

WASTE HEAR RECOVERY

IN

FOUNDRIES

FOUNDRY SECTOR

- **THERE ARE ABOUT 5000 FOUNDRIES IN INDIA, MOST OF WHICH ARE IN SMALL SCALE SECTOR**
- **GENERAL LEVEL OF AWARENESS ABOUT ENERGY CONSERVATION IS LOW**

FOUNDRY SECTOR

- IN A FOUNDRY UNIT CUPOLA OPERATION IS MOST ENERGY INTENSIVE.....AND MOST OF THEM ARE HIGHLY ENERGY INEFFICIENT!
- TOTAL ESTIMATED COKE CONSUMPTION IN FOUNDRIES IS ABOUT 600000 TPY

FOUNDRIY SECTOR

- IN ADDITION FOUNDRIES HAVE FURNACES LIKE HT, DRYING WHICH CONSUME FOSSIL FUELS
- IN A TYPICAL FOUNDRIY UNIT COKE REPRESENTS 30-40 % OF TOTAL ENERGY USE

POTENTIAL THERMAL ENERGY SAVINGS IN FOUNDRIES

20 % FUEL SAVINGS

IS A PRAGMATIC FIGURE!

How?

STRATEGIES

- **PRODUCTIVITY**
- **COMBUSTION TECHNOLOGY**
- **WASTE HEAT RECOVERY**

PRODUCTIVITY

- **PRODUCTIVITY = PRODUCTION AT DESIGN CAPACITY**
- **OVERLOADING AND UNDER-LOADING RESULTS IN EXCESS FUEL CONSUMPTION**

MOST FURNACES OPERATE AT 60-70 % OF DESIGN CAPACITY.

COMBUSTION TECHNOLOGY

- **BURNERS**
- **CONTROLS- TEMP, RATIO**
- **FUEL OIL RING MAINS**

CASE – A LEADING PISTON UNIT

- 40 CRUCIBLE HOLDING FURNACES
- SINGLE COMBUSTION AIR BLOWER
- TEMP CONTROL THRU OIL REGULATION
- IMPROPER FUEL OIL RING MAIN
- NO WASTE HEAT RECOVERY

WASTE HEAT RECOVERY

- HIGH TEMP. FURNACES
- MEDIUM TEMP. ENGINES,GT,FCE
- LOW TEMP. PROCESSES

ROUGH ENERGY BALANCE REHEATING FURNACE

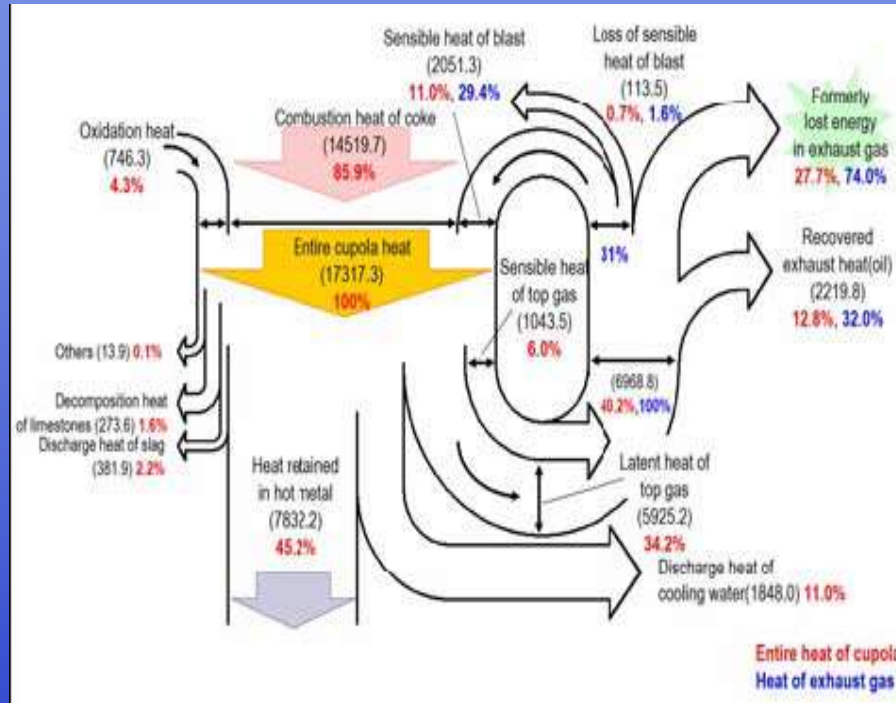
INPUT

- FUEL 100 %

OUTPUT

- USEFUL HEAT 20 %
- WASTE GAS HEAT 70 %
- RADIATION AND OTHER LOSSES 10 % %

HEAT BALANCE OF EFFICIENT CUPOLA



WASTE HEAT RECOVERY

WHY?

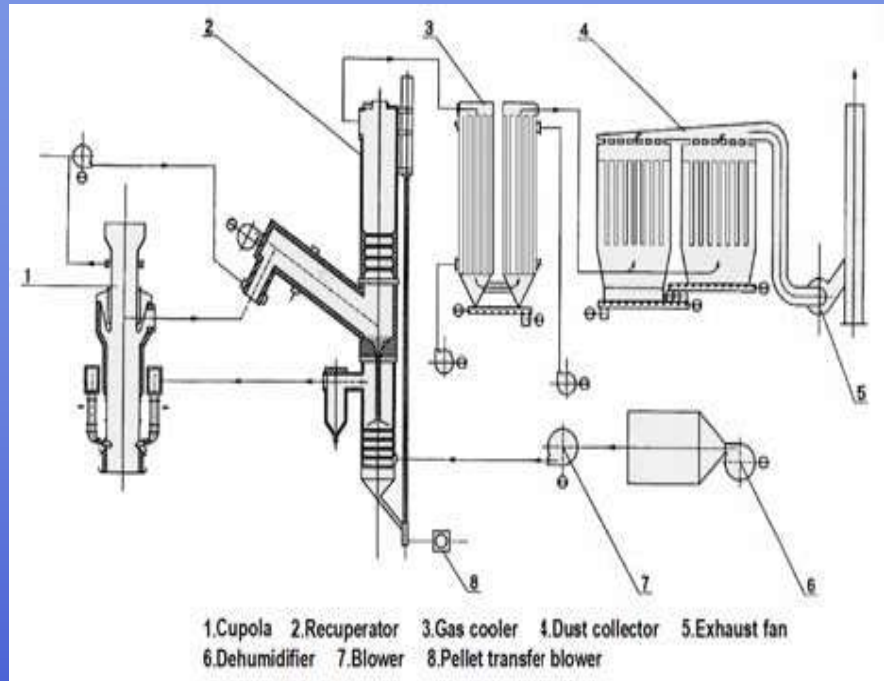
- 40 TO 60% OF ENERGY INPUT LOST IN EXHAUST OF HIGH TEMP FURNACES
- RECOVERY TECHNOLOGY AVAILABLE
- ATTRACTIVE SAVINGS!
- FAST PAYBACK PERIOD!

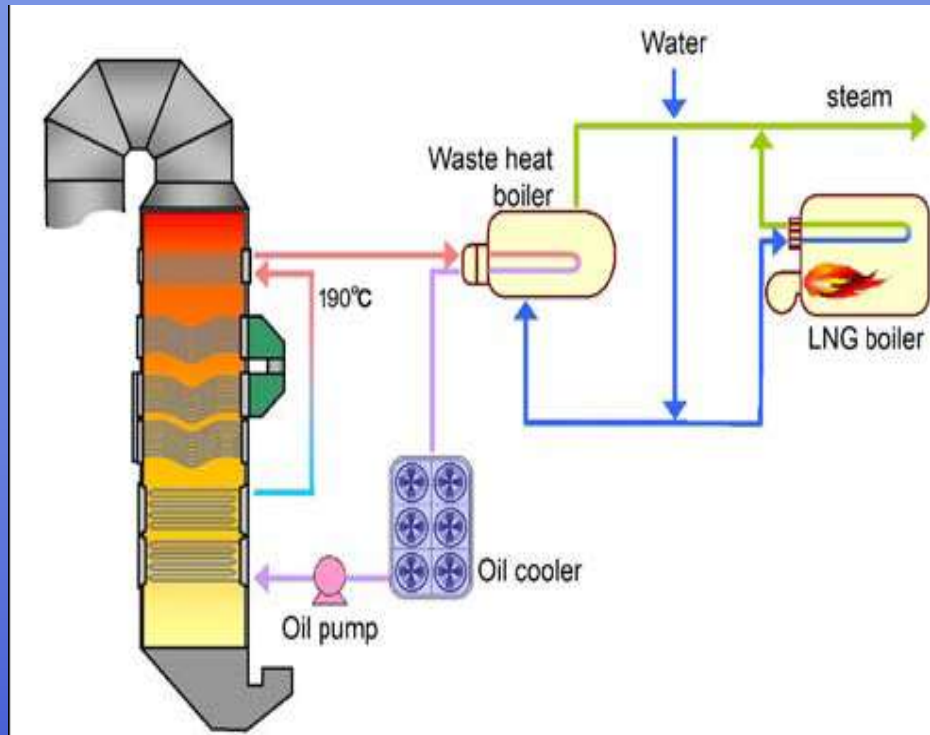
How?

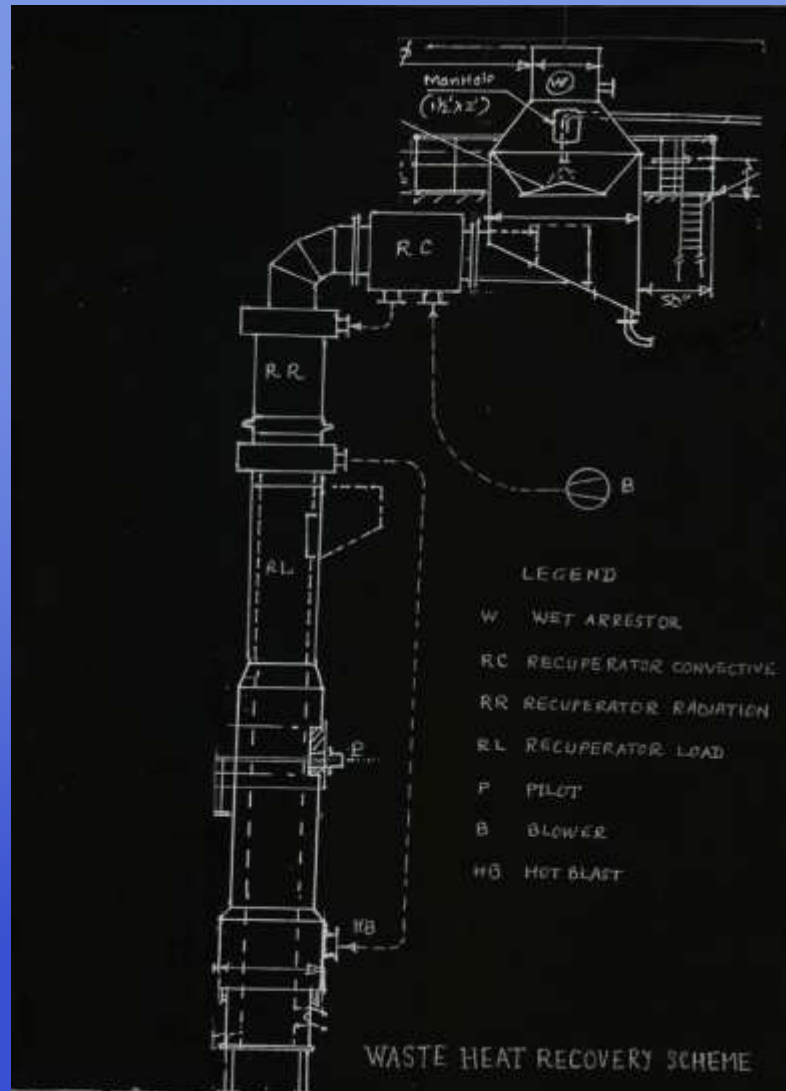
- **BLAST/AIR PRE HEATING**
- **CHARGE PREHEATING**
- **PROCESS HOT WATER / STEAM**
- **PROCESS COOLING**
- **POWER GENERATION**

CASE- A LEADING FORGING UNIT

- LARGE NUMBER OF BATCH TYPE, ROTARY HEARTH, PUSHER FURNACES WERE REDESIGNED, FITTED WITH RECUPERATORS AND CONTROLS
- FUEL SAVINGS ACHIEVED OVER 30 %



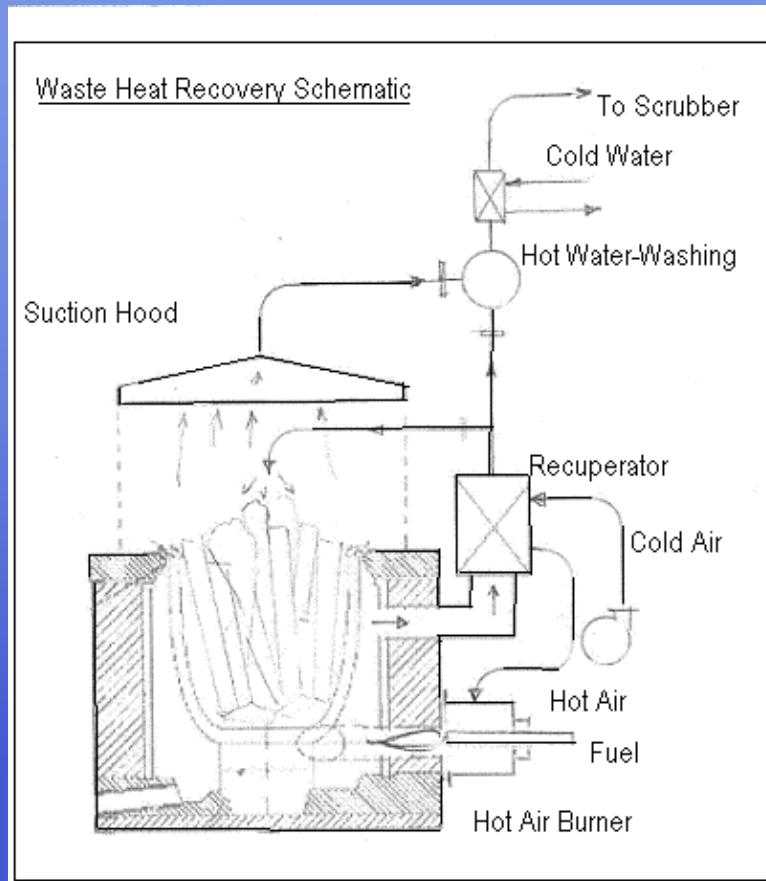




ANNUAL SAVINGS IN CUPOLAs

Load recuperation Cupola1 &2	86.0 T(8.6%)	17.2 LAC
Blast pre-heating Cupola1 &2	92.0 T(9.2%)	18.4 LAC
Blast pre-heating Cupola 3	49.0 T(9.8%)	09.8 LAC
Reduced thermal storage C1,2	12.0 T(1.2%)	02.4 LAC
Longer campaign Cupola 1&2	86.5 T(8.65%)	17.3 LAC
Longer campaign Cupola 3	25.8 T(5.2%)	05.2 LAC
Drying blast, drying coke	15.0 T(1.0%)	03.0 LAC
Total	366.3T(24%)	73.3 LAC

COST-BENEFIT ANALYSIS	INVESTMENT RS. LACS	PAY BACK MONTHS
Load recuperation Cupola1 &2	3	9
Blast pre-heating Cupola1 &2	15	10
Blast pre-heating Cupola 3	26	8
Reduced thermal storage C1,2	0	*
Longer campaign Cupola	0	*
Drying blast, drying coke	9	36



ANNUAL SAVINGS AT 200 KL / YR HSD

AIR PRE-HEATING	37 KL	13 LAC
CHARGE PRE HEATINGH	10 KL	3.5 LAC
XS AIR CONTROLL	9 KL	3,2 LAC
INSULATION-MELTING FCE	5 KL	1.8 LAC
COVER HOLDING FCE	120000 kWh	5.9 LAC
VFD SCRUBBER FAN	30000 kWh	1.5 LAC

COST-BENEFIT ANALYSIS	INVESTMENT RS. LACS	PAY BACK MONTHS
AIR PRE-HEATING	20	18
CHARGE PRE HEATINGH	2	7
XS AIR CONTROLL	2	7.5
INSULATION-MELTING FCE	1	6.5
COVER HOLDING FCE	1	2
VFD SCRUBBER FAN	1	8

THE EFFICACY OF WASTE HEAT
RECOVERY IS WELL PROVEN

BUT THE RESPONSE OF INDUSTRY??



A WELCOME STEP

- **MEDA HAS LAUNCHED A SCHEME TO PROMOTE WASTE HEAT RECOVERY !!**
- **FINANCIAL ASSISTANCE FOR MAKING DPR FOR WASTE HEAT RECOVERY SCHEMES FOR POWER GENERATION**
- **SCHEME EXTENDED FOR THERMAL APPLICATIONS ALSO TO PROMOTE ENERGY EFFICIENCY IN SMALL TO MEDIUM UNITS.**

THANK YOU