



ENERGY EFFICIENCY IN AUTOMOBILE INDUSTRY





Anama Enertech Solutions is a group company of 17-year-old Anama Energies Pvt. Ltd. dedicated to provide Cogeneration and Trigeration solutions in Steam, Gas and Liquid fuel-based systems.

Energy conservation begins with Optimum utilization of energy resources and to optimize the same Anama has created a niche entity Anama Energy Solutions Pvt. Ltd. which is dedicated to offer services in the field Energy Audit and optimization.



- **Mission:** Providing services to industrial sectors to improve their energy efficiency on a sustainable basis, thereby enhancing their competitive edge and profitability.
- **Vision:** To be a global leader in energy conservation domain, through energy audit services, energy efficiency project implementations, training in energy management and execution of green eco-friendly projects.





Anama Energies Pvt Ltd:

- **Steam Turbine Based Cogeneration and Trigeration.**
 - Tailor made CHP solutions through extensive range of steam turbines
 - Back pressure, Extraction cum condensing as well as condensing turbines
- **Natural Gas based Cogen.**
 - CHP solutions using Gas Engines and Turbines with Waste heat recovery system
 - Vapor Absorption, Process heat projects from waste heat of gas engines
- **Biogas/Biomass based Power generation and CHP.**
 - Sole representative of Schmitt Enertech
 - Technology licensee of IISC – Bangalore
 - Biomass briquette based process steam and CHP
 - **Biomass gasification for process/power**



Anama Enertech Solutions Pvt Ltd:

- Comprehensive Energy Audits for Electrical and Thermal Systems.
- Energy Efficiency Project Implementation.
- Energy Management Training Programs.
- Energy Management services for Gas Turbine Power plants
- CDM Projects for Carbon Credits.
- Waste Heat Recovery and Cogeneration Feasibility.
- Water System Audits.



Objectives of Energy Audit

- ✓ To study the present pattern of energy consumption
- ✓ Examination and evaluation of energy efficiency of major energy consuming systems, processes and equipments
- ✓ Identify the potential areas for energy optimization
- ✓ To recommend energy conservation proposals with cost benefit analysis
- ✓ To identify CDM, cogeneration and renewable energy projects
- ✓ Training to plant personnel for effective energy management



STATE-OF-THE-ART INSTRUMENTS AT ANAMA

ANAMA Energies Pvt. Ltd.
COGENERATION : An Investment in Productivity

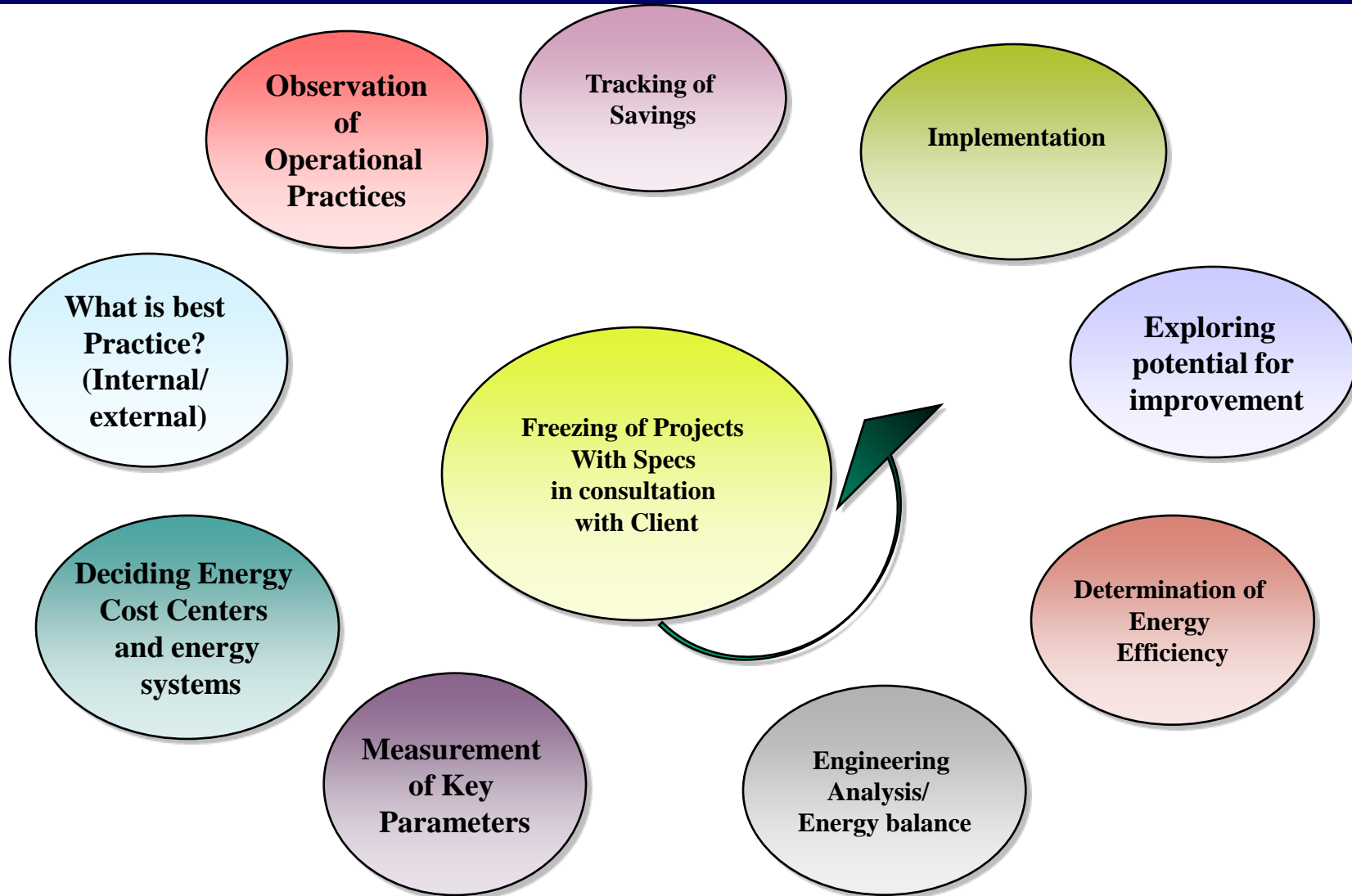


Major instruments used for energy audit

- ✓ 3 phase power quality analyser
- ✓ Single phase power analyser
- ✓ Flue gas analyser – Measurement of parameters in flue gas
- ✓ Contact type temperature indicators
- ✓ Infra-red non contact temperature indicator
- ✓ Ultrasonic flow meter – Fluid flow
- ✓ Anemometer – Air velocity



OUR APPROACH FOR ENERGY AUDIT



- **Thermal System:** Boilers, Hot Water Generators, Waste Heat Recovery Systems, Steam distribution system, Insulation, Steam Traps, Condensate and Flash Recovery system, Thermic Fluid Heaters, Instrumentation and Controls, Monitoring , Cogeneration & Fuel switch over options.
- **Electrical System:** Transformers, Distribution, Analysis of Demand, PF, Improvement, Motor Loading, Optimizing measures for equipment and system performance such as Blowers, Pumps, Fans, Compressors, option of Variable Speed Drives, Controls and Monitoring System, Cable Size analysis etc.
- **Compressed Air System:** Compressor Efficiency, Distribution, Distribution, Line Sizing, Layout, Accessories, Air Quality, Leakage Identification, Pressure Drop, Controls and Monitoring system
- **Water System:** Water Balance, Line Sizing, Pump Selection, Piping Layout, Accessories, Optimization of Consumption,
- **HVAC and Refrigeration System :**Chiller performance , AHU , optimization of A/C loads, Cooling Towers , Pumps
- **Lighting Systems**

OUR ESTEEMED CLIENTELE

ENERGY AUDITS

AUTOMOTIVE & TYRE

- BAJAJ AUTO LTD.
- BADVE GROUP
- APPOLO TYRES
- MAHINDRA & MAHINDRA

STEEL

- ISPAT INDUSTRIES LTD.
- UTTAM GALVA STEELS LTD.

HOTELS

- TAJ GROUP OF HOTELS
- INTERCONTINENTAL GROUP OF HOTELS
- LE-MERIDIEN
- BHARAT GROUP OF HOTELS

STARCH

- RIDDHI SIDDHI GLUCO BIOLS

PHARMA

- BRIOCIA
- BIOCON

OUR INTERNATIONAL CLIENTS

- Al Sallan Foods SAOG – Oman
- Strategic Foods – Dubai (Britannia group)
- Bidco Oil Refineries (Kenya)
- Ispat / Kremikovetzi(Bulgaria)
- Pure Ice cream (Sharjah)
- Taj Pamodzi (Zambia)

TEXTILE INDUSTRY

- BHARAT VIJAY MILLS – TEXTILE DIV.

FOOD & BEVERAGE INDUSTRY

- KWALITY BRAND COMPANIES
- UNITED BREWERIES LTD.

ENERGY EFFICIENCY IN AUTOMOBILE SECTOR



HEAT TREATMENT FURNACE EFFICIENCY OPTIMIZATION

- (a) Electrical heating to NG/LPG heating
- (b) Tuning
- (c) Ceramic coating in the furnace
- (d) Loading optimization
- (e) Continuous operation ...optimize cycle time.....furnace size
- (f) Reduce weight of jigs / fixtures / trays
- (g) Waste Heat Recovery

PAINT SHOP....OPTIMIZE USAGE OF BLOWERS / CA / AIRWASHER PUMPS

DRYING OVEN EFFICIENCY OPTIMIZATION

- (a) Tuning
- (b) Waste Heat Recovery
- (c) Direct fired instead of indirect fired

WASTE HEAT RECOVERY FROM DG SETS

NATURAL LPG VAPORIZER INSTEAD OF ELECTRICAL HEATING

MOTOR LOADING OPTIMIZATION / AUTO STAR DELTA CONVERTER OPTIONS

VFD FOR PUMPS / BLOWERS / FANS

ENGINE TESTING WITH INDUCTION GENERATOR





UTILITIES

MAXIMUM DEMAND CONTROL

OPTIMIZATION OF MOTOR LOADING

REPLACEMENT WITH ENERGY EFFICIENT MOTORS

OPTIMIZATION OF COMPRESSED AIR SYSTEM

Selection / part load operation / leakage control / monitoring / line sizing / pressure drop / decentralization

OPTIMIZATION OF PUMPING SYSTEMS / BLOWERS

OPTIMIZATION OF A/C AND LIGHTING SYSTEMS

COOLING TOWERS OPTIMIZATION

PF OPTIMIZATION / TRANSFORMER LOADING OPTIMIZATION

RENEWABLE ENERGY USAGE

NATURAL LIGHTING

TURBOVENTILATORS

SOLAR ENERGY FOR HOT WATER

BIO GAS FROM KITCHEN WASTE

WIND MILLS POWER WHEELING



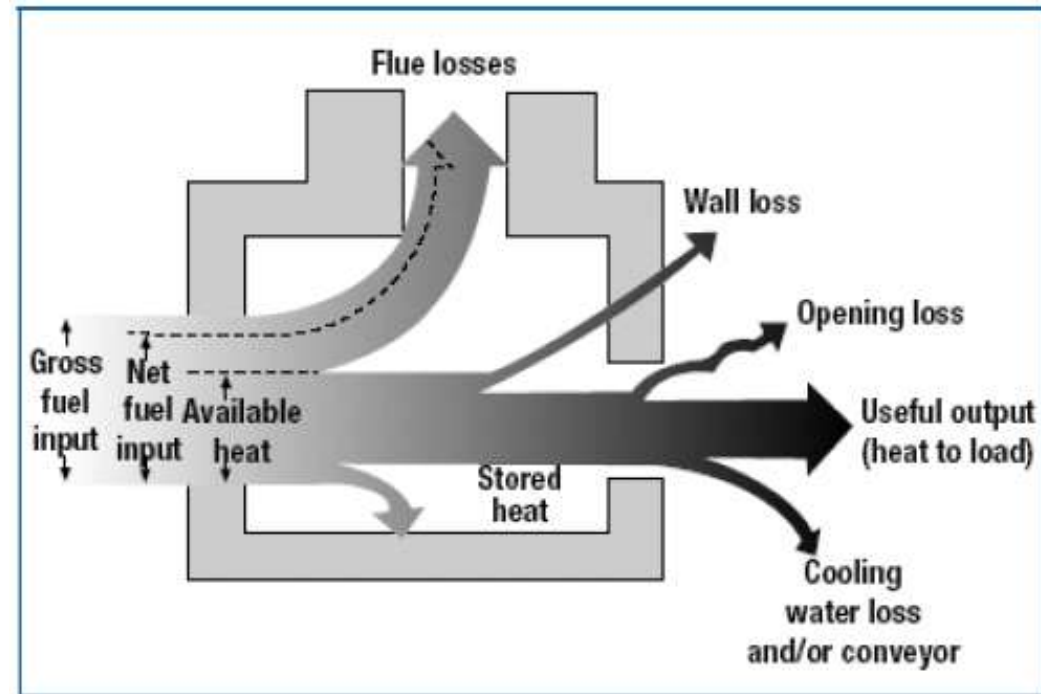
Energy Balance of a Furnace

Heat Loss Contributors

1. Useful heat carried by material
2. Flue gas loss
3. Stored heat
4. Opening loss by radiation
5. Wall losses
6. Miscellaneous losses

Assumptions for Energy Balance

1. Steady state condition
2. Leakage/ infiltration etc. considered as miscellaneous losses

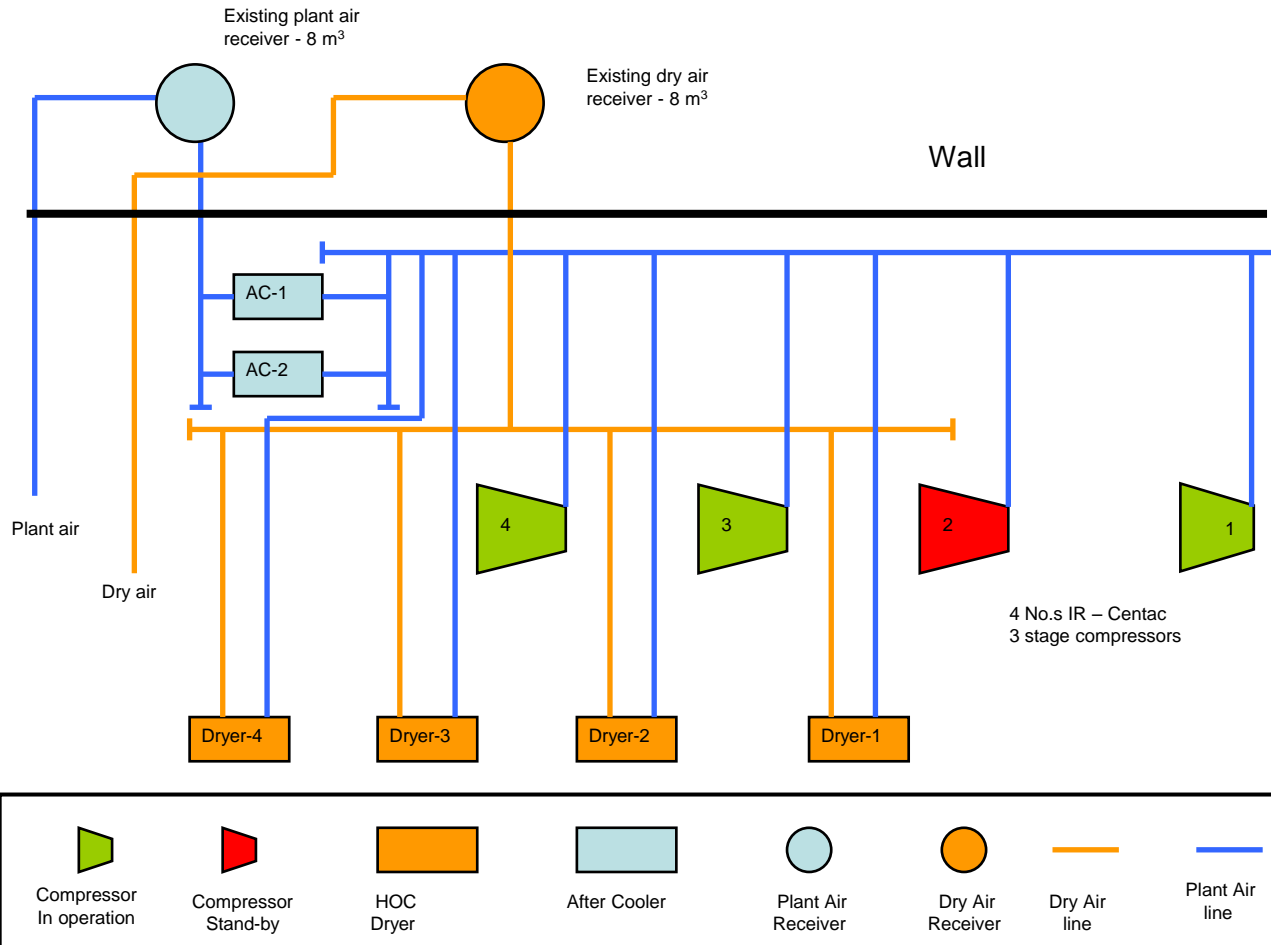


Efficiency (Direct Method) : The ratio of useful heat input to total energy consumption

Efficiency (Indirect Method) : Total Heat input – Unused heat losses

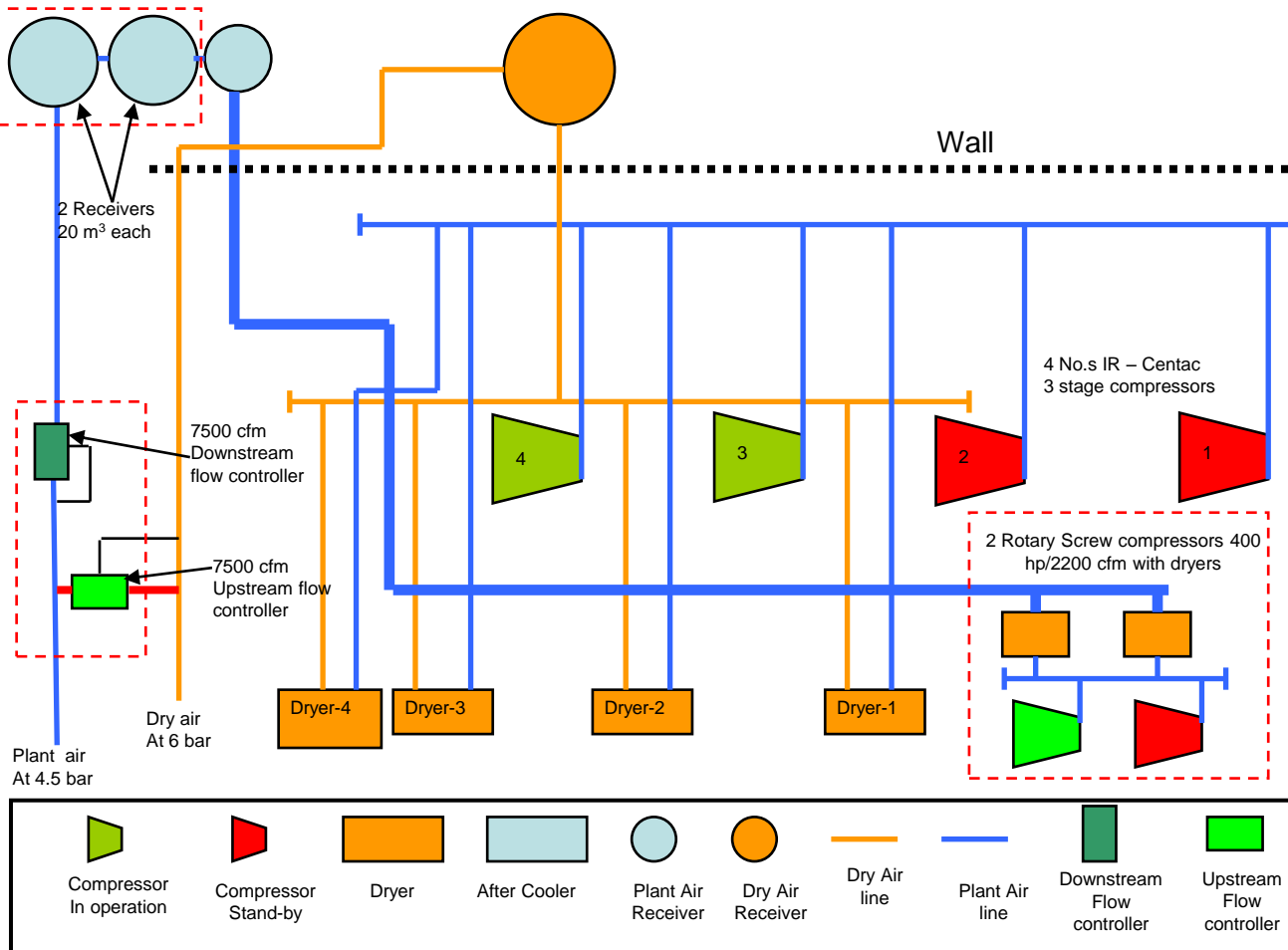
Case Study 3: Implemented scheme for compressed air

System before implementation of project



- Separate supply of plant air and dry air
- Dry air & Plant air both at 6.5 kg/cm²
- One receiver of 8 m³
- Large variation in compressed air usage
- Venting of air from centrifugal air compressors
- No control for compressed air
- Total power consumption = 3.5 MW

Case Study 3: Implemented scheme for compressed air



- Additional receivers for plant air
- Smaller capacity compressors for trim load
- Downstream / Upstream flow meter
- Pressure lowered for plant air
- Pressure regulated for dry air
- Stoppage of 1 centrifugal compressor
- Total expected power saving = 450 kW
- Total saving potential = $450 \times 8760 \times 4.3$ (@ 8760 hrs/year, Rs. 4.3/kWh) = Rs. 1.7 crore / year
- Investment = Rs. 1.8 crore
- Payback period = 13 months

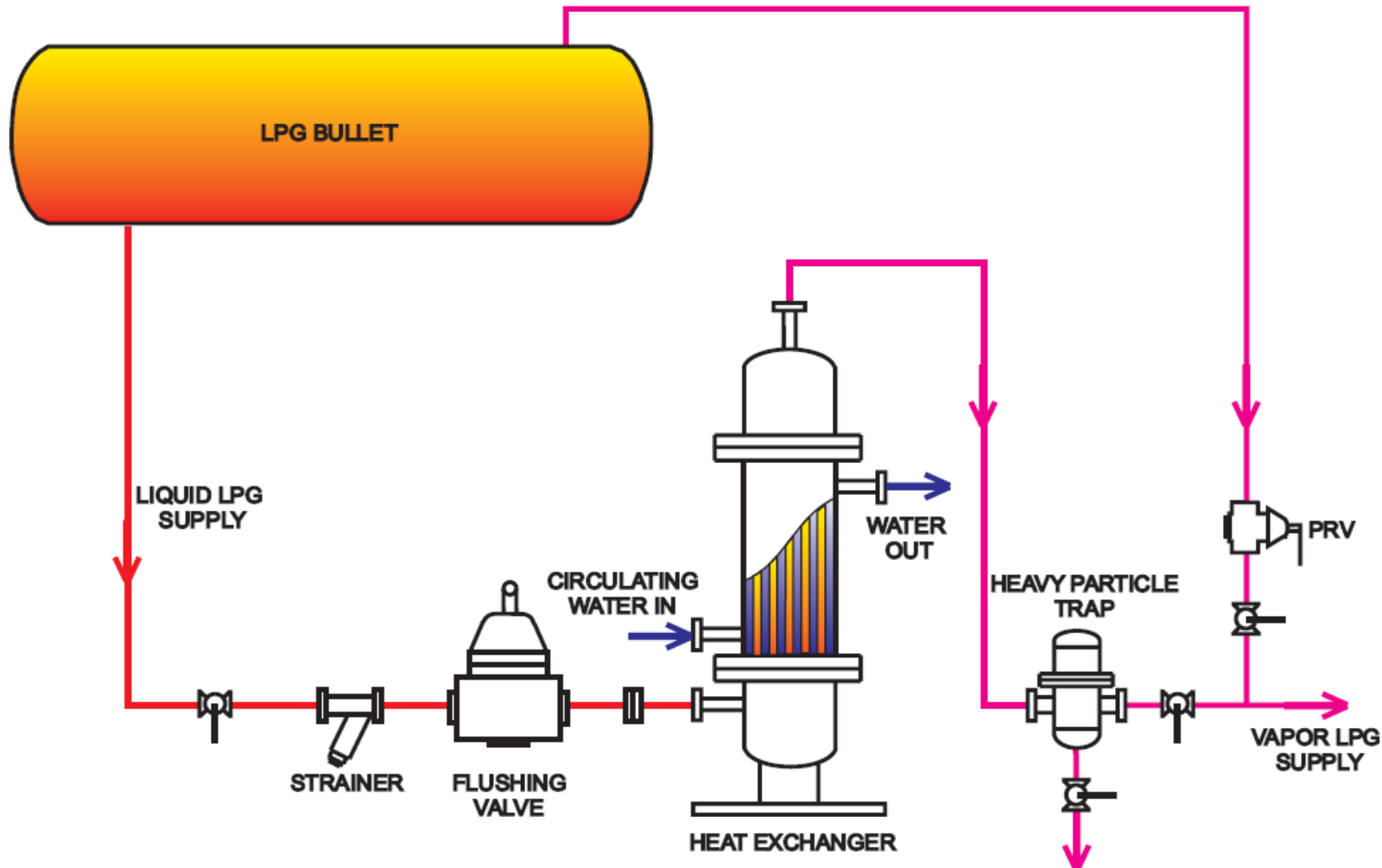


- **Replacement of inefficient pumps with energy efficient pumps**
- **Present efficiency of the following pumps is less. So it is recommended to replace inefficient**
- **pumps energy efficient pumps to reduce power consumption by meeting present duty conditions.**

Pump Identification	WTP sand filter pump-6	Make up water pump-CRM	Group-2 CRM pump-4	Group-2 CRM Pump-6	Group-3 CRM Pump-10	Total
Present efficiency	37.4	19.7	28	37	40	
Proposed efficiency	75	75	75	75	75	
Present power consumption (kW)	30	11	13	25	16.8	96
Proposed power consumption (kW)	14	5.3	10	12	10	51
Annual savings (Rs lacs)	5	2	1	4	2	14
Investement, Rs Lacs	5	2	1	4	2	14
Simple payback, months	12	13	13	12	11	12



CASE STUDY 5 - LPG Vaporiser using environmental heat



CASE STUDY 5 - LPG Vaporiser using environmental heat

- Boiling point of LPG at 1.2 kg/cm² (g) = 1⁰ C
- Vaporiser uses electrical power to vaporise LPG
- As pressure decreases, boiling point lower (easy vaporisation)

Average present power consumption of LPG vaporiser	=	20	kW
No. of units consumed per day	=	480	kWh/day
Power requirement after installation vaporiser	=	50	kWh/day
Saving potential= 430 x 300 x 5	=	Rs. 6.5	lakh/year
Investment	=	Rs. 8.75	lakh/year
Payback	=	16	months

Case Study 7 – Energy Efficient motors for continuous duty applications

Present System

Present air compressor motors are not energy efficient type and do not have an optimal full load efficiency. Present full load efficiency is about 85 %

Proposed System

It is recommended to replace the motors by energy efficient motrs.

It is estimated that there will be about 5% reduction of power consumption by implementation of this measure. Full load efficiencies of 93-95 % is possible with energy efficient motors.

Saving calculation

Total saving potential= $130 \times 2 \times 0.05 \times 8000 \times 4.3 = 4.5$ lakh/year
(@ 130 kW for each motor, 2 motors and 8000 hours operation per year)

Investment	~	10	lakh
Payback Period	=	26	months



Thank You

