonomic-backpack developed that dramatically reduces the dynamic forces on the body by laurence c rome, andy l ruina.sep 2012
- [6] importance to evaluate the kinematic responses to existing load carriage operations by deepthi majumdar, madhu sudan pal, dhurjati majumdar.dec 2020
- [7] studies into the biomechanics of load carriage by joseph f seay.jun 2015dynamic modeling and simulation of the suspended-load backpack to obtain optimal suspension and reducing effect of grf by narendra kurnia putra , suprijanto , and andar bagus sriwarno 2011 oct