

## Bharat Sanchar Nigam Limited Nagpur

### (I) General description of the Building

The CTO compound plot is measuring around 34,410 sq. mtr. Comprising mainly FIVE buildings alongwith FOUR Cable godowns, Two canteens, One play ground and other very old structures of British era. The main buildings are namely TAX building, CTO building, Microwave building, Old CTO building & Director(Mtce.) office building. It is situated near Zero point named as it is said to be the centre of India.

The TAX building which is also known as Sitabuldi Exchange is the main building of CTO compound, can be said as heart of Nagpur Telecom, as it comprises all the modern type of exchanges and other ultra modern facilities that Nagpur Telecom offers to the subscribers. This building is having Basement plus Ground plus three floors each of 4.9 mtrs. high and measuring plinth area 1051 sq.mtr. of basement & 1832 sq.mtr. of each floor.

The Old CTO building is very old structure of CTO compound and previously it was housing Strawger exchange. Now it houses office of the Superint. Engineer(Civil) & Electriacal), D.E.(Rural) and Circle Telecommunication Training centre. Also the office of Executive Engineer(Civil), Civil division is also situated in this building. It is ground plus partially one floor having total plinth area 3420 sq.mtr. and height 8.4 mtr. It was constructed in British era.

The Director(Mtce.) office building is also one of old structure of CTO compound and it houses office of the Director(Mtce.) and Amenity Hall. It is ground floor having plinth area 585 sq.mtr. and height 4.0 mtr.



### Features of the building alongwith services

The sanctioned demand for the bldg is 1200 KVA and connected load is 1100KW. The annual electricity consumption was 4694298 KWH units and annual electricity bill was Rs.20195414/- for the last year i.e.2006. The expenditure of diesel for running of Engine-Alternator set for year 2006 was Rs.1117203/- .This building is selected for energy audit due to its large electricity bill and its potential in SSA as compared to others.This is under the maintenance of electrical wing and is located at the Head quarter of the BSNL, electrical Circle and division at Nagpur.

The different electromechanical services available in the premises are as below



## SUBSTATION

There are 2nos. Substations to feed the different load of CTO compound. One is 2X1250KVA Transformer Indoor substation and other is 2X 250KVA Transformer outdoor substation.



## Engine Alternator Set

There are 3nos. 590KVA and 1no. of 275KVA E/A and one no.160 KVA sets to feed the emergency load of CTO compound, Nagpur.



## A.C. Plants

There are total 10 no. of A.C. plants having 47 no. 7 TR A.C. package units in Tax Building.



## Lifts

There are total 5 lifts are available in C.T.O. compound. Two 6 passanger lifts are available in C.T.O. Building, one 8 passanger, one 13 passanger and one 20 passanger cum goods lifts are available in Tax building.



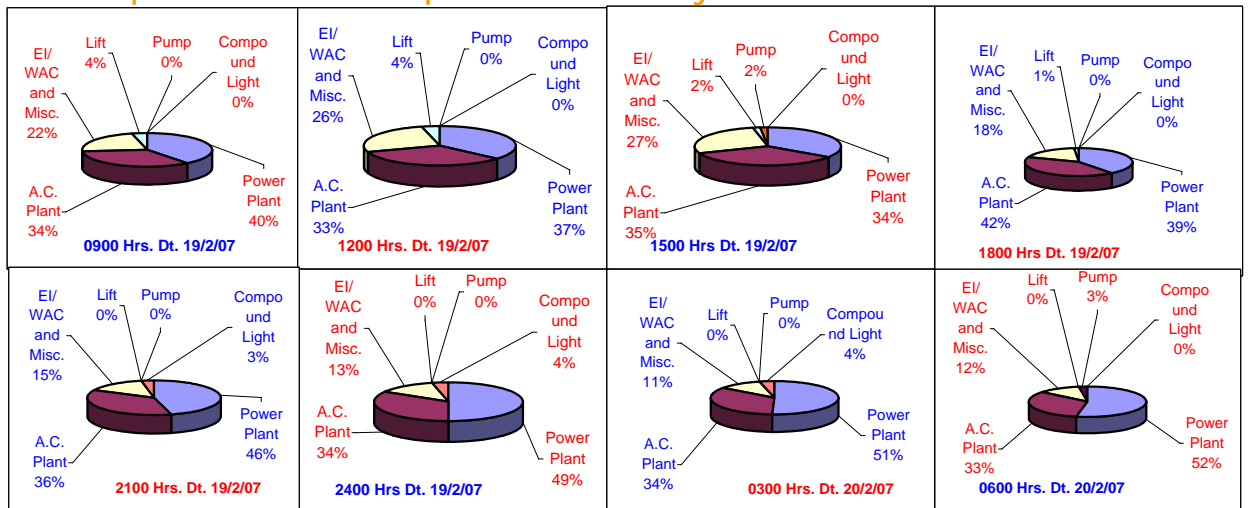
## Power Plants

There are 7 nos. are available in Tax Bldg. Out of which 6 nos. are of SMPS type and 1no. Is conventional type.

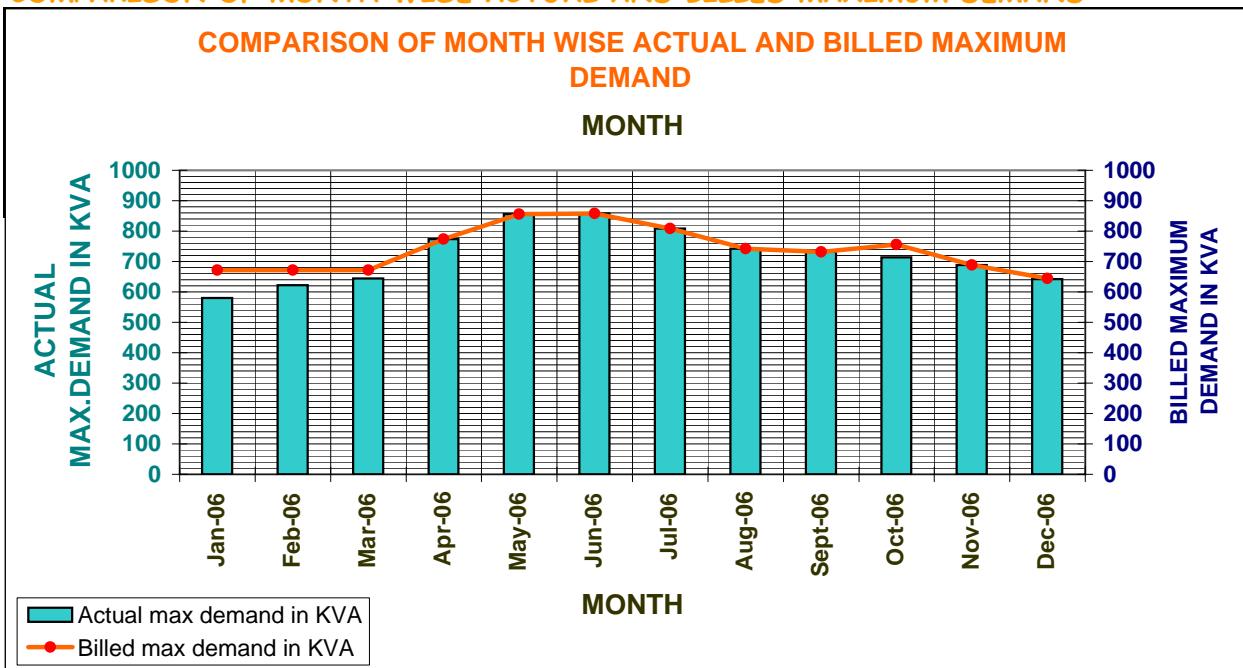
## 9(i) Energy Consumption Details

YEAR	UNITS (EB)	EB BILL (Rs.)	UNITS (E/A)	Diesel Bill Rs.	Total cost Rs.	Average PF	Increase in units due to new load added	Unit consumption in previous year	Unit saving
1	2	3	4	5	6	7	8	9	9=8-2-4
2004-05	4532698	16385788	219948	2377813	18763601	0.998	169325	5010172	426851
2005-06	4396056	16328024	213825	1927106	18255130	1	98295	4752646	241060
2006-07	4769398	22092221	201924	1278636	23370857	1	616097	4609881	254656

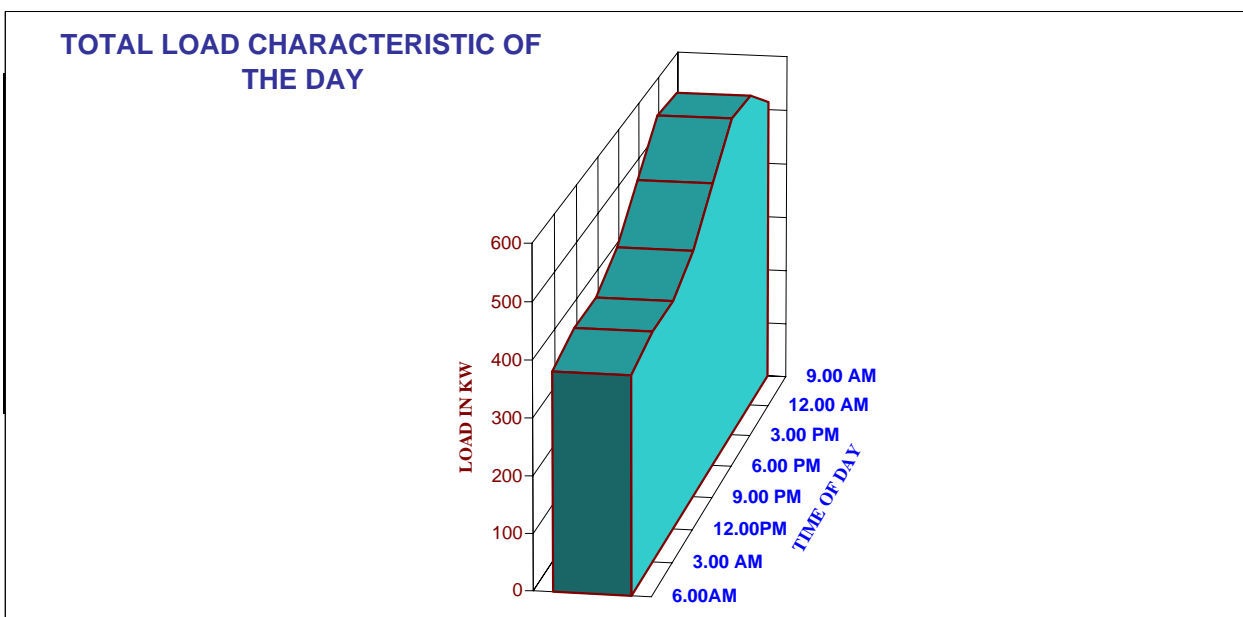
## Consumption Pattern in respect of time of day



### COMPARISON OF MONTH WISE ACTUAL AND BILLED MAXIMUM DEMAND



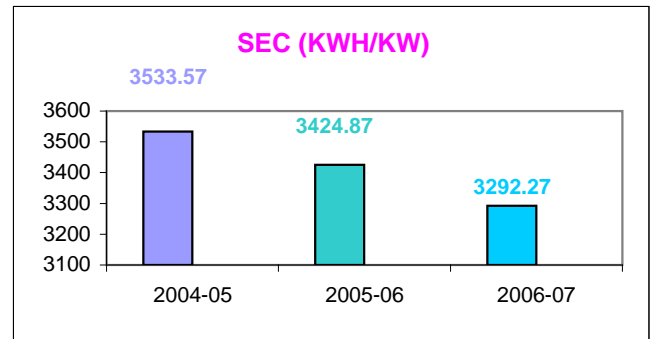
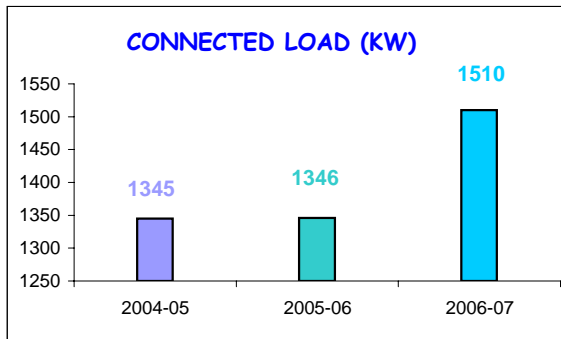
### PATTERN OF LOAD VARIATION IN RESPECT OF TIME OF DAY



### SPECIFIC ENERGY CONSUMPTION (YEAR 2004-05 TO 2006-07)

YEAR	KWh (yearly)	Connected LOAD	SEC*
2004-05	4752646	1345	3533.57
2005-06	4609881	1346	3424.87
2006-07	4971322	1510	3292.27

SEC\*- Specific Energy Consumption= $\frac{\text{KWh}(\text{yearly})}{\text{KW}(\text{connected})}$



## 9(iii) Energy Conservation Achievements

As per the energy policy of organisation, Electrical wing of BSNL Nagpur has initiated the energy conservation measures right from 2001-2002. Initially we have focussed on 'No cost measures' and awareness of user's which are continuous processes. The 'Low cost measures' have been taken up from 2004-2005 onwards. Now we are going to implement 'High cost measures' in which adoption of new technologies, replacement of old equipments with energy efficient equipments etc will be there. We are committed to conserve the energy by all the means, to benefit our organisation as well as our country.

The major electricity consumption is observed in Power plants and A.C. package units used to condition the switch room area. Therefore the measures are taken to conserve the energy mainly in these two loads.

### 1. Diversion of exchange load from low efficiency conventional power plant to existing partially loaded high efficiency SMPS power plant.

#### (A) E-10-B exchange load diverted from conventional to existing SMPS power plant.

The 50 KW load of E-10-B exchange has been shifted from conventional power plant (efficiency=75%) to partially loaded existing SMPS power plant (efficiency=90%). The saving obtained was 97324 units per year.

<b>Yearly saving on energy</b>	<b>=97324KWh/year</b>
yearly saving in energy cost	=Rs.389296/- per year
Investment	=Rs.0/-
Pay back period	=0 months

#### (B) EWSD exchange load diverted from conventional to existing SMPS power plant.

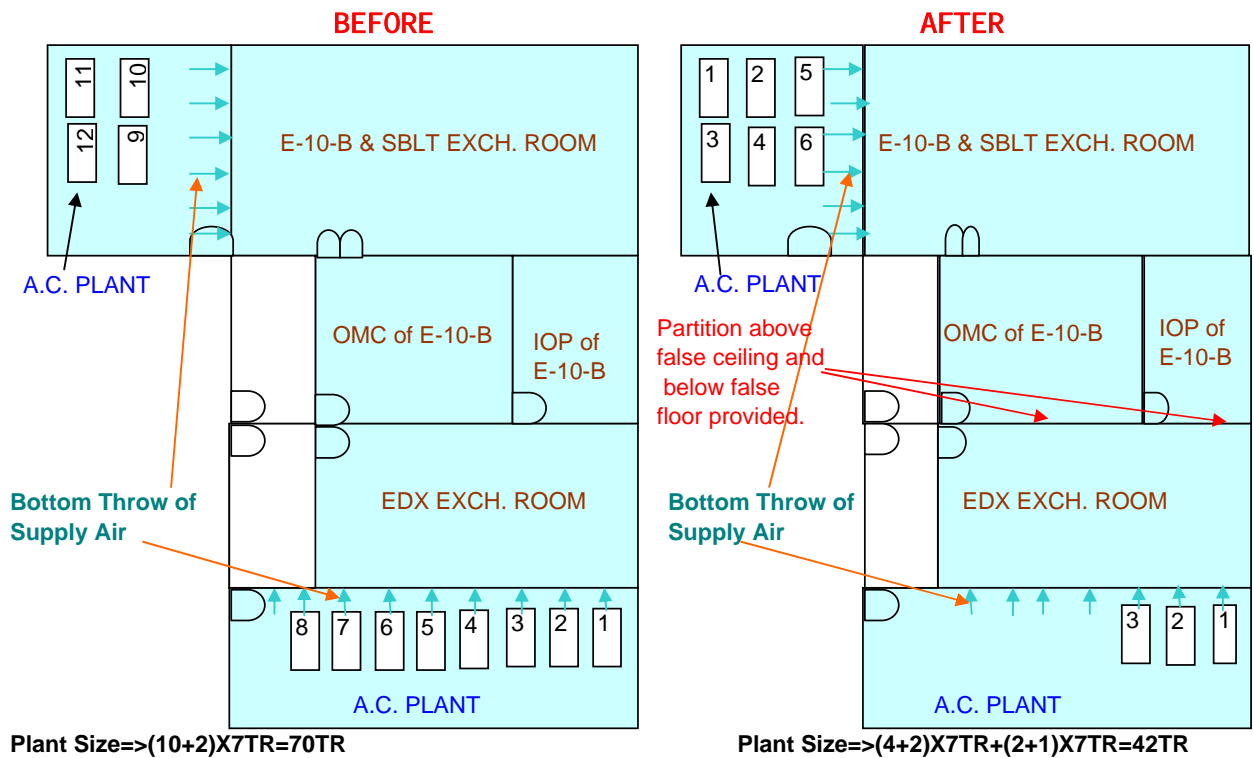
The 30 KW load of EWSD exchange has been shifted from conventional power plant (efficiency=75%) to partially loaded existing SMPS power plant (efficiency=90%). The saving obtained was 58394 units per year.

<b>Yearly saving on energy</b>	<b>=58394KWh/year</b>
yearly saving in energy cost	=Rs.233576/- per year
Investment	=Rs.0/-
Pay back period	=0 months

### 2. Rearrangement of A.C. plant used for E-10-B & EDX switch rooms.

#### Background

In E-10-B+EDX Switch room two plants i.e. 4x7TR of M/s. Singhsons and (6+2)x7TR of M/s. Batliboi have been clubbed together to maintain conditions making the plant (10+2)x7TR. The supply air direction of both the A.C. plants were perpendicular to each other. In switch room false floor and false ceiling is there. Bunch of cables have been passed beneath the false floor, perpendicular to the supply air path which restricted the supply air flow and to maintain the temperature in E-10-B Exchange higher C.F.M. required which has been got by running additional package. This resulted into the lower temperature (16°C) in EDX Exchange. The supply Air path and return air path increases unnecessary for Batliboi Plant. To overcome the problem both the switch room have been separated by providing partition below false floor and above false ceiling. According to the heat load of both the switch rooms the packages have been rearranged and made two separate plants (i) (4+2)x7TR for E-10-B, (2)(2+1)x7TR for EDX Exchange. By this we got 3 Nos. packages spare.



Yearly saving on energy	=110376 KWh/year
yealy saving in energy cost	=Rs.441504/- per year
Investment	=Rs.85000/-
Pay back period	=2.3 months

### 3.Replacement of old defective/low sensitivity thermostat with new high sensitivity thermostat in A.C. packages.

To get the auto as well as minute control on temperature to be maintained in switch room the existing low sensitivity/faulty thermostat has been replaced by new high sensitivity thermostat on every package A.C. unit. The high sensitivity thermostat are available in heaters and pan humidifier of each A.C. plant. As the heaters and pan humidifiers are not useful in climate of this area, therefore the thermostats are used for package units. Total 20 nos. thermostat are available and 9 nos. are purchased. The unrealised saving of 30% of energy efficiency measure implemented in 2004-05 (Kept the temperature of all the switch rooms at 23°C in place of 18°C except E-10-B switch room in which temperature is to be kept 20°C in place of 18°C.)

Yearly saving on energy	=98499 KWh/year
yealy saving in energy cost	=Rs.393996/- per year
Investment	=Rs.15000/-
Pay back period	=0.46 months

### 4. Efficient management of Power Factor

The power supply system is equipped with automatic power factor controller (APFC) which sensed the power factor from main panel and switching the required capacitors. As the transformers no load losses and the copper losses in cable connecting the transformers and main panel are not sensed by the APFC relay, the hourly reading of TOD meter provided by supply company is taken manually to maintain unity power factor. The minimum P.F. specified by supply company is 0.9, below which penalty is imposed and if the P.F. is more than 0.95 incentive is given. The BSNL Nagpur has continuously maintained unity power factor in CTO compound from last three years and got incentive of Rs.635862/- from supply company for year 2006-07. The demand KVA is also reduced by maintaining high P.F. and benefited the other consumers if available at peak hours ( when there is load shedding due to difference in available and required demand). The T&D loss is also reduced due to reduction in current at higher P.F.

YEAR	Average MD	Average Power Factor	Annual Saving (Rs.)
2004-05	717	0.998	282656
2005-06	735	1	237967
2006-07	743	1	282847



Automatic Power Factor Controller

### 5. Awareness campaign

The occupancy of the CTO compound is very high and different types of units are working here. Mainly the users of electrical energy are from telecommunication, commercial, marketing, civil and clerical field, which do not have adequate background of electrical field. Hence to make them aware about energy consumption, useful use and conservation, a continuous one to one interaction with users, by energy monitoring cell and the awareness campaign has been launched. In which Poster/stickers campaign, meetings with users at utility and presentation of energy coservation measures to higher officers have been arranged.



### Organisational set-up of Energy monitoring cell

Position	Designation	Name	Qualification
Energy Auditor	Executive Engineer (E)	Suhas R. Devasthali	Qualified Energy Auditor-EA-5222
Energy Manager	Sub-Divisional Engineer(E)	S.P. Kashikar	Qualified Energy Manager-EM-1412
Energy Manager	Sub-Divisional Engineer(E)	G.M. Barapatre	Qualified Energy Manager-EM-1076
Deputy Energy Manager	Junior Telecom Officer(E)	P.U. Thanekar	Diploma Engineer
Electrical maintenance staff	Electrician/ AC mechanic	-----	ITI / Wireman



The energy saving achievement for year 2003-04 to 2006-07

