

**Annexure - B**

**Energy Conservation Measure implemented in 2007-2008-----Scheme -I**

	Title of the measure <b>Structural loss saving for SRT Heaters thru' Detailed Thermography Survey and corrective action</b>	Sector : <b>Petrochemical</b>
		Technology : <b>ABB Lummus for SRT Heaters</b>

**Description of the energy conservation measure:**

Detailed Thermography survey for 3 SRT Heaters (Cracker Plant) both for the pre and post repair activities with mapping of temperatures for all areas and for all the sides done. Based on the data, it became quite useful information for the maintenance team for carrying out the rectification jobs for the refractory bricks as per the mapping chart. Pl. refer the following table which highlights the heater wise savings achieved after post maintenance activity. .



(Photograph of a section of SRT Heaters for which detailed thermography survey cum post correction carried out)

Heater	Before Maintenance		After Maintenance	
	Structural losses %	Monetary Loss Rs/Lakhs	Structural losses %	Monetary Loss Rs/Lakhs
H-101	1.78	4.41	0.93	14.68
H-102	2.48	16.14	1.46	18.09
H-103	2.98	27.62	1.36	26.48
H-104	Survey not conducted		0.88	10.81
H-105	3.98	46.67	Survey to be conducted	
H-106	3.24	1.78		

An appropriate Thermography survey is essential for successful mapping of all the hot zones. Infact it is a highly skilled job. Estimated saving due to reduction in structural losses post maintenance is around Rs. 69 Lakhs / annum.					
Agency that executed the project (with complete address and email): For details pl. contact Company person whose details are mentioned below.					
Total investment, Rs.: 29.7 Lakhs			Year of implementation: 2007-08		
First year energy cost savings, Rs.: 70.10 Lakhs					
First year other savings, Rs.:					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Furnace Oil (MT)	Other
Energy consumption before					
Energy consumption after				572*	
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...				15438	
Company complete address:  Kanu K Parmar Sr. GM (Central Technical Services) Reliance Industries Ltd. Vadodara Mfg. Division P.O. Petrochemicals Dist. Vadodara - 391346				We authorize Bureau to use this information for dissemination  Signature  Date 15.10.2008	
* Net estimated saving after the implementation of the scheme					

**Annexure - B**  
**Energy Conservation Measure implemented in 2007-2008-----Scheme -II**

	Title of the measure	Sector : <b>Petrochemical</b>
	<b>Pinch Analysis study application for reduction of steam consumption</b>	Technology : <b>M/s Forbes Marshall</b>

**Description of the energy conservation measure:**

Application of Pinch analysis for reduction of steam consumption in Steam turbines at Cracker plant by increasing of steam pressure and temperature. This was established as under :

The simulation based on 50 MT/hr steam flow was carried out to know the impact of increase in Steam pressure. The results indicates the saving of 0.1 mmkcal/hr per increase of 1 kg/cm<sup>2</sup>g steam pressure.

Following is the simulated results:

**Base Case**

Steam	
Flow , kg/hr	50000
Pressure, kg/cm <sup>2</sup> g	41.5
Temp., °C	400
Heat load, mmkcal	32.81

**Sensitivity w.r.t. steam pressure.**

Steam Press. kg/cm <sup>2</sup> g	Steam flow Kg/hr	Heat Load mmkcal/hr	Saving in Heat Load mmkcal/hr
42.5	49867	32.71	0.10
43.0	49801	32.65	0.16
43.5	49736	32.60	0.21

**With the implementation of the scheme, there is a saving of 0.3 MMKCAL/Hr. Annual revenue saving is Rs. 30 Lakhs. Investment on the scheme is NIL. Only operational changes were made.**



Agency that executed the project (with complete address and email): For details pl. contact Company person whose details are mentioned below.

Total investment, Rs.: NIL

Year of implementation: 2007-08

First year energy cost savings, Rs.: 29.40 Lakhs

First year other savings, Rs.:

On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Furnace Oil (MT)	Other
Energy consumption before					
Energy consumption after				*240	
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...				15438	

Company complete address:

Kanu K Parmar  
Sr. GM (Central Technical Services)  
Reliance Industries Ltd.  
Vadodara Mfg. Division  
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Date 15.10.2008

\* Net estimated saving after the implementation of the scheme

**Annexure - B**

**Energy Conservation Measure implemented in 2007-2008-----Scheme -III**

	Title of the measure	Sector : <b>Petrochemical</b>
	<b>Optimization of steam cons. in auxiliary boilers</b>	Technology : <b>Own initiative</b>

**Description of the energy conservation measure:**

Auxiliary steam consumption for Auxiliary Boilers (Mitsui – Japan make) were optimized with the availability of gas by adopting following measures:

- a) Stopping of steam atomization and replacement with air atomization.
- b) Stopping of soot blowing,
- c) Stopping steam supply to coil air preheating
- d) Reduction of furnace oil storage temperature, taking advantage of lower pour point.

**All the above measures resulted in revenue saving of Rs. 180 Lakhs / annum. The stack temperature has come down significantly to 90 °C. Investment on the scheme is NIL. Only changes in Standard Operating Procedures were made.**



Boilers of Utilities Plant

Agency that executed the project (with complete address and email): For details pl. contact Company person whose details are mentioned below.					
Total investment, Rs.: NIL			Year of implementation: 2007-08		
First year energy cost savings, Rs.: 180.0 Lakhs					
First year other savings, Rs.:					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before					
Energy consumption after				1471*	
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...				15438	
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* Net estimated saving after the implementation of the scheme					

**Annexure - B**

**Energy Conservation Measure implemented in 2007-2008-----Scheme - IV**

	Title of the measure <b>Optimization in Air consumption</b>	Sector : <b>Petrochemical</b>
		Technology : <b>Own initiative</b>

**Description of the energy conservation measure:**

Extensive drive on the Optimization of air consumption resulted in stoppage of an air compressor in Utility plant. The measures include the following:

- a) Reducing consumption of plant air for non-productive purposes like cleaning, sweeping etc.
- b) Arresting of leakages in the whole piping network and from the control valves within the plant battery limit.
- c) Changing the instrument metering factor of supplier and for the consumer as per the pressure of the instrument air for proper accounting of the consumption.

**By these measures we have achieved power saving of around 400 KW/Hr. Revenue saving of Rs. 80 lakhs / annum is achieved.**



Agency that executed the project (with complete address and email): For details pl. contact Company person whose details are mentioned below.					
Total investment, Rs.: 2.0 lakhs			Year of implementation : 2007-08		
First year energy cost savings, Rs.: 80 lakhs.					
First year other savings, Rs.:					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before					
Energy consumption after	3170				
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	2.80				
Company complete address:  Kanu K Parmar Sr. GM (Central Technical Services) Reliance Industries Ltd. Vadodara Mfg. Division P.O. Petrochemicals Dist. Vadodara - 391346  * Net estimated saving after the implementation of the scheme				We authorize Bureau to use this information for dissemination  Signature  Date 15.10.2008	

**Annexure - B**

**Energy Conservation Measure implemented in 2007-2008-----Scheme -V**

	Title of the measure	Sector : <b>Petrochemical</b>
	<b>Replacement with energy efficient circulating cooling water pump</b>	Technology : Internal team assessment

**Description of the energy conservation measure:**

In our Utility plant for cooling tower area we have circulating cooling water pump of two different makes viz M/s Jyoti and M/s Mathar and Platt (M & P). The efficiency of M/s M & P make is higher than that of M/s Jyoti. In the normal practice one M/s Jyoti make is always in operation. The proposal was worked out for replacement with M/s M & P make. **Power saving being 60 KW/Hr. Payback period comes to 1.8 years. Annual Revenue saving is Rs. 9.0 Lakhs.**



**( Photograph showing Cooling Tower of Utilities plant where energy efficient pump was installed in place of less efficient one.)**

Agency that executed the project (with complete address and email): For details pl. contact Company person whose details are mentioned below.					
Total investment, Rs.: 37.6 Lakhs			Year of implementation: 2007-08		
First year energy cost savings, Rs.: 21.0 Lakhs					
First year other savings, Rs.:					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before					
Energy consumption after	48*				
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	2.80				
Company complete address:  Kanu K Parmar Sr. GM (Central Technical Services) Reliance Industries Ltd. Vadodara Mfg. Division P.O. Petrochemicals Dist. Vadodara - 391346				We authorize Bureau to use this information for dissemination  Signature  Date 15.10.2008	
* Net estimated saving after the implementation of the scheme					

<b>Annexure - B</b>		
<b>Energy Conservation Measure implemented in 2007-2008-----Scheme - VI</b>		
	<b>Reducing Utilities losses in Yard piping region</b>	Sector : <b>Petrochemical</b>
		Technology : <b>Own initiative</b>
<p><b>Description of the energy conservation measure:</b></p> <p>Major drive was carried out during the year for reducing the Energy losses in Yard Piping Area. Detailed survey was carried out. The objective of the survey are listed as under :</p> <ul style="list-style-type: none"> <li>• Rectification of Steam traps of the yard piping region.</li> <li>• Finding out Steam leakages in Yard Piping Area and getting it attended through concerned agencies</li> <li>• Finding out Service water, Raw water, Cooling water, DM water leakages in Yard Piping area and getting it attended through concerned agencies..</li> <li>• Finding out Plant air and Instrument air leakages in Yard Piping Area and getting it attended through concerned agencies.</li> <li>• Checking health of lines physically and if suspected abnormal, to be informed to concerned agency for required actions and rectification.</li> <li>• Carrying insulation survey of steam lines in Yard Piping Areas and wherever if insulation is found damaged bare, then got it repaired reinsulated through concerned agency.</li> <li>• Carrying out other surveys whenever required in plants and give report to Management.</li> </ul> <p>The drive had been quite successful. Arresting of the various leakages have saved enormous energy and revenue for the Complex. Also there was considerable improvement in the housekeeping of Yard piping region. Secondly, big insulation rectification job was carried out. Estimated revenue earning due to the all above measures being around 1160 Rs. Lakhs.</p>		



Photograph showing section of the Yard Piping area of the Complex.

Agency that executed the project (with complete address and email): For details pl. contact Company person whose details are mentioned below.

Total investment, Rs.: 50.0 Lakhs      Year of implementation: 2007-08

First year energy cost savings, Rs.: 1159.0 Lakhs

First year other savings, Rs.:

On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before					
Energy consumption after				5000*	
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...				15438	

<p>Company complete address:</p> <p>Kanu K. Parmar GM (Central Technical Services) Reliance Industries Ltd. Vadodara Mfg. Division P.O. Petrochemicals Dist. Vadodara - 391346</p>	<p>We authorize Bureau to use this information for dissemination</p> <p>Signature</p> <p>Date 15.10.2008</p>
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\* Net estimated saving after the implementation of the scheme

**Annexure - B**

**Energy Conservation Measure implemented in 2007-2008-----Scheme -VII**

	Title of the measure	Sector : <b>Petrochemical</b>
	<b>Major refractory repair of an Auxiliary boiler (BHEL no: 2) of Utilities area</b>	Technology : <b>Own initiative</b>

**Description of the energy conservation measure:**

Auxiliary Boiler, BHEL Blr. no: 2 it's major repair of refractory of baffle plates and of superheater region were carried out thereby short-circuiting of flue gases was averted. Few pockets in this region were arrested resulting in reduction in stack temperature by 40°C. This is standby boiler. However, if it were in operation then revenue earning could have been around Rs. 50.0 Lakhs.



Agency that executed the project (with complete address and email): For details pl. contact Company person whose details are mentioned below.

Total investment, Rs.: 14.8 Lakhs	Year of implementation: 2007-08
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First year energy cost savings, Rs.: 50.0 Lakhs					
First year other savings, Rs.:					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before					
Energy consumption after				225*	
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...				15438	
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* Net estimated saving after the implementation of the scheme					

**Annexure - B**

**Energy Conservation Measure implemented in 2007-2008-----Scheme -VIII**

	Title of the measure	Sector : <b>Petrochemical</b>
	<b>Major insulation repair of an auxiliary boiler</b>	Technology : <b>Own initiative</b>

**Description of the energy conservation measure:**

A detailed survey was carried out and mapped for all the hot spots. Insulation jobs were carried out as per the desired thickness for all the Hot zone surfaces of all the Auxiliary Boilers and steam headers.

The above measures resulted in revenue saving of Rs. 30.0 Lakhs / annum.



Agency that executed the project (with complete address and email): For details pl. contact Company person whose details are mentioned below.					
Total investment, Rs.: Rs. 9.9 Lakhs			Year of implementation: 2007-08		
First year energy cost savings, Rs.: 30.0 Lakhs					
First year other savings, Rs.:					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before					
Energy consumption after				135*	
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...				15438	
Company complete address:  Kanu K Parmar GM (Central Technical Services) Reliance Industries Ltd. Vadodara Mfg. Division P.O. Petrochemicals Dist. Vadodara - 391346  * Net estimated saving after the implementation of the scheme				We authorize Bureau to use this information for dissemination  Signature  Date 15.10.2008	