





**Energy Conservation Measure Implemented in 2007-2008**

( To be filled separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of measure		Sector		
Year to be filled by BEE	Commissioning of FGAAU		HPCL Visakh Refinery		
			Technology		
			Fuel gas desulphurisation		
Description of energy conservation measures:					
<p>The sour fuel gas generated in the Refinery was treated in ARI SRUs. However the ARI SRUs posed problems of high operating cost (high power, steam &amp; chemical consumption), maintenance costs and had poor service factor. Considering the requirement for legal compliance, scope for energy conservation (power and steam) and sustained trouble free sweetening of the sour fuel gas, it was proposed to install a FGAAU (Fuel gas Amine Absorber Unit) and integrate with the existing Diesel Hydro-desulphurisation unit (DHDS)-SRU which is based on Claus technology. It may be noted that the design cushion available in existing amine regenerator unit was utilized in regenerating the rich amine basis a separate feasibility study.</p> <p>The FGAAU helped in 100% compliance of SO<sub>2</sub> emission norm as set by state pollution control board, and resulted in savings &amp; in steam consumption, power consumption, lower maintenance cost, saving in chemical cost, improving fuel gas quality, enabled better emission &amp; effluent management as compared to ARI SRU units</p>					
Picture /Sketch/drawing before modification			Picture / sketch/drawing after modification		
 <p>Picture of ARI SRU</p>			 <p>Picture of FGAAU</p>		
Agency that executed the project (with complete address and e-mail): Field modifications were inhouse.					
Total investment Rs. 1830 Lakhs			Year of implementation: 2007-2008		
First year energy cost savings, Rs:588 lakhs					
First year other savings, Rs:446 Lakhs (Chemical cost)					
On annual basis	kWh, 000	Coal (Tons)	Gas NM3	Oil KL	Others
Energy consumption before					
Energy consumption after					
Savings in fuel	5405.8 MWH			1160 MT	
Energy tariff, Rs/KWh/Ton/NM3/KL..	Rs 6.73 /KWH			RS 19356.25/MT	
Company complete address				We authorise Bureau to use this information for dissemination	
Hindustan Petroleum Corporation Limited, Visakh Refinery, PO Box No 15, Malkapuram Post, Visakhapatnam -530 011 (A.P.), Tel No.: 0891-2577862, Fax No: 0891-2759861, E-mail: techvr@hpcl.co.in					
Contact person which could be contacted for more information				Signature	
Mr. P.S. Rao, Sr. Manager-Technical, PS&E.				Date	

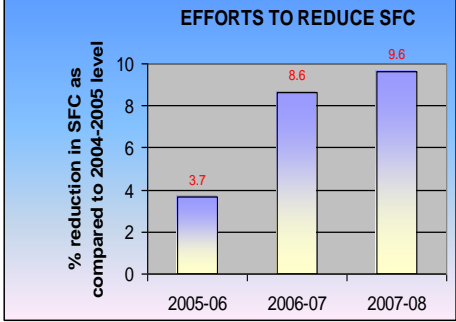

**Energy Conservation Measure Implemented in 2007-2008**

( To be filled separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of measure		Sector		
Year to be filled by BEE	Routing of CDU-II Hot well off gases to Furnace		HPCL Visakh Refinery		
			Technology		
			Hot well off gas burners		
Description of energy conservation measures:					
<p>As per original design, the hot well off gas in Crude / Vacuum unit was routed to Atmosphere due to its low pressure (The pressure is 0.1 Kg/cm<sup>2</sup>g and hence this gas can not be routed directly to fuel gas system which operates at higher pressure). This was leading to VOC emission and also loss of hydrocarbon gas to atmosphere. Schemes were developed in-house and imported special burners (by John Zink) were installed to burn the gas inside Atmospheric Furnace of crude unit, thereby utilizing calorific value of the gas in heating crude, saving fuel and at the same time reducing the VOC emission. This project was an improvement over original designing of the unit.</p>					
Picture /Sketch/drawing before modification			Picture /sketch/drawing after modification		
					
Agency that executed the project (with complete address and e-mail): Field modifications were inhouse, burners were supplied by M/s John Zink. Address: Mr. Nitin Gupta, Sales Manager, 31, Kalpataru Court, Dr. C. Gidwani Marg, Chembur, Mumbai 400 074, Mobile : 9820 891400, e-mail: nitin.gupta@johnzink.com.					
Total investment Rs. 34 Lakhs			Year of implementation: 2007-2008		
First year energy cost savings, Rs: 535 lakhs					
First year other savings, Rs: Nil					
On annual basis	kWh, 000	Coal (Tons)	Gas NM3	Oil KL	Others
Energy consumption before					
Energy consumption after					
Savings in fuel			1722313 NM3 of off gas, equivalent to 2762.1MT of LSHS		
Energy tariff, Rs/KWh/Ton/NM3/KL..				RS 19356.25/MT	
Company complete address				We authorise Bureau to use this information for dissemination	
Hindustan Petroleum Corporation Limited, Visakh Refinery, PO Box No 15, Malkapuram Post, Visakhapatnam -530 011 (A.P.), Tel No.: 0891-2577862, Fax No: 0891-2759861, E-maiil: techvr@hpcl.co.in					
Contact person which could be contacted for more information				Signature	
Mr. P.S. Rao, Sr. Manager-Technical, PS&E.				Date	


**Energy Conservation Measure Implemented in 2007-2008**

( To be filled separately for each Energy Conservation Measure)

ID to be filled by BEE		Title of measure		Sector	
Year to be filled by BEE		Reduction in specific fuel consumption in CPP		HPCL Visakh Refinery	
				Technology	
				Optimising GTG Operation	
Description of energy conservation measures:					
<p>In cogeneration captive power plant at Visakh Refinery, there are total four numbers of gas turbines. Depending on power demand and utility supply logistics, the number of turbines in service is minimized and less number of turbines are run at higher load, thereby reducing specific fuel consumption (SFC). The SFC was improved from 0.37 MT/MWH during 2006-7 to 0.3668 MT/MWH during 2007-8, thereby saving fuel in per unit power generation.</p>					
Picture /Sketch/drawing before modification			Picture /Sketch/drawing after modification		
			 <p style="text-align: center;"><i>Pictute of Captive power plant</i></p>		
Agency that executed the project (with complete address and e-mail): No modifications were made to existing system.					
Total investment Rs. Nil			Year of implementation: 2007-2008		
First year energy cost savings, Rs:358 lakhs					
First year other savings, Rs: Nil					
On annual basis	kWh, 000	Coal (Tons)	Gas NM3	Oil KL	Others
Energy consumption before					
Energy consumption after					
Savings in fuel				1125 MT of Naphtha	
Energy tariff, Rs/KWh/Ton/NM3/KL..				Rs 31831.03/MT	
Company complete address				We authorise Bureau to use this information for dissemination	
Hindustan Petroleum Corporation Limited, Visakh Refinery, PO Box No 15, Malkapuram Post, Visakhapatnam -530 011 (A.P.), Tel No.: 0891-2577862, Fax No: 0891-2759861, E-maiil: techvr@hpcl.co.in					
Contact person which could be contacted for more information				Signature	
Mr. P.S. Rao, Sr. Manager-Technical, PS&E.				Date	

**Energy Conservation Measure Implemented in 2007-2008**

( To be filled separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of measure		Sector		
Year to be filled by BEE	Steam leak survey and arresting		HPCL Visakh Refinery		
			Technology		
			Leak survey by ultrasonic detector		
Description of energy conservation measures:					
External energy auditors are appointed to carry out steam leak surveys using ultrasonic detector at an interval of every 4 months. The identified leaks are arrested by appointing external parties under "Steam trap System Management", or in house. The reduction achieved in steam loss was by 2.8 MT/Hr during 2007-08 ( steam leak was reduced from 4.6 to 1.8 MT/Hr during the year). During the year, large numbers of MST traps were also provided for ¼" copper tubings in FCCU-I & CDU-III.					
Picture /ketch/drawing before modification			Picture /sketch/drawing after modification		
					
<i>Picture of MST trap</i>					
Agency that executed the project (with complete address and e-mail): Field modifications were inhouse and by Forbes Marshall. Surveys were carried out by Forbes Marshall. Mr. Vishwas S. Patil, Manager Energy Services, M/s Forbes Marshall, PB No 29, Mumbai Pune Road, Kasarwadi, Pune -411034, India. email: pv@forbesmarshall.com, cell: 09922940250					
Total investment Rs. 21 Lakhs			Year of implementation: 2007-2008		
First year energy cost savings, Rs:175 lakhs					
First year other savings, Rs: Nil					
On annual basis	kWh, 000	Coal (Tons)	Gas NM3	Oil KL	Others
Energy consumption before					
Energy consumption after					
Savings in fuel				902 MT	
Energy tariff, Rs/KWh/Ton/NM3/KL..				RS 19356.25/MT	
Company complete address				We authorise Bureau to use this information for dissemination	
Hindustan Petroleum Corporation Limited, Visakh Refinery, PO Box No 15, Malkapuram Post, Visakhapatnam -530 011 (A.P.), Tel No.: 0891-2577862, Fax No: 0891-2759861, E-maiil: techvr@hpcl.co.in					
Contact person which could be contacted for more information				Signature	
Mr. P.S. Rao, Sr. Manager-Technical, PS&E				Date	

**Energy Conservation Measure Implemented in 2007-2008**

( To be filled separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of measure	Sector HPCL Visakh Refinery			
Year to be filled by BEE	Reduction in operating pressure of Crude Distillation Columns in CDU-I & II	Technology Reduction in operating pressure			
Description of energy conservation measures: Operating pressures of Atmospheric column of CDU I & II have been reduced from 2.3 to 1.94 kg/cm <sup>2</sup> g for CDU I and 2.43 to 2.33 kg/cm <sup>2</sup> g for CDU II without resulting in flaring so as to enable operation at lower atmos heater COTs. Operations at lower atmos COT has resulted in savings in fuel consumption					
Picture /Sketch/drawing before modification			Picture /Sketch/drawing after modification		
<p>To Overhead</p> <p>Operating pressure 2.3 kg/cm<sup>2</sup>g</p> <p>Crude Column</p> <p>Crude</p> <p>Heavy Naphtha</p> <p>Kerosene</p> <p>Light Diesel</p> <p>Heavy Diesel</p> <p>RCO</p> <p>CDU-I</p>			<p>To Overhead</p> <p>Operating pressure 1.94 kg/cm<sup>2</sup>g</p> <p>Crude Column</p> <p>Crude</p> <p>Heavy Naphtha</p> <p>Kerosene</p> <p>Light Diesel</p> <p>Heavy Diesel</p> <p>RCO</p> <p>CDU-I</p>		
Agency that executed the project (with complete address and e-mail): No modifications were made to existing system.					
Total investment Rs. Nil			Year of implementation: 2007-2008		
First year energy cost savings, Rs:113.6 lakhs					
First year other savings, Rs: Nil					
On annual basis	kWh, 000	Coal (Tons)	Gas NM3	Oil KL	Others
Energy consumption before					
Energy consumption after					
Savings in fuel				587 MT of LSHS	
Energy tariff, Rs/KWh/Ton/NM3/KL..				RS 19356.25/MT	
Company complete address Hindustan Petroleum Corporation Limited, Visakh Refinery, PO Box No 15, Malkapuram Post, Visakhapatnam -530 011 (A.P.), Tel No.: 0891-2577862, Fax No: 0891-2759861, E-mail: techvr@hpcl.co.in				We authorise Bureau to use this information for dissemination	
Contact person which could be contacted for more information				Signature	
Mr. P.S. Rao, Sr. Manager-Technical, PS&E.				Date	

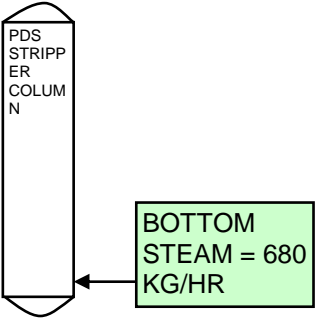
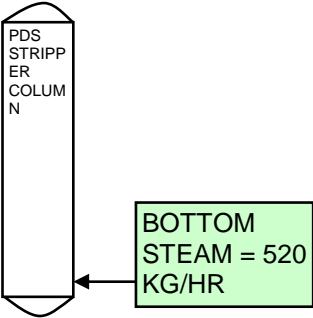
**Energy Conservation Measure Implemented in 2007-2008**

( To be filled separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of measure	Sector HPCL Visakh Refinery			
Year to be filled by BEE	Optimising stripping steam of FCC Main fractionator	Technology Reduction in stripping steam			
Description of energy conservation measures: The stripping steam rate to the Main Fractionator in Fluidised Catalytic Cracking Unit-I was reduced without effecting product quality. The reduction achieved in steam was around 1600 MT for the entire year.					
Picture /Sketch/drawing before modification			Picture /Sketch/drawing after modification		
Agency that executed the project (with complete address and e-mail): No modifications were made to existing hardware.					
Total investment Rs. Nil			Year of implementation: 2007-2008		
First year energy cost savings, Rs:25.8 lakhs					
First year other savings, Rs: Nil					
On annual basis	kWh, 000	Coal (Tons)	Gas NM3	Oil KL	Others
Energy consumption before					
Energy consumption after					
Savings in fuel				133 MT of LSHS	
Energy tariff, Rs/KWh/Ton/NM3/KL..				RS 19356.25/MT	
Company complete address Hindustan Petroleum Corporation Limited, Visakh Refinery, PO Box No 15, Malkapuram Post, Visakhapatnam -530 011 (A.P.), Tel No.: 0891-2577862, Fax No: 0891-2759861, E-mail: techvr@hpcl.co.in				We authorise Bureau to use this information for dissemination	
Contact person which could be contacted for more information				Signature	
Mr. P.S. Rao, Sr. Manager-Technical, PS&E.				Date	

**Energy Conservation Measure Implemented in 2007-2008**


( To be filled separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of measure	Sector HPCL Visakh Refinery			
Year to be filled by BEE	Optimising stripping steam to PDS stripper in Hydrogen unit	Technology Reduction in stripping steam			
Description of energy conservation measures: The stripping steam rate to the PDS Stripper in Hydrogen Unit was reduced without effecting the process. The reduction achieved in steam was around 1280 MT for the entire year.					
Picture /Sketch/drawing before modification			Picture /Sketch/drawing after modification		
					
Agency that executed the project (with complete address and e-mail): No modifications were made to existing hardware.					
Total investment Rs. Nil			Year of implementation: 2007-2008		
First year energy cost savings, Rs:20.65 lakhs					
First year other savings, Rs: Nil					
On annual basis	kWh, 000	Coal (Tons)	Gas NM3	Oil KL	Others
Energy consumption before					
Energy consumption after					
Savings in fuel				107 MT of LSHS	
Energy tariff, Rs/KWh/Ton/NM3/KL..				RS 19356.25/MT	
Company complete address Hindustan Petroleum Corporation Limited, Visakh Refinery, PO Box No 15, Malkapuram Post, Visakhapatnam -530 011 (A.P.), Tel No.: 0891-2577862, Fax No: 0891-2759861, E-maiil: techvr@hpcl.co.in				We authorise Bureau to use this information for dissemination	
Contact person which could be contacted for more information				Signature	
Mr. P.S. Rao, Sr. Manager-Technical, PS&E.				Date	

## Annexure-B

**Energy Conservation Measure Implemented in 2007-2008**


( To be filled separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of measure		Sector HPCL Visakh Refinery		
Year to be filled by BEE	Oil recovery by ex situ processing of sludge		Technology Oil recovery from sludge		
Description of energy conservation measures: The Refinery carried out ex-situ processing of high oily sludge (generated due to sedimentation in crude tanks, Refinery operation etc.) by appointing external agency. Oil was recovered from the sludge by use of solvent, heating, chemical usage and centrifuge. The recovered oil was processed with crude oil to produce fuels. This resulted in double benefit of treating hazardous waste as well as recovering oil. Total 1674 m3 of oil in 2007-08 was recovered by treating 3568 m3 of sludge.					
Picture /Sketch/drawing before modification			Picture /Sketch/drawing after modification		
					
<i>Picture of sludge processing and oil recovery plant</i>					
Agency that executed the project (with complete address and e-mail): M/s Balmer Lawrie & Co Ltd. 21 Netaji Subhas Road, Kolkata-700 001, e-mail: akpaul@balmerlawrie.com					
Total investment Rs.96.2 Lakhs			Year of implementation: 2007-2008		
First year energy cost savings, Rs:283 lakhs					
First year other savings, Rs: Nil					
On annual basis	kWh, 000	Coal (Tons)	Gas NM3	Oil KL	Others
Energy consumption before					
Energy consumption after					
Savings in fuel				1461 MT	
Energy tariff, Rs/KWh/Ton/NM3/KL..				RS 19356.25/MT	
Company complete address Hindustan Petroleum Corporation Limited, Visakh Refinery, PO Box No 15, Malkapuram Post, Visakhapatnam -530 011 (A.P.), Tel No.: 0891-2577862, Fax No: 0891-2759861, E-maail: techvr@hpcl.co.in				We authorise Bureau to use this information for dissemination	
Contact person which could be contacted for more information				Signature	
Mr. P.S. Rao, Sr. Manager-Technical, PS&E.				Date	

## Annexure-B

**Energy Conservation Measure Implemented in 2007-2008**


( To be filled separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of measure		Sector		
Year to be filled by BEE	Oil recovery by in-situ processing of sludge		HPCL Visakh Refinery		
			Technology		
			Oil recovery from sludge		
Description of energy conservation measures:					
Oil was recovered from crude tank bottom sludge by using chemical and solvent. Necessary modifications were carried out and chemical treatment was done to recover oil from sludge.					
Picture /Sketch/drawing before modification			Picture /Sketch/drawing after modification		
					
<i>Piping modifications for chemical cleaning</i>					
Agency that executed the project (with complete address and e-mail): M/s Nalco supplied the chemical. M/s Ondeo Nalco India Ltd. 20A, Park Street, Kolkata-700016, e-mail : asinha@nalco.com					
Total investment Rs. 17 Lakhs			Year of implementation: 2007-2008		
First year energy cost savings, Rs:110.7 lakhs					
First year other savings, Rs: Nil					
On annual basis	kWh, 000	Coal (Tons)	Gas NM3	Oil KL	Others
Energy consumption before					
Energy consumption after					
Savings in fuel				571 MT	
Energy tariff, Rs/KWh/Ton/NM3/KL..				RS 19356.25/MT	
Company complete address				We authorise Bureau to use this information for dissemination	
Hindustan Petroleum Corporation Limited, Visakh Refinery, PO Box No 15, Malkapuram Post, Visakhapatnam -530 011 (A.P.), Tel No.: 0891-2577862, Fax No: 0891-2759861, E-mail: techvr@hpcl.co.in					
Contact person which could be contacted for more information				Signature	
Mr. P.S. Rao, Sr. Manager-Technical, PS&E, HPCL-Visakh Refinery				Date	

## Annexure-B



**Energy Conservation Measure Implemented in 2007-2008**

( To be filled separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of measure		Sector HPCL Visakh Refinery		
Year to be filled by BEE	Periodic compressed air leak survey and further reduction in air leak		Technology Ultrasonic leak detection		
Description of energy conservation measures:					
At Visakh Refinery, compressed air surveys are carried out at every six month by external agency. Ultrasonic leak detectors are used to identify leaks. The identified leaks are arrested in house. Further improvement in compressed air leak was achieved during 2007-08 (around 93% reduction in compressed air leak is achieved over last three years).					
Picture /Sketch/drawing before modification			Picture /Sketch/drawing after modification		
					
<i>Picture of ultrasonic leak detector being used</i>					
Agency that executed the project (with complete address and e-mail): Surveys were carried by M/s Permaweld India Ltd. Arresting of leaks were carried out in house. M/s Permaweld India Pvt. Ltd. # 227, Akash Plaza, 1st stage, 5th Phase, Shivanagar, W.O.C.R. Bangalore-560 010, e-mail: permaweld@permaweld.com					
Total investment Rs. 2.1 Lakhs			Year of implementation: 2007-2008		
First year energy cost savings, Rs: 33.3 lakhs					
First year other savings, Rs: Nil					
On annual basis	kWh, 000	Coal (Tons)	Gas NM3	Oil KL	Others
Energy consumption before					
Energy consumption after					
Savings in fuel				105 MT of Naphtha	
Energy tariff, Rs/KWh/Ton/NM3/KL..				Rs 31831.03/MT of Naphtha	
Company complete address				We authorise Bureau to use this information for dissemination	
Hindustan Petroleum Corporation Limited, Visakh Refinery, PO Box No 15, Malkapuram Post, Visakhapatnam -530 011 (A.P.), Tel No.: 0891-2577862, Fax No: 0891-2759861, E-mail: techvr@hpcl.co.in					
Contact person which could be contacted for more information				Signature	
Mr. P.S. Rao, Sr. Manager-Technical, PS&E.				Date	

**Energy Conservation Measure Implemented in 2007-2008**

( To be filled separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of measure		Sector		
Year to be filled by BEE	Online cleaning of Atmospheric & Vacuum furnaces		HPCL Visakh Refinery		
Description of energy conservation measures:		Technology			
Due to firing of LSHS and fuel gas, metallic, organic and inorganic foulants get deposited on the outer surface of tubes in Furnaces. This reduces heat transfer across the tubes, necessitating an increase in fuel firing to get the same heat duty and capacity. Increase in heater arch temperatures, fire box temperatures and tube skin temperatures are consequential and affect the heater duty/capacity. Normally the heaters tubes are manually cleaned during shutdown. Online chemical cleaning of furnaces (available with few experts in the world) was carried out to clean the furnace tubes without taking shutdown, thereby reducing arch temperature by ~ 80 to 120 deg.C. and stack temperature by ~10 to 20 deg.C. The Refinery has 4 Atmospheric Furnaces and 3 Vacuum Furnaces. All the Atmospheric furnaces were cleaned 3 times and Vacuum furnaces twice during 2007-08 as per plan (Total 18 cleanings were carried out during 2007-08). The cleaning was carried out by a group of experts from Korea using speciality chemicals.		Proprietary of GTC Technology.			
Picture before cleaning of tubes		Picture after online cleaning of tubes			
					
<i>Radiation tube before cleaning</i>		<i>Radiation tube after cleaning</i>			
Agency that executed the project (with complete address and e-mail): GTC Technology, 1001 D. Dairy Ashford Road, Suite 200, Houston, Texas 77077, USA, Tel (281)597-4800, Fax (281) 597-0942					
Total investment Rs. 500 lakhs			Year of implementation: 2007-2008		
First year energy cost savings, Rs: 55.5 lakhs					
First year other savings, <b>Rs: 3210 lakhs (Savings due to increased crude thruput)</b>					
On annual basis	kWh, 000	Coal (Tons)	Gas NM3	Oil KL	Others
Energy consumption before					
Energy consumption after					
Savings in fuel				287 MT	
Energy tariff, Rs/KWh/Ton/NM3/KL..				RS 19356.25/MT	
Company complete address				We authorise Bureau to use this information for dissemination	
Hindustan Petroleum Corporation Limited, Visakh Refinery, PO Box No 15, Malkapuram Post, Visakhapatnam -530 011 (A.P.), Tel No.: 0891-2577862, Fax No: 0891-2759861, E-mail: techvr@hpcl.co.in				Signature	
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Mr. P.S. Rao, Sr. Manager-Technical, PS&E.					