





## Energy Conservation Measure implemented in 2006-2007

ID to be filled by BEE	Title of the measure <b>Plant 1, Chiller 2 efficiency improvement.</b>	Sector TYRE.....			
Year to be filled by BEE		Technology Efficiency imp.			
<p><u>Description of the energy conservation measure:</u>                  2nos 120TR chillers were running with ordinary controls and hence maintaining required specification found difficult. Microprocessor based controls provided for both chillers for fine operation. Output of chiller # 2 comparatively less and hence retrofit evaporator with improved cooling area tried as suggested by M/s Voltas. Cooling found considerable increased and reduction in energy consumption also achieved. How ever as the process temperature requirement reduced for trails reduction in energy consumption not fully achieved while comparing monthly consumption</p>					
<b>Picture/ sketch/ drawing before modification</b> (if available)	<b>Picture/ sketch/ drawing after modification</b>				
					
Agency that executed the project (with complete address and email): In house					
Total investment, Rs.: 9.1 Lakhs	Year of implementation: Nov 2006				
First year energy cost savings, Rs.: 5.24 Lakhs					
First year other savings, Rs.: NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	1551588	N.A	N.A	N.A	N.A
Energy consumption after	1406028	N.A	N.A	N.A	N.A
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	Rs.3.6	N.A	N.A	N.A	N.A
Company complete address:  MRF LIMITED, P.B.No 2, VADAVATHOOR.P.O,KOTTAYAM, KERALA STATE				We authorise Bureau to use this information for dissemination  Signature  Date 20.10.2007	
Contact person who could be contacted for more information: M.G.RAJAN,MANAGER ELECTRICAL MAINTENANCE					



## Energy Conservation Measure implemented in 2006-2007

ID to be filled by BEE	Title of the measure <b>Tyre building m/c modifications for energy efficiency.</b>	Sector TYRE.....			
Year to be filled by BEE		Technology ...Modification.....			
<b>Description of the energy conservation measure:</b> 59J tyre building machine was having ordinary 15 HP double speed motor and controls. Whole system upgraded with 10HP motor with Allen Bradley Power flex drive. System performance improved and energy consumption reduced considerably.					
<b>Picture/ sketch/ drawing before modification</b> (if available)	<b>Picture/ sketch/ drawing after modification</b>				
					
Agency that executed the project (with complete address and email): In house					
Total investment, Rs.: 1.6 Lakhs	Year of implementation: 2007				
First year energy cost savings, Rs.: 0.70 Lakhs					
First year other savings, Rs.: NIL					
On annual basis	KWh	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	53550	N.A	N.A	N.A	N.A
Energy consumption after	34125	N.A	N.A	N.A	N.A
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...		N.A	N.A	N.A	N.A
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## Energy Conservation Measure implemented in 2006-2007

ID to be filled by BEE	Title of the measure		Sector TYRE.....			
Year to be filled by BEE	<b>Plant 1, Energy efficient freezer for tube curing line.</b>		Technology Efficiency imp.			
<p><u>Description of the energy conservation measure:</u>          5.5HP freezer (compressor and cooling fan) with Freon 12 refrigerant is used for green tube splice area cooling. 10 nos freezers were being used for this. All 10 nos freezers were replaced with 32nos 200 watts Mini freezers with R143 refrigerant for energy reduction. Cooling line size reduced and only top most portion kept open for ice formation. All other pipelines were insulated to avoid wastage.</p>						
Picture/ sketch/ drawing before modification (if available)			Picture/ sketch/ drawing after modification			
						
Agency that executed the project (with complete address and email): In house						
Total investment, Rs.: <b>7.01</b> Lakhs			Year of implementation: 2005-2007			
First year energy cost savings, Rs.: <b>8.33</b> Lakhs						
First year other savings, Rs.: NIL						
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other	
Energy consumption before	285190	N.A	N.A	N.A	N.A	
Energy consumption after	53760	N.A	N.A	N.A	N.A	
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	Rs.3.6	N.A	N.A	N.A	N.A	
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## Energy Conservation Measure implemented in 2006-2007

ID to be filled by BEE	Title of the measure <b>Energy efficient heat exchanger pumps.</b>	Sector TYRE.....			
Year to be filled by BEE		Technology. HP reduction.			
<p><u>Description of the energy conservation measure:</u>          4nos 15 HP ordinary motor with Johnson pumps were used for heat exchangers. To optimize load all the four heat exchanger pumps were replaced with 10HP Grundfos energy efficient pumps.</p>					
<b>Picture/ sketch/ drawing before modification</b> (if available)	<b>Picture/ sketch/ drawing after modification</b>				
					
Agency that executed the project (with complete address and email): In house					
Total investment, Rs.: <b>8.6</b> Lakhs	Year of implementation: 2006-2007				
First year energy cost savings, Rs.: <b>5.32</b> Lakhs					
First year other savings, Rs.: NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	356160	N.A	N.A	N.A	N.A
Energy consumption after	208320	N.A	N.A	N.A	N.A
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	Rs.3.6	N.A	N.A	N.A	N.A
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## Energy Conservation Measure implemented in 2006-2007

ID to be filled by BEE	Title of the measure <b>Plant 2, Hot water fill pump optimization with VFD.</b>	Sector TYRE.....			
Year to be filled by BEE		Technology ...VFD.....			
<p><u>Description of the energy conservation measure:</u>          60HP hot water fill pump is using in tyre curing trench to avoid pressure drop during Hot water fill cycle. Application of pump is only for few minutes in one curing cycle and kept running continuously to avoid pressure drop and resultant tyre scrap. Allen Bradley make VFD provided and interlocked with all curing press operations through PLC. Now pump will be ON just before the required step and would switch off after use. Now pump would be running max 20 min during a curing cycle of 90 min.</p>					
<b>Picture/ sketch/ drawing before modification</b> (if available)	<b>Picture/ sketch/ drawing after modification</b>				
					
Agency that executed the project (with complete address and email): In house					
Total investment, Rs.: 2.90 Lakhs	Year of implementation: Oct 2006				
First year energy cost savings, Rs.: 5.43 Lakhs					
First year other savings, Rs.: NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	346368	N.A	N.A	N.A	N.A
Energy consumption after	195444	N.A	N.A	N.A	N.A
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	Rs.3.6	N.A	N.A	N.A	N.A
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## Energy Conservation Measure implemented in 2006-2007

ID to be filled by BEE	Title of the measure <b>Plant 2, Lighting energy saver for plant lighting.</b>	Sector TYRE.....			
Year to be filled by BEE		Technology. Magnetic amp.			
<p><u>Description of the energy conservation measure:</u>                  Plant lighting voltage was in the range of 240-245V as supply was fed from power transformer. Lighting voltage reduction was tried and implemented successfully at other areas and hence Duex make E mag, 21 KVA and 30 KVA used for lighting voltage reduction at Plant 2.</p>					
<b>Picture/ sketch/ drawing before modification</b> (if available)	<b>Picture/ sketch/ drawing after modification</b>				
					
Agency that executed the project (with complete address and email): In house					
Total investment, Rs.: <b>3.2 Lakhs</b>	Year of implementation: 2007				
First year energy cost savings, Rs.: <b>2.70 Lakhs</b>					
First year other savings, Rs.: NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	239400	N.A	N.A	N.A	N.A
Energy consumption after	164150	N.A	N.A	N.A	N.A
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	Rs.3.6	N.A	N.A	N.A	N.A
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## Energy Conservation Measure implemented in 2006-2007

ID to be filled by BEE	Title of the measure <b>Plant 1,2 &amp; 4 Low watts fans for man cooler.</b>	Sector TYRE.....			
Year to be filled by BEE		Technology. HP reduction.			
<p><u>Description of the energy conservation measure:</u>                      550 watts 3 phase fans were widely used through out the plant for man cooler application. 180 watts 1 phase air circulators with same sweep found applicable to many locations. 17 nos 550 watts fans were replaced with 180 watts fans.</p>					
<b>Picture/ sketch/ drawing before modification</b> (if available)	<b>Picture/ sketch/ drawing after modification</b>				
					
Agency that executed the project (with complete address and email): In house					
Total investment, Rs.: <b>0.90</b> Lakhs	Year of implementation: 2005-2007				
First year energy cost savings, Rs.: <b>1.58</b> Lakhs					
First year other savings, Rs.: NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	65450	N.A	N.A	N.A	N.A
Energy consumption after	21420	N.A	N.A	N.A	N.A
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	Rs.3.6	N.A	N.A	N.A	N.A
Company complete address:  MRF LIMITED, P.B.No 2, VADAVATHOOR.P.O,KOTTAYAM, KERALA STATE   Contact person who could be contacted for more information: M.G.RAJAN,MANAGER ELECTRICAL MAINTENANCE				We authorise Bureau to use this information for dissemination   Signature   Date 20.10.2007	

## Energy Conservation Measure implemented in 2006-2007



ID to be filled by BEE	Title of the measure <b>Plant power factor improvement.</b>	Sector TYRE.....
Year to be filled by BEE		Technology ...Capacitor.....
<u>Description of the energy conservation measure:</u> Plant power factor was only 0.93 lag. 3 nos 250 KVAR Automatic power factor control panels were provided at 3 nos 1600 KVA transformers. 2nos 100 KVAR capacitor banks, 250 KVAR group capacitors and 400 KVAR capacitor for individual motors etc provided to improve power factor to 0.96 level at 110 KV sub station. Further improvement being studied 11KV banbury motors with highly fluctuating load.		
<b>Picture/ sketch/ drawing before modification</b> (if available)	<b>Picture/ sketch/ drawing after modification</b>	
		
Agency that executed the project (with complete address and email): In house		
Total investment, Rs.: 14 Lakhs		Year of implementation: 2007
First year energy cost savings, Rs.: 20 Lakhs		
First year other savings, Rs.: NIL		
On annual basis	PF	Coal (Tons)
	Gas Nm <sup>3</sup>	Oil (kL)
	Other	
Energy consumption before	0.93 lag	N.A
Energy consumption after	0.96 lag	N.A
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	N.A	N.A
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## Energy Conservation Measure implemented in 2006-2007



ID to be filled by BEE	Title of the measure <b>Furnace oil consumption reduction using heigh efficiency burner.</b>	Sector TYRE.....			
Year to be filled by BEE		Technology ...Capacitor.....			
<p><u>Description of the energy conservation measure:</u>                  In 20 T boiler , Thermax Oretli burner was used for generating 14.1 kg of steam per kg of fuel. Thermax Oretli burner replaced, with energy efficient imported Weishaupt burner to generate 14.5 kg of steam per kg of fuel.</p>					
<b>Picture/ sketch/ drawing before modification</b> (if available)	<b>Picture/ sketch/ drawing after modification</b>				
					
Agency that executed the project (with complete address and email): In house					
Total investment, Rs.: 35 Lakhs	Year of implementation: 2007				
First year energy cost savings, Rs.: 39.17 Lakhs					
First year other savings, Rs.: NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before		N.A	N.A	6869	N.A
Energy consumption after		N.A	N.A	6673	N.A
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	Rs.3.6	N.A	N.A	20.06	N.A
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## Energy Conservation Measure implemented in 2006-2007



(To be filled up separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of the measure	Sector TYRE.....			
Year to be filled by BEE	<b>IGBT based welding sets instead of air cooled transformer.</b>	Technology. New .			
<u>Description of the energy conservation measure:</u> <b>Miniarc 150, IGBT based welding set procured to replaced ESAB 15 KVA welding set for application up to 150A</b>					
<b>Picture/ sketch/ drawing before modification</b> (if available)			<b>Picture/ sketch/ drawing after modification</b>		
					
Agency that executed the project (with complete address and email): In house					
Total investment, Rs.: 0.64 Lakhs			Year of implementation: 2007		
First year energy cost savings, Rs.: 0.15 Lakhs					
First year other savings, Rs.: NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before		N.A	N.A	N.A	N.A
Energy consumption after		N.A	N.A	N.A	N.A
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	Rs.3.6	N.A	N.A	N.A	N.A
Company complete address:				We authorise Bureau to use this information for dissemination	
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Contact person who could be contacted for more information: M.G.RAJAN,MANAGER ELECTRICAL MAINTENANCE				Date 20.10.2007	


## Energy Conservation Measure implemented in 2006-2007

ID to be filled by BEE	Title of the measure <b>Plant 1, 8" &amp; 10" tube tuber dust collector optimization.</b>	Sector TYRE.....			
Year to be filled by BEE		Technology ...New			
<u>Description of the energy conservation measure:</u> Dust collector is used at booking end for collecting dusty particles escapes from external dusting system. Dust collector with 20HP motor is used with suction from bottom of bag filter chamber. Now suction line is modified to increase system efficiency. Dust collector replaced with one of compact size and installed very near to external dusting unit. 2HP motor is used here instead of 20HP. 3HP Rotary feeder also replaced with 0.5 HP.					
<b>Picture/ sketch/ drawing before modification</b> (if available)	<b>Picture/ sketch/ drawing after modification</b>				
					
Agency that executed the project (with complete address and email): In house					
Total investment, Rs.: 3.25 Lakhs	Year of implementation: Dec 2006				
First year energy cost savings, Rs.: 4.72 Lakhs					
First year other savings, Rs.: NIL					
On annual basis	kWh 000'	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	143999	N.A	N.A	N.A	N.A
Energy consumption after	12888	N.A	N.A	N.A	N.A
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	Rs.3.6	N.A	N.A	N.A	N.A
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## Energy Conservation Measure implemented in 2006-2007

ID to be filled by BEE	Title of the measure	Sector TYRE.....			
Year to be filled by BEE	<b>68" Calendar wind up DC motor replacement with AC motor and VFD.</b>	Technology ...Modification.....			
<u>Description of the energy conservation measure:</u> 68" calendar wind up was having 20HP DC motor, 1HP cooling fan and DC drive. To reduce energy consumption 20 HP AC motor and VFD provided.					
<b>Picture/ sketch/ drawing before modification</b> (if available)			<b>Picture/ sketch/ drawing after modification</b>		
					
Agency that executed the project (with complete address and email): In house					
Total investment, Rs.: 1.2 Lakhs			Year of implementation: 2007		
First year energy cost savings, Rs.: 0.47 Lakhs					
First year other savings, Rs.: NIL					
On annual basis	KWh	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	69335	N.A	N.A	N.A	N.A
Energy consumption after	56350	N.A	N.A	N.A	N.A
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	3.6	N.A	N.A	N.A	N.A
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## Energy Conservation Measure implemented in 2006-2007

ID to be filled by BEE	Title of the measure	Sector TYRE.....			
Year to be filled by BEE	<b>Bead extruder No 1 DC motor replacement with AC motor and VFD.</b>	Technology ...Modification.....			
<p><u>Description of the energy conservation measure:</u>                  Bead extruder No 1 was having 20HP DC motor, 1HP cooling fan and DC drive. To reduce energy consumption 20 HP AC motor and VFD provided.</p>					
<b>Picture/ sketch/ drawing before modification</b> (if available)			<b>Picture/ sketch/ drawing after modification</b>		
					
Agency that executed the project (with complete address and email): In house					
Total investment, Rs.: 1.2 Lakhs			Year of implementation: 2007		
First year energy cost savings, Rs.: 0.64 Lakhs					
First year other savings, Rs.: NIL					
On annual basis	KWh	Coal (Tons)	Gas Nm <sup>3</sup>	Oil (kL)	Other
Energy consumption before	71785	N.A	N.A	N.A	N.A
Energy consumption after	53900	N.A	N.A	N.A	N.A
Energy tariff, Rs/ kWh/ Ton/ Nm <sup>3</sup> / kL ...	3.6	N.A	N.A	N.A	N.A
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