



Lafarge India Pvt Limited Sonadih Cement Plant



**Lafarge India Private Limited
Sonadih Cement Plant
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Organization Profile : ENERGY MANAGEMENT AT SONADIH
CEMENT PLANT

Unit Profile:

Lafarge India Pvt Ltd a subsidiary of Lafarge with its head quarters in Paris in France, which is leader in construction materials. It is spread in 75 countries with more than 85,000 employees and having a sales of 12.2 Billion Euro in 2000.

Lafarge has it leading positions in following divisions:

Division	World Ranking
Cement	No.1
Aggregates	No.3
Concrete	No.3
Roofing	No.1
Gypsum	No.4



The Sonadih Cement Plant, Lafarge India Pvt Limited (Formerly Sonadih Cement Works, a part of Cement Division, The Tata Iron and Steel Company Limited) was primarily set up with a view to utilize the Slag being generated as a waste from the Steel Works of Tata Iron and Steel Company, Jamshedpur. Currently the production capacity of plant is 1.0 Million Tonne per Annum clinker and 0.3 Million Tonne per annum of OPC.

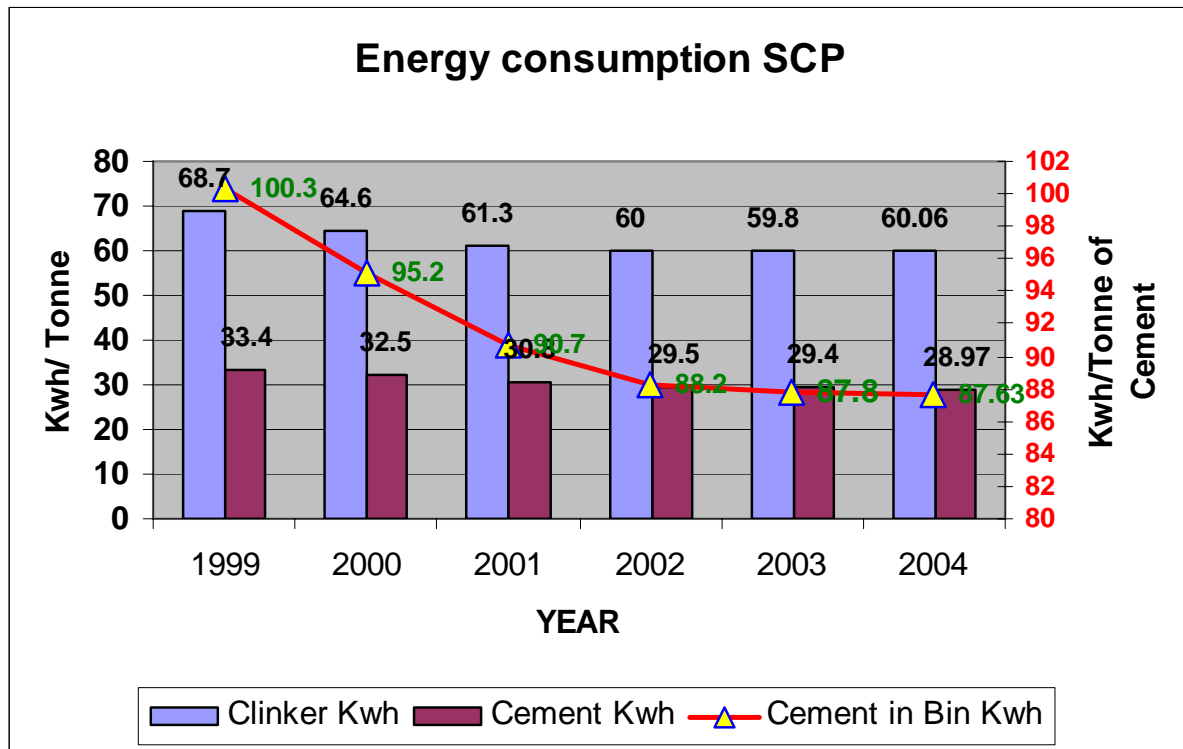
70% of the Clinker produced at Sonadih is transported to Jamshedpur by Rail and Ground along with Slag to produce Portland Slag Cement (PSC). The plant has been set up with the primary objective of utilizing the waste product of Steel manufacturing slag, which was being thrown out in the past and was an environmental hazard.

As a part of expansion of Lafarge operations in South East Asian Markets, it has acquired Sonadih Cement Plant in November 1999.

The 1.0 Million MT per annum clinkerisation and 0.3 MTPA 43 grade OPC grinding unit at Sonadih incorporates the latest state of the art technology comprising a five stage preheater with in-line precalciner and Vertical Roller Mills for raw material and coal grinding. The cement grinding system consists of a ball mill attached to roller press and classifier in hybrid circuit. The plant employs latest concept in instrumentation, which is fully automatic and centralized process control for operating the equipment.

Energy Consumption:

Sonadih Cement Plant is committed for Energy conservation. The trends of energy consumption figures as mentioned below:



Parameter	Unit	Year		
		2002	2003	2004
Cement Production	Lakh MT	12.83	10.21	
Clinker Production	Lakh MT	4.16	4.66	
Total Electrical Energy	Lakh kWh	942.93	787.68	
Sp.Electrical Energy Consp Clinkerization	kWh/T-clk	60.00	59.78	
Sp.Electrical Energy Consp Cement	kWh/T-cement	88.21	87.77	
Sp Thermal Energy Consumption	Kcal/kg - clinker	720.71	721.11	
(Net) Coal Consumption	MT	234361	187996	
Fuel Cost % of Manufacturing cost	%	22.57	22.69	
Power Cost % of Manufacturing cost	%	36.46	36.80	

Energy conservation commitment, policy and set up:

Lafarge India is committed for conservation of energy and same is reflected in the formulation of Quality and Environmental Policies subjected to annual audits by external agencies. The energy consumptions in the plant is monitored in daily and reviewed under regular intervals. At the beginning of every calendar year targets are fixed for both electrical and thermal energy consumptions. The same parameters are closely monitored by concern Section Incharge as follows:

➤ Shift wise monitoring of specific power consumption for major units

PARAMETER		LAST HR. MIN.	LAST HR. MAX.	LAST HR. AVG.	YSTR DAY AVG.
TAD TEMP.		814	834	827	834
COOLER GRATE 1 SPEED		1082	1148	1116	1114
COOLER ESP OIL TEMP.		262	306	290	295
COOLER ESP OIL TEMP.		236	247	240	251
CLINKER TEMP.		76	106	92	96
COOLER COMP 3 PRESS.		854	900	879	900
P H FAN OIL TEMP.		293	299	295	296
RP PR LEFT		0	0	0	97
RP PR RIGHT		0	0	0	96
RP GAP LEFT		0	0	0	25
RP GAP RIGHT		0	0	0	24
RP STATIC ROLLER AMPS		0	0	0	17
RP MOV. ROLLER AMPS		0	0	0	17


LAST SHIFT	TPH			SPECIFIC POWER						AVG.KW	
	KILN	R.MILL	C.MILL	P.H. FAN	ESP FAN	MCC-6	RAW MILL	520IX1	513RP	L40IX1	L40FN1
A	174.6	325.0	72.5	9.34	7.68	3.54	10.33	16.75	4.12	476.2	324.6
B	171.3	325.2	74.5	9.66	7.64	3.52	10.28	16.26	4.21	477.1	322.2
C	174.5	326.2	77.0	9.46	7.61	3.44	10.25	15.63	4.08	478.5	310.0

SHIFT	KILN O/P IN TONS	RAWMILL O/P IN TONS	CEM.MILL O/P IN TONS	TOTAL COAL IN TONS	SP.HEAT IN K/Cal	AVERAGE FREQ.	210AF1 RUN HRS.	MCC-3 KW
A	1414.3	2600.0	141.8	229.5	724.1	49.8	5.6	366.6
B	1387.0	2601.0	595.7	226.5	728.7	49.0	4.9	176.6
C	1413.0	2610.0	616.2	230.7	728.5	49.5	*****	468.9

17:19:31	P2VALM91	KILN INLET ANALYSER CO % HIGH	TRIP ESP
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➤ Monitoring of energy MCC wise based upon major drives

LAFARGE		ENERGY METER (KWTH) READINGS - Page 54					February 18, 2005 10:48:31	
KILN & COOLER SUBSTATION								
DESCRIPTION	TODAY KWH	YDAY KWH	CRN MNTH MWH	LST MNTH MWH	CRN YEAR MWH	LST YEAR MWH		
6.6KV I/C 1 KILN S/S	47782.289	98141.338	1491.8784	2926.8142	23812.400	24661.367		
420FN1 PH FAN	17909.771	39133.367	556.48315	1185.1514	8480.1259	8955.2089		
415FN1 ESP FAN	27348.438	61571.839	829.54394	1625.9607	13763.572	14591.618		
6.6KV O/G TO DISTR8 N/PLANT	2837.3559	6594.6485	101.79750	0.000000	0.000000	0.000000		
415FN1 SPRS RECOVERY	738.14532	3082.1091	51.563880	95.871806	882.34393	966.70300		
XFMR LOSSES TRANSMISSION /	426.86474	923.59277	16.614464	27.654488	230.08184	390.91418		
6.6KV I/C 2 KILN S/S	28190.914	66434.429	829.09298	1672.5801	13162.389	14224.190		
421KL1 KILN MAIN DRIVE	2826.4729	6340.5292	87.800140	188.61700	1920.4161	1423.0535		
422FN1 COOLER EXH FAN	981.00512	2212.3464	31.878733	54.488793	417.18527	483.30056		
MCC # 6	6673.7670	14674.842	215.19104	427.76346	3651.7399	3960.0596		
1600 KVA DIS TR 5	7898.5878	17240.448	258.85760	474.86483	3837.9841	4142.6957		
MCC # 5	2369.4992	6321.6909	85.441193	166.73913	1380.4766	1463.7844		
MCC # 5A	2363.0163	8221.9843	81.808115	168.14283	1241.8994	1309.8366		

KILN-CLR DISP. PAGE	KILN-CLR GRP. CMND.	KILN-CLR TRENDS	KILN-CLR DRV. STS	RAW MILL DISP. PAGE	COAL MILL DISP. PAGE	CEM & PACK DISP. PAGE	GROUP COMMAND	TRENDS	DRIVE STATUS	PID	RESET DRIVES
10:47:47	P3\IC_L40IX1	COAL MILL MOTOR CURRENT									

Display 54 Clear Clear All



- Review of specific power consumption on daily basis and initiating necessary corrective actions as required

SCP	View Calendar											
STATUS ON :10-08-2005	Energy Consumption Report Without Utilities											HOME
	UNIT CONS.			PRODUCTION			RUNNING HRS			TPH		
ITEM	TDY	MTD	YTD	TDY	MTD	YTD	TDY	MTD	YTD	TDY	MTD	YTD
Crusher	7714.35	46609.73	1166561	7766.37	49657	1203195	10.23	61.41	1410	759.2	808.622	853.614
Raw mill -1	110639.8	1140245.42	26082543	5188	54891	1259219	16.22	168.6	3884	319.9	325.626	324.242
Coal Mill-1	20374.98	169663.31	3814126.4	714	5931	135820	17.85	149	3234	40	39.8	41.996
Kiln	96900.58	744106.88	17304637	4305	35345	836814	24	201	4760	179.4	175.846	175.796
Cement Mill-1	47217.48	286164.38	8463757.7	1744.4	10628	309197.9	24	147.3	4372	72.68	72.132	70.721
Packing Plant	1997.94	15005.34	370658.37	1547	10379	306662	13.92	99.76	2783	111.1	104.04	110.193
TOTAL	284845.13	2401795.06	57202283		Å		Å			Å		
DEPARTMENT	ACTUAL UT/MAT.			TARGET	ACTUAL UT/CL			TARGET	ACTUAL UT/CM			
ITEM	TODAY	MTD	YTD	UT/CL	TODAY	MTD	YTD	UT/CM	TODAY	MTD	YTD	
Crusher	0.993	0.939	0.97	1.4	1.428	1.35	1.397	0	1.394	1.32	1.364	
Raw mill -1	21.326	20.773	20.713	32.25	31.989	31.16	31.07	0	31.23	30.45	30.322	
Coal Mill-1	28.536	28.606	28.082	4.56	4.733	4.734	4.56	0	4.62	4.626	4.45	
Kiln	22.509	21.053	20.679	20.5	22.509	21.053	20.679	0	21.98	20.57	20.182	
Cement Mill-1	27.068	26.926	27.373	0	0	0	0	27.17	27.07	26.93	27.373	
Packing Plant	1.291	1.446	1.209	0	0	0	0	1.21	1.291	1.446	1.209	
TOTAL	0	Å	0	58.71	60.658	58.296	57.706	28.38	87.58	85.34	84.899	
POWER	CSEB CONS.		CSEB+DG	NON PLANT	DG AUX.	LOSS	TOTAL	DIFFERENCE				
TODAY	95400	224100	319500	21658.9	10440	2556	34655	451				
MTD	751200	1986700	2737900	212502	101700	21903.2	336105	-6471				
YTD	18552200	45397600	63949800	4002658	2E+06	511598.4	7E+06	####				
SEQ.	ITEM	VALUE	MAIN DRIVE STATUS									
A	CSEB+DG TOTAL CONS	319500	EQUIP.CODE	U/T.M AT TDY	DG#	TODAY						
B	TOTAL CONS. IN PLANTS	284845.1	320IX1		DG-1	57800						
C	NON PLANT & OTHERS CONS	34654.87	415FN1		DG-2	48600						
D	TOTAL CONS. [B+C]	319500	420FN1		DG-3	1E+05						
			L40IX1		TOTAL	2E+05						
			520IX1									
			513IX1/IX2									

- Sonadih Cement Plant has the advantage of having access to global knowledge base for innovation and improvement plant performance in terms of Energy Conservation. A well-defined system exists to ascertain at all levels. Performance audits are carried out by qualified professionals from CTI, Lafarge, Lyon and plants are suggested for performance improvements in the respective areas. Projects are drawn from the identified improvements and validated for the returns. Accordingly the action plans are drawn upto commissioning and performance study.
- There was a remarkable improvement in terms of specific power consumption after acquisition by Lafarge. It has reduced from 71.8 KWH/tonne of clinker in 1998-99 to 60.285 KWH/tonne in 2002-2003.



Energy Conservation Achievements:

As a result of implementation of Energy conservation measures there has been a steady decrease in Energy consumption over the period. The following measures have been taken:

- Selection of proper composition of Raw mix for suitable grindability and better burnability
- Optimization of Coal mix
- Monitoring of process parameters and false air leakage & optimization of process
- Replacement of table liner & roller tyres of Raw Mill and Coal Mill at optimum wear
- Elimination of dampers from DC drive fans
- Use of variable speed control fan & Belt Drives by v/f, Slip Power Recovery System (SPRS), Thyristor Control Devices for energy conservation.
- Replacement of refractory at optimum wears to avoid radiation losses.
- Uninterrupted Power Supply to plant by running main grid & DG Power grid in auto parallel control
- Raw Mill reject recirculation intermittent running
- Optimization of Compressors
- Replacement of LJKS classifier with LV technology classifier in the Raw Mill

A typical list of improvement projects along with savings is as below.

Energy saving Projects Year 2002:

1. Title : Raw mill table water spray control by using V/F drive by optimising the water spray requirement.



Investment Rs : 1.4 Lacs
 Energy savings : 1.74 Lacs Per annum

2. Title : Installation of high efficiency Fan for Raw mill ESP Fan

To get edge concerning technology available the existing Raw Mill ESP Fan is replaced with high efficiency fan.



High Efficiency Fan



Conventional Fan

Investment : Rs. 29.68 Lacs
 Savings : Rs15.90 Lacs/Annum.



3. **Title : Rerouting of the duct of silo top bag filter for effective utilization.** Optimization of bag filter .

Investment : Rs 1.50 Lacs
Savings : Rs 3.31Lacs/Annum.

4. **Title :Addition of 2 Nos more spout in electronic packer**

Investment : Rs 12.46 Lacs
Savings : Rs 1.15 Lacs/ annum.

Energy Saving Projects Year 2003:-

Phase-1 Optimization of voltage for lighting by using P20 energy saving panels.

Phase-2 : Replacement of conventional high loss tube light fittings with high efficiency electronic ballast .

Phase-1



Phase-2



Total Investment incurred: Rs. 12.46Lacs
Savings Rs. 9.67 Lacs/ Annum

Energy Saving Projects Year 2004:-

- Replacement of high loss 150 Watt & 70 Watt HPSV street light fittings with Low loss 70 Watt &



50 Watt metal halide fittings respectively.

No of street lights provided with Metal Halide fittings – 300 Nos.
(Including Plant & colony)

Savings achieved :Around 1.5 Lacs for the 5 Months operation.

Energy Conservation Plans and Targets:

The following measures have been planned for further reduction in specific energy consumption:

- Use of KHD make Multi channel burner.
- Use of Glass type reflectors in FTL fittings .With that double tube FTL can be replaced by single tube FTL
- Raw mix optimization.
- Use of Emulsion oil for fuel efficiency of heavy earth equipment.
- Cooler & Preheater modification for thermal energy & Electrical Energy Conversion.
- Installation of Harmonic filters for potential locations.
- Conversion of Product – Manufacture of PPC in place OPC.