

**BEE 3L Technical Workshop on  
ENERGY CONSERVATION  
in Power Sector**

**By M P Bhalerao**

**May 14, 2010**

**Dahanu Thermal Power Station**

# Case Study 1

## Modifications to Drum Level Controls of HPBFP & LPBFP

- **Previous system**
- Drum level control was done through control valve with a constant speed motor.
- As a energy conservation measure, VFD was installed for HPBFPs as well as for LPBFPs. VFD used to maintain pressure drop of 7 bar across the control valve and the drum level control signal was given to the control valve. Control valve used to remain throttled. Due to installation of VFD, power consumption had reduced considerably. However there seems to be further opportunity for saving by eliminating the pressure drop across the control valve.

# Case Study 1 – contd.

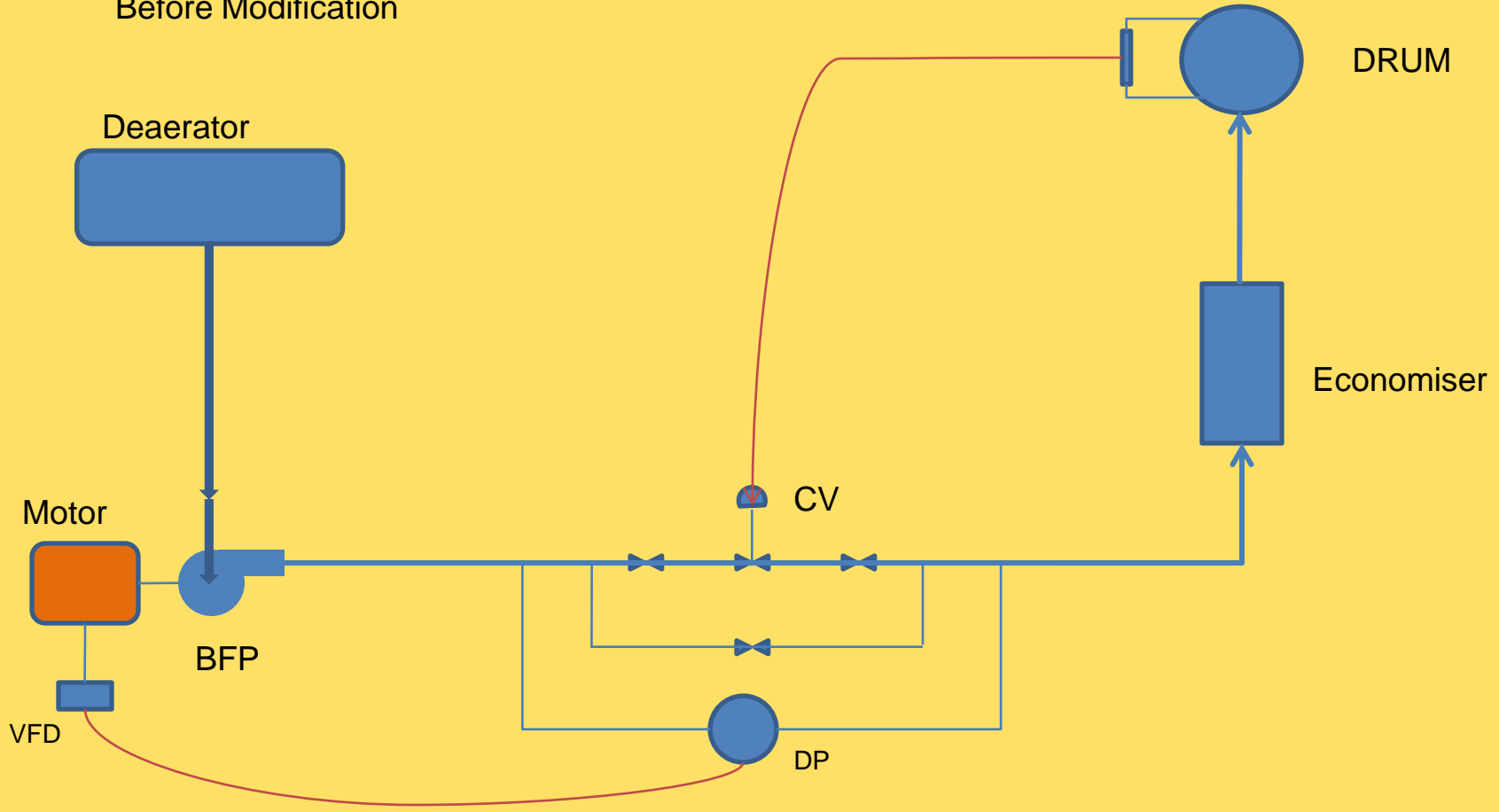
## Modifications to Drum Level Controls of HPBFP & LPBFP

- **Proposed system**
- It was proposed to transfer the drum level control signal from control valve to VFD directly. Thus the VFD controls the drum level with 3 element signal. The control valve being kept full open.
- **Status:**
  - Implemented

# Case Study 1 – contd.

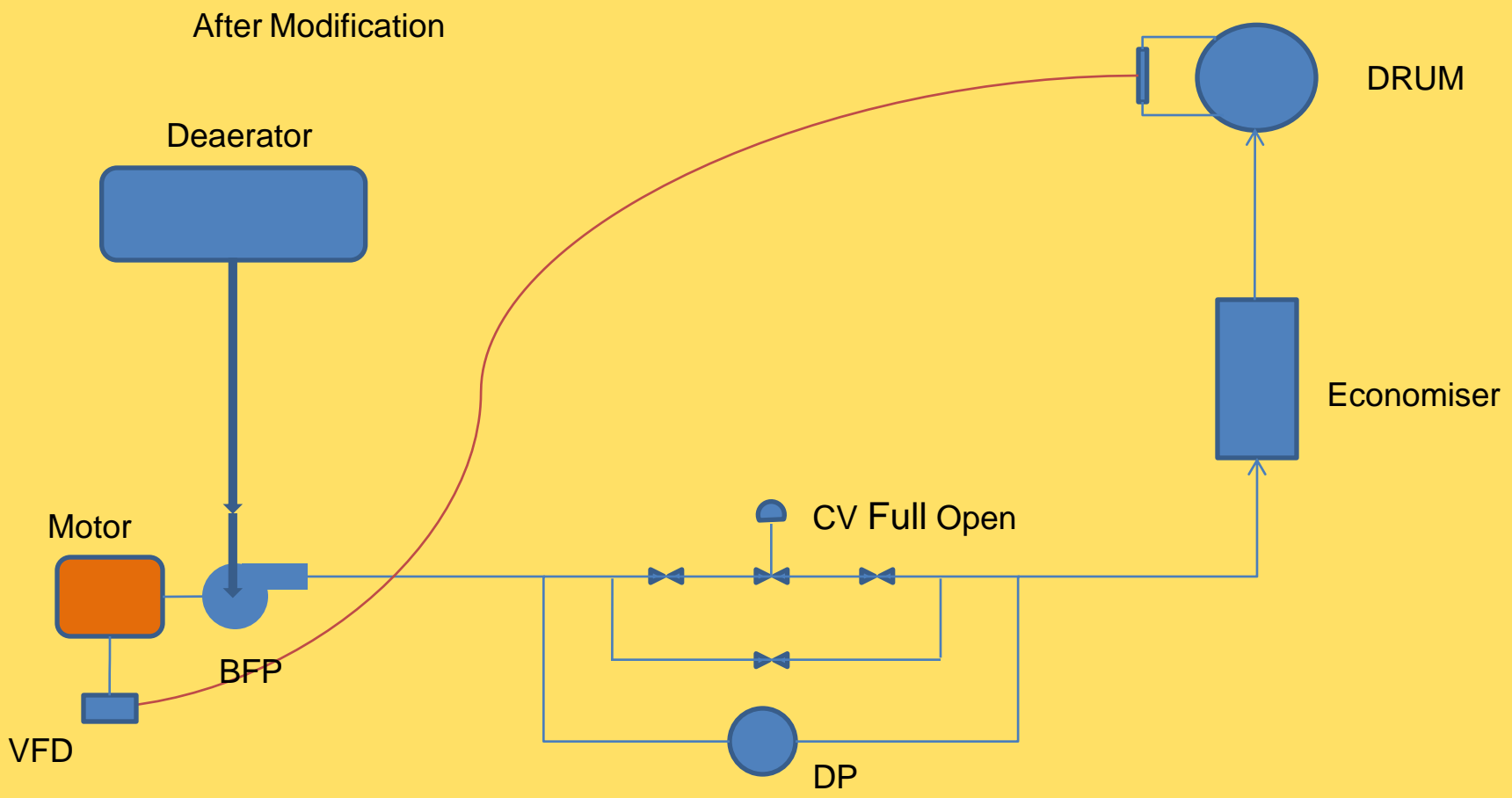
## Modifications to Drum Level Controls of HPBFP & LPBFP

Before Modification



# Case Study 1 – contd.

## Modifications to Drum Level Controls of HPBFP & LPBFP



# Case Study 1 – contd.

## Modifications to Drum Level Controls of HPBFP & LPBFP

### Saving Due to HP Drum Level Control Modification

Description	UoM	Present	After control modification
HPBFP Disch Pr	bar	88.13	83
Feed Flow	t/h	211	211
Hydraulic Power	kW	506.7	477.2
Power Saving	kW		29.5
pump efficiency at full load	%	78.2	78.2
Pump efficiency at present load from pump curve	%	75	75
Shaft input power	kW	675	636
motor efficiency	%	85.9	85.9
Motor Input power	kW	786	740
Motor input power saving	kW		46
Annual running hours		8640	8640
Annual energy saving	kWh		<b>395399</b>
Annual saving @ Rs 3.55 /kWh	Rs		<b>1403668</b>

**Investment NIL**

# Case Study 1 – contd.

## Modifications to Drum Level Controls of HPBFP & LPBFP

### Saving Due to LP Drum Level Control Modification

Description	UoM	Present	After control modification
LPBFP Disch Pr	bar	15.13	10
Feed Flow	t/h	54.5	54.5
Hydraulic Power	kW	22.5	14.9
Power Saving	kW		7.6
pump efficiency at full load	%	78.4	78.4
Pump efficiency at present load from pump curve	%	75	75
Shaft input power	kW	30.0	19.8
motor efficiency	%	59.9	59.9
Motor Input power	kW	50.0	33.1
Motor input power saving	kW		17
Annual running hours		8640	8640
Annual energy saving	kWh		<b>146605</b>
Annual Saving @ Rs 3.55 / kWh	Rs		<b>520447</b>

**Investment NIL**

# Case Study 2

## Use of Gravity for Cooling Tower Make up

- **Previous system**
- Cooling tower make up water was being transferred with the help of CT make up pump of capacity 370 m<sup>3</sup>/hr and head 20 m, 30 KW drive motor, from Clarified water tank to fore bay. A level control valve used to control the level in the fore bay.
- CT make up pump used to run continuously.
- It was observed that a gradient of about 1 meter exists between Clarified water tank level and fore bay water level. This gradient is sufficient for the water to flow by gravity. Clarified water from the flocculator is flowing through open channel to clarified water tank. Most of the water is required for CT make up and a very small percentage is used for other services.

## **Case Study 2 - Contd.**

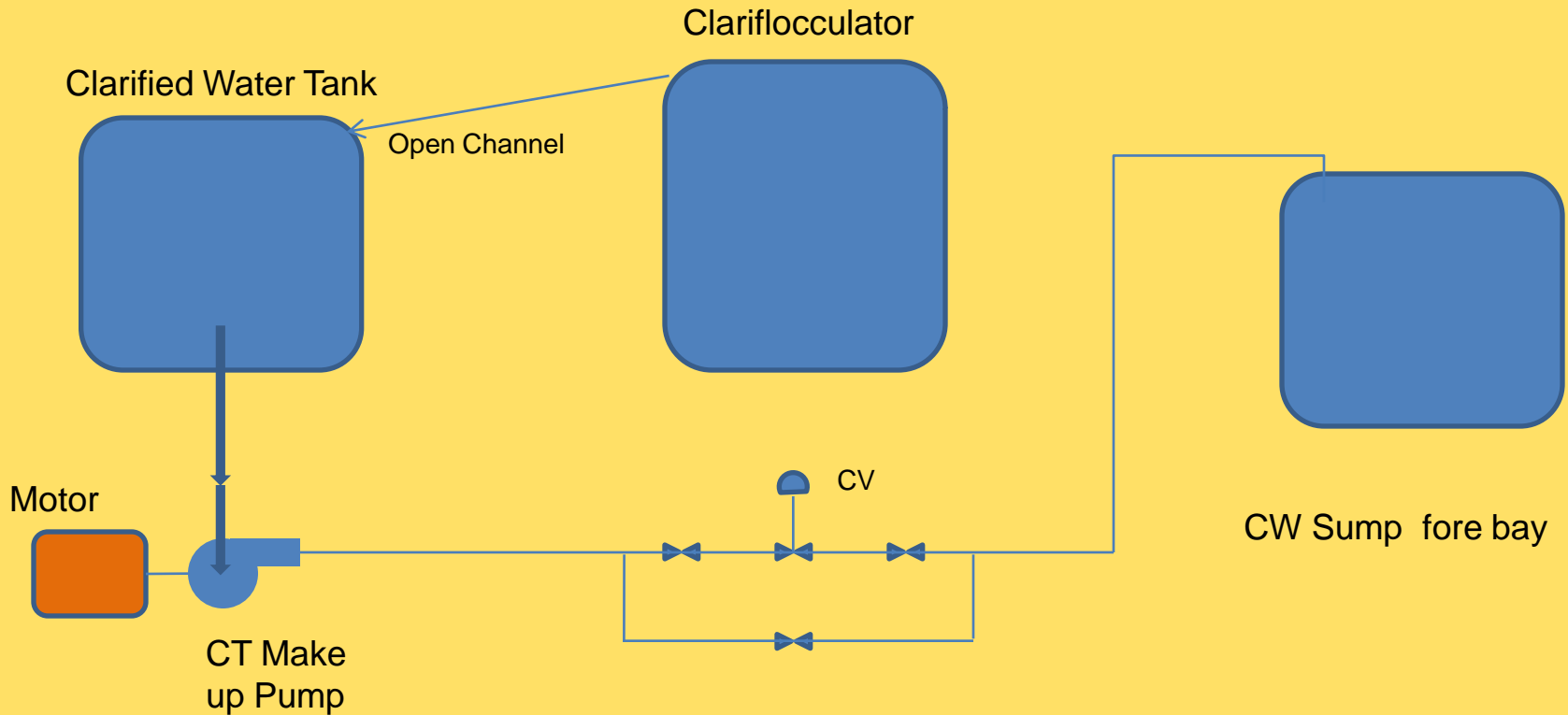
# **Use of Gravity for Cooling Tower Make up**

- **Proposed System**
- An open concrete channel or a pipe can be laid from the flocculator tank down to the forebay.
- **Cooling Tower make up pump to be stopped.**
- **Status:**
  - **Implemented**

# Case Study 2 - Contd.

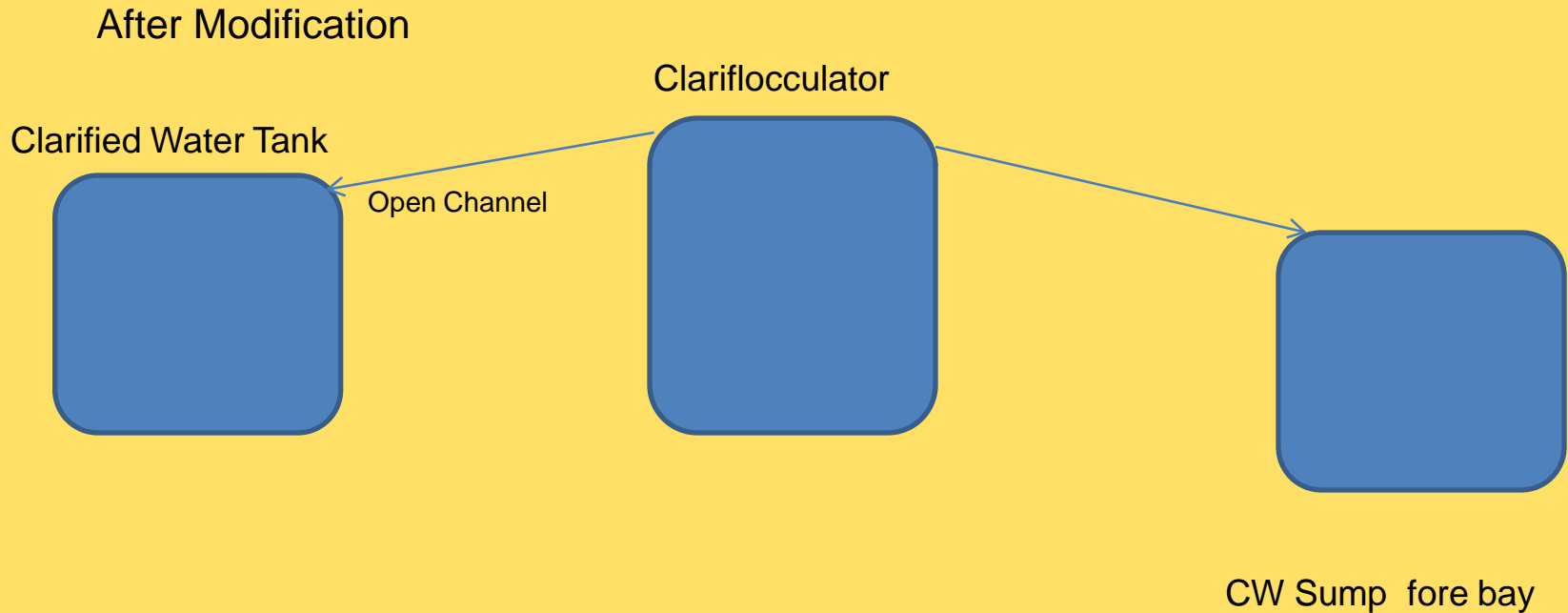
## Use of Gravity for Cooling Tower Make up

Before Modification



# Case Study 2 - Contd.

## Use of Gravity for Cooling Tower Make up



# Case Study 2 - Contd.

## Use of Gravity for Cooling Tower Make up

### Saving Due to Replacement of CT make up Pump System

Description	UoM	
CT make up pump rated power	kW	30
Actual Power	kW	25
Running hours per day	Hrs	24
Energy consumption per day	kWH	600
Energy consumption per annum	kWH	216000
Saving in energy per annum	kWH	<b>216000</b>
Saving in Rs per annum @ Rs 3.55/kWh	Rs	<b>766800</b>

# Other Measures for Energy Conservation

- Installation of Inlet Air Cooling System for Gas Turbine to improve compressor efficiency and increase the output of GT
- Replacement of motors with Energy Efficient motors
- Replacement of inefficient pumps with Higher efficiency pumps
- Replacement of 250 W HPSVs with 100 W LEDs

# **Prerana Energy Professionals' Co-op Society Ltd., Pune**

- **Established on 1<sup>st</sup> May 2009**
- **Objectives**
  - Creating Business opportunities for Professional Energy Engineers, Energy Experts, Energy Consultants, Energy Auditors and Managers in addition to promoting Awareness of Energy Conservation among the members of Public in general and Members of Engineering fraternity in particular.

# **Prerana Energy Professionals' Co-op Society Ltd., Pune**

- **Major Activities & Services**

- A) Energy Audits & Energy Efficiency  
Improvement Studies**

- Undertaking Energy Audits & Energy Efficiency Improvement Studies in Industries / Organizations
- Implementation Assistance for Energy Conservation Programs
- Monitoring of Energy Saving Programs
- Energy Related Special Studies / Surveys in Energy Efficiency / Renewable Sector
- Energy Performance Evaluation Studies

# **Prerana Energy Professionals' Co-op Society Ltd., Pune**

## **Energy Management / Project Management Services**

- Providing Consultancy / Advisory Services of Energy Experts & Energy Professionals
- Energy Management Services
- Project Management of Energy Efficiency /Energy Conservation Projects
- Project Engineering & Project Management Services for Renewable Energy Projects
- Project Monitoring & Project Evaluation of Energy related Projects

# **Prerana Energy Professionals' Co-op Society Ltd., Pune**

## **C) Assistance to Manufacturers of Energy Saving Devices / Energy Efficient Equipment**

- Promotional Assistance for Energy Efficient and Energy Saving Devices
- Provide platform for Demonstration of various existing and newly developed Energy Saving Devices
- Presentations/Demonstrations from Energy Saving Device Manufacturers
- Evaluation of Energy Saving Devices / Energy Efficient Products

# **Prerana Energy Professionals' Co-op Society Ltd., Pune**

## **D) Assistance to Energy Service Companies (ESCOs)**

- Promotional Assistance
- Project Design, Implementation, Monitoring Services
- Providing Expert Manpower
- Developing M & V Protocol

# **Prerana Energy Professionals' Co-op Society Ltd., Pune**

## **E) Assistance to National and State Level Energy Development Agencies / Regulatory Commissions**

- Offering services to National & State level Energy Development Agencies (like BEE, MEDA) and Electricity Regulatory Commissions (like MERC)
- Providing Expert Services / Guidance
- Assistance for Organizing Training / Awareness Programs
- Providing Co-ordination Services for their Activities

# **Prerana Energy Professionals' Co-op Society Ltd., Pune**

**F) Training & Awareness**

**G) Guidance on Policy Matters**

**H) Financial / Commercial Services**

**I) Expert Manpower**

**J) General Services**

Providing experienced faculty as judges to Various Competitions in Educational Institutions for Energy Conservation Programmes.

- Arrange ENCON project competitions.
- Documentation and Information
- Assistance to Industries, Government Organizations and Institutions (Already Started)

# **Prerana Energy Professionals' Co-op Society Ltd., Pune**

## **Empanelment of Energy Auditors and Energy Experts**

Certified Energy Auditors and Energy Experts will be empanelled for undertaking Energy Audits and Energy Efficiency Improvement Studies.

Procedure for Empanelment will be made available to result oriented and genuinely interested persons only.

# Prerana Energy Professionals' Co-op Society Ltd., Pune

## Benefits of Empanelment

Exposure of Members to large Clientele of Prerana Energy Group.

Receiving ENQUIRIES for Energy Audits / Energy Efficiency Improvement Projects in various fields at ONE place.

Reduces marketing efforts / expenses of small companies or Individuals

# **Prerana Energy Professionals' Co-op Society Ltd., Pune**

## **ADDRESS:**

**The Prerana Energy Professionals' Co-operative  
Society Ltd., Pune ,**

C/o DPTS Enterprises,

Shop No. 5, Shopping Plaza – 'B'

Survey No 121 & 122,

Rambaug Colony,

Paud Road,

**Pune – 411 038**

Tel No. 020 - 2546 9476

Fax No. 020 - 2546 9476

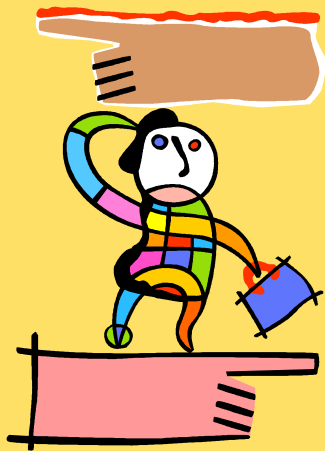
## Contact Details:

M P Bhalerao

[mpbhalerao@yahoo.com](mailto:mpbhalerao@yahoo.com)

[empiconservices@yahoo.co.in](mailto:empiconservices@yahoo.co.in)

Mob: 94223 14812



THANK YOU!

