



PROMETHEAN ENERGY

ENERGY EFFICIENCY IN BILLET HEATERS

Discussion details

Current efficiencies of billet heater

Recuperator and energy efficient heater

Investment and ROI



“At Promethean Energy, we make energy efficiency products for industrial purposes to help reduce heating costs by upto 75%”

Objective of our innovative products



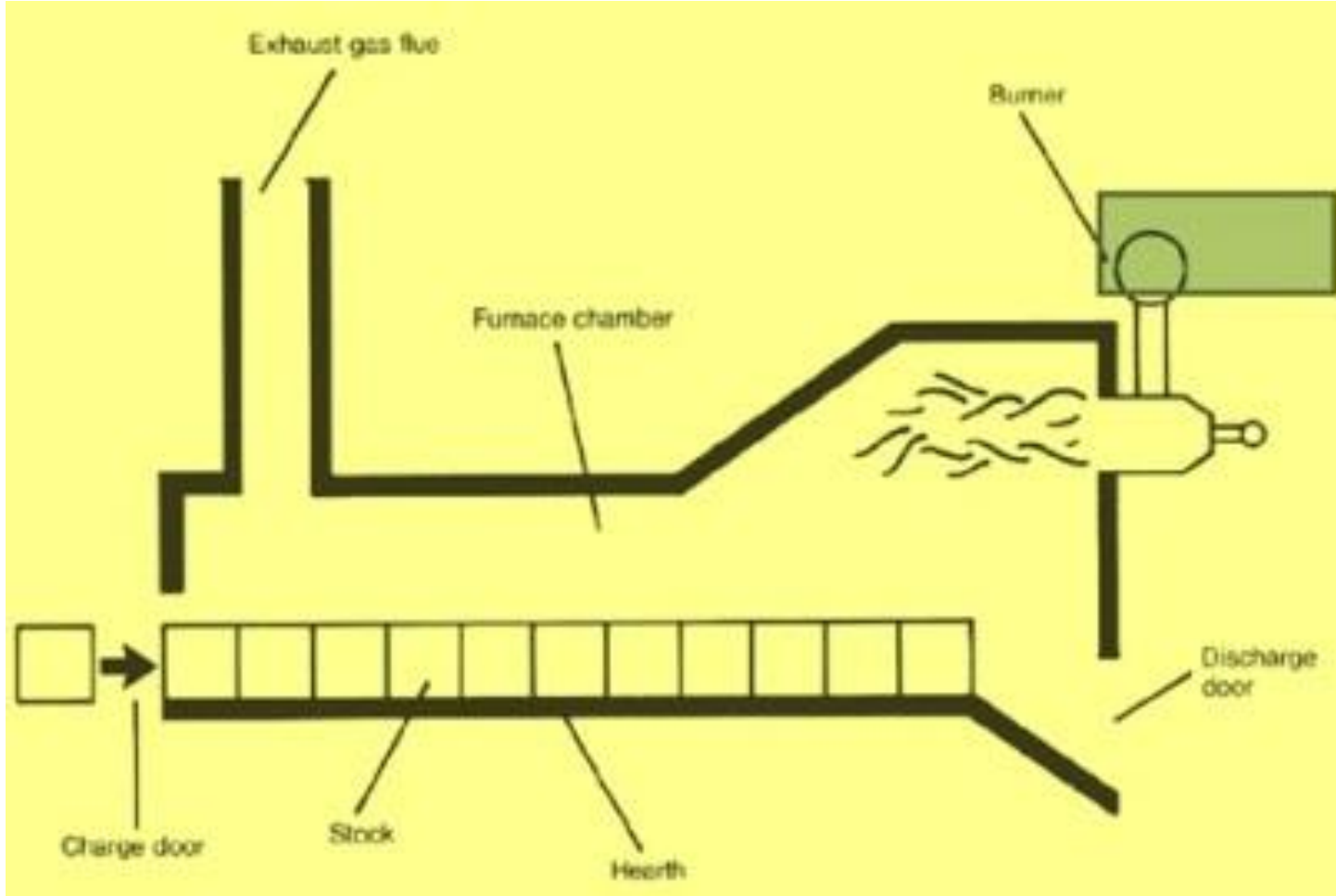
Reduce fuel usage



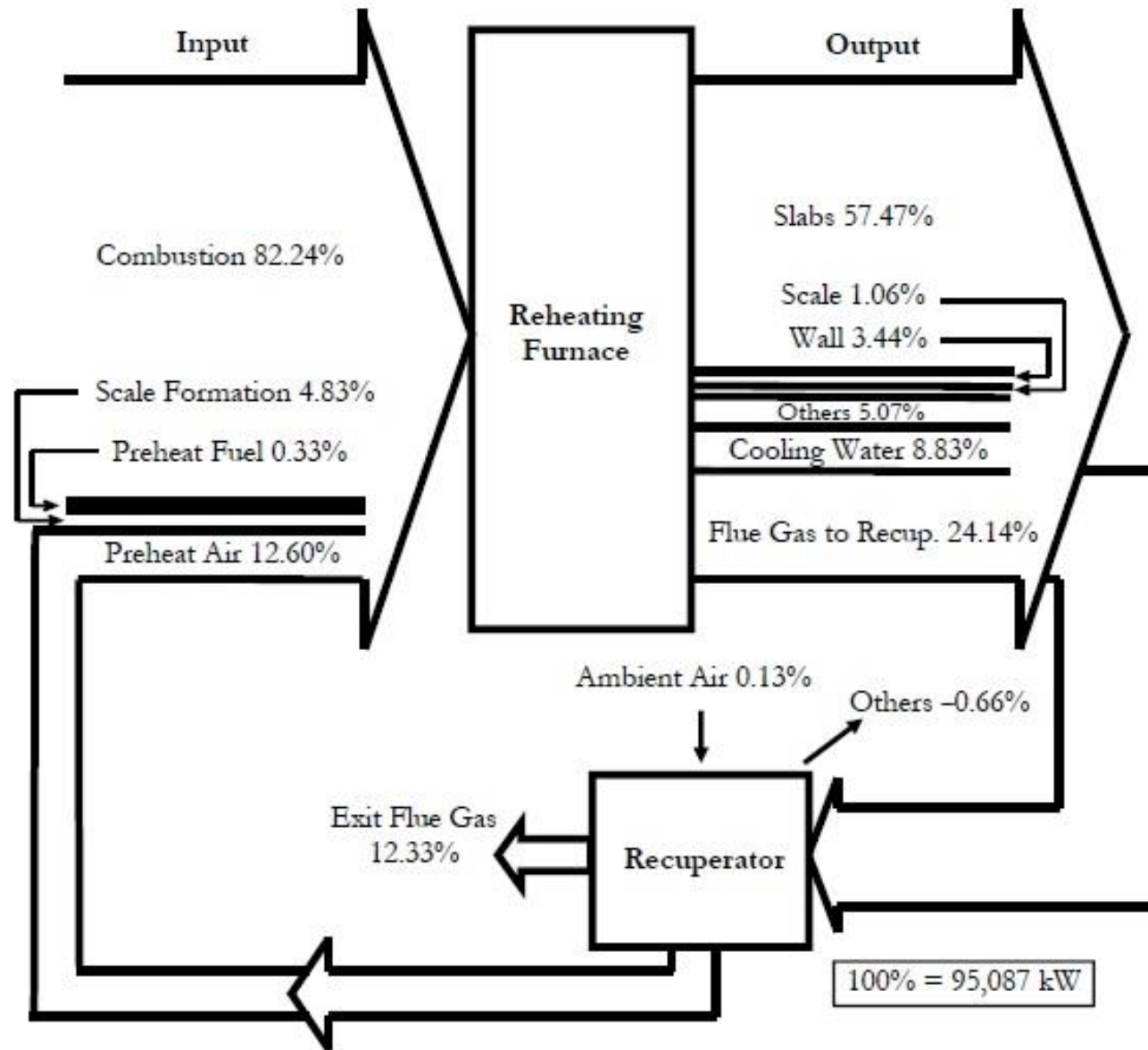
Reduce carbon dioxide emissions



Energy efficiency in billet heaters discussed today



Energy efficiency in billet heater



Energy flow diagram of a billet heater

Jamnagar : How much is actually consumed

Case Study 1 : 3000 Tons per year production

Fuel consumed during the year : 100,000 liters

Specific energy consumption : 33.33 liters/ton

Case Study 2 : 200 tons per month

Fuel consumed during the month : 6400 liters

Specific energy consumption : 32 liters/ton

Calculations done on 5" dia billet

Jamnagar : How much goes into heating metal

Mass of metal :
Cp of brass : 0.38 kJ/kg °C
 ΔT :

Total heat required :
Total heat required in kilo calories :

GCV of furnace oil :

Liters per ton :

Less than 25% of total energy goes into heating metal

Common reasons for poor energy efficiency

- Furnace capacity un-matched with rolling capacity.
- Improper selection of combustion equipment.
- Inefficient recuperators or absent recuperators.
- Absent / by-passed automatic air / fuel ratio control system.
- Absent automatic temperature control system.
- Absent automatic furnace pressure control system.

Common reasons for poor energy efficiency (II)

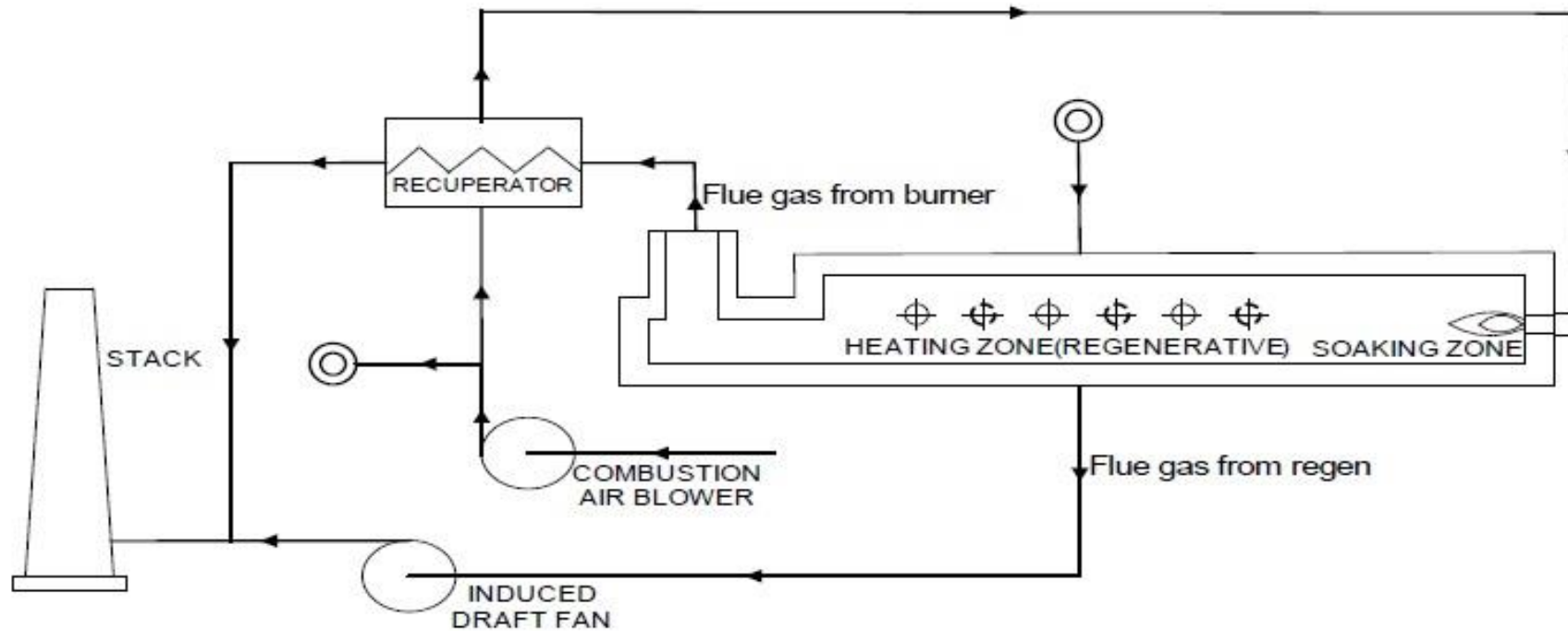
- Improper maintenance and operation of furnace and combustion system
- Losses from the furnace outside walls or structure
- Heat transported out of the furnace by the load conveyors, fixtures, trays, etc.
- Radiation losses from openings, hot exposed parts, etc.
- Heat carried by the cold air infiltration into the furnace
- Heat carried by the excess air used in the burners.

Two options for saving energy

Recuperator – low investment, lower savings

EE Billet heater – Higher investment, higher savings

What is a recuperator



Heat Exchanger which recovers heat from flue gases and preheats fresh air

Why recuperator?

22°C higher air temperature = 1% lower fuel

How much savings is possible

Current consumption	: 33 liters/ton
Temperature of preheated air	: 250 C
Savings per ton	: 3 liters/ton
Annual production	: 3000 tons
Annual savings in oil	: 9,000 liters of FO
Annual savings in INR	: INR 2.7 Lakh

Investment in a 1 tph Billet Heater recuperator : INR 1.25 Lakh

Energy
efficient
reheating
furnace

- Control of air-fuel mixture
- Proper flame geometry
- Correctly designed burner
- Insulation and radiative losses minimized
- Ideally designed recuperator
- Minimize convective losses

Reheating furnace in brass forging industry

SEC : 22 liters/ton



Savings in an EE billet heater

Current consumption : 33 liters/ton

EE billet heater : 22 liters/ton

Savings per ton : 11 liters/ton

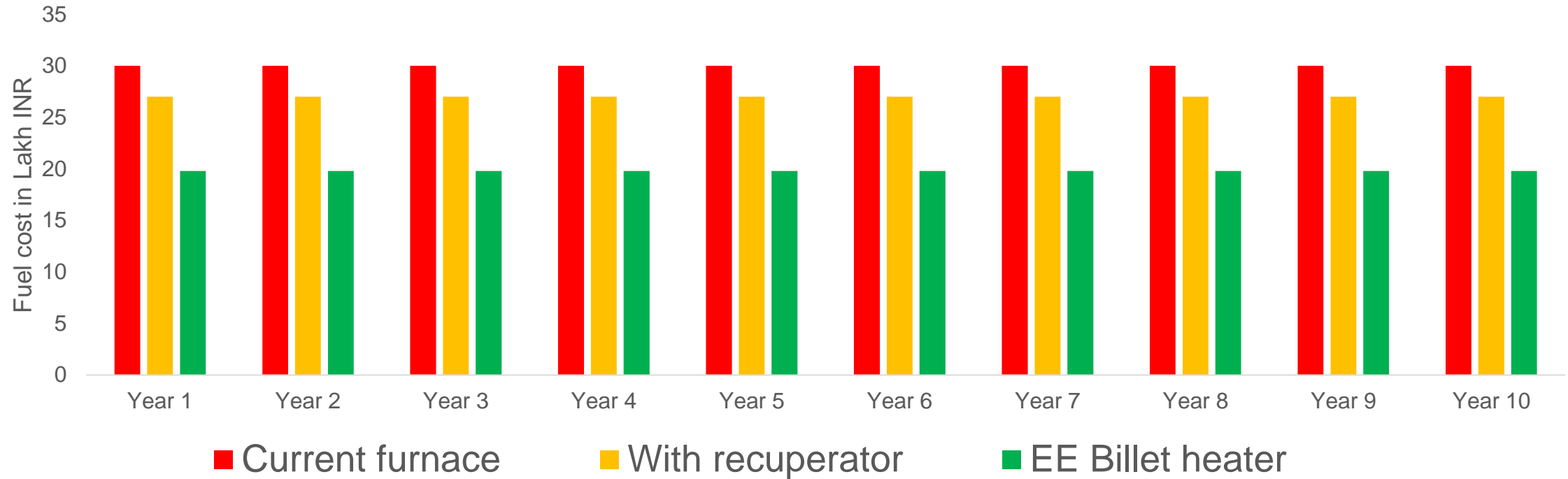
Annual production : 3000 tons

Annual savings in oil : 33,000 liters of FO

Annual savings in INR : INR ~10 Lakh

Investment in a 1 tph Billet Heater : INR 12.5 Lakh

Savings comparison over 10 years



Savings using recuperator over 10 years : ~25-30 Lakh INR

Savings using EE Billet Heater over 10 years : ~80 – 100 Lakh INR

Thank you

