

By Courier

To  
The Chairman  
SEB

Date 1<sup>st</sup> October, 02

Subject- DPR for the Circle/Town plan

Dear Sir

This is with reference to letter no F. /1605/ 2002 APDRP dated 26/8/2002 to you from MOP, GOI informing the approval of following towns selected in your State / Region for development in the next phase

- 1.
- 2.

As directed by MOP the DPR for the circle, covering above town may be prepared and submitted by 15<sup>th</sup> October, 02 to us for review. DPRs after review shall be sent to MOP for consideration of schemes / Proposals for approval by them in 4<sup>th</sup> week of Oct 02.

In order to facilitate appraisal on uniform basis it is requested that following enclosed format for above mentioned towns be filled and submitted in triplicate

1. Format for snap shot
2. Modular DPR for Towns/Circles

The modular DPR proposed sheet is based on expert committee guidelines for project formulation and booklet handed over in the workshop conducted by CEA in Sept.,02.

You are further requested to forward the town plans in soft form as well at following email-Id [lvrao@ntpceoc.co.in](mailto:lvrao@ntpceoc.co.in), [rdhup@yahoo.com](mailto:rdhup@yahoo.com), [yuvikac@yahoo.com](mailto:yuvikac@yahoo.com) for expeditious review.

G. S. SOHAL  
ED (APDRP)

Encl. a.a

# APDP Schemes for 2002-03 of Circle, SEB

## 1.0 Profile of the Circle

- 33/11 kV Substation :
- Feeders
  - 33kV feeders :
  - 11kV feeders : kms.
  - LT lines :
  - LT: HT ratio :
- Peak demand : MW
- Consumers :
- Energy consumption : MU

## 2.0 Energy Accounting

- Energy input : MU
- Energy metered :
- Energy assessed :
- (for the un-metered consumers and defective meters)
  
- Energy Sold : MU
- Energy Loss : MU ( %)
  - Technical loss :
  - Commercial loss :
- Aggregate Technical & Commercial loss
  - Amount realised :
  - Energy for which payment realized :
  - Aggregate T&C loss :

### 3.0 The details of the schemes proposed for system improvements are as below:

Circle (SEB)			
S N O	BRIEF DESCRIPTION OF WORK	Quantity	Estimated Cost Rs in Lakhs
A	<b>Technical</b>		
1	Erection of 11KV lines		
2	Installation of 63 KVA DT		
3	Installation of new VCBs for new feeders		
4	Erection of .6 MVAR 11 KV switched Capacitor		
5	LT line		
6	A B Switches		
B	<b>Commercial</b>		
1	Installation of DT meters		
2	Installation of 3 ph Static meters for Agricultural Consumers		
3	Energy Accounting and billing center		
4	Installation of HT metering equipments at crossover points		
5	1 ph meter for replacement		
	<b>GRAND TOTAL</b>		

### 4.0 Cost-benefit analysis

Cost of the recommended Schemes : **Rs. Lakhs**

Annual Benefit

- Reduction in technical losses : Rs. Lakhs
- Increase in revenue due to increased energy consumption : Rs. Lakhs

- Increase in billed energy :

**Total Annual Benefits : Rs. Lakhs**

# **Modular DPR for Distribution Circles**

**APDRP DEPTT.**  
NATIONAL THERMAL POWER CORPORATION LTD.  
EOC, Sector-24, NOIDA, U.P.-201301

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## Executive summary

The total population of the Distribution Circle is -----with area of -----Sq. km and has a customer base of ----- . The monthly input energy for this Circle is ----- LU and the monthly revenue collected is Rs----- lakhs.

Physical map locating state and circle in country is enclosed as exhibit.

The Circle has following divisions;

Sl. No.	Name of Division	No. of sub-division

Improvements are proposed under the APDRP, to enhance revenue collection and improving customer satisfaction. The investments required have been estimated as Rs----- Crores and on completion the annual revenue of the Circle is expected to improve by Rs. -----Lakhs

The pay back period for the scheme would be ----- years-----months.

The scheme would be executed on turnkey basis and implemented in phases and completed in ----- months.

**SECTION 00**

**Existing Circle Data**

### Physical Details

The physical details of the \_\_\_\_\_ Distribution Circle are as follows:

Area covered by the Circle is Sq. Km	
Population as on 2001 census	
Circle Administration	

### Utility Administrative Control

Name	
Designation	
Address Office	
Telephone Office /Residence	
E – Mail address/ web location	

### Power supply system

Details	Nos.
66 KV Substations	
66 KV lines Number/km	
33 KV lines Number	
33 KV lines Number/km	
22 KV Sub stations	
22 KV lines Number/kms.	
Power Transformer Nos.	
Power Transformers Capacity in MVA	
11 KV lines number	
11 Kv lines kms.	
Distribution Transformers No. - 1 $\phi$ &3 $\phi$ 3 $\phi$	

DTs. Capacity in MVA -1 $\phi$ &3 $\phi$ 3 $\phi$	
LT lines	

### Demand and supply position

Division	Reference period (Year)	Power Demand in MW		Energy Demand in MU	
		Unrestricted	Met	Unrestricted	Met
Total Circle					

### Declared losses as on

Division	Period	Input energy	Metered energy	Assessed Energy	Declared losses	
					Technica 1	Commertia 1
Total Circle						

### Commercial Performance (previous years)

Particulars	2000 – 01	2001 - 02
The peak demand in MW		
Energy input in LU		
Energy metered in LU		
Revenue billed in lakhs		
Revenue collected in lakhs		
Metering Efficiency - %		
Billing Efficiency - %		
Collection Efficiency -%		
ARR on Billed Energy		
ARR on input Energy		

### Category wise Consumption & Revenue Billing

(Financial year wise for previous two years)

Particulars	No. of consumers	Connected Load (KW)	Energy drawn (LU)	Billing (Rs. in Lakhs)	Collection (Rs. in Lakhs)
Domestic					
Commercial					
Industrial HT					
Industrial LT					
Agricultural					
Railway					
Public Water Works					
Public lighting					
Other					
<b>TOTAL</b>					

### Sub-division wise collection centres are

Sl.	Name of collection centre	Mode of payment /Tie up with bank	Remarks

### No current complaint cells.

Sub-division	Name of Complaint centre	Mode	Remarks

### Detailed Technical Data of the Circle

The technical data of the circle shall include and enclose

- Electrical single line diagram of the system( The drawings if not readily available may be sent within two to three weeks of submission of DPR)
- Physical diagram showing geographic location of sub stations and lines and
- Single line diagram for each EHV & HV substation
- Physical diagram showing location of HV sub-stations, routing of 11 KV feeders and location of distribution transformers for the feeders which have been proposed for intervention.

### Details of EHV Sub Stations

S. No.	Name of EHV S/Stn.	Voltage ratio	Transformer capacity			Maximum demand MVA
			No.	Capacity MVA	Total MVA	

### Details of EHV interconnections

Sl.	From EHV S/Stn	To EHV S/Stn	Name of feeders	No. of circuits	Length in Ckt km.	Conductor Size- Sq.Inch	Avg. demand MW	Peak demand MW

### Details of HV substations

S. No.	Name of HV S/Stn.	Voltage ratio	Transformer capacity		Total MVA	Maximum demand	
			No.	Capacity MVA		MVA	MVAR

**Details of connections from EHV to HV substations**

Sl. no	From EHV S/Stn	To HV S/Stn	Name of feeder	No. of circuits	Length ckt km.	Conductor Size-sq.inch	Avg. demand MW	Peak demand MW

**Details of HV Interconnections**

Sl. no	From HV S/Stn	To HV S/Stn	Name of feeder	No. of circuits	Length ckt km.	Conductor Size-sq.inch	Average demand MW	Peak demand MW

**11 kV feeders emanating from HV substations**

Sl.	Name of HV S/St 66-33/11 KV	Name of transformer	Transformer Rating MVA	Name of feeder 11 KV	Distribution Transformer			Flow during reference pd.		
					No.	KVA	Total KVA	Peak MW	MVA	MUs

**11 kV feeders emanating from EHV substations**

Sl.	Name of EHV S/s	Name of transformer	Transformer Rating MVA	Name of feeder 11 KV	Predominant conductor size	Distribution Transformer			Flow during reference pd.		
						No.	KVA	Total KVA	Peak MW	MVA	MUs

**Technical data for each of the accounting units**

**Flow data on 11 kV feeder**

Name of feeder	Length of Main feeder	Conductor Size	Diversity factor	Load loss factor	Flow during reference period				
					Peak MW	MVA	Minimum MW	MVA	Energy in MU

**Organization chart of Circle**

To be enclosed in Chart form.

**Summary of manpower**

Technical Officers	
Technical Others	
Non Technical Officers	
Non Technical Others	
Total Staff	

## **Section I**

### **Customer Indexing & Metering**

**Feeder Metering Status –**

**Along with meter equipments (CT, PT)**

Voltage	No. of feeders		Metered			Electronic Meters requirement
	Direct	Interconnecting	EM	Electronic	Data Logging	
33 KV						
11 KV						
DT Meters	Nos.	Provided	Balance Required			

**Customer metering Status**

Customer Category	Total Number	Meter type		Metered Quantity		Requirement of electronic meters
		1Q	3Q	Electronic	Electro Mechanical	
HT Consumers						
LT Consumers						
Domestic						
Commercial						
Industrial						
Agricultural						
Others						
TOTAL						

### Customer Indexing Status

Customers	% Indexing
HT	
LT	

### Requirement of customer indexing/metering

Sl.	Item	Quantity	Unit rate in Lakhs	Cost in lakhs	Benefit	
					In LU	In lakhs
1	Consumer Meters - 1 Ø					
2	Consumer Meters 3 Ø					
	Total Consumer Meters					
3	Feeder Meters					
4	DT Meters					
	Total System meters					
5	Consumer indexing					

## **Section II**

## **Capacitors**

## Capacitors

HT/LT capacitors in substation and distribution transformer are required to be provided of the size depending upon the condition of power factor and actual availability of capacitors on Agricultural pumps & other Loads to ensure the power factor is at least 0.9.

### Requirement of capacitors

Sl.	Particulars	Unit	Rate/Unit (Lacs)	Qty.	Amount	Benefit	
						LU	Rs Lakhs
1	11 KV Capacitor Bank						
A	KVAR	NOS					
B	KVAR	NOS					
	<b>HT Capacitors</b>						
2	415 V Capacitors on DT						
A	KVAR ON 25 KVA DT	NOS					
B	KVAR ON 63 KVA DT	NOS					
C	KVAR ON 100 KVA DT	NOS					
D	KVAR ON 200 KVA DT	NOS					
	<b>LT Capacitors</b>						

### **Section III**

### **Sub Station Equipments(New/R&M)**

**Requirement of Substation Equipment**

**(to be filled for each sub-stn separately)**

**Name of Substation:**

Item	Total Reqd.	Installed		Balance Reqd.	Unit Cost	Total Cost
		Working	Defective			
<b>66-33KV</b>						
Circuit Breaker (3-Ph.)						
AB Switch						
HG Fuse (1 Ph.)						
CTs						
PTs						
Earthing						
Bus-bar & jumpering						
LA (1-Ph.)						
Energy Meter (3 ph.)						
ME(3 Ph.)						
<b>11KV</b>						
Circuit Breaker (3-Ph.)						
AB Switch						
HG Fuse (1 Ph.)						
CTs						
PTs						
Earthing						

Item	Total Reqd.	Installed		Balance Reqd.	Unit Cost	Total Cost
		Working	Defective			
Bus-bar & jumpering						
LA(1-Ph.)						
Energy Meter (3 ph.)						
ME (3 Ph.)						
<b>Common Items</b>						
Battery Charger						
Battery Bank						
Control panel						
Firefighting						
Sub Station T&P						
Oil centrifuge M/c and test lab						
Power cables with sizes						
Control cables with sizes						
<b>Civil / lighting works</b>						
Structure works						
Paint & plastering						
Water scheme						
Boundary						
Fencing						
Lighting System						

## Requirement of Relays etc. in Substation

Relays & instrumentation for transformers & lines

Item	BUCH HLOZ RELA Y	HV O/C RELA Y	HV E/F RELA Y	LV O/C RELA Y	LV E/F RELA Y	OTI	WTI	OIL LVLS GUAGE	SILIC A GEL	NEUTRAL EARTHING
Transformer-I										
Transformer-II										
Transformer-III										
Transformer-IV										
Feeder-I	x					x				
Feeder II										
Feeder III										
Feeder IV										
No. of Relays										
Unit Cost In Rs										
Total Cost TOTAL for Substation										

## Total cost of Sub-station Relay & R&M

Sl.	Name of Substation	Cost of Equipment	Cost of relays etc.	Total Cost
	For all Substations			

## **Section IV**

### **Distribution Transformers**

### Distribution transformers (overloaded)

Name and location of Distribution Transformer	Capacity	Details of LT capacitors KVAR	Flow during reference period				
			Peak MW	MVA	Minimum MW	MVA	Energy in MU

### Outage data of feeders on account of DTs

Name of feeder	No of Outages during reference period		Total duration of outages	Number of DT failures
	< 5 Mins	> 5 Mins		

### Statement Of DT Failures

Sr.no	Capacity of DT	Total DT	No of DT Failed	Failure Rate In %
1	25 KVA			
2	63 KVA			
3	100 KVA			
4	ABOVE 100 KVA			
5	TOTAL			

### Requirement of DTs (Replacement)

SL.	DTs (R & M)	Rating KVA	Quantity	Unit rate in Lakhs	Cost in lakhs	Benefit	
						% Outage Reduction	In LU

### Distribution Transformer R & M

Name of feeder	DTs No	DTs KVA	GO Replacement		GO Refurbishment		LA		MCCB/Fuses		Structure		Total Cost
			No	Cost	No	Cost	No	Cost	No	Cost	No	Cost	

## Section V

# POWER TRANSFORMERS

### Statement Of Overloading Of Power Transformers

S.No.	Substation Name	Power Transformer Details			
		Capacity MVA	Avg MVA	Peak MVA	Duration of overload

### Power Transformer failure rate

SL. No	Rating of PT MVA	Total Nos.	No of PT Failed	Failure Rate In %

### Requirement of Power Transformers

S.No	Substation Name	Capacity MVA	Cost	Benefit In Outage reduction

**Section VI**

**IT ENABLING**

## Business Centres

Type of Centres	Nos.	Conceptual Details Of Proposal with Configuration of System with features of up-gradability & connectivity to be enclosed	Cost	Benefit In terms of Customer satisfaction & Increase in revenue & energy savings to be given
Computerized Billing & collection centre				
Computerized No Current Complaint centre				
Sub-Stns with Computerized data Logging facilities				

## Section VII

# FEEDER UPGRADATION

### Feeder details

Physical diagram showing location of HV Sub stations, routing of 11 kV feeders and location of Distribution transformers for the feeder where Voltage regulation is extremely poor to be enclosed for priority works

Sl. no	Name of feeder	No. of circuits	Length Ckt km.	Conductor Size- Sq.Inch	Average demand MW	Peak demand MW
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### Requirement

Sl.	Description	UNIT	QTY	COST IN Rs.	Benefit in LU	% Outage Reduction
	Bifurcation Of 11 KV Feeders	KM				
	Reconditioning Of 11 KV Lines	KM				
	NEW 33/11 KV S/S	NO.				
	ADDITIONAL 1 * 5 MVA TRANSFORMER	NO.				
	New Additional 11/0.4 KV Transformers	NO.				
	11 KV Line	KM				
	Defective 11 KV VCB	NO.				
	Defective 33 KV VCB	NO.				
	Conversion Of Lt To Ht					
	A)11 KV LINE ON ACSR CONDUCTOR	KM				
	B) DO ABC CABLE	KM				
	C) 25 KVA TRANSFORMERS	MO.				
	D) 16 KVA TRANSFORMERS	NO.				
	E) 10 KVA TRANSFORMERS	NO.				
	New Lt Line	KM				
	Total					

**Section VIII**  
**Benchmarking**

## Benchmarks of Performance

The existing levels of performance and the targeted levels expected to be reached after the intervention out as below:

Sl. No	Benchmark parameter	Present level	Level to be achieved	Date by which parameter would be achieved
1	Input Vs. metered energy			
2	Revenue realization Efficiency (Amount collected to amount billed)			
3	Transmission & Distribution losses			
4	Number of Feeder outages in last year			
5	Failure rate of DTs in last year			
6	Number of consumer complaints			
7	Consumer complaint disposal time			
8	Progress of meter installation			

9	HT/LT ratio			
10	Consumers / Employee			
11	Units input /Employee			
12	Revenue Realized/ Employee/YEAR			
13	Metering Efficiency			
14	Billing Efficiency			
15	ARR on Billed energy			
16	ARR on input energy			
17	No of Outages / 100 km of 11 kV line in a month			
18	Duration of Outages / 100 km of 11 kV line in a month			

**Section IX**

**Summary Cost Sheet**

### Summary Cost sheet with major heads

Sl.of section of DPR		Quantity	Cost	Benefit in LU	Benefit in Rs.	% Outage reduction	Remarks
6.1	Consumer Metering						
6.1	System Metering						
6.1	Customer indexing						
7.1	LT Capacitors						
7.1	HT Capacitors						
9	Substation R&M						
11.2	DTs replacement						
11.3	DTs R&M						
12.2	Power Transformers						
13	Billing & Collection Centre						
13	No-current complaint centre						
13	Computerized data logging						
14.1	Feeder Up gradation						

	Total DPR Cost					
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