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Dynamic Method to Control the Coal Pollution

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ABSTRACT: Coal pollution is a very serious problem because it generates a lots of disease due to pollution. Millions people will die in whole world per year. Over the past decades many techniques and or resources are used to generate the electricity or power but coal is a unique source of power producing. Now still we are so much developed but also still we are mainly depend on the coal to produce the power that's why it is used mainly in coal fired power plant. In coal industry, they burn the coal and after burning the coal a lots of heat is to be generated and they are using this heat to either running the turning or any other places. Main objective of this is to produce the electricity. After burning of the coal, If releases a lot of gases which are harmful like as fly ash content ,Carbon dioxide (CO2), Carbon monoxide(CO) , Nitrogen(N2) , Hydrogen(H2) , Sulphur(S) , Ammonia(NH3) and moisture(H2O) . According to the various research, the production of CO2 is much larger than the other element which mostly affects the global warming. This project has a new concept which aims to reduce most of those gases which comes out from the thermal power plant. An experimental study has been conducted to check the Amount of pollutants which is comes out from the our prototype and on the basis of the result the amount of pollutants reduction will be calculated. I have reduces all the harmful gases by recycling process. This paper has aim to reduce all the harmful gases which affects the our environment and our system.

Keywords:pollution, carbon monoxide, electricity, turbine, recycling etc.

I. INTRODUCTION:

Coal is mainly used to generate the electricity. Coal has become the most common source used in generation of steam to produce power. Coal fired power plant currently account for about 36% of the electricity generated in the world wide because coal is an abundant and inexpensive fuel. Three major concern arises from the fossil fuel combustion. The release of SO2 and the formation of release of nitrogen oxide, and the release of fly ash content which is also known as particulate matter. After burning of the fuel, fly ash content will be emitted and they will release in to the atmosphere by which they degrade the quality of the environment and they causes a lot of problems related to the health. Due to burning of the fuel, it release the carbon monoxide and by which they causes to the depletion of the ozone layer and as a result, it causes the cancer. That's why to control the emission is very important. We are doing recycling process to reduce the coal pollution because if all industry adopted my technique then they can helps to control the pollution .

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Fig. 1 (Coal fired power plant) energy.economicstimes.indiatimes.com

COAL TYPES:

Coal types	Ignition temperature	Volatile initial release temperatu
Lignite	250-450	130-170
Bituminous	400-500	200-300
Anthracite	700-800	380-400

Table (1) Heating characteristics of coal www.wikipidia.com

- Bituminous coal is the most abundant rank of the coal found in United States, and it is accounted for about 48%of the total U. S coal production in 2019.
- Bituminous coal is used to generate the electricity and it is an important fuel and raw material for making cooking coal
- It is also used in iron and steel industry.

GAS EMITTED FROM THE POWER PLANT: There are the various types of gases which are emitted after burning of the coal.

Pollutants	Anthracite	Lignite
CO2	96,400	101,000
CO	89.1	89.1
NOx	292	183
SO2	765	1361
PM	1203	3254

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Organic compounds	4.92	7.78
Total vol.of flue gases	360	444

Table 2. Components of coal gas. Taken from EEA agency (2008)

Working Steps Of Recycling Of Gases:

Step1:To remove the fly ash content : After burning of the fuel, A lot of gases is released in which one is the fly ash content. Fly ash content is emitted from power plant and it makes a deep impact on the health of the human. We are using the **esp.**(electro static precipitator)

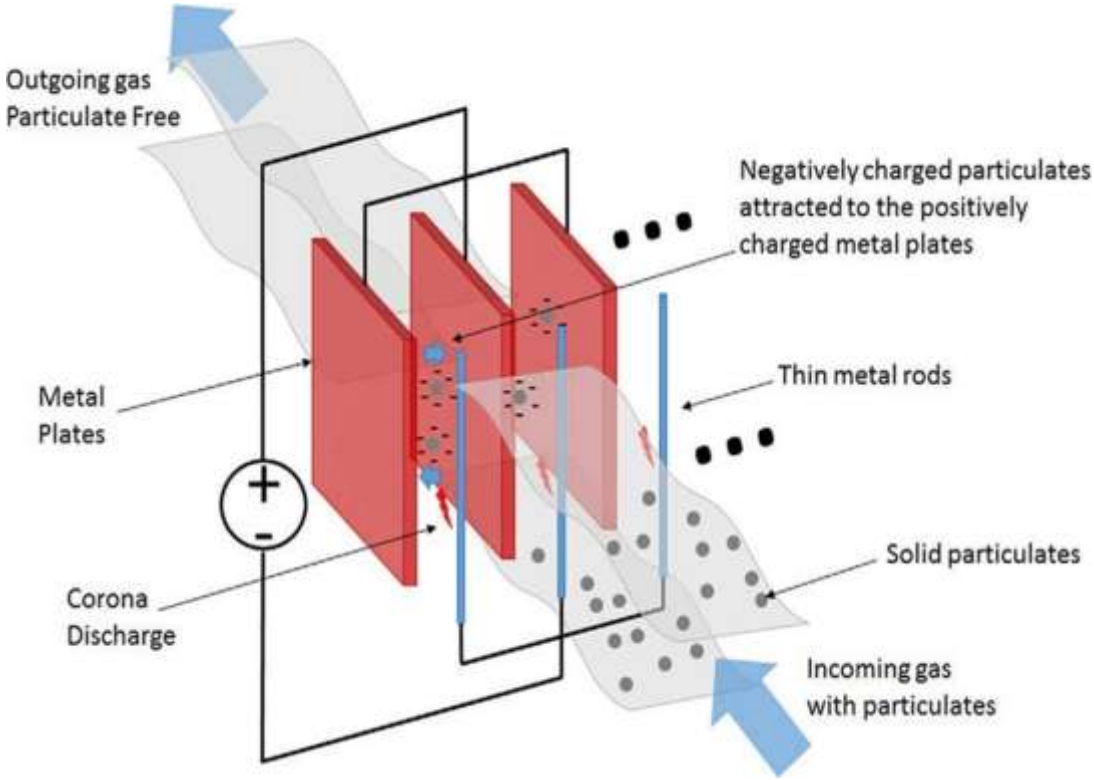

Fig. 2 (Electrostatic precipitation) www.sorcedata: data

Step2: To compress all gases and store at high pressure: After passing through the esp. All refined gases are compresses at a very high pressure and temp that's why and after this it is collected in a closes leak proof gas chamber.

Step3 : Remove moisture : Now, we move on next stage and gases will flow inside the basement of the chimney inside a closed pipe and when gas move inside the basement of chimney where a very high temperatures exits then by increasing temperature, moisture present in the coal gas will removed.

Step4 :Remove the Ammonia and N2 : Now, gas temperatures will continuously increased and when it reaches to 300-400C then at this temperatures, Ammonia breaks in to Nitrogen and hydrogen. Now at this stage finally we get the nitrogen components and the hydrogen.

2 NH3 = N2 + 3H2 (at 300-400 C)

Step5: Remove the carbon dioxide : Now still gases are moving inside the pipes inside the basements where high temperatures will be present now then, at the temperature of 800-900 Carbon dioxide will break in to carbon and oxygen.

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CO2 = C + O2 (at 800-900c)

Fuel	CO_2 emissions (lb/MWh)
Coal	1,900
Natural gas	1,200
Nuclear	2
Hydro	3
Biomass	4
Wind	1
Solar photovoltaic	2
Geothermal	3

Fig.3(CO2 emissions data from coal gas) cleanenenergywire. Org

Step6 : To supply extra steam : when we gets Carbon and oxygen And at that particular place, we are supplying the water in side the basement of chimney through the pipe which gets converted in to steam and they reacts with carbon and make CO and H2 and we gets a little among of ammonia.

2C + O2 = 2CO

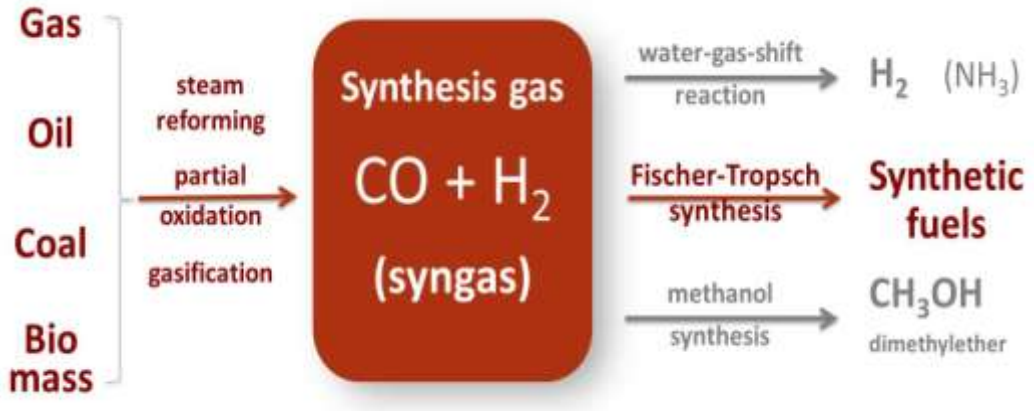

Fig. 4 (Only show combination of syn gas) AAVOS..

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WORKING PRINCIPLES OF RECYCLING PROCESS OF COAL GAS:

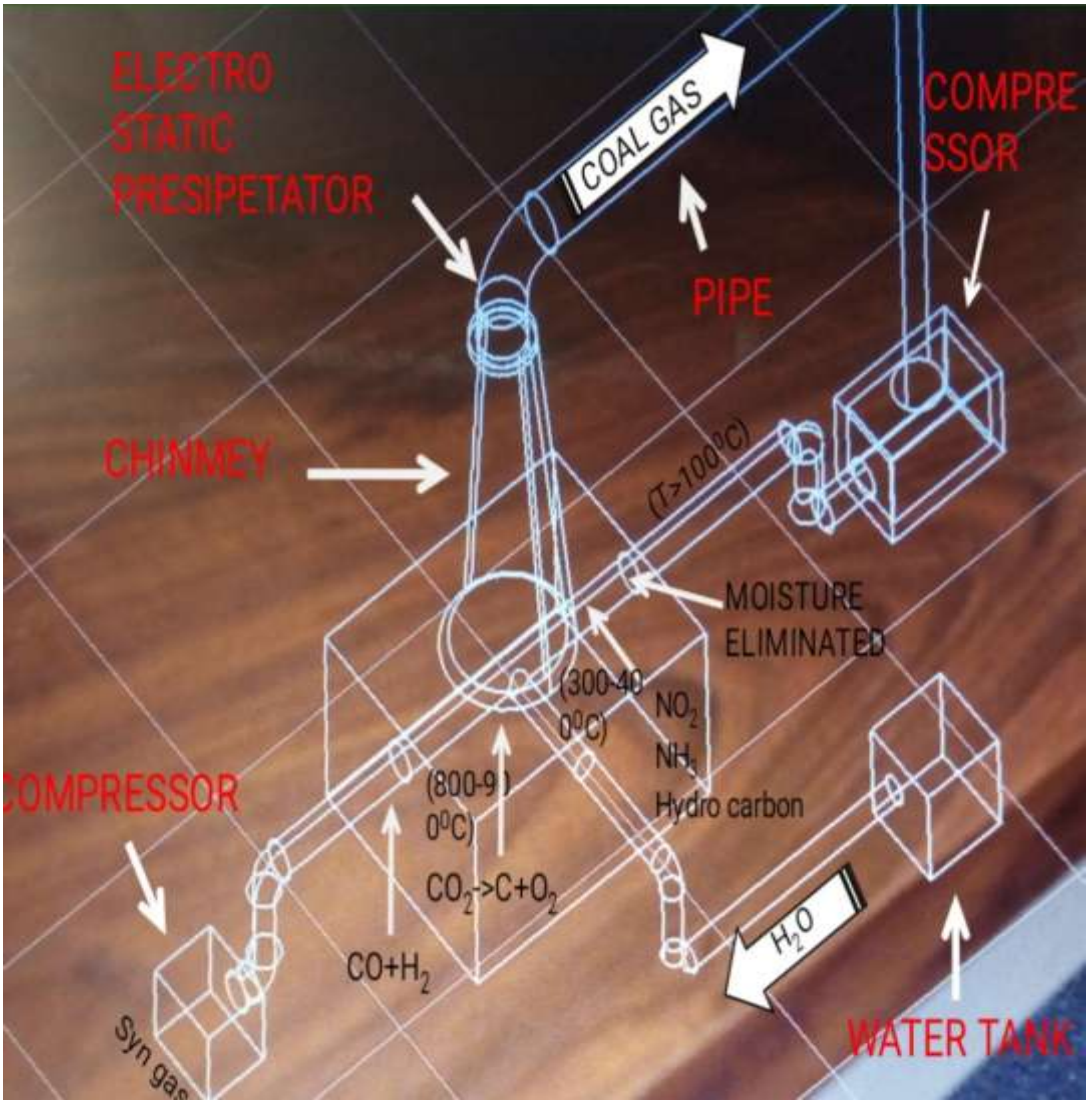

Fig. 5 (Complete process of reducing the coal gases) made by self on catia

We are provides such a beautiful Concept of recycling process of coal gas it is applicable at each and every like as coal fired power plant and chimney which are situated in the village and now first of all, after burning of the coal, it produces a lot of gases but first of all we are removed the fly ash content which is removed by the use of electro static precipitation and now these gases move through the pipe which are shown above below in the diagram and now all gases is stored in a chamber at a very high pressure and temperatures and now then we are release the stored gas in another pipe by outlet and then theses pipes will passes through the basement of the chimney where very high temperature is available now , after this when gases move inside this, then temperature of gases will increase and when temperature reach at 100C then moisture present in the gas will be removed . After this, gas temperature will continue increase and when temperature reach at 300-400C then ammonia will break in its own composition and now when temperature reaches at so much high near about 800-900C then carbon dioxide will break and after this at this place we are supplied the water which gets converts in to the steam and now at this place reaction takes place and make CO+H2+N2. Combination of CO+H2 is known as syn gas or water gas. Finally after doing this

process, we are able to reduce the pollution and make safe to our environment.

Advantages Of Recycling Process: There are the following advantage which are describes below.

- Finally we gets syn gas.
- Syn gas or water gas is used to make the methanol.
- It is also used to make the ammonia.
- It is used as per industrial purpose.
- Fly ash content is used to increase the strength of the cement.
- It is also used to make the carbon rod.
- We save our environment.

II. CONCLUSION:

After doing all these process, we are removing all the harmful gases which are produced after burning of the coal. To remove the harmful gases, we save our life from several disease which are causes due to only harmful gases like as respiratory problem. Due to emission of Carbon dioxide and CO, it depletes the ozone layer and also they are responsible to increase the temperature of our earth and also responsible for to change the climate but after recycling process, all harmful gases will removed that's why we save our climate and environment. Syn gas has its own industrial applications to make several things .

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