GASIFICATION

In lieu of

INCINERATION

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Background

- GP Energy, through its parent company entered into the field of Biomass Gasification in 1987.
- It is based on fixed grate updraft technology.
- The basic engineering package was supplied by an expert from Power Gas Corporation, UK.

Process Technology

GP Gasification Plant

Hot Gas Out at 100^0 - 110^0C

V.M.> distillation > Hydrocarbon - Heat

$C + CO_2 = 2CO$ - Heat

$CO + H_2O = CO_2 + H_2$ - Heat

$C + CO_2 = 2CO$ - Heat

$C + H_2O = CO + H_2$ - Heat

$C + 2H_2O = CO_2 + 2H_2$ – Heat

$C + O_2 = CO_2$ + Heat

Particulars of Producer Gas

Gas Composition :

CO_2 : 8 -10 % O_2 : Less than 1.0 %

CO : 18 to 20% CH_4 : 1.5 -2 %

H_2 : 15 to 18% N_2 : 54 - 56 %

Calorific Value (Gross) : 1200 - 1300 K.cal/ Nm^3

Sp. gravity : 0.92 (air = 1)

Yield of Gas : 1.90 - 2.30 Nm^3/ kg. of biomass

Tar & Particulate in gas : < 10mg/Nm^3

Commercial Applications of GP Gasifier

- Power generation by dual fuel i.e. 70 – 75% of gas & 25 – 30% of diesel oil in Diesel Engine.
- Power generation by single fuel i.e. 100% of gas in Spark Ignition Engine.
- Process heating up to 1100^0C by firing of the gas.

Feed stocks for gasification

- Branch, Twig, Saw Dust etc.
- Stalk of wheat, corn etc
- Mustard Seed Hull & Stem
- Bagasse
- Corn Cob
- Rice Husk, straw etc.

Installed more than 100 Gasifiers in India, Nepal, Thailand, Guyana (S.A) out of which following clients have placed repeat orders :-

1. ITC Limited.
2. Dabur Nepal Ltd.
3. Britannia Industries Ltd.
4. Parle Food Products Pvt. Ltd.
5. Heemankshi Bakers Pvt. Ltd.
6. Hulas Steel Industries Ltd.
7. Kwality Diet & Food Products Pvt. Ltd.
8. Mahaicony Rice Mill, Guyana.

Specific Advantages of GP Gasifier

- Continuous operating system
- Multi-fuel system
- High thermal efficiency
- Virtually tar free gas
- Sturdy construction
- Attracts fiscal benefits from government

Applications

Decentralized Power Generation for

Industries in captive use

Selling to the grid

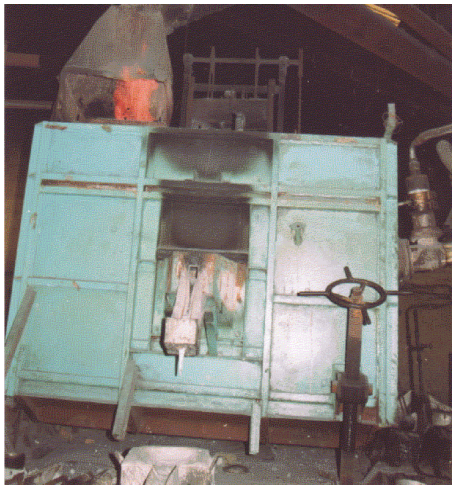
Electrification of villages

Applications

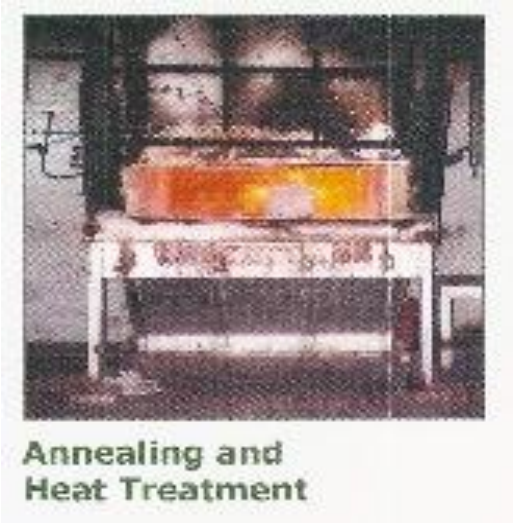
❑ Thermal use for

firing of boiler

Firing of kiln



Melting of metal



Hot air generation

Bakery & Biscuit Oven

... and lot more

Cost of Energy Generation

largely depends on the following three factors -

- capacity of the plant
- cost of input
- plant load factor (plf)

Advantages of Biomass Gasifier

- Energy any time, any where
- High efficiency ensures low investment and cheap energy.
- wide range of economically viable capacities from few kilowatts to few megawatts.
- de-centralized stand-alone system.
- environment friendly, carbon neutral system.

Partnership

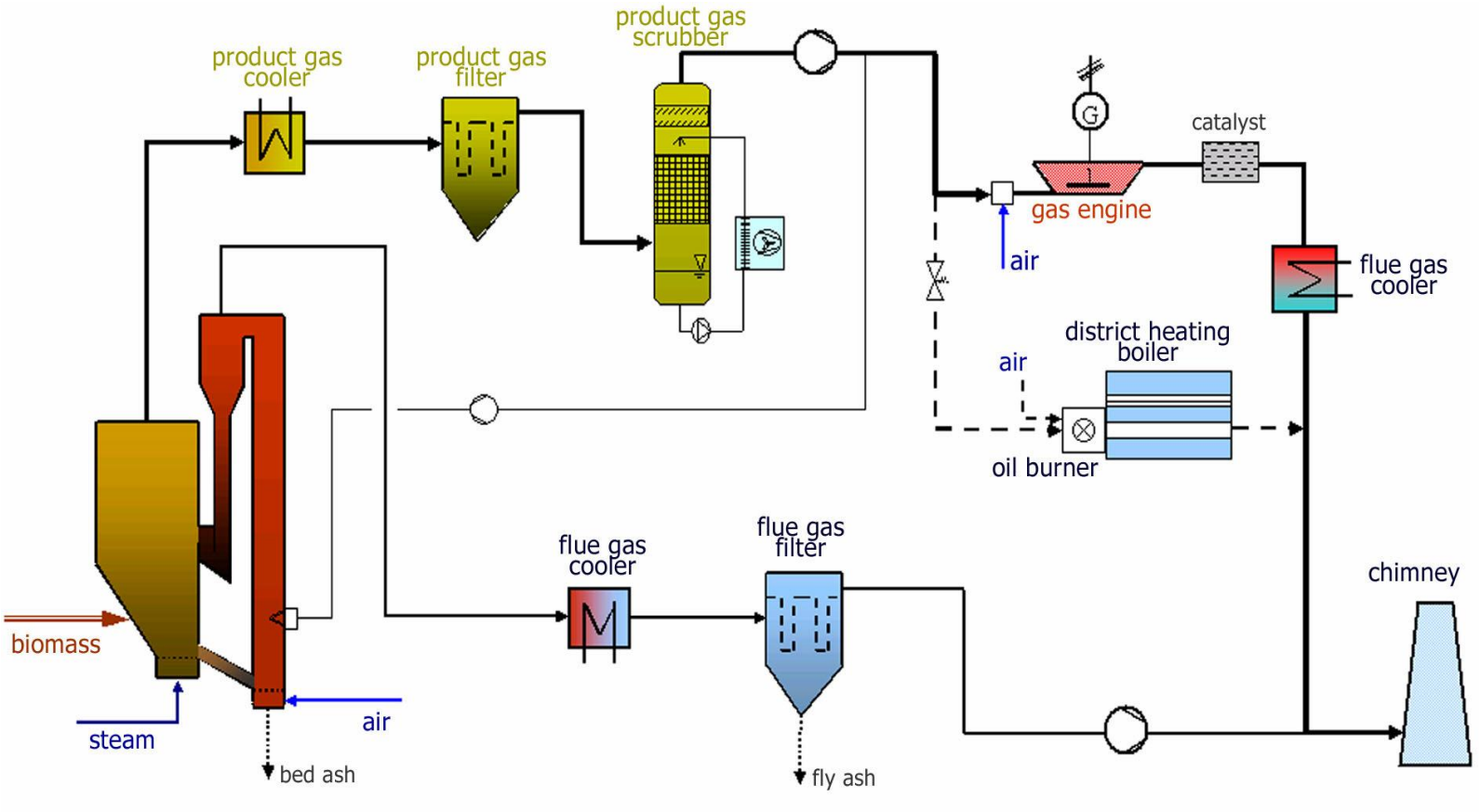
Gussing Renewable GmbH joined as a partner for equity & technology on 30-01-2012

Gussing Gasifier

- Heat
- Electricity
- Synthetic natural gas
- Gasoline, diesel

Dual fluidized bed steam gasification developed by Gussing Renewable

Gasification Technology



Flow diagram of the Gussing Plant

Particulars of Product Gas

Gas Composition :

CO_2	: 15 – 25 %	CO	: 20 – 30 %
CH_4	: 8 – 12 %	H_2	: 35 – 40 %
N_2	: 3 – 5 %		

Lower Calorific Value : 12.50 MJ/Cubic Meter

Thermal Efficiency (related to product gas) : 78%

Yield of Gas : 1.62 – 1.65 Nm^3/ Kg.

Energy supply to community

A 5 MW Gussing Plant energizing a township since 2001

Vehicle Fuel

Vehicles run on synthetic gasoline produced in Gussing plant

Feed stock tried

- Wood Chips
- Saw dust
- Clover pellets
- Animal residues
- MSW
- Rape seed grisp
- Brown coal
- Sewage sludge (Pellets)
- Barley
- Hard coal

Waste to Energy

- About 1,40,000 tons of MSW is generated per day in the country. This figure could be twice as much by 2020.

- From dry high calorific valued combustible waste, the potential capacity for Waste-to-Energy plants is expected to grow to approx. 2200 MW by 2030.

- It emits poisonous methane gas, which is 21 times more harmful than CO_2 and also attacks the ozone layer.

- Hence, Waste-to-Energy maximizes resource value, while minimizing environmental impact so that both economy and environment can thrive.

Gasification vs. Incineration

- In gasification process, waste is burnt in O_2 deficient condition to produce a gas which can be thoroughly cleaned before any use, whereas in case of Incinerator waste is burnt in a O_2 rich environment and product is CO_2 and heat with pollutants.

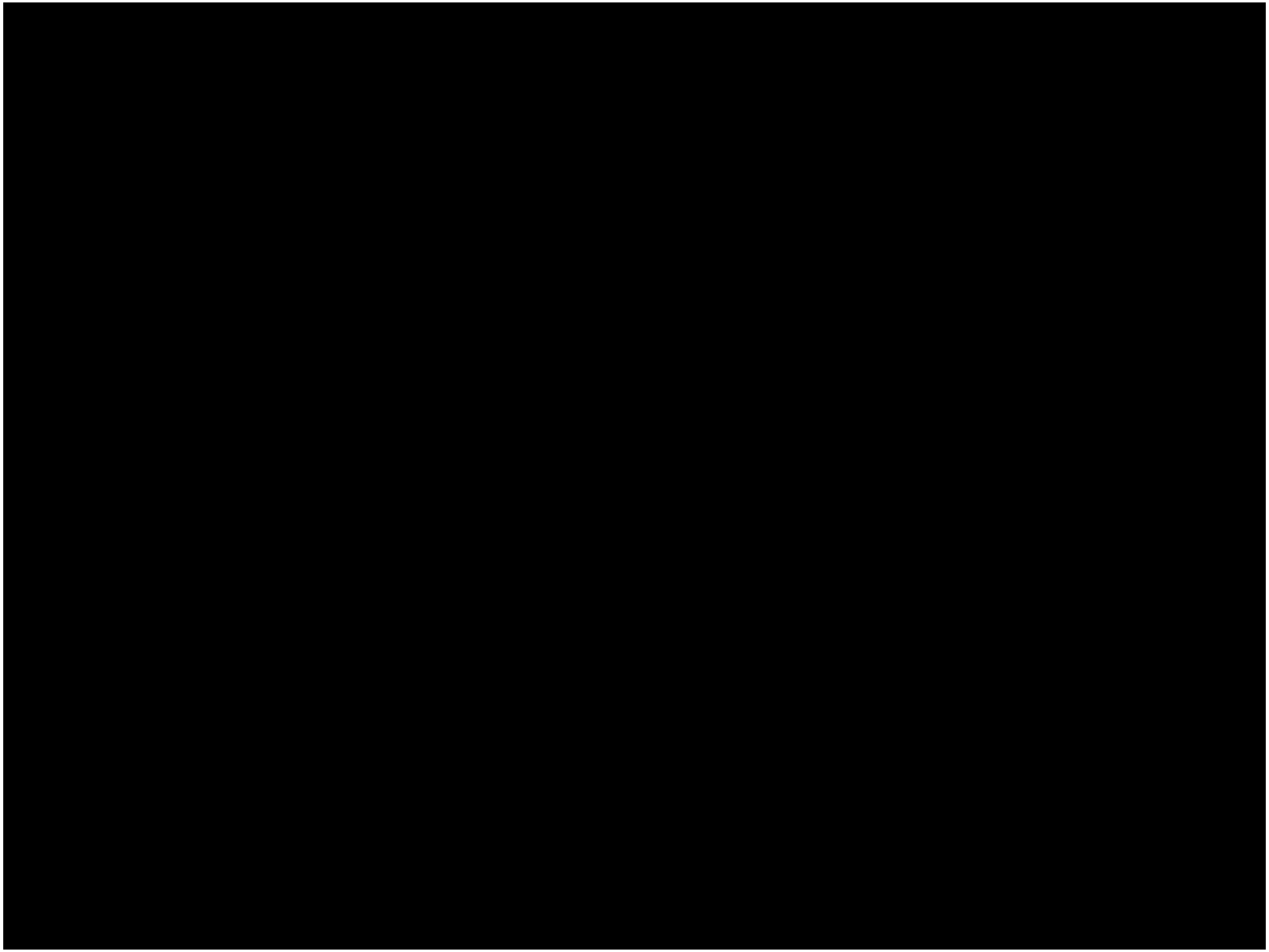
- O_2 deprived atmosphere at low temperature in gasification does not allow formation of Dioxins and Furans but in combustion with O_2 rich atmosphere and temperature formation and reformation of toxic Dioxins and Furans takes place which end up in exhaust gases along with fly ash.

Gasification vs. Incineration

- Large molecules of plastic are completely broken down to components of syngas in a gasifier reactor but combustion of plastic produces toxic gases with high SOx and NOx.

- The overall efficiency in case of gasification is around 25-26 % whereas the same is 20-22% in case of rankine cycle. As a result, feed-stock / fuel consumption is lower by almost 25%.

- Water and auxiliary power consumption for gasification is minimal and much lower than those for incineration.



Benefit

Now available

Proven Green Technology

from **Europe**

at **Indian Price**

Thank you

for your kind attention