

HINDUSTAN CONSTRUCTION COMPANY LIMITED, MUMBAI. PROJECT: KKNPP

Hindustan Construction Company is a world-class Indian construction company - leading with compelling impact - for eighty years. HCC has been executing some of the most exciting and challenging projects in India. The company has made an unmatched contribution to civil engineering landmarks around the country in such widely divergent areas such as power, roads and bridges, dams, buildings and environmental projects.

One such power project is Kudankulam Nuclear Power Project, which is under construction near Kanyakumari, Tamilnadu. The client is NPCIL (Nuclear Power Co-operation of India Ltd.). The scope of the project consists of construction of 1000 MW Reactor buildings (2 Nos), Reactor Auxillary Buildings (2 Nos), Hydraulic structures including 900 mtrs long breakwaters (2 Nos) and many others allied structures.

Construction industry is one of the rapidly growing industries in our country and around the world. Infrastructure projects have seen a phenomenal increase in last 10 years, like the golden quadrangle road project, The Konkan Railway project, Road projects in J & K, dam projects in north east etc. This rapidly growing industry requires lot of machinery to complete the project on time; machines require energy to run and hence this industry is emerging as one of the largest consumer of Energy.

Project description and energy consumption:

The project is divided into various packages by the client for easy identification and management. HCC is working on package C3 (Reactor buildings (2 Nos), Reactor Auxillary Buildings (2 Nos) and package C6, Hydraulic structures including 900 mtrs long breakwaters (2 Nos) and many others allied structures

HCC has set up a state of the art plants consisting of latest construction equipments for aiding the construction activities. The connected load of the Project is 2800 KVA and the contract sanctioned demand is 2000 KVA.

The major equipments used at site:

Batching plants completely automatic: - 90M³ (2 nos) & 60M³ (2 nos).

Crushing Plant: 250,125 and 80TPH.

Ice Plants: 20TPD (4 nos) & 10TPD (2 nos).

Refrigeration plant: 165 TR.

Gantry Cranes: 35T (1 no), 25T (3 nos), 15T (1 no)

Tower Cranes: 12T (8 nos), 10T (4 nos)

Pre-stressing Platforms: 4 nos.

Grout plant and accessories.

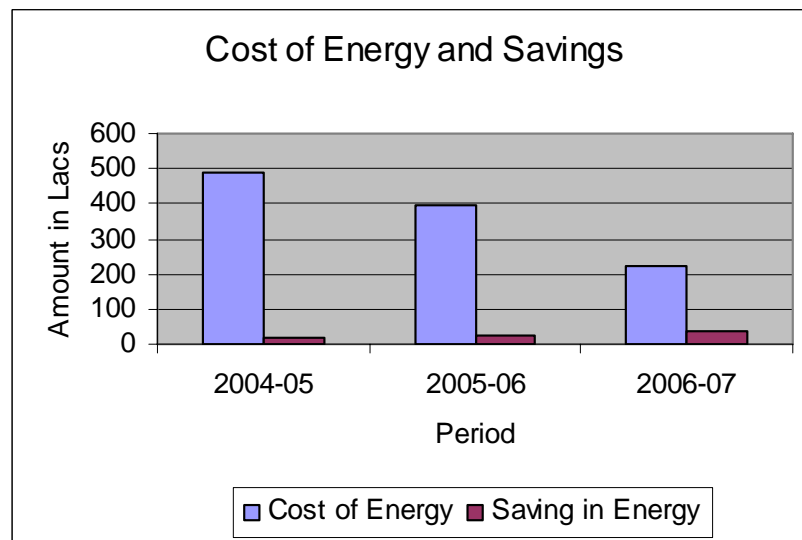
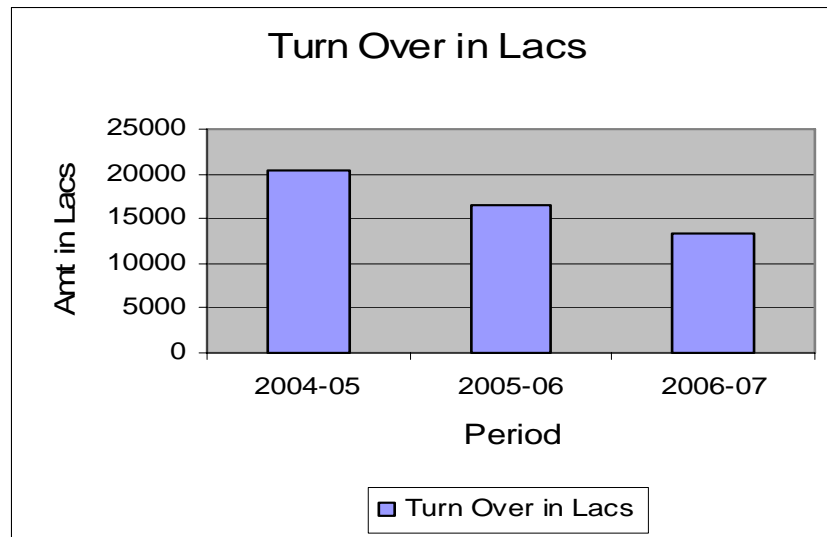
Welding machines and accessories.

Stationary concrete placer booms: 8 nos.

Concrete Pumps: 2 nos electric

D.G sets: 775 KVA, 500 KVA, 320 KVA, 75 KVA (2 nos).

PERIOD	PROJECT TURN OVER IN (Lacs)	TOTAL COST OF ENERGY IN (Lacs)	TOTAL KWh CONSUMED IN (Lacs)	TOTAL SAVINGS IN ENERGY CONSUMPTION IN (Lacs)
2004-05	20439.24	488.16	79.93	18.16
2005-06	16516.43	394.97	61.42	26.26
2006-07	13276.63	220.68	36.49	26.1



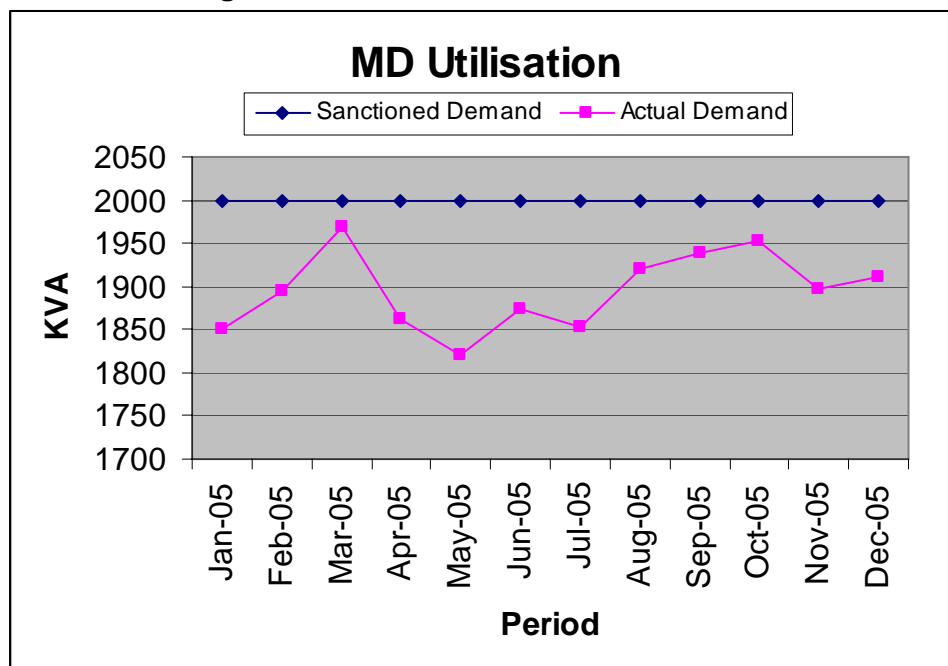
Tariff structure applicable to project:

{{(Rs.5 x No.of units consumed) + (Rs.300 x Maximum Demand)}} + 5% E. Tax.

MD Utilisation at Project:

SR NO	LOCATION	SANCTIONED DEMAND (KVA)	PEAK DEMAND (KVA)	AVGRAGE DEMAND (KVA)
1.	Entire Project	2000	1970	1878

Note: Maximum demand charged is on 90% of sanctioned demand or actual recorded which ever is higher.



As can be seen from the above graph, the maximum demand required for the project varies largely. This is because of the equipments that are used on the site are having different 'load factor' and 'diversity factor'.

The challenge faced by the energy conservation team was to reduce the maximum demand, improve the power factor of the system and improve the performance of the equipments without sacrificing the quality of the product.

The Branch is successful in maintaining the power factor of the utility at 0.99 continuously and by doing this; the branch has not only reduced the maximum demand charges but also gained PF incentives from the client for reduction of transmissions losses.



न्यूक्लियर पावर कॉर्पोरेशन ऑफ इंडिया लिमिटेड

(भारत सरकार का उद्यम)

NUCLEAR POWER CORPORATION OF INDIA LIMITED

(A Govt. of India Enterprise)

KUDANKULAM NUCLEAR POWER PROJECT

Kudankulam : PO, Radhapuram Taluk, Tirunelveli Dist

Tamil Nadu - 627106. Tel.04637-282508, Fax .04637-259715

No: NPCIL/KKNPP/E&I/2007/164

8 February, 2007

To,

M/S The Project manager
M/S HCC, Site office,
Kudankulam

CONGRATS TO M/S HCC'S
TEAM AT KKNPP

Through: Project Engineer (C)

Sir,

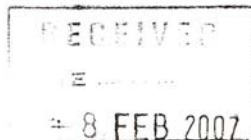
Sub: Maintenance of excellent power factor.

We appreciate your efforts in the maintenance of excellent power factor (in the range of 0.97 to 0.99) for the electrical connection given in 2002 till date. For your commitment towards maintaining very good power factor you were also been awarded with power factor incentives through the monthly electricity bills. Better power factor has brought down the maximum demand (MD), reactive power consumption from the grid and also wastage of energy towards the line losses. All these years you were also been benefited by way of lesser Maximum demand charges which other wise would have been much more.

We congratulate M/S HCC for the commitment towards the maintenance of excellent power factor.

4
With regards

942



Thomas Kavalakat
(Thomas Kavalakat)
Project Engineer (E-2)

PEE - Congratulations

NTB

for comm to: PC
KSTY & ESUI
Ajilper & SA in.

BY

All-Elect-Engineers
&
Staff.
Hachha

Factor Improvement Incentives

Power

Sr No	Period	MD(KVA) Reduced	MD Charges Reduced (Rs)	E.Tax on MD Charges	PF Incentives	Total Amount Saved (Rs)
1	2004-05	1655	496500	24825	387556	908881
2	2005-06	1352	405600	20280	516337	942217
3	2006-07	710	213000	10650	280306	503956
	Total	3717	1115100	55755	1184199	2355054

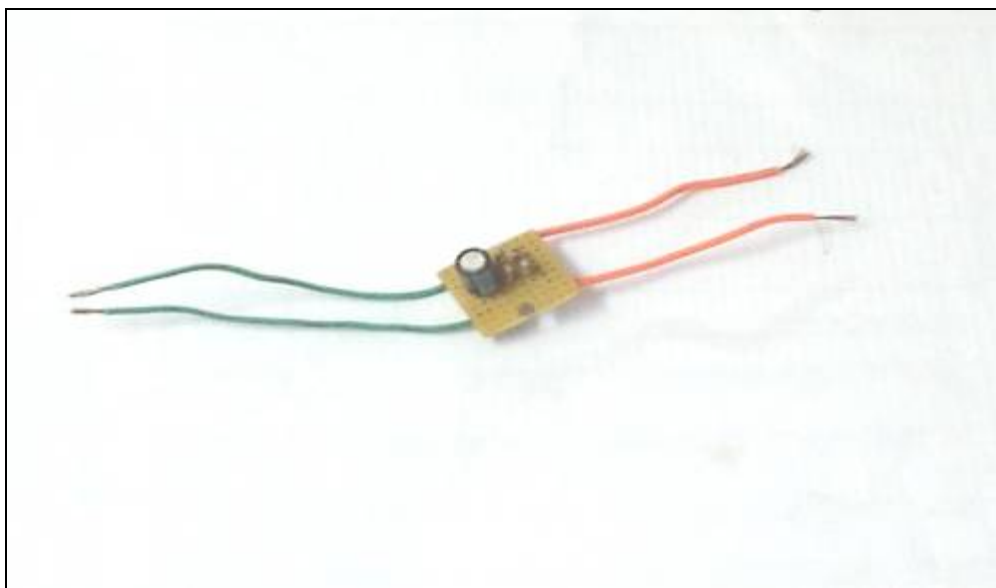
BENEFITS OF POWER FACTOR IMPROVEMENT: -

1. System Capacity increased for same KW of Power
2. Reduced size of conductor (Cable Size)
3. Reduced line losses of the System
4. Improved Voltage at receiving end (Better Voltage Regulation)
5. Increased System Life
6. Healthy working of System avoided overload tripping

Since inception of the project in 2002, reduction in specific consumption and proper utilization of the maximum demand is an ongoing process. With implementation of various energy conservation measures and ideas in last 5 years the branch has been able to achieve reduction in specific consumption, proper utilization of maximum demand and improvement of power factor to reduce the transmission losses and increase the efficiency of the distribution system.

To enhance the energy conservation and improve the equipment performance we have carried out modifications on our site:

1. In house filter designed to reduce the fluctuations of aggregate scale:



2. Modification done on Grout Plant Mixer gates:

Before:



After:





In the above picture before modification the OEM had supplied the mechanism with manual lever. This is replaced with pneumatic cylinder control by electrical.

The various modifications are carried out for smooth functioning and energy savings at the plants and the client has appreciation for it. (Letter of appreciation attached)



NUCLEAR POWER CORPORATION OF INDIA LIMITED
 (A Govt. of India Enterprise)
KUDANKULAM NUCLEAR POWER PROJECT
 Kudankulam PO, Radhapuram Taluk, Tirunelveli Dist
 Tamil Nadu - 627106.
 Telephone: 04637- 282304 FAX No .04637-259715
 E-Mail: mkotaiah@kknpp.com



NO.NPCIL/KKNPP/PE (CV-1) /2006/S/156

Feb 24, 06

To
 M/s. Hindustan Construction Company Ltd.,
 KKNPP Site, KUDANKULAM

KIND ATTENTION
Shri V. P. R. SUDHAGAR,
PROJECT MANAGER

Dear Sir,

Sub: Construction of RB - Prestressing Works - reg

Grouting of H1 Cable in RB1 was successfully completed on 21.02.06.

It is observed that at grouting plant, some modifications worth mentioning have been carried out as compared to the mockup grouting. These modifications resulted into smooth production of grout and its discharge into the grouting tank. It is also seen that waiting tank with in-built agitator was developed by your Engineers which worked efficiently.

The modifications done by M/s. HCC resulted into more automation and are very good for smooth and efficient grouting of the cables. The team involved in these modifications deserves appreciation. Convey our appreciation to all the team members involved in these works.

Thanking you,

Mr S N Jadar - with Team
Mr Rajesh K S - with Team
Mr. Mr Nilesh - with
Mr. Mr Chaitanya - with
 Copy to, *For*

Head (QA)
 PE (Civil)
 PE (CV-3)
 ENC (QA-1)

RECEIVED
 DATE
 25 FEB 2006

Yours faithfully,

 M. KOTAIAH 24.2.06
 PE (CV-1)

PE may write to
copy to PNB and his team
PCB and his team

Summary of various energy conservation projects implemented on the site and energy savings:

Sr. No.	Description	Year of Implementation	Savings in Rs. Lacs. For first year	Investment in Rs. Lacs.
1.	Awareness for Energy Savings at Officers camp	2005	3.0	0.65
2.	Reduction in idle running hrs of inclined belt and mixer in batching plant	2005	0.628	0.35
3.	Saving due to improvement in PF	2005	9.08	7.78
4.	Replacement of halogen lamps 1000 watts with HPSV 400 watts.	2005	4.50	2.9
5.	Modification in water pump circuit	2005	0.45	NIL
6.	In Co-Operation Of Filter Circuits In Aggregate Weighing.	2005	0.5	NIL
7.	Human resource development	2006	1.54	0.90
8.	Process monitoring control (ice plant)	2006	2.01	1.11
9.	Recycling of material (water) at Plant area	2006	1.08	0.75
10.	Replacement of halogen lamps 1000 watts with HPSV 400 watts.	2006	4.50	2.9
11.	Grout Plant mixer gate modifications	2006	1.21	0.60
12.	Reduction of rejects in production processes	2007	0.37	0.75
13.	Replacement of halogen lamps 1000 watts with HPSV 400 watts.	2007	4.50	2.9

The project is committed to preserve environment and ensure safety of its employees. Following major steps and improvements have been taken during last three years:

Environment:

a) Water Effluent:

The major use of water is for ice and concrete production. The water discharge from the plant does not contain acids or any other chemicals except cement and dust particles and is collected in a sedimentation tank after which the same is sprinkled on nearby area and roads. This protects the environment as well as the employees working in that area from dust. This also reduces cost of water transportation for sprinkling purposes.

b) Air:

Regarding control of air pollution the company has installed bag filters in concrete plants for cement stock silos. The water spraying system is used in aggregate process plants. The project has provided stack height as per ISO 14001 for Diesel Generating sets. The project is regularly monitoring all the pollution parameters of DGs and also the ambient air quality of the surrounding project site.

All the air parameters are maintained well within the norms as per prescribed by TNPCB (Tamil Nadu Pollution Control Board) and tests are carried out periodically.

c) Solid wastes:

The solid waste mainly in form of cement/ dust sludge is disposed off into the low lying barren land. The empty cement gunny bags, reinforcement and other metal waste are stocked properly and sold to authorized dealers. Automobile and UPS batteries are disposed off through authorized dealer or manufacturer. Used oil is collected properly and disposed off through Pollution Control Board authorized Agency.

d) Tree plantation:

Company has planted 5000 tree saplings at work site and another 20000 at residential area. The site is an arid region which receives scanty rainfall; HCC has maintained drip irrigation system for watering of the plants.

Hindustan Construction Company Limited has acquired **ISO 14001 certification** for environment and is committed to follow all the guide lines as per ISO standards.

Site before tree plantation:



After tree plantation:



Before:
Officer residence area before tree Plantation:



After:
Officer residence area after tree Plantation:



Officer residence area after tree Plantation:



Safety:

a) Electrical:

All the electrical control panels and boards (Main, secondary and down stream) are provided with rubber mats. The outputs from main ACB control panels are routed through Earth fault relay (EFR) and the cables are connected through metal glands and aluminum terminals lugs.

Every outlet of secondary distribution is routed through earth leakage relay ranging from 30mA to 300mA.

Each end user is connected through ELBCs in the range of 30mA.

The system neutral is grounded at secondary distribution panel.

All the equipments are grounded through separate double earth connection.

Lightning arresters (10 Nos.) have been provided at work site, office as well as residential area.

b) Equipment:

All the belts, chains, mechanical couplings, drives etc. are covered with protection guards. The electrical motors exposed to atmosphere are covered with rain protectors. The equipments are provided with emergency stop (latch able) push button at operator control cabin as well as on the equipment. The conveyor belts are provided with remote pull cord switch (PCS), belt sway switch (BCS) and zero speed switch (ZSS). The equipments hatch gates and door openings are provided with limit switches to stop the plant when in open condition.

c) Employees:

The employees are provided with personal protective equipments (PPE) like helmet, safety shoe, dust masks, etc. Employees working at height wear safety belts and harnesses. Safety tool box talks are conducted on daily basis. Awareness training regarding HIV/AIDS is imparted to employees as a Corporate Social responsibility.

Hindustan Construction Company Limited has acquired **ISO 18001 certification** for OHSAS and committed to follow all the guidelines as per ISO standards.