

VI. ENERGY

POWER DEMAND AND AVAILABILITY OF POWER

The transmission system of DPSCL has met the actual peak demand of 3097 MW of Delhi on 18/07/2002 at 20.00 hrs. after carrying out load shedding of 170MW. As per the 16th Annual Power Survey conducted by CEA, the estimated peak demand of Delhi is expected to rise to 3450MW by the end of Annual Plan 2002-03 and to 4310 MW by the end of 10th Plan i.e. 2002-07.

The power requirement of Delhi are being met partly by its own generation from I.P. Station, Combine Cycle GTPS, Rajghat Power Station and Pragati Combined Cycle Project. The generation from BTPS is also fully dedicated to meet the power requirements of Delhi. The shortfall is met through assistance from the Northern Regional Grid.

In order to meet the rising power demand of Delhi, additional allocation of power from various central generating stations/other power stations are to be arranged.

The agency/deptt. wise break up of the approved outlay for Annual Plan 2003-04 is as under:

(Rs. in Lakhs)

S.NO.	AGENCY	PROPOSED OUTLAY 2003-04
1.	GENCO	9500
2.	TRANSCO	10500
3.	Power Sector Reforms	126000
4.	Delhi Electricity Regulatory Commission	225
5.	D.E.D.A.	100
	TOTAL	<u>146325</u>

I. GENCO

1. R&M WORKS FOR RAJGHAT POWER HOUSE (Rs. 2900.00 lakh)

The details are as under :-

1. Replacement of Data Acquisition system:

The existing DAS system installed in 1988-89 for both the units has outlived its life and no spares are available due to obsolescence of the products. We are finding it difficult to maintain the system. It is further to add that all DAS installed in other stations prior to 1990 that all DAS installed in other stations prior to 1990 have been replaced. Most of these were replaced prior to 2000.

In view of day to day problems in maintenance of the system, approval of Chairman/DVB was obtained to replace the existing DAS and limited enquiry was issued after consultancy from NTPC. Offers from BHEL and ABB have been received and technical offers have been opened and are under scrutiny. The price bid shall be opened in April, 03 after evaluation of the technical bids.

Replacement of DAS is necessary to ensure reliable and continuous operation of the plant. In absence of DAS sufficient operation of machines is not ensured.

The estimated cost of the work is Rs.400 lacs.

2. Procurement of generator rotor.

The order for procurement of spare generator rotor has been placed on M/s BHEL. The spare rotor for the two machines installed at RPH is being procured to ensure the continuity of power generation in case of any problem in the rotor of the two machines. This being a long delivery item is being procured.

The total cost of the rotor is Rs.440 lacs out of which Rs.40 lacs was released to BHEL in the year 2001-02 at the time of placement of order.

3. Modification of APRDS

The APRDS provided to meet the auxiliary steam requirement at RPH has not been functioning properly and we are finding it difficult to control the pressure and temperature of auxiliary steam. So, it has been decided to modify the APRDS at the station by replacing the pressure reducing and desuper heating control valves.

Implementation of this scheme will provide better control of auxiliary steam temperature and pressure resulting in smooth operation of the plant and will contribute to reduce number of trippings of the units.

The estimated cost of the scheme is Rs.16 lacs. Part of the modification have been carried out during the year 202-03. Balance work costing Rs.8 lacs is proposed to be taken up during the year 2003-04.

4. Upgradation of ESP of 2x67.5 MW units.

The existing ESPs have been designed for flue gas emission of 150mg/NM³ with no spare field. In view of the revised norms imposed by DPCC for achieving emission level less than 50mg/NM³, the matter was referred to M/s BHEL who are OEM of the plant. M/s BHEL after conducted the study at site has recommended installation of larger size of ESPs in place of existing ESPs for both the Rajghat units. M/s BHEL has already submitted their technical and commercial offer. These offers are under scrutiny.

By implementing this scheme we will be able to achieve the emission norms of 50mg/NM³ fixed by DPCC.

The cost of the scheme proposed by BHEL including taxes and duties works out to approx. Rs.2000 lacs out of which anticipated expenditure during the year 2003-04 will be Rs.1800 lacs.

5. Procurement of HP Heaters.

The HP heaters are installed in thermo units to improve the thermal efficiency of the unit. Number of tubes in existing heaters have given way as such these have been plugged. Therefore, HP heaters is being procured to replace the defective heater.

By replacing the defective heaters the efficiency of the plant will improve.

The estimated cost of two heaters is Rs.132 lacs. P.O. on M.s BHEL is being finalized and supply of the HP heater is expected during 2003-04.

6. Augmentation of 2nd 75 MVA Tr. to 100 MVA Tr.

33KV Switchyard at RPH is connected to 220KV/System through two nos. 220KV/33KV power transformers. One transformer is of 100MVA whereas the other is 75 MVA rating. Though during the normal operation no problem is being faced with this arrangement, however, during the outage of 100 MVA transformer at times, it has been observed that 75MVA transformer gets overloaded resulted in reduction in generation at RPH. In view of this it has been decided to install one 100 MVA power transformer in place of 75 MVA existing transformer

By augmentation of 2nd 75 MVA transformer to 100 MVA transformer backing down of generation will be avoided as and when the transformer is under shutdown/trappings.

The estimated cost is Rs.350 lacs. Only 10% advance shall be released during 2003-04.

7. Installation of weigh-in-motion at inlet of IP Station

The coal supply for RPH is being received from Coal India Limited and the quantity of coal receipt is taking into books as per R/R issued by Indian Railways (as given by Coal India Ltd. after weighment at the time of loading). Presently, no effective

method is available to check/verify the quantity receipt. To achieve this target it has been proposed to install the weigh-in-motion at the outlet of I.P.Station Railyard whereby all coal rakes entering DVB premises shall be weighed and actual receipt of coal could be known at any different level/loading and receipt can be taken up with Railways/Coal India Ltd.

By implementing this scheme, actual receipt of coal will be known and necessary claims can be lodged with Railways/Coal India Ltd./CISF.

The estimated cost of the scheme is Rs.20 lacs and the scheme is expected to be executed during the year 2003-04.

8. Ash Management

Presently all ash disposal at RPH is being carried in slurry form and after decantation of ash the decanted water is allowed to flow to river Yamuna. But, at times the water entering into river Yamuna is not meeting the pollution control requirement. As such, the scheme is under preparation for re-circulating the decanted water from ash ponds and also alternative method of use/disposal of ash is easy in manufacturing of bricks.

The provision of Rs.600 lacs has been made for the year 2003-04.

9. Modification in water treatment plant.

During the recent past it has been observed that quality of raw water being taken from Yamuna is deteriorating and the present system under modification so as to get desired level and treatment to the water for use in power station. Also the additional chlorination units with safety measures are required to be provided.

The estimated cost of these modification is Rs.100 lacs and the scheme is expected to be executed during the year 2003-04.

An amount of Rs. 2900 lakh has been approved for this scheme for the above mentioned works.

2. **R&M WORKS AT I.P. STATION (Rs. 3000 lakh)**

The details are as under :-

1. Indraprastha Power Station has at present 4 units and the installed capacity is 247.5 MW i.e. 3 units each of 625MW installed in the year 1967-68 and the one unit is of 60 MW installed in the year 1971. These units have outlived their useful life and require extensive R&M work. M/s NTPC was entrusted with the consultancy job for formulating the long terms action plan for enhancing the station capacity to 1000 MW. Out of the four options, the option of Renovation and Modernisation of the existing units was considered viable for the present keeping in view the non-availability of gas.

M/s DPCC while according the clearance of Pragati Power Project stipulated that I.P.Station should be decommissioned within 6 months of the commissioning of Pragati Power Project. The stipulation was again reviewed by the DPCC in its meeting held on 30th January, 2003 and have allowed continuation of the IP. Station subject to the commencement of R&M project in a time bound manner especially with respect to pollution control measures with the objective of meeting the following conditions :-

- a) the particulate matter emission shall be restricted to 50mg/NM³.
- b) the recommendations of the Fly Ash Mission will be implemented regarding increase in concentration of ash in the slurry, re-cycling of ash pond overflow (implying zero discharge of effluent into the river Yamuna) and providing basal lining in the ash pond
- c) Installation of fly ash based brick manufacturing plant at the land especially allotted by DDA to M/s Sand Plast Ltd., under the tripartite agreement as per the directions of Hon'ble Chief Metropolitan Magistrate in the matter CPCB-vs-MCD (Delhi Vidyut Board, GENCO)

The offer has been obtained from M/s BHEL in compliance of Resolution of erstwhile DVB vide Resolution No..23.2002/388-D dated 29.6.2002. The award of work on M/s BHEL is under process.

As per offer of M/s BHEL the computed cost for augmentation for electrostatic precipitator is Rs.38 crores for all the 4 units with all the fields in service and Rs.48 crores with any two fields per boiler out of service. The completion period is 15 months from the date of receipt of clear order and advance.

The UOP ESPs of Units 2,3&4 were installed along with plant in the year 1967-68. These are to be replaced with the new two fields ESPs and the other existing ESPs which were installed in the year 1987-88 will be re-vamped/refurbished. In unit No. 5 as per proposal of M/s BHEL, the ESP installed in the year 1982 and in the year 1999 will have to be replaced with new 6 fields ESP to meet the requirement of emission of 50 mg/NM³ from the stack.

These replacement/revamping will decrease the pollution level to meet the requirement of DPCC and is in the larger interest of the health of the citizen. Incidentally this will also reduce the erosion of I.D. fan blades.

The Committee also decided that the R&M work w.r.t. pollution control should be completed by the plant within 18 months if not before. GENCO will submit the detailed action plan to comply with the above conditions within one month to DPCC. This will be placed before the DPCC in its next meeting. The progress of R&M as per the approved time frame will be monitored by a sub-committee of DPCC.

A provision of Rs.25 crores is required in the Annual Plan 2003-04 for this work.

2. **Ash pond management**

One of the principal component of R&M Works of I.P Power Station is Renovation & Modernisation of the ash ponds.

Due to depleted generation at I.P Power Station, the quantity of ash slurry generated has also depleted. At Present about 2.25MT of fly ash is generated by burning of coal. After R&M Works the quantity of generation of fly ash will be of the order of 4.5 lac MT annually. To manage this much quantity of fly ash, as per environmental norm, action has been initiated for improvement of ash pond management.

M/s NTPC has been entrusted with the consultancy work of development of scheme for remodeling of the ash pond of I.P. Power Station.

To fulfill the stipulations of the Delhi Pollution Control Committee, the scope of work envisaged in the remodeling of ash pond will have the following components: -

- a) Creation of two chambers of ash lagoon.
- b) Decanted water lake.
- c) Water Treatment Plant for treatment of decanted water.
- d) Pump house for re-circulation of water back to power house.
- e) Laying of pipeline for carrying the decanted water back to power house.
- f) Construction of a sump at power house to receive the water for reuse in the operation of the plant particularly for ash slurry.

In the modified ash disposal system at the Ash Lagoon there will be multi-point ash disposal to keep the top surface of the disposed fly ash always moist so that no dry ash particle escapes into the air during blast of wind. The collection and re-circulation of the ash water will stop discharge of decanted water into river.

Provision for observation of the quality of the underground water by periodical analysis of the quality of water in and around the ash ponds will also be made.

Profile of ash lagoon

At present about 50 acres of land is available in the ash pod area. Out of this land about 8 acres of land has been handed over for establishment of fly ash brick plant. The establishment of the brick plat will utilize about 1.86 lac MT of fly ash at its presently installed capacity of 3 lacs bricks per day. The balance fly ash will be stored in the ash

lagoon and will be progressively removed for utilizing in other specified utilities like land-fill and allowing issue of fly ash to private clay brick manufacturers for puddling it with clay.

A provision of Rs.5 crores for civil works towards ash pond remodeling is required.

An amount of Rs. 3000 lakh has been approved for this scheme for 2003-04 for the above mentioned works.

3. Overhauling of Gas turbines (Rs. 2500 lakh)

1. Combustion of GT 2,3,5&6

As per the recommendation of OEM various inspection of gas turbine as detailed below is to be carried out as part of the preventive maintenance of the machine.

- i) Ist combustion inspection after 8,000 fired hours.
- ii) IInd combustion inspection after 16,000 fired hours.
- iii) Hot gas path inspection after 24,000 fired hours.
- iv) Again combustion inspection after 32,000 fired hours.
- v) Another combustion inspection after 40,000 fired hours.
- vi) And finally the major overhauling after 48,000 fired hours.

During these inspection various faulty burners/leakage damaged components in the gas path are to be repaired/replaced which increase the plant efficiency and results in reducing the cost of generation.

Estimated Expenditure: Rs 50 lacs

2. Repair of GT No. 1

During recent O/H of G.T. No. 1, the rotor of this machine found to be badly damaged which was replaced with the new rotor procured as spare one. The rotor taken out from this machine was found with buckets, shrouds badly damaged, wheel spacer ring No. 1 also found damaged and the compressor blades having thinned edges /worn out blades needing replacement. The rotor shall be sent to M/s BGGTS for complete

refurbishment and shall be kept as stand by one to be used in O/H on subsequent machines/ hot gas path inspection of the machine and hence increase generation from the machine and also reflect on the cost the generation.

Estimated Expenditure: Rs. 450 lacs

3. Compressor blade one set and bucket one set.

One set each of compressor blade and bucket has been proposed for procurement. Out of two sets of compressor blades already procured for GT 2 &3 (as per the recommendation of OEM.) one set will be utilized for refurbishment of damaged GT rotor No 1 and another set shall be used in rotor of GT 2 or 3 which shall be taken out first. And the proposed one set to be used in the IInd GT out of No. 2 & 3 opened later. The set of turbine buckets proposed under this proposal shall be used in refurbishment of rotor of GT 1 and shall be made stand by rotor.

An amount of Rs. 2500 lakh has been approved for the scheme for 2003-04 for above mentioned works.

4. Refurbishment of WHRU (Rs. 1000.00 lakh)

As has been seen in the past that the steam turbine rotor found failing very frequently due to the faulty design/workmanship though lot of modifications/works have been carried out to reduce the failure of the rotor. Still in order to face any eventuality of the turbine failure at the later stage, spare rotor has been proposed for procurement so that the machine may not remain off the bars for longer duration and hence reduction in loss of generation.

An amount of Rs. 1000 lakh has been approved for this scheme for 2003-04.

5. POWER GENERATION PLANT CONSULTANCY (Rs. 100 lakh)

1. Bawana Joint Venture

NTPC has been appointed as a Consultant for finding the joint venture partner for installing 1000MW Gas based power station at Bawana. NTPC has already submitted the

draft bidding document in this regard, however, decision in this matter is still pending with Delhi Government.

NTPC has been awarded this job for Rs.24 lacs.

2. 1000 MW proposed Gas Based Power Station at Bawana.

Delhi Government has decided to setup this Project of its own for which NTPC was requested to submit their offer for preparing the feasibility report and environmental impact assessment study pertaining to the proposed 1000 MW Gas Based Power station at Bawana.

NTPC has furnished their offer amounting to Rs. 16.5 lacs for preparing feasibility report and Rs.29.50 lacs for EIA (Environmental Impact Assessment Report).

The balance amount is required for other generation project and miscellaneous works for the above Projects.

II. TRANSCO

TRANSMISSION & DISTRIBUTION WORKS

(1) 400KV Works (Rs. in 2785 Lakh)

It is proposed to add 1x315MVA 4th Transformer at Bawana and 1x315MVA 3rd Transformer at Bamnauli during the year 2003-04.

To meet the growing power demand of Delhi, a system capable of transmitting and distributing bulk power has become essential. 2 nos. more 400/220KV sub-stations have been proposed during the Tenth Plan. The proposed 400/220KV sub-station at Maharani Bagh shall meet the load of South and East Delhi. Power at this station will be drawn by 'looping in' and 'looping out' the existing 400KV D/C lines between Dadri and Ballabgarh. The other proposed 400/220KV sub-station at Mundka is for the load demand of West and North-west Delhi. Power at this sub-station will be drawn by

'looping in' and 'looping out' 400KV D/C line between Bawana and Bamnauli. The works on both these 400KV sub-station shall commence during the A.P. 2003-04.

An outlay of Rs. 2785lakh has been approved for A.P. 2003-04 which also includes pending works of previous years.

(2) **220KV Works (Rs. 7515 lakh)**

This is a continuing work which envisages establishment of new 220KV sub-station as well as augmentation of transformation capacity of the existing 220KV sub-station to meet the growing power demand of Delhi.

An outlay of Rs. 331 Cr. was approved by Govt. of NCT of Delhi for Tenth Plan (2002-07) for 220KV works. The approved outlay for A.P. 2003-04 is Rs. 7515 lakh and covers ongoing and new works.

(3) **SCADA SYSTEM (Rs. 200 lakh)**

At present, the power system of Delhi is controlled manually through system operation control room with the help of telephone lines, VHF sets, wireless sets and PLCC links etc. The complexity of the Power system and the quantum of information to be processed by the control room engineers has reached a point, where human capacity is inadequate for proper handling of emergency situations. In order to have proper monitoring, supervision and control of the system, a Unified Load Dispatch and Communication Scheme for Northern Region of India including 400KV and 220KV system of Delhi Power Supply Company Limited is being implemented by Power Grid.

An amount of Rs. 200 lakh is approved for this scheme for Annual Plan 2003-04.

III. POWER SECTOR REFORMS (Rs. 126000 lakh)

An amount of Rs. 3450 crore is to be given by Govt. of Delhi for Power Sector Reforms due to privatisation of DVB. Out of this, an amount of Rs. 1364 crore has been

given during the year 2002-03. For 2003-04 , an amount of Rs. 1260 crore is approved for this purpose.

IV. DELHI ELECTRICITY REGULATORY COMMISSION (Rs. 225 LACS)

The Delhi Electricity Regulatory Commission (DERC) was notified on 3rd March,1999 under Electricity Regulatory Commissions Act, 1998. The chairman of the Commission was appointed in December 1999. The Commission has been made functional and 34 post on temporary basis have been sanctioned by the Government. For the year 2001-02 budget under Non Plan Major Head “2801” Rs.3.2002 crores (Rupees Three Crores Twenty Lakhs Two Thousands Only) was available.

The commission as a body is responsible for determination of tariff and licensing; bring about a balance between the interest of the State, the consumers, the units involved in generation, transmission, distribution and supply of electricity and investors in the electricity industry and to monitor, control and regulate the working of these units; gather information and monitor price and quality of service; prevent monopoly abuse; promote competition and foster private participation in power sector; regulate and adjudicate on the tariffs and other related issues and also act as a body to resolve or set up machinery to resolve to speedily disputes among the licensees.

After the commencement of Reform Act, DERC has been noified as the Electricity Regulatory Commission for Delhi under Section 3 of the Reform Act. As a result of the above, DERC has been conferred the following functions:

- a) To determine the tariff for electricity, wholesate, bulk, grid or retail, as the case may be,
- b) To determine the tariff payable for the use of the transmission facilities;
- c) To regulate power purchase and procurement process of the licencees and transmission utilities including the price at which the power shall be procured from the generating companies, generating stations or from other sources for transmission, sale, distribution and supply in the National Capital Territory of Delhi;

- d) To promote competition, efficiency and economy in the activities of the electricity industry to achieve the objects and purposes of this Act;
- e) To aid and advise the Government in matters concerning electricity generation, transmission, distribution and supply in the National Capital Territory of Delhi;
- f) To regulate the operation of the power system within the National Capital Territory of Delhi;
- g) To set standards for the electricity industry in the National Capital Territory of Delhi including standards relating to quality, continuity and reliability of service;
- h) To promote competitiveness and make avenues for participation of private sector in the electricity industry in the National Capital Territory of Delhi and also ensure a fair deal to the consumers;
- i) To aid and advise the Government in the formulation of its power policy;
- j) To collect and publish data and forecasts on the demand for, and use of electricity in the National Capital Territory of Delhi and to require the licensees to collect and publish such data;
- k) To regulate the assets, properties and interest in properties relating to the electricity industry in the National Capital Territory of Delhi including the conditions governing entry into, and exit from the electricity industry in such manner as to safeguard the public interest;
- l) To issue licenses for transmission, bulk supply, distribution or supply of electricity and determine the conditions of the licences;
- m) To regulate the working of licensees and other persons authorized or permitted to engage in the electricity industry in the National Capital Territory of Delhi and to promote their working in an efficient, economical and equitable;
- n) To require licensees to formulate prospective plans and schemes in co-ordination with the others for the promotion of generation, transmission, distributions, supply and utilization of electricity, quality of service and to device proper power purchase and procurement process;
- o) To adjudicate upon the disputes and differences between the licensees and/or to transmission utilities and to refer the matter for arbitration;
- p) To aid and advise the Government on any other matter referred to the commission by the Government

In view of the important role of the Delhi Electricity Regulatory Commission in the development of infrastructure and promotion and growth of electricity sector in Delhi, it has been desired to meet its expenses through a Plan Scheme so that DERC can be provided requisite funds as a grantee organization of Government of National Capital Territory of Delhi.

An amount of Rs.1000.00 lakh is approved for 10th Five Year Plan which includes Rs.200.00 lakh for Annual Plan 2002-03 for meeting day to day expenditure of DERC. An amount of Rs. 225 lakh has been approved for this scheme for Annual Plan 2003-04.

V. DEDA

1. PLYING OF BATTERY BUSES SCHEME (RS.60.00 LAKH)

Battery Bus scheme is a continuing scheme in the IXth Plan 1997-2002. The battery buses were supplied by BHEL alongwith choppers which could not run successfully in field conditions. Efforts of BHEL to improve the chopper could not succeed. Consequently two buses were given to Prof. Arockiaswamy of IIT Delhi for development of chopper. After sustain efforts a chopper has been developed by IIT Delhi. IIT Delhi also installed two newly developed choppers and free of charge in two buses for intensive field trail. These two buses fitted with newly developed choppers were dedicated to the citizen of Delhi by Hon'ble Chief Minister Delhi on 23/6/00 which are under trial in IIT Campus. It shows that the technology developed is being stabilized. IIT Delhi is also trying to involve the reputed firms for manufacturing and after sales service in this field and also requested DEDA to consider revival of some more buses from its fleet on the technology developed and agreed o undertake the installation and commissioning of these buses.

Further a meeting was held on 21/9/2000 in the chamber of Hon'ble Chief Minister to discuss various schemes/activities of DEDA. The meeting was also attended by Hon'ble Finance Minister alongwith other Ministers and Senior Officers of Government of Delhi and Minister of Non-conventional Energy Sources, Government of

India wherein it has been decided that DEDA may run battery operated buses on experimental basis on the technology developed by IIT Delhi. Accordingly it is proposed to revive 8 more buses so that the total fleet of 10 buses could be operated. However, the same depends upon the outcome of the trial being conducted.

A provision of Rs. 60.00 lakh has been approved for this scheme for Annual Plan 2003-04 for meeting the salary expenditure for the staff.

2. **INTEGRATED URBAN ENERGY PROGRAMME (RS. 40 LAKH)**

.A provision of Rs.40.00 lakh has been approved for this scheme for 2003-04 for meeting salary expenses of the staff and providing solar water heating system.