

# National Energy conservation award 2007



Presented by,

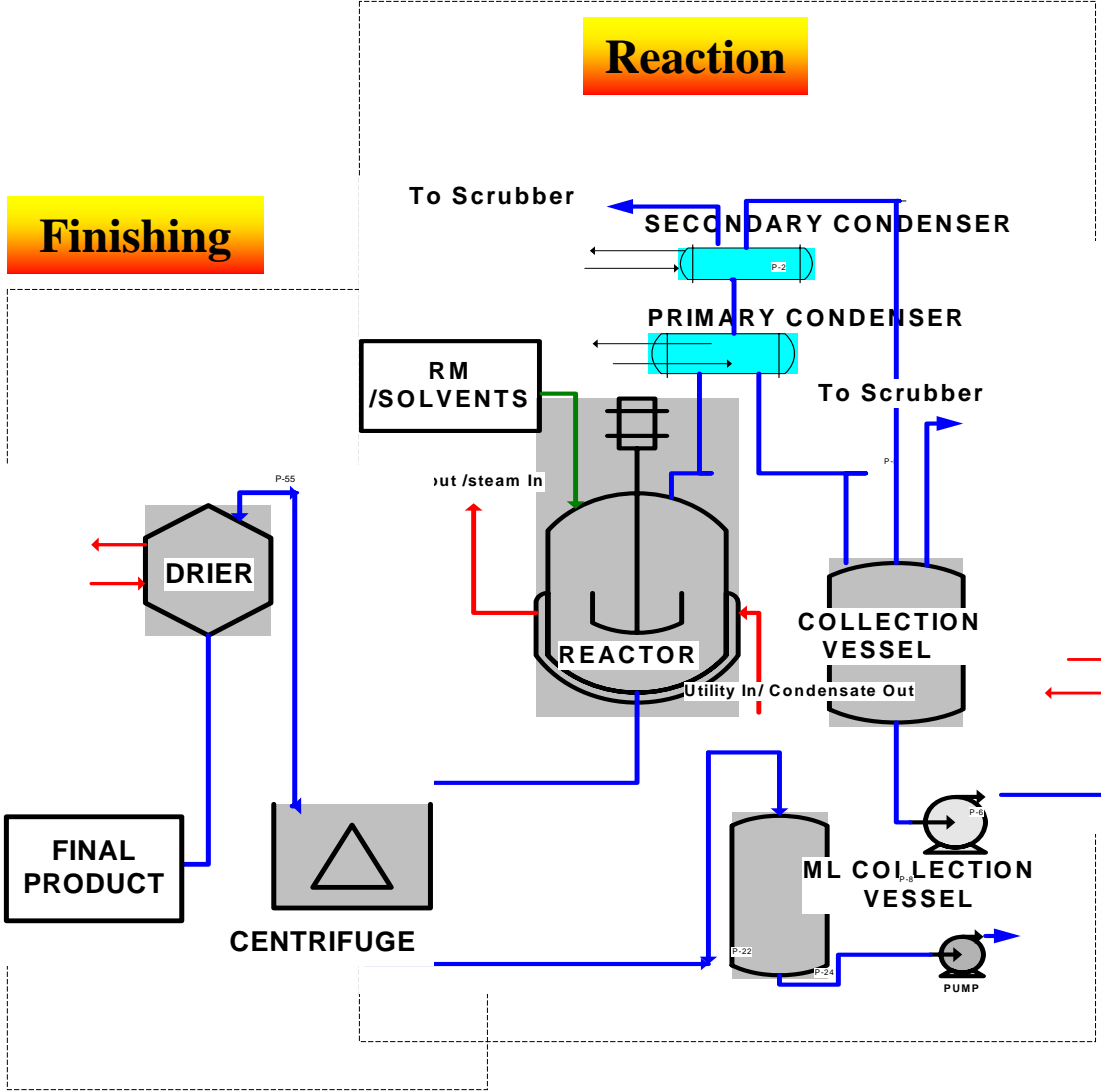
**Jubilant Organosys Ltd, API Div Nanjangud**



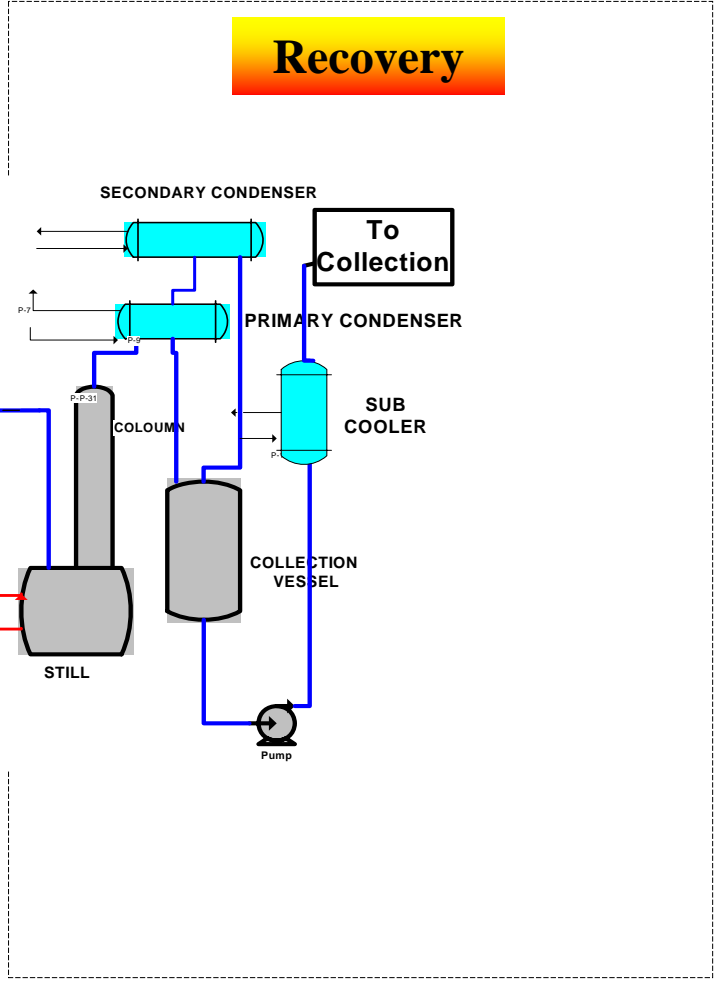
# Typical Process



## Finishing



## Recovery



# Projects undertaken in 2006-2007



SL No	Project description	Achievement of energy savings per year basis				Investment incurred on the project (Rs. Lakhs)
		Electricity (Lakhs (kWh))	Fuels*		Total savings in (Rs. Lakhs)	
			F.Oil (KL)	Total (fuel) in Mkcal)		
1	Conversion of 4 Nos of 110 KW reciprocating brine compressors drives to flat belt drives	0.36			1.65	0.50
2	Conversion of 3 nos Nitrogen compressors to flat belt drives	0.28			1.28	0.40
3	Installation of header pressure control system and VFD for the cooling water pumps for process in Utility 2	10.01			45.75	8.00
4	Installation of continuous teperature based fan speed control Utility 2 cooling tower	2.95			13.08	5.00
5	Installation of 2X36 w CFL lamps in place of 125 W HPMV lamps	0.002			0.01	0.50
6	Installation of VFD in Plant 5 Hot water pump	0.31			1.42	0.78
	<b>Sub Total</b>	<b>13.91</b>			<b>63.18</b>	<b>15.18</b>

# Projects undertaken in 2005-2006



SL No	Project description	Achievement of energy savings per year basis				Investment incurred on the project (Rs. Lakhs)
		Electricity (Lakhs kWh)	Fuels*		Total savings in (Rs. Lakhs)	
			F.Oil (KL)	Total (fuel) in Mkcal)		
1	Installation of PID control in TEE CT fan	0.16			0.7	0.45
2	Installation of PID control in AHU system CT fan in plant 3	0.06			0.3	0.75
3	Installation of Header pressure control system in CT-3 Circulation pump	0.5			2.3	1.25
4	Impeller trimming /low speed operation for chilled water pump of AHU system of plant-3	0.12			0.6	0.65
5	Header pressure control system in TEE CT Circulation pump	0.16			0.7	0.75
6	Header pressure control system in CTW Circulation pump no 4	0.51			2.3	2.75
7	Header pressure control system in CTW Circulation pump no 1	0.98			4.5	3.25
8	PID control for cooling tower -1 fans based on temperature	0.4			1.8	1

# Projects undertaken in 2005-2006



SL No	Project description	Achievement of energy savings per year basis				Investment incurred on the project (Rs. Lakhs)
		Electricity (Lakhs kWh)	Fuels*		Total savings in (Rs. Lakhs)	
			F.Oil (KL)	Total (fuel) in Mkcal)		
9	Header pressure control and avoidance of short cycling loop for Chilled water secondary pumps	1.5			6.9	3.5
10	Header pressure control and avoidance of short cycling loop for Chilled Brine secondary pumps	0.14			6.6	3.5
11	Installation of header pressure controls on hot water pump for plant-1/2	0.3			1.4	1
12	header pressure control for hot water pump in plant-3	0.08			0.3	0.55
13	header pressure control for hot water pump in plant-6	0.15			0.7	0.75
14	Conversion of lightly loaded motors to star from delts	0.08			0.3	0
15	Conversion of CP compressors to flat belt	0.8			3.7	0.45

# Projects undertaken in 2005-2006



SL No	Project description	Achievement of energy savings per year basis			Total savings in (Rs. Lakhs)	Investment incurred on the project (Rs. Lakhs)
		Electricity	Fuels*			
		(Lakhs (kWh))	F.Oil (KL)	Total (fuel) in Mkcal)		
16	Header pressure control of plant 4 hot water system	0.2			0.9	0.85
17	Installation of energy efficient hydrofoil agitators <b>(Technology innovation)</b>	4.12			49	23
18	Modification in steam trapping system		62.86		13.2	8.5
19	Integration of Utilities for pilot plant	3.6			16.5	1
	<b>Sub Total</b>	<b>13.86</b>	<b>62.86</b>	<b>0.00</b>	<b>112.70</b>	<b>53.95</b>

# Projects undertaken in 2004-2005



SL No	Project description	Achievement of energy savings per year basis			Total savings in (Rs. Lakhs)	Investment incurred on the project (Rs. Lakhs)
		Electricity	Fuels*			
		(Lakhs (kWh))	F.Oil (KL)	Total (fuel) in Mkcal)		
1	Improvement in transmission efficiency in air compressor-1	0.15			0.6	0.35
2	Installation of VFD for modulation of ID fan in incinerator	0.29			0.33	0.19
3	Improvement in efficiency of boiler by Oxygen % control		73.68		9.77	0.26
	<b>Sub Total</b>	<b>0.44</b>	<b>73.68</b>	<b>0.00</b>	<b>10.70</b>	<b>0.80</b>

## Methodology

- Energy Audits (Internal/External)
- Policy decisions on EE motors
- Training and mentoring
- Monitoring of Energy (Formats)
- Technology up gradation

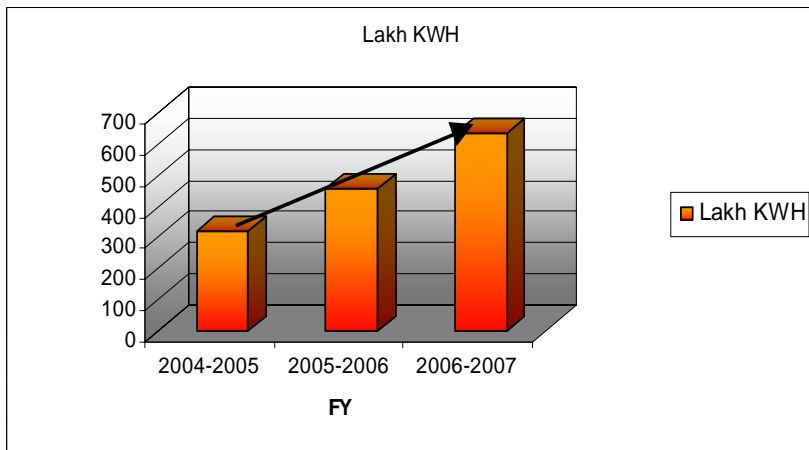


- **External audits**
- **Internal audits**
- **Technical Audits**



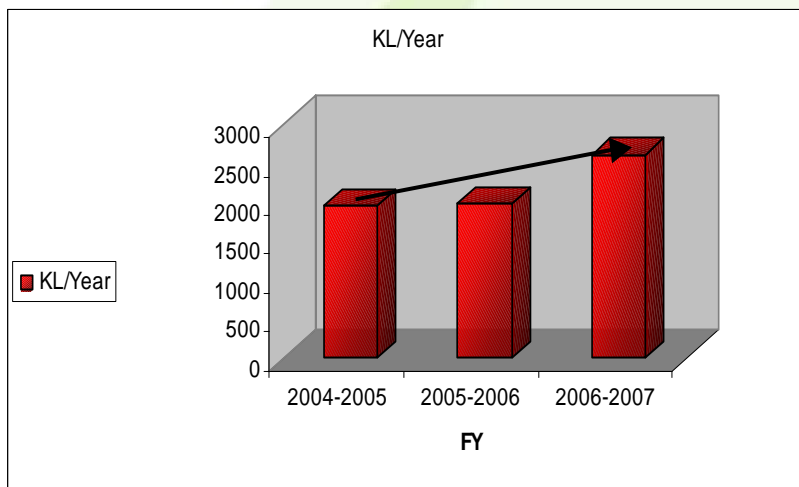
# Specific Energy Consumption – Electrical/Thermal 2006-2007

## Total electricity consumed

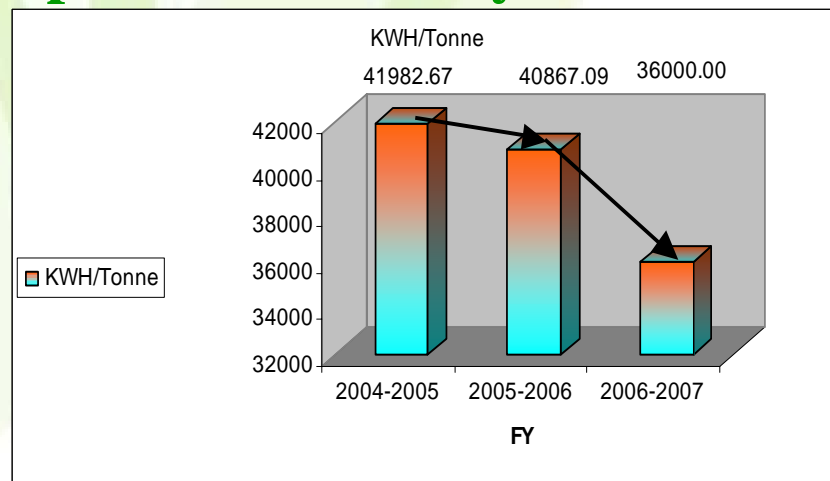


• Better capacity utilization  
• Batch size optimization  
Resulted in lower Sp energy

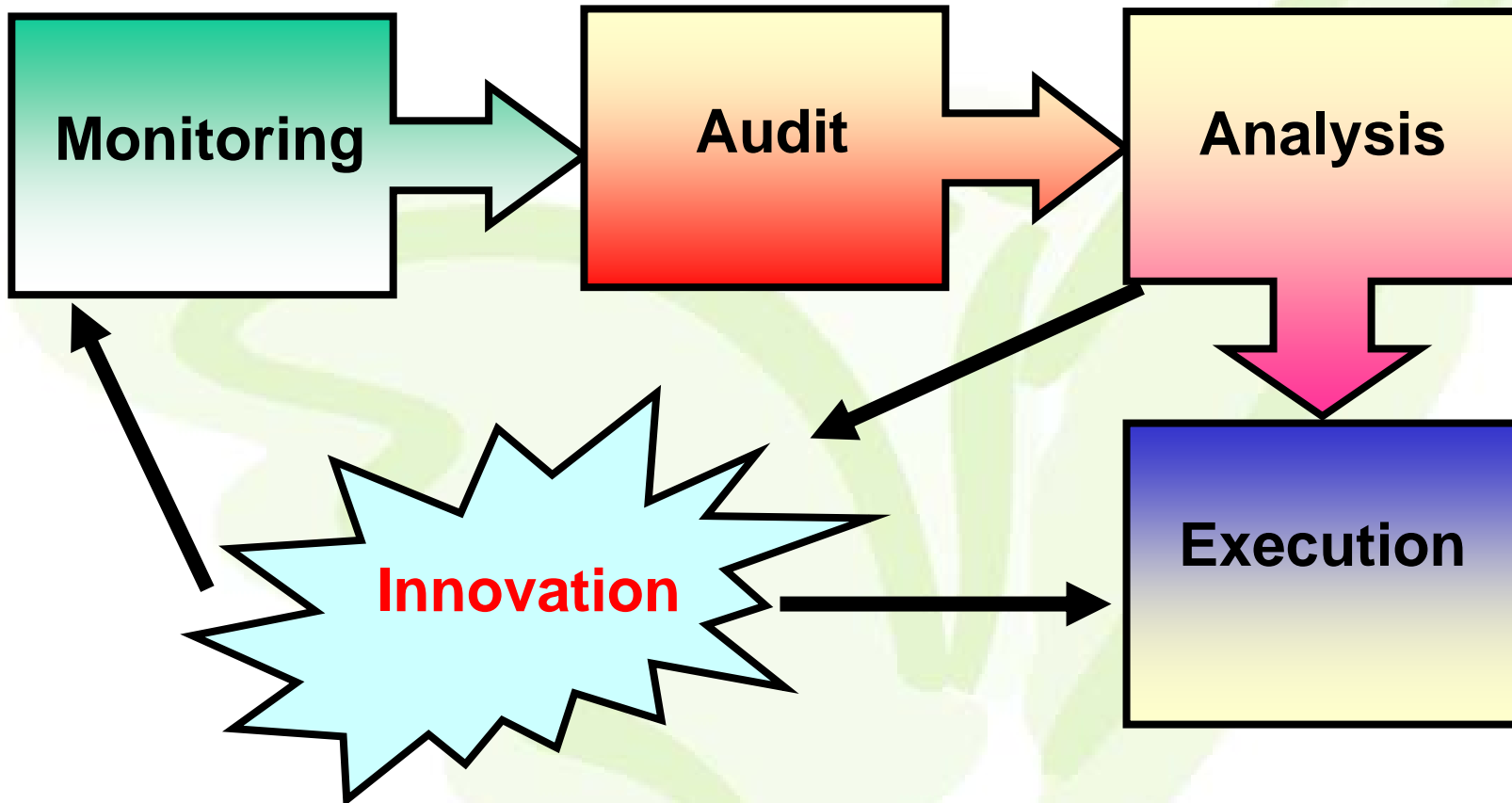
## Total Furnace oil consumed



## Specific Electricity KWH/Ton



# Energy Management Approach





# **Detailed Presentation of Major Projects implemented**



# Project Title : Provision of Flat belts for Compressors

## Before Implementation

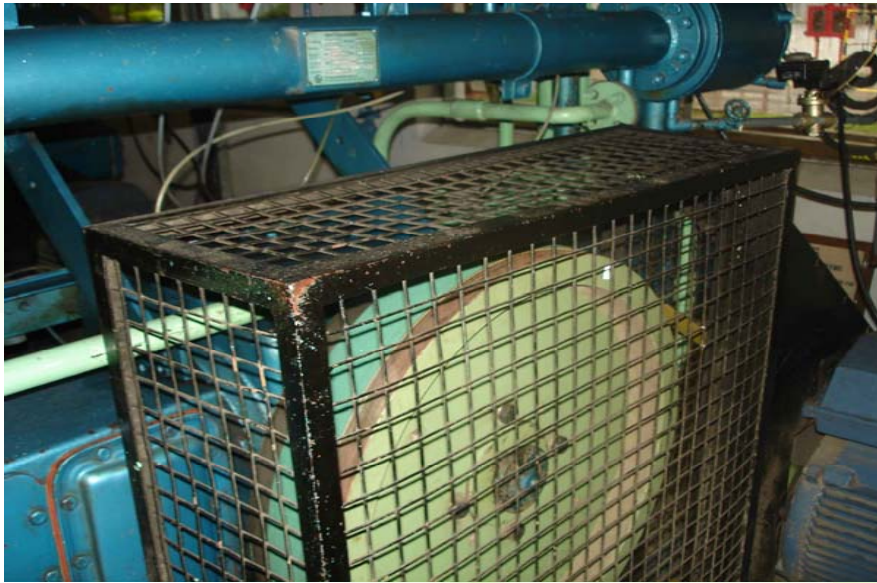
- Compressors running on V belts
- Power consumed was 52.7 KWh per Hr (Brine compressors)  
Power consumed was 88.7 KWh per Hr (Air compressors)

## After Implementation

- Compressors running on Flat belts
- Power consumed was **47.5 KWh per Hr** (Brine compressors)  
Power consumed was **85.2 KWh per Hr** (Air compressors)

# Project Title : Provision of Flat belts for Compressors

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• **Installed flat belt in air compressor**

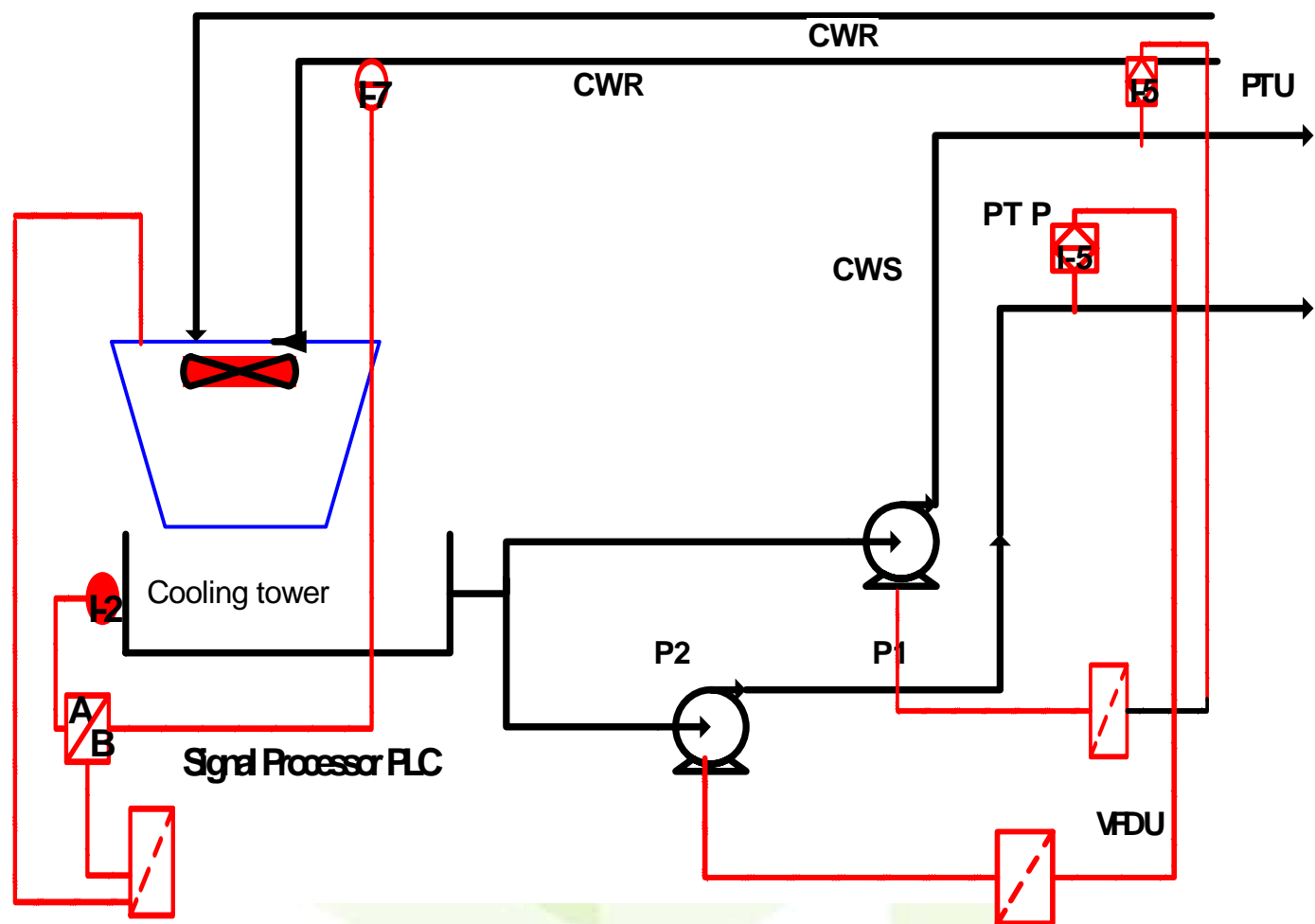


## Provision of VFD' in Cooling Tower pump and Fans

### Before Implementation

- Cooling water pumps were running with Excess Flow
- Plant side requirement is need based and not continuous
- Cooling tower Fans run Continuously
- Power consumed was 131.9 KWh per Hr (CT Pump Process)  
Power consumed was 20.4 KWh per Hr (CT Fan 1 and 2)

# Schemes for cooling water pump and Fans



Variable Freq Drive for Fans

VFD for Cooling water pumps



## Project Title : Provision of VFD for Pumps and Blowers

### Scheme II : Provision of VFD' in Cooling Tower pump and Fans

#### After Implementation of VFD

- Cooling Water pump Flows Optimized
- Pump RPM is now controlled by discharge header pressure  
Pressure transmitter there by adjusting the flow.
- Power reduced from **139 to 76** KWh per Hr (Cooling tower Process)  
and **\_** KWh per Hr (cooling tower Utility)
- Power consumed reduced from **20.4 KWh per Hr**  
**to 4.5** KW/Hr for CT Fans
- Savings **Rs 58 Lakhs in FY 2006-2007**

## Project Title : Installation of Energy efficient Agitators

- One of our product has lot of solid suspension during the reaction and needed efficient mixing at lower power
- Conventional agitators are anchor/turbine type which draws more power and limited mixing applications
- New Efficient hydrofoil agitator is specially designed for low power and high efficient mixing. ***There fore it was selected as Technological up gradation***



**New Technology**

# Project Title : Installation of Energy efficient Agitators

## Before



- Anchor type
- Better Heat transfer in viscous media
- $N = 400 / \rho$ ,  $N_p = 4$
- Horizontal flow well suited for low liquid level geometries
- Most economical for laminar flow

## After



- Ideal for blending (due to low shear forces), heat transfer and solids suspension
- Narrow-blade Turbulent heat transfer,  $N_p = 0.27$
- Extremely efficient: creates greater fluid motion with less energy



# Project Title : Installation of Energy efficient Agitators

## Saving Summary after installation of Hydrofoil agitators

Sr.No.	Reactor No.	Capacity in KL	Conventional Agitator KW	New Agitator KW	Energy saved per hour	Total hrs run	Total Power saved	In Rupees
1	R-4101	8	22	4	18	864	15811	73838
2	R-4202	15	37	15	22	4800	105600	493152
3	R-4203	15	37	15	22	4800	105600	493152
4	R-4204	6	19	4	15	3960	58608	273699
5	R-4205-A	8	19	15	4	4560	15960	74533
6	R-4206	5	15	2	13	2160	27648	129116
7	R-4207	12	30	4	26	1728	45446	212235
8	R-4208	12	30	4	26	3000	78900	368463
							<b>Total in Rs Million</b>	<b>2.12</b>

**Saving From yield Improvement due to better agitation Rs 40 Million/Annum**



## Project Title : Installation of Energy efficient Agitators

### After Installation of Hydrofoil Agitators

- Power requirement reduction achieved was 70% resulting in **Rs 2.12 Million/annum**
- Due to high efficient mixing , yield increased by 18% resulted in saving of **Rs 40 Million/annum.**

**Total saving in FY 2005-2006 Rs 42 Million**

# Tools used



## List of Tools used

- Portable Flue Analyzer Effipro
- Load Manager Fluke/Krykard
- Ultrasonic Flow Monitor
- Ultrasonic leak detector
- Graphical analysis software  
Minitab
- Harmonic analyzer

## Major environmental improvements made during Last three years

2006-2007



- Utilization of spent solvent mixtures to reduce fuel consumption in incinerator. (2006-2007)
- Completed trials for zero discharge by treating utility blowdowns and treated process effluents by RO system. Integrated system installed. (2006-2007)
- Construction of SLF at site for hazardous waste disposal.

Improvement in process of various products to reduce effluent generation by 324 KL (2006-2007)

## Major environmental improvements made during Last three years

### 2005-2006

- One product in the crop is also being isolated to reduce incineration load by 8 MT per year (2005-2006)
- Reduction of Noise level around Generator area from 170 Db to 90 Db by providing room acoustics. (2005-2006)
- Installed spray drier for high TDS effluent treatment (2005-2006)

## Major environmental improvements made during Last three years

**2004-2005**

**Reduction in Solvent consumption by improved recycling (Ongoing) achieved following**

- 1. Acetic anhydride 24 MT per annum**
- 2. Cyclohexane 24 MT per annum**
- 3. Toluene 21 MT per annum**
- 4. Methanol 7 MT per annum**
- 5. n Butanol 11 MT per annum**

# List of awards and certifications



**ISO 9001.**

**ISO 14001.**

**OSHAS 18001.**

**Greentech environmetal Silver award for 03-04**

**Greentech Safety Gold Award 03-04.**

**Greentech Environment Excellence Gold award 2006 (In chemical Sector).**

**Suraksha award from National safety Council Karnataka Chapter for the year (2003-2005).**

**National Energy Conservation Award second prize in pharma sector 2006.**

**Excellent energy unit award CII 2006**



**THANK YOU**