

Annual Energy Audit Report

DNHDDPDCL

Year: 2022-23



Annual Energy Audit for DISCOM Sector under BEE DISCOM Notification

DNHDDPDCL

DNH, Daman and Diu,



Prepared For



Bureau of Energy Efficiency

[Govt. of India – Ministry of Power]

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Prepared by

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November 2023

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The image shows a handwritten signature in blue ink on the left, and a circular blue stamp on the right. The stamp contains the text "A.R.S. ENERGY AUDITORS" around the perimeter and "VIRAR" in the center, with a small star at the bottom.

Acknowledgement

We are also thankful to DNHDDPDCL for their positive support in undertaking this intricate task of verification study. The energy audit field visit and data verification process would not have been completed on time without their interaction and timely support. We are grateful for their co-operation during verification and provision of data for the study. We would like to particularly thank.

Mr. Shailendrasingh Negi -	Whole time Director
Mr. Dharmesh Dave -	General Manager, Nodal Officer
Mr. Satish Patel -	Assistant Manager, Energy manager
Mr. Pranav Mehta -	Assistant General Manager, Finance

and all other supporting staff who have given full co-operation and support. They took keen interest and gave valuable inputs during the course of study.

Study Team

The annual energy audit involved engagement of following team members representing ARS ENERGY AUDITORS that was awarded the said work for DNHDDPDCL., vide the Order No. 3130032818 dated 20 Oct 2022

Company/ Institution/ Organization	Team Member	Designation	Role
ARS ENERGY AUDITORS	Mr. Sachin Deshpande	Accredited Energy Auditor	Project head, review of data and report
	Mr. Bhaskar N. Rawal	Sector Expert	Review of data and report
	Mr. Narayan Amzare	Certified Energy Auditor	Field visit inspection, document verification and report writing
	Mr. Pavan Sharma	Senior Consultant	Field visit inspection, document verification and report writing
	Mr. Jitendra Vyas	Certified Energy Manager	Field visit inspection, document verification and report writing
	Mr. Anant Kulkarni	Team Member	Field visit inspection, document verification and report writing
	Mr. Janardhan khade	Team Member	Field visit inspection, document verification and report writing

Abbreviations

AMI	Advanced Metering Infrastructure
AMR	Automated Meter Reading
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AT & C	Aggregate Technical and Commercial
BEE	Bureau of Energy Efficiency
CKT	Circuit Kilometer
CT	Current Transformer
DC	Designated Consumer
DEEP	Discovery of Efficient Electricity Price
DISCOM	Electricity Distribution Company
<u>DNHDDPDCL</u>	Dadra and Nagar Haveli and Daman and Diu Power Distribution Corporation Limited
DT	Distribution Transformer
EA	Energy Auditor
EHT	Extra High Tension
EHV	Extra High Voltage
EM	Energy Manager
FY	Financial Year
HT	High Tension
HVDS	High Voltage Distribution System
KVA	Kilo Volt Ampere
LT	Low Tension
MoP	Ministry of Power
MU	Million Unit
MW	Mega Watt
NO	Nodal Officer
OA	Open Access
POC	Point of Connection
PVC	Polyvinyl Chloride
PT	Potential Transformer
PX	Power Exchange
RE	Renewable Energy
RLDC	Regional Load Dispatch Centre
SDA	State Designated Agency
SLD	Single Line Diagram
SLDC	State Load Dispatch Centre
T & D	T & D Transmission and Distribution
TPL	Torrent Power Ltd.
XLPE	Cross Linked Polyethylene

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1 Executive Summary

1.1 Objective of the study

- To develop and establish a framework and a set of comprehensive guidelines that all Distribution utilities across India can follow and adhere to.
- To identify areas of high loss and pilferage, and thereafter focus efforts to take corrective action.

1.2 Brief Overview of DISCOM

DNHDDPDCL subsidiary company of Torrent Power Ltd, a company incorporated under the Companies Act, 2013, is the distribution licensee in the Union Territory of Dadra and Nagar Haveli and Daman and Diu.

Torrent Power is one of the leading brands in the Indian power sector, promoted by Torrent Group – committed to its mission of transforming life by serving two of the most critical needs - healthcare and power. It is an integrated power utility and is one of the largest private sector players in India having interests in power generation, transmission, and distribution.

The below parameters mentioned in section 1.3 are documented and verified during energy audit site inspection and are true to the facts for FY22-23.

1.3 Important Parameters

- DNHDDPDCL has purchased power from multiple sources. The list of power sources are mentioned as below:
 - a) NTPC
 - b) NPCIL – KAPS
 - c) NPCIL – TAPS
 - d) NSPCL
 - e) RGGPL
 - f) Power Exchange
- The DNHDDPDCL provides power supply in the categories as below:
 - 1) AGRICULTURE AND POULTRY: This schedule shall apply to Agriculture or poultry loads up to 99 HP sanctioned load will be considered in this category.
 - 2) Non-Domestic/Commercial: This schedule shall apply to Shops, Offices, Restaurants, Bus Stations, Schools (other than Govt. schools & their hostels), Photo Studios, Laundries, Cinema Theatres, Industrial Lighting, clubs and other Commercial installations.
 - 3) Domestic: This schedule shall apply to private houses, hospitals run on Non-commercial lines, Government Schools (including Government Schools Hostels), Charitable Religious Institutions for Light, Fans, Radios, Domestic Heating and other household appliances including water pumps up to 2 HP.
 - 4) Life Line Consumer: BPL category consumer (Up to 2x40 W Bulbs only)
 - 5) Public Lighting and Water works: Streetlight and Public Pumping stations
 - 6) LT Industrial : This schedule shall apply to all Low Tension Industrial Motive Power Connections including water works/pumps with sanctioned load up to 120 HP.
 - 7) HT : This schedule shall apply to all Industrial/Commercial / Motive power/ Ferro Metallurgical / Steel Melting / Steel Rerolling / Power Intensive consumers drawing through 11 kV, 66 KV , 220 KV systems.
 - 8) HT and LT EV : This tariff schedule shall apply to consumers that have set up Public Charging Stations (PCS) in accordance with the technical norms/ standards/specifications laid down by the Ministry of Power, GoI and Central Electricity Authority (CEA) from time to time.
- DISCOM has 2344 Distribution transformers. There are in total 157106 registered consumers of the licensee as on 31.03.2023. 100% of the Licensee consumers are metered consumers. Out of its total consumer base, around 73.13

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% of the consumers are residential and agriculture consumers, 12.6 % are LIG & Public Lighting & Water Works Customer, 13.24% of them are industrial LT consumers and 1.04% of industrial/HT consumers.

- DISCOM has completed 100% metering at consumer end. DISCOM has also completed 100 % metering at DT level with communicable meters. DISCOM has plans to replace electronic meters to smart meter within stipulated time.
- The total connected/contracted load demand of licensee is 2154.5 MW; out of which 10.54% are under residential category and agriculture, 0.53% are LIG & Public Lighting & Water Works Customer, 13.64% of them are industrial & Commercial LT consumers and 75.28% of industrial/HT consumers.
- The input energy at DISCOM periphery for the FY2022-23 was 9772.33 MU out of which MU were metered and billed ; and 158.42 MU (~ 1.62%) was Distribution loss. The AT & C losses are 2.01 % as DISCOM is able to achieve 99.60% collection efficiency.

1.4 Critical Comments

Based on physical inspection of datasheets and invoice history, no variation in the input energy billed vs reported in proforma and output energy sold vs reported in proforma was found.

2 Background

2.1 About PAT under NMEEE

In 2008, Government of India announced 'National Action Plan on Climate Change (NAPCC), identifying eight missions to promote inclusive growth in the country. The National Mission for Enhanced Energy Efficiency (NMEEE) is one of the eight identified missions under.

NAPCC. One of the initiatives under NMEEE is Perform Achieve and Trade (PAT) scheme; which is a market-based mechanism having the objective to enhance energy efficiency (target based) in the country with an option to trade the additional energy savings, in the form of energy saving certificates. Bureau of Energy Efficiency (BEE) under Ministry of Power (MoP) is implementing this scheme in 13 energy intensive sectors namely- Thermal Power Plant, Aluminum, Pulp & Paper, Chlor- Alkali, Cement, Iron & Steel, Textile, Fertilizer, Refinery, Railways, DISCOM, Petro-chemical & Buildings.

In order to further widen the coverage of PAT scheme, in subsequent phases, it is required to bring in more DISCOM units/establishments under its ambit by increasing the number of designated consumers in already notified 13 energy intensive sectors.

2.2 Role of BEE

Role of BEE for formulation of Sector Specific Technical committee and finalization of Target setting methodology. Establishment of Energy Consumption Norms and Standards for DCs in consultation with Technical Committee. Conducting the Regional Workshops and guiding DCs regarding the PAT Scheme.

2.3 About DISCOM Sector

A healthy distribution sector is considered as the key to a financially viable power sector. One of the major challenges affecting the health of Indian distribution sector is the high aggregate technical and commercial (AT&C) losses. AT&C loss is the sum of technical loss and commercial loss. The technical loss occurs due to flow of energy into transmission and distribution network. Technological advancements could help in reduction of technical loss to an optimum level. As per international norms, the technical loss in a distribution system should be in the range of 4-5%.

On the other hand, the commercial loss is mostly man-made and occurs due to inefficient billing and collection of the energy supplied, illegal connections, theft, meter tampering, and pilferage, etc. The commercial loss is occurring mostly due to managerial issues and could be brought down to zero with efficient administrative practices. National aggregate technical and commercial losses stood at 22%. As long as AT&C losses continues to be in such a high range, it is difficult for the DISCOMs to be commercially viable.

In order to improve the energy efficiencies in the power system, State electricity Distribution Companies are included in PAT cycle II. DISCOMs having AT&C losses of 1000 Million Unit (MU) (Equivalent to 86000 MTOE) and above are notified as Designated Consumers (DCs) and targets were assigned to 44 DISCOMs for reducing the T&D losses under PAT Cycle-II. T&D losses is considered as performance matrix of electricity distribution companies under PAT.

As per the notification, which was formulated in consultation with the Bureau of Energy Efficiency (BEE), "All entities having issued distribution license by State/Joint Electricity Regulatory Commission under the Electricity Act, 2003..." are notified as DCs. After this notification, all DISCOMs will be governed under various provisions of the EC Act 2001, such as appointment of energy manager, energy accounting and auditing, identification of energy losses category-wise, and implementation of energy conservation and efficiency measures. With this, the number of DISCOM covered under the EC Act.2001 will increase from 44 to 103.

This decision will facilitate energy accounting and auditing as mandatory activity for all the DISCOM, leading to the actions towards reducing losses and increase their profitability. The amendment is expected to help DISCOMs to monitor their

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performance parameters and bring in transparency in the distribution sector through professional inputs, it added. It will also assist in developing projects for reducing the electricity losses by DISCOMs and implementing effective solutions.

The amendment is expected to improve the financial state of DISCOMs. The quarterly data of these DISCOMs will be collected and monitored by the government to suggest measures for increasing the efficiency and reduce the energy losses.

2.4 Period of Energy Auditing and accounting

Period of Energy accounting in this report is considered to be FY 22-23 i.e from 1st April 2022 till 31st March 2023.

The detailed energy audit site inspection and data verification exercise initiated from 25 Oct 2023 and was completed on 26 Oct 2023. Detailed description of day wise activity is mentioned in below table.

Date & Time	Activity	Description of Work Done
25-Oct-2023		
10:00	Arrival at Office	
10:30 till 11:30	Opening Meeting: Scope of work, timetable, and verification methodology	Meeting with concerned site engineers and officers, discussion on audit methodology and site support required
11:30 till 18:00	Substation visit and metering cross verification	Visit of import feeders at substations and physical site inspection.
18:30	End of Day 1	
26-Oct-2023		
10:00 till 17:00	Proforma and Data Verification	Verification of data filled in proforma and their source document at DISCOM office.
18:00	Closing Meeting	

3 Introduction of DISCOM [DNHDDPDCL]

3.1 Name and Address of Designated Consumer

Dadra and Nagar Haveli and Daman and Diu Power Distribution Corporation Limited

Office: 1st & 2nd Floor, Vidyut Bhavan, Next to Secretariat Building, 66KV Road, Dadra & Nagar Haveli and Daman & Diu – 396230

3.2 Name and details of energy manager and Authorized signatory of DISCOM

Energy Manager:

Mr. Satish Patel , Certified Energy Manager , EM -11542/22
DNHDDPDCL
Vidyut bhavan, DNH - 396230
(M 6357072764 (E) satishnaniipatel@torrentpower.com)

Nodal Officer:

Mr. Dharmesh Dave, General Manager- Distribution,
DNHDDPDCL
Vidyut bhavan, DNH - 396230
+91-9824750187, (E) dharmeshdave@torrentpower.com

3.3 About DISCOM

Torrent Power Limited is a leading integrated power utility in India with all-round experience in generation, transmission and distribution of power. Our operations are spread across the states of Gujarat, Maharashtra, Uttar Pradesh and Karnataka and UT of Dadra and Nagar Haveli and Daman and Diu.

TPL has aggregate operational generating capacity of 4160 MW with a unique mix of coal-based, gas-based, solar and wind power plants. TPL's advanced technology and efficient operations have enabled TPL to achieve new benchmarks in excellence in TPL generation as well as distribution assets. The licensed areas of Ahmedabad, Gandhinagar, Surat and Dahej SEZ and UT of Dadra and Nagar Haveli and Daman and Diu offer to its customers best-in-class power supply. TPL maintain a 24x7 power supply in their areas of operations and have phenomenal operational track record and customer service. TPL are currently focused on developing electricity supply infrastructure and streamlining operations at its licensed areas and franchised areas.

Through operational excellence and service, TPL licensed distribution utility was assessed as the first Indian power distribution company to achieve the prestigious 5-star rating in the health & safety audit conducted by British Safety Council, an independent body for workplace safety assessment. TPL is well-aligned to contribute as per the Sustainable Development Goals set out by the United Nations.

DNHDDPDCL has commenced operations in UT of Dadra and Nagar Haveli and Daman and Diu w.e.f. 01.04.2022. Therefore, Performance parameters for past period for DNHDDPDCL is not available. Number of consumers and Sales mix for FY 22-23 is depicted herein below: -

3.4 General Information

General Information				
1	Name of the DISCOM	Dadra and Nagar Haveli and Daman and Diu Power Distribution Corporation Limited (A subsidiary of Torrent Power Limited)		
2	i) Year of Establishment	2022		
	ii) Government/Public/Private	Private		
3	DISCOM's Contact details & Address			
i	City/Town/Village	Silvassa (DNH)		
ii	District	Dadra & Nagar Haveli (DNH)		
iii	State	DNHDD (UT)	Pin	396230
iv	Telephone		Fax	-
4	Registered Office			
i	Company's Chief Executive Name	Sh. Shailendrasingh Negi		
ii	Designation	Whole Time Director		
iii	Address	1st & 2nd Floor, Vidyut Bhavan, Next to Secretariat Building, 66 kV road, Silvassa		
iv	City/Town/Village	Silvassa (DNH)	P.O.	
v	District	Dadra & Nagar Haveli (DNH)		
vi	State	DNHDD (UT)	Pin	396230
vii	Telephone	9227231303	Fax	-
5	Nodal Officer Details*			
i	Nodal Officer Name (Designated at DISCOM's)	Sh. Dharmesh Dave		
ii	Designation	General Manager		
iii	Address	1st & 2nd Floor, Vidyut Bhavan, Next to Secretariat Building, 66 kV road, Silvassa		
iv	City/Town/Village	Silvassa (DNH)	P.O.	
v	District	Dadra & Nagar Haveli (DNH)		
vi	State	DNHDD (UT)	Pin	396230
vii	Telephone	9824750187	Fax	-
6	Energy Manager Details*			
i	Name	Satish Patel		

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ii	Designation	Assistant Manager	Whether EA or EM	EM
iii	EA/EM Registration No.	EM-11542/22		
iv	Telephone		Fax	-
v	Mobile	6357072764	E-mail ID	satishnanjipatel@torrentpower.com
7	Period of Information			
	Year of (FY) information including Date and Month (Start & End)	1st April -2022 to 31st Mach-2023		

4 Evaluation of Energy Management System

4.1 Energy accounts for previous years

DISCOM is carrying out energy audit for the first time, the energy accounting for each year will be on built in subsequent years.

4.2 Input Energy Detail

4.2.1 Source of Power Purchase

Below table describes source of power supply and their technical details

Table 1 Source of Power Purchase

Sr. No	Name of Generation Station	Contracted Capacity (In MW/MVA)	Type of Station Generation	Type of Contract	Type of Grid	Point of Connection (POC) Loss MU	Remarks
1	NTPC	Flexible	Coal	Long Term Contract	Inter-State	NA	
2	NPCIL-KAPS	Flexible	Coal	Long Term Contract	Inter-State	NA	
3	NPCIL-TAPS	Flexible	Coal	Long Term Contract	Inter-State	NA	
4	NSPCL	Flexible	Coal	Long Term Contract	Inter-State	NA	
5	RGGPL	Flexible	Any	Long Term Contract	Inter-State	NA	
6	Power Exchange	Flexible	Any	Short Term Contract	Inter-State	NA	
7	UI/DSM	Flexible	Renewable	Long Term Contract	Inter-State	NA	

4.2.2 Input Energy Feeder Wise

Below table describes quantum of energy injected by each power supplier in grid

Table 2 Input Energy Feeder Wise

S.No	Feeder ID	Feeder Name	Previous year(2021-22)				Current year(2022-23)		
			Meter S.No	CT/PT ratio	Import (MU)	Export (MU)	Meter S.No	Import (MU)	Export (MU)
B.1	NTPC	NTPC						6217.5	0
B.2	NPCIL-KAPS	NPCIL-KAPS						154.2	0
B.3	NPCIL-TAPS	NPCIL-TAPS						416.8	0
B.4	NSPCL	NSPCL						1138.6	0
B.5	RGGPL	RGGPL						3.1	0
B.6	Power Exchange	Power Exchange						2299.7	0
B.7	UI/DSM	UI/DSM						2.6	0
B.8	Solar	Solar						20.9	0
B.9	Transmission Loss	Inter State Transmission Loss						-278.9	0
B.10	Transmission Loss	Intra State Transmission Loss						-181.4	0

4.3 Infrastructure Details

4.3.1 Transformers and Feeders (Voltage level wise)

Below table describes installed capacity and infrastructure of power distribution available with DISCOM

Table 3 Power and Distribution Transformer Capacity

	Parameters	Total
1	Number of feeders	393
2	Number of DTs	2344

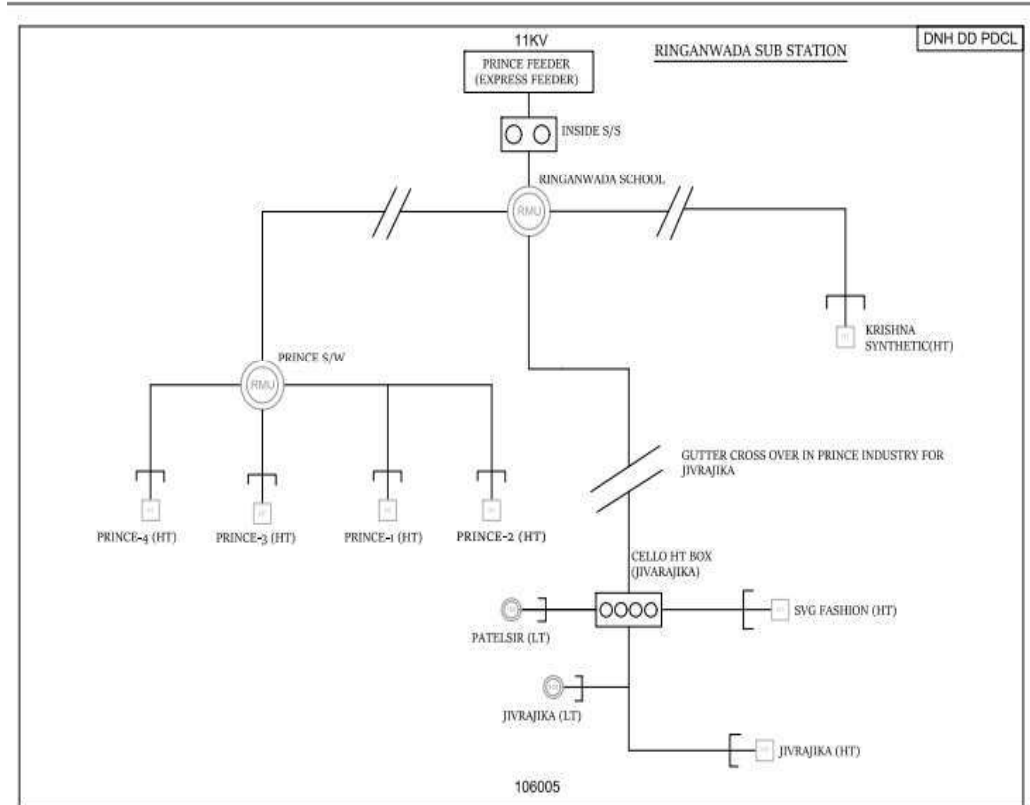
4.3.2 Number of feeders with line length and cable details

Table 4 Feeder and Cable Details

Voltage Level	No. of Feeder	Length of line (cKt. KM)	Type of cable	Cable Size (Sq mm)	Type (Over Head/ Underground)
11 kV	393	1246	XLPE/OHL	Various	Over Head/ Underground
LT Level	-	2331	XLPE/OHL	Various	Over Head/ Underground

4.3.3 Single Line Diagram

Whereas it is not possible to describe single line diagram of large network, sample SLD of individual substation in the network is as below.



4.3.4 Summary of Electrical Power Distribution Infrastructure

Form-Details of Input Infrastructure					
1	Parameters	Total	Covered during in audit	Verified by Auditor in Sample Check	Remarks (Source of data)
i	Number of circles	1	1	1	
ii	Number of divisions	1	1	1	
iii	Number of sub-divisions	NA			
iv	Number of feeders	393	6	6	Internal Data base
v	Number of DTs	2344	10	10	Internal Data base
vi	Number of consumers	157106	NA	NA	Internal Data base

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8	Sipat 2	27.64	29.20	28.40	27.17	27.66	25.39	22.86	25.99	26.99	27.62	12.69	20.90
9	KSTPS 3	19.32	13.16		13.39	20.14	19.33	19.79	18.75	18.71	18.71	16.89	17.44
10	Sipat 1	24.73	42.36	49.88	66.24	80.48	74.97	68.66	69.78	69.93	74.90	68.17	72.19
11	NSPCL	110.06	107.99	110.40	114.47	106.02	73.46	67.16	53.69	86.23	96.20	102.38	110.54
12	VSTPS 5	10.04	23.65	22.88	22.12	23.69	22.88	23.16	22.31	22.40	22.40	20.23	22.57
13	MSTPS 1	6.48	6.84	7.22	5.57	5.55	5.04	1.35	3.86	12.76	19.69	20.42	22.74
14	MST 2	44.09	43.65	46.36	31.77	24.55	28.98	7.89	20.21	30.57	36.27	41.96	40.07
15	SolSTPP	52.75	36.09	26.89	20.08	25.64	20.44	0.34	17.66	25.94	28.05	41.93	44.43
16	GSTPP	73.07	70.85	62.98	53.02	45.59	35.76	2.87	45.60	52.15	51.43	46.29	33.23
17	Lara	52.68	62.67	60.76	65.25	57.37	46.90	37.69	58.61	47.72	47.48	51.09	63.30
18	Khargone	29.97	46.48	47.67	17.29	15.62	17.80	1.09	12.51	18.96	28.16	21.28	30.02
19	KhSTPS2	2.89	3.23	3.31	3.35	2.84	2.12	0.87	2.61	1.64	1.93	2.72	2.52
	NTPC TOTAL -Sub-total-1	657.11	688.40	653.85	634.93	623.64	557.40	459.15	547.25	609.92	649.99	608.23	666.26
	NPICL SOURCES												
	KAPS	13.53	13.89	11.78	14.06	14.02	13.44	10.79	8.57	12.13	14.31	12.90	14.80
	TAPS 1 & 2	-	-					37.18	33.08	31.01	35.84	33.70	31.52
	TAPS 3 & 4	35.97	37.17	36.10	32.08	37.20	35.98						
2	NPICL Subtotal-2	49.49	51.05	47.88	46.14	51.21	49.42	47.97	41.65	43.14	50.14	46.60	46.32
3	Other Sources												
	Reactive Charges	-	-		-								
	RGPPPL (Gas)	1.90	1.21										
	POSOCO	-	-	-	-								
	Total (Other Sources)	1.90	1.21	-	-	-	-	-	-	-	-	-	-
4	Procurement from sources outside the state (U1=(1+2+3)	708.51	740.66	701.73	681.08	674.86	606.83	507.12	588.90	653.06	700.14	654.83	712.58
5	UI/DSM Purchase - U2	10.00	-1.00	3.59	2.51	2.78	1.18	2.46	3.40	2.28	2.22	2.08	-
6	Power Purchase through exchange - U3 (PTC)	137.31	132.70	158.95	163.34	183.48	243.79	308.92	233.67	219.94	178.03	166.17	199.60
7	Solar - U4	2.06	2.07	1.73	1.01	1.36	1.54	1.78	1.76	1.65	1.76	2.04	2.10
	U1+U2+U3+U4	857.87	874.42	866.01	847.93	862.48	853.33	820.27	827.73	876.93	882.15	825.12	914.29
8	Less: sale of surplus power	0.82	1.10	1.28	0.62	0.82	5.30	2.18	2.51	4.08	2.30	4.09	1.12
9	DSM				0.60	0.74	2.68	0.41	0.08	2.05	2.45	1.62	18.22
	U5	0.82	1.10	1.28	1.22	1.56	7.97	2.59	2.58	6.13	4.75	5.71	19.34
10	P actual (U1+U2+U3+U4-U5)	857.05	873.33	864.73	846.71	860.92	845.36	817.69	825.15	870.80	877.40	819.41	894.94

ARS Energy Auditors

4.5.2 Net Input Energy

It is the net energy at DISCOM periphery after adjusting the transmission losses and energy traded, renewable captive power off set after accounting.

Table 8 Net Input Energy

Unit	Year 2019-20	Year 2020-21	Year 2021-22	Year 2022-23
Million kWh	NA	NA	NA	9772

* Not applicable as DNHDDPDCL has commenced operations w.e.f. 01.04.2022.

4.5.3 Total Billed Energy

It is the Net energy billed to DISCOM consumers after offsetting renewable captive power.

Table 9 Billed Energy

Unit	Year 2019-20	Year 2020-21	Year 2021-22	Year 2022-23
Million kWh	NA	NA	NA	9613

* Not applicable as DNHDDPDCL has commenced operations w.e.f. 01.04.2022.

Table 10 Billed Energy (FY22-23)

Category-wise Sales (MUs) for FY 2022-23 (Mus)

Tariff Category	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Total
Industrial - HT	718.1	726.3	719.6	711.6	729.3	718.9	699.6	700.6	739.8	750.7	697.1	760.9	8672.5
Industrial - LT	42.2	47.4	44.3	41.6	44.7	46.3	40.8	41.1	45.5	46.3	41.8	43.6	525.5
Commercial - HT	0.3	0.1	0.6	0.6	0.5	0.6	0.7	0.5	0.6	0.5	0.5	1.9	7.4
Commercial - LT	9.7	7.5	6.0	9.5	8.7	7.3	8.0	7.0	6.9	6.9	7.1	8.1	92.7
Domestic - LT	35.3	25.6	26.2	29.5	27.9	25.8	26.5	20.6	20.3	19.2	20.7	25.8	303.5
Agriculture - LT	1.0	0.6	0.4	0.7	0.5	0.3	0.7	0.4	0.5	0.5	0.6	1.1	7.3
Public Lighting - LT	0.7	0.6	0.4	0.5	0.5	0.4	0.4	0.5	0.6	0.5	0.6	0.5	6.0
Public Water works - LT	0.6	0.3	0.3	0.5	0.3	0.3	0.5	0.2	0.3	0.4	0.3	0.4	4.3
EV Charging Station - HT	0.0	0.2	0.1	0.1	0.1	0.2	0.0	0.2	0.2	0.2	0.2	0.2	1.5
LIG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.1	1.2	2.6
EV Charging Station - LT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temporary	0.9	0.9	1.4	1.0	0.9	0.9	1.3	0.7	0.8	0.9	0.9	0.9	11.4
Total	808.8	809.4	799.2	795.5	813.5	800.9	778.5	771.8	815.4	826.3	770.8	844.7	9634.8

ARS Energy Auditors

4.5.4 Distribution loss

It is the total Distribution losses incurred for specific financial year.

Table 11 Distribution Loss Summary

Unit	Year 2019-20	Year 2020-21	Year 2021-22	Year 2022-23
Million kWh	NA	NA	NA	158.42
%	NA	NA	NA	1.62

** Not applicable as DNHDDPDCL has commenced operations w.e.f. 01.04.2022.*

Note : Distribution Loss in MUs = Net Input Energy at DISCOM periphery in Mus – Total Billed Energy in Mus
(both adjusted for Solar Generation within UT)

4.5.5 Category wise energy consumption

Sr No.	Year	Consumer Category *	No. of Consumer as on Mar 2023	Contract Demand (MW)	% Contract load	Energy sold MUs
1	2022-23	Residential	112419	218.8	10.2%	305.9
		Agricultural	2476	8.2	0.4%	7.3
		Commercial/Industrial-LT	20797	293.9	13.6%	626.4
		HT	1642	1622.0	75.3%	8680.7
		Others	19772	11.5	0.5%	14.5
		Total	157106	2154.5	100.0%	9634.8

* Including 1141 Nos of Temporary Consumers in respective categories.

4.5.6 Detailed Consumer Category wise Energy Consumption

Sr. No.	Type of Consumer	Category of Consumers (EHT/HT/LT/Others)	Voltage	No. of Consumers	Total Consumption in MU	Remarks
1	Domestic	LT	440 V	1,12,279	303.46	
2	Commercial	LT	440 V	15,446	92.74	
3	LIG/Kutirjyoti	LT	440 V	18,100	2.58	
4	Public Lighting	LT	440 V	1,080	6.05	
5	Agricultural Pumpsets	LT	440 V	2,472	7.29	
6	Industry	LT	440 V	4,361	525.48	
7	Public Water Work	LT	440 V	586	4.31	
8	EV Charging Station	LT	440 V	1	0.01	
9	HT/EHT consumers	HT/EHT	11/66/220 kV	1,639	8,679.94	
10	EV Charging Station	HT/EHT	11 KV	1	1.51	
11	Temporary Supply			1,141	11.42	
	Total			1,57,106	9,634.79	

4.5.7 Energy Consumption and reduction of losses details

- The DISCOM has around 1.62% Distribution loss. DNHDDPDCL follows the JERC order and tries to keep Distribution loss near technical level.
- DISCOM has an overall collection efficiency of 99.60% in FY22-23, which means there is not much difference in Distribution loss and A T & C losses.
- The overall A T & C loss of the DISCOM are considerable lower than that of the average A T & C loss benchmark of 20.66% (CEA Report, Oct 2020)

4.6 Energy Conservation Measures being taken by DNHDDPDCL:

DNHDDPDCL has implemented energy saving project which includes below

1. Solar rooftop installation at consumer end by providing net-meter facility.
2. Adoption of 3 & 4 Star rated distributed transformers.
3. Periodic visit to HT consumers and encouragement for energy conservation for DSM.

4.7 Energy Conservation Measures Recommended

Below are two measures recommended for improving technical losses as well improving energy accounting.

1. Replacement of old DTs (installed before 2014) in phase wise manner with BEE 4 star rated, IS 1180 labeled DTs. At present 4 star rated transformers ranging up to 2000 kVA are cost effective for replacement with life span of 25 years and with % loading between 35% and 50%, its simple payback period ranges between 7 and 10 years. It has been noticed that DNHDDPDCL is aware of star rated transformers and are currently identifying immediate replaceable DTs.
2. Replacement of static electronic meters with digital smart meters at consumer end. It is noticed that DNHDDPDCL is aware about the technology is planning to replace conventional meters in phase wise manner.
3. DNHDDPDCL to continue the periodic checking of retail consumer energy meter to find out the losses due to meter tamper/ error.
4. Battery Storage at DISCOM level
5. Solar Rooftop Installations at DISCOM Premises wherever feasible.

5 Inclusions & Exclusions

It is to be noted that no inclusion and exclusion are made in the report data provided by DNHDDPDCL during the FY22-23

6 Critical Analysis

DNHDDPDCL has started operating with effect from 01.04.2022 and carried out commendable activities. It is observed that Distribution loss of DISCOM for FY 22-23 is 1.62% and has reached saturation. There is no room for further improvement in the losses. However, energy accounting can be further improved by replacement of consumer meters with smart meters at judicious locations and nullifying or offsetting meter errors. Also, Consumer Indexing should be completed at the earliest.

7 Measuring Equipment and Instrument Calibration

Not Available

Annexures

Annexure- I Introduction of Verification Team

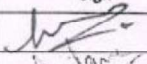
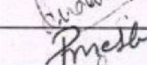
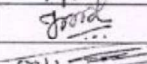
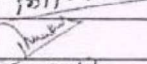
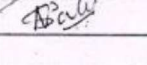
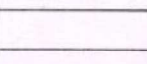
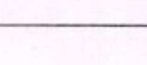
Company/ Institution/ Organization	Team Member	Designation	Role
ARS ENERGY AUDITORS	Mr. Sachin Deshpande	Accredited Energy Auditor	Project head, review of data and report
	Mr. Bhaskar N. Rawal	Sector Expert	Review of data and report
	Mr. Narayan Amzare	Certified Energy Auditor	Field visit inspection, document verification and report writing
	Mr. Pavan Sharma	Senior Consultant	Field visit inspection, document verification and report writing
	Mr. Jitendra Vyas	Certified Energy Manager	Field visit inspection, document verification and report writing
	Mr. Anant Kulkarni	Team Member	Field visit inspection, document verification and report writing
	Mr. Janardhan khade	Team Member	Field visit inspection, document verification and report writing

Annexure- II Minutes of Meeting with the DISCOM team

MINUTES OF MEETING		
	Dadra and Nagar Haveli and Daman and Diu Power Distribution Corporation Limited. 1st & 2nd Floor, Vidyut Bhavan, Next to Secretariat Building, 66 kV road, Silvassa - 396230	Date: 26-Oct-2023
	ARS Energy Auditors	Revision : NA

Topic		Annual Energy Audit of DNHDDPDCL License Area for FY 2022-23			
Meeting Details					
Date	26-Oct-23	Time	18:00	Venue	Conference Room, First Floor, Silvassa
DNHDDPDCL	1.Mr. Shailendrasingh Negi 2 Mr Dharmesh Dave 3.Mr. Jitesh Jariwala 4.Mr. Pranav Mehta			5.Mr. Mukesh Pawar 6 Mr. Mikul Joshi 7.Mr. Satish Patel	
Consultant Team	1.Mr. Sachin Deshpande (AEA) 2.Mr. Bhaskar N. Rawal (Sector Expt) 3.Mr. Pavan Sharma			4.Mr. Narayan Amzare (CEA) 5.Mr. Jitendra Vyas (CEM) 6.Mr. Anant Kulkarni 7.Mr. Janardhan khade	
<p>Meeting involved detailed discussion on the infrastructure details of DNHDDPDCL and scope of work including activities to be undertaken for the completion of Annual Energy Audit of DISCOM for FY 2022-23. Following points were discussed/reviewed/performed:</p> <ol style="list-style-type: none"> 1. Data provided by DNHDDPDCL in the Annual Energy Accounting Form 2. The Consultant verified the purchase energy, billed energy, transmission loss, billed amount, collected amount, T & D loss. 3. The Consultant verified the category wise number of consumers, connected load, billed energy 4. The Consultant verified the infrastructure details such as number of DT substations, number of voltage wise feeders etc. 5. Sample field measurements for physical meter verification 6. Input Energy is considered from 11 KV lines. 7. All data which is being maintained by the DNHDDPDCL has been collected as per the Annual Energy Accounting Form and sample measurements have been completed. 8. Some modification in proforma of annual energy accounting sheet is requested from BEE end so as to accommodate the data specific to DNHDDPDCL network. Consultant will write to BEE regarding the same and request to customize the proforma accordingly. 					

Signed on behalf DNHDDPDCL

Dadra and Nagar Haveli and Daman and Diu Power Distribution Corporation Limited			
Attendance sheet of the meeting with ARS team			26-10-2023
Sr. No	Name	Designation	Sign
1	Mr. Shailendrasingh Negi	Whole Time Director	
2	Mr. Dharmesh Dave	General Manager	
3	Mr. Pranav Mehta	Assistant General Manager	
4	Mr. Jitesh Jariwala	Manager	
5	Mr. Mukesh Pawar	Manager	
6	Mr. Mukul Joshi	Manager	
7	Mr. Satish Patel	Assistant Manager	
8			
9			
10			

Signed on behalf of ARS Energy Auditors

Sr. No	ARS	Name of person	Positions	signature
1	ARS	Shri. Sachin S. Deshpande	BEE-Accredited Energy Auditor (AEA-0261), M.Tech. Energy, B.E. Mechanical Engg., A.M.I.E. In Electrical Engg. Chartered Engineer	
2	ARS	Shri. Bhaskar N. Raval	Sector Expert Former Chief Electrical Inspector Gov. of Gujarat & Chief Engineer- GETCO	
3	ARS	Shri. Pavan Sharma	Electrical Engineer Energy analyst & Energy Engineer	
4	ARS	Shri. Narayan Amzare	B.E. Electronic and Power Retired Superintending Engineer MSEDCL Certified Energy Auditor	
5	ARS	Shri. Jitendra Vyas	B.E. Electrical Engineering Certified Energy Manager	
6	ARS	Shri. Anant Kulkarni	B.S. Power Engineering Sr. Energy Engineer	
7	ARS	Shri. Janardhan Khade	Diploma in Electrical Engineering Sr. Consultant	

Annexure- III Check List prepared by auditing Firm

Parameter	Primary Documents from where the information can be sourced and to be kept ready for verification by Accredited Energy Auditor (Annual for FY 22-23)	Data Provided by DNHDDPDCL
Detailed expenditure report	Annual Reports	Internal data provided by company
Details of purchased energy	Power purchase bills, SLDC documents, energy accounts, Audit statement, petition	Utility Bills from DNHDDPDCL
Transmission loss %	Calculation of transmission loss viz difference in total energy purchased and total energy drawl at distribution periphery.	Calculation Sheet
Transmission loss in (MU) Energy sold outside the periphery, Open access sale, EHT Sale	Energy accounting statements	Statement
Net input energy(received at DISCOM periphery, after adjustment) in MU	GIS Database	Statement
Energy input details meter wise, with other mentioned details	SLDC document, meter log	SLDC Statement
Summary of Circle wise Loss Number of metered consumers and connected load, category wise of each circle Number of un-metered consumers and connected load, category wise of each circle	Statements, Database	MIS
Circle wise input Energy for billed meter energy and billed un-metered energy	Meter logs through which input energy of circle was computed. Un-metered energy with reference of calculation should be maintained	MIS

Annexure- IV Brief Approach, Scope & Methodology for audit

Annual Energy Audit shall have verification of:

- a) Existing pattern of energy distribution across periphery of the company;
- b) Accounted energy flow submitted by the company at all applicable voltage levels of the distribution network,—
 - (i) Energy flow between 11 kV feeders and distribution transformers
 - (ii) Energy flow between Feeder to end-consumer
 - (iii) Energy flow between 11 kV/0.44 kV directly to consumer

Auditor, in consultation with the nodal officer of the company shall:

- (i) The energy audit shall be conducted strictly as per BEE guidelines for DISCOM audit.
- (ii) Agree on best practice procedures on accounting of energy distributed across the network
- (iii) Collect data on energy received, and distributed, covered within the scope of energy audit.

Auditor shall:

- (i) Verify the accuracy of the data collected in consultation with the nodal officer of the company as per standard practice to assess the validity of the data collected;
- (ii) Analyse and process the data with respect to—
- (iii) Consistency of data monitoring compared to the collected data;
- (iv) Recommendations to facilitate energy accounting and improve energy efficiency;
- (v) With respect to the purpose of energy accounting in reducing losses for the company.

Prioritization and preparation of action plan:

- Report shall include following activities, namely:—
- Data collection and verification of energy distribution:
- Monthly energy consumption data of consumers and system metering from the company at following voltage levels —
- 11kV level feeders of Sub-stations;
- 440 V level, including Distribution Transformer and low tension consumer;
- Input energy details for all metered input points;
- Source of energy supply (e.g. electricity from grid or self-generation), including generation from renewables.
- Review of the current consumption practices in order to identify the energy loss in the system;
- Data verification, validation and correction:
- A monitoring and verification protocol to quantify on annual basis the impact of each measure with respect to energy conservation and cost reduction for reporting to Bureau and the concerned State designated agency;
- Verification and correction of input energy, taking into account the following —
- Recorded system meter reading by metering agency;
- Verify and validate the system metering data provided by metering agency through random field visit (particularly for data irregularity).

ARS Energy Auditors

METHODOLOGY

- Auditor shall depute a team of experts for conducting the evaluation / audit and shall work in close association with DISCOM.
- Auditor shall submit an execution work plan for the assignment for which relevant data support will be provided by DISCOM.
- Auditor will arrange meeting and provide presentation on overview, roadmap, scenario and results of the assignment to various plant heads / operational staff / engineering staff.

Annexure- V Power Purchase Detail (Sample Power Purchase bills)

न्यूक्लियर पावर कॉर्पोरेशन ऑफ इंडिया लि.
(भारत सरकार का उद्यम, परमाणु ऊर्जा विभाग)

काकरापार गुजरात स्थल
पोस्ट-अनुमाला, जि-सूरत, गुजरात - 394 651

वित्त एवं लेखा अनुभाग
आईएसओ-9001, आईएसओ-14001 और
आईएसओ-45001 प्रमाणित संगठन



www.npcil.nic.in

NUCLEAR POWER CORPORATION OF INDIA LTD.
(A Government of India Enterprise, Department of Atomic Energy)

KAKRAPAR GUJARAT SITE
PO-Anumala, Dist-Surat, Gujarat - 394 651

FINANCE & ACCOUNT SECTION
AN ISO-9001, ISO-14001 AND ISO-45001
CERTIFIED ORGANISATION

GSTN : 24AAACN3154F1ZW

CIN : U40104MH1987GOI149458

PAN : AAACN3154F

To,
General Manager (F&A),
DNH and DD Power Distribution Co. Ltd.,
Vidyut Bhavan, Next to Secretarial Building,
66KV Road, DNH and DD- 396 230
GSTN: 26AAJCD1268K1ZF PAN: AAJCD1268K

Bill No. 350067	Date 4-Jan-23
-----------------	---------------

Product Electrical Energy
HSN No. 27160000

Bill of Supply for the month : Dec-22

Energy Supplied based on REA No.WRPC/Comml-I/3/ABTREA/2022/12 Dt.03-Jan-2023 (Kwh)		12133966
Tariff Rate Details :		(₹/kWh)
		Amount Rs.
i) Tariff as per Notification No.408/3/2020-Power/9334 dated 12-Aug-21	2.2765	2 76 22 974
ii) Fuel adjustment charges	-0.1919	- 23 28 508
iii) HW Makeup adjustment charges	0.0168	2 03 851
iv) HW Lease adjustment charges	0.0340	4 12 555
v) Additional charge for Heavy Water	0.0000	0
vi) Self Insurance Fund	0.0150	1 82 009
vii) Levy Nuclear Liability Fund	0.0500	6 06 698
viii) Decomm. Levy Adjustment	0.0000	0
ix) Return on Equity Adjustment	0.0000	0
x) Insurance charges	0.0591	7 17 117
Total	2.2595	2 74 16 696

Rupees Two Crore SeventyFour Lakh Sixteen Thousand Six Hundred NinetySix Only

Note:

- 1) Rebate under Special Incentive Scheme (SIS) is allowable only if relevant conditions as stipulated therein are met with.
- 2) For delayed payments, Delayed Payment Charges (DPC) @ 15% per annum compounded quarterly will be levied from the last day of the month following the month in which bill is raised (i.e. from 01-Mar-2023).

Rebate Calculation

Admissible tariff for Rebate (₹/kwh)	Energy supplied (Kwh)	Rebatable bill ₹
2.1745	12133966	2 63 85 309
Payment Period:	Rebate (%)	Rebate (₹)
If paid from bill date to last day of Jan-23	2.50%	6 59 633

Certified that :

- 1 Bill is prepared as per REA account referred to above.
- 2 The rate charged is as per Notification No.408/3/2020-Power/9334 dated 12-Aug-21

Details of Letter of Credit (LC)

Rs.309.53 Lakh, AXIS Bank
No.1530LCO-0008234 & 1530LCO-0008238
Valid upto 29-Mar-23

BANK DETAILS:

STATE BANK OF INDIA, OVERSEAS BRANCH, MUMBAI (BR. CODE:4791)
ACCOUNT NO.10937612405, MICR CODE:400002063, IFS CODE:SBIN0004791

(Authorised Signatory)

Payment details please be intimated by e-mail: yogeshagarwal@npcil.co.in, hiteshdesai@npcil.co.in
Phone Nos. 02626-230566, 230459 Fax No.02626-234266/268 Tel Fax No.02626-230233

निगम कार्यालय : विक्रम साराभाई भवन, अणुशक्तिनगर, मुंबई-400 094
Corporate Office : Vikram Sarabhai Bhavan, Anushaktinagar, Mumbai-400094
पंजीकृत कार्यालय : सेंटर-१, १६वां दिश्व व्यापार केंद्र, कफ परेड, कोलाबा, मुंबई-400 095
Register Office : Center-1,16th Floor, World Trade Center, Cuffe Parado, Colaba, Mumbai-400 095

NUCLEAR POWER CORPORATION OF INDIA LTD(A Government of India Enterprise)
TARAPUR ATOMIC POWER STATION
GSTIN. 27AAACN3154F1ZQ**Bill of Supply for Jul'2022**

Bill No 122RB6604

Bill Date 03/08/2022

DNH AND DD POWER DIST CORP LTD
1st and 2nd Floor Vidyut Bhavan, Next to Secretariat
Building 66 kv Road, Silvasa DNH 396230
SILVASA-396230
GSTIN.

Attention Shri Jitendra Patel, General Manager

Due Date 30/08/2022

UNIT DETAILS

Unit	Product Description	HSN No.	KWHs	Rate(Rs.)	Amount(Rs.)
TWIN UNIT 3&4 - TAPP	Electrical Energy	27160000	32080478	3.3952	108920826
Total(Rs):					108,920,826


GROSS BILL AMOUNT (Rs)

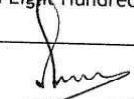
108,920,826

Amount in Words

Rupees Ten Crore Eighty Nine Lakh Twenty Thousand Eight Hundred And Twenty Six Only


Prepared By


Reviewed By 3/8/22


Bill Signatory
Website: www.npcil.nic.in Corporate identification Number (CIN) - U40104MH1987GOI149458
Office Address: TARAPUR MAHARASHTRA SITE PO TAPP TAL PALGHAR DIST PALGHAR MAHARASHTRA - 401504

COPY TO

NPICL CONTACT DETAILS

UNIT		HEAD OFFICE	
Name	U B Mohapatra	Name	Smt Shiny Nelson
Desig	Addl Gen Mgr (F&A)	Desig	DGM (F&A) Commercial
Address	TARAPUR ATOMIC POWER STATION 1 TO 4 PO TAPP, VIA BOISAR, DIST PALGHAR, MAHARASHTRA 401 504	Address	Nuclear Power Corporation of India Ltd. 8TH FLOOR VS BHAVAN ANUSHAKITI NAGAR MUMBAI 40094
Fax	02525 244014	Fax	022 2599 2839
Phone	02525 244014	Phone	022 2599 2837
EEmail	ubmohapatra@npcil.co.in	EEmail	shiny_nelson@npcil.co.in



एनटीपीसी-सेल पावर कंपनी लिमिटेड

(एनटीपीसी और सेल का संयुक्त उपक्रम)

NTPC-SAIL Power Company Limited

(A joint venture of NTPC & SAIL)

CIN : U74899DL1999PLC098274, GSTIN : 22AABCN5467A1ZX, HSN : 27160000

Energy Bill Period 01.05.2022 - 31.05.2022

Bill No. 6300308

Bill Date 03.06.2022

Beneficiary DNHDDPDCL (DNH)

GSTIN Of Beneficiary 26AAJCD1268K1ZF

Station Bhilai PP 3

Ack. No.:

Ack. Date:

IRN No. :

S.No	Description	Unit	Rate	Cumulative Amount (Rs.)	Claimed Amount (Rs.)	Net Amount (Rs.)
1	Capacity Charges	Cr.(Rs)/Yr	501.831	167,276,866.00	83,638,433.00	83,638,433.00
2	Incentive Amount of beneficiary	Rs.		7,794,617.00	4,757,237.00	3,037,380.00
3	URS Amount of beneficiary	Rs.		91,470.00		91,470.00
4	Energy Charge Rate (ECR)	Rs./kwh	2.805			
5	Energy Charges	Rs.		334,662,637.00	154,963,500.00	179,699,137.00
6	Electricity Duty/Cess/Taxes	Rs./kvah				
7	Electricity Duty on APC	Rs./kwh	0.622	7,780,221.00	4,077,705.00	3,702,516.00
8	Other Charges	Rs.		496,331.00	468,169.00	28,162.00
9	Total	Rs.		518,102,142.00	247,905,044.00	270,197,098.00
10	Rebate(-)	Rs.				
11	Surcharge(+)	Rs.				
12	Other Adjustment	Rs.		9,425,397.00	8,907,341.00	518,056.00
13	Sharing of benefits	Rs.		31,180,158.00-	2,965,518.00-	28,214,640.00-
14	Sharing of Gains via Power Trading	Rs.				
15	Net Amount	Rs.		496,347,381.00	253,846,867.00	242,500,514.00

Two Hundred Forty-Two Million Five Hundred Thousand Five Hundred Fourteen And Zero INR

पंजीकृत केन्द्रीय कार्यालय : चतुर्थ तल, एनटीपीसी टावर, 15, भिकाजी कामा प्लेस, नई दिल्ली - 110066
 दूरभाष / Tel: 011-26717378-79-80-82, 26172273/ Fax: 011-, 26717364, 26717365, 26717366, 26717381
 Registered Corporate Office: 4th Floor, NBCC Tower, 15 Bhikaji Cama Place, New Delhi-110066

Annexure- VI List of Parameters arrived through calculation or formulae with list of documents as source of data

S.No.	Data	Unit	Sources of data
1	Input Energy Purchased	MUs	Monthly Electricity bills of DNHDDPDCL
2	Transmission Loss	%	MYT Petition/Order and records available on public domain
3	Energy sold outside the periphery	MUs	SAP Statement
5	sales	MUs	SAP Statement
6	% of metering available at DT	%	Internal Data base
7	% of metering available at consumer end	%	Internal Data base
9	No of feeders at 11kV voltage level	Nos.	Internal Data base
11	Line length (ckt. km) at 11kV voltage level	Km	Internal Data base
12	Line length (km) at LT level	Km	Internal Data base
13	HT/LT ratio		Internal Data base
14	Feeder wise Import Energy	MUs	Internal Data base
15	Nos. of Consumers	Nos.	True up Data
16	Connected Load of Consumers	MW	Statement
17	Input Energy	MUs	Monthly Electricity bills
18	Consumer wise Billed Energy	MUs	internal data base
19	Distribution Loss	MUs	Internal data base
20	Distribution loss	%	Internal data base