Annexure-I

List of Transmission Licensees as on 31.03.2025

S. No.	Name of Licensee	Date of grant of licence
1	Powerlinks Transmission Ltd.	13.11.2003
2	Torrent Power Grid Ltd	16.05.2007
3	Jaypee Powergrid Ltd	01.10.2007
4	Essar Power Transmission Company Ltd.	10.04.2008
5	Parbati Koldam Transmission Company Ltd	15.09.2008
6	Western Region Transmission (Maharashtra) (P) Ltd	30.12.2008
7	Western Region Transmission (Gujrat) (P) Ltd	30.12.2008
8	Teestavalley Power Transmission Ltd	14.05.2009
9	North East Transmission Company Ltd	16.06.2009
10	East - North Inter - Connection Company Ltd.	28.10.2010
11	Talcher - II Transmission Company Ltd.	08.11.2010
12	Cross Border Power Transmission Company Ltd	01.12.2010
13	North Karanpura Transmission Company Ltd.	16.12.2010
14	Jindal Power Ltd	09.05.2011
15	Raichur Sholapur Transmission Company Ltd	24.08.2011
16	Jabalpur Transmission Company Ltd	12.10.2011
17	Bhopal Dhule Transmission Company Ltd	12.10.2011
18	Powergrid NM Transmission Ltd	20.06.2013
19	Torrent Power Ltd	16.07.2013
20	Adani Transmission (India) Ltd	29.07.2013
21	Aravali Power Co. Ltd.	07.11.2013
22	Kudgi Transmission Ltd	07.01.2014
23	Powergrid Vizag Transmission Ltd	08.01.2014
24	Darbhanga - Motihari Transmission Company Ltd	30.05.2014
25	Purulia & Kharagpur Transmission Company Ltd	30.05.2014
26	Patran Transmission Company Ltd	14.07.2014
27	Powergrid Unchahar Transmission Ltd	21.07.2014
28	RAPP Transmission Company Ltd	31.07.2014
29	NRSS XXXI (B) Transmission Ltd	25.08.2014
30	Powergrid Kala Amb Transmission Ltd	04.09.2014
31	NRSS XXIX Transmission Ltd (Sterlite)	14.11.2014
32	Powergrid Jabalpur Transmission Ltd	15.06.2015
33	Powergrid Parli Transmission Ltd	10.07.2015
34	POWERGRID Warora Transmission Ltd	05.08.2015

35	Maheshwaram Transmission Ltd	23.11.2015
36	Raipur-Rajandgaon-Warora Transmission Ltd	29.02.2016
37	Chhattisgarh-WR Transmission Ltd	29.02.2016
38	Sipat Transmission Ltd	07.03.2016
39	POWERGRID Southern Interconnector Transmission System Ltd	14.03.2016
40	Alipurduar Transmission Ltd	21.03.2016
41	Odisha Generation Phase-II Transmission Ltd	30.06.2016
42	Gurgaon Palwal Transmission Ltd	29.09.2016
43	Warora-Kurnool Transmission Ltd	29.09.2016
44	North Karanpura Transco Ltd	29.09.2016
45	Khargone Transmission Ltd	17.11.2016
46	NRSS XXXVI Transmission Ltd	07.12.2016
47	NER-II Transmission Ltd	20.06.2017
48	Powergrid Medinipur Jeerat Transmission Ltd	20.06.2017
49	Kohima-Mariani Transmission Ltd	10.07.2017
50	Powergrid Mithilanchal Transmission Limited	24.04.2018
51	Goa - Tamnar Transmission Project Ltd	13.07.2018
52	Fatehgarh-Bhadla Transmission Ltd	27.08.2018
53	Powergrid Varanasi Transmission Ltd (WR-NR Power Transmission Ltd)	27.08.2018
54	Powergrid Khetri Transmission System Limited	19.12.2019
55	Bikaner-Khetri Transmission Limited	27.12.2019
56	Udupi Kasargode Transmission Limited (UKTL)	24.01.2020
57	WRSS XXI (A) Transco Limited	24.01.2020
58	Power Grid Bhuj Transmission Limited (PBTL)	03.03.2020
59	Lakadia Banaskantha Transco Limited	03.03.2020
60	Powergrid Ajmer Phagi Transmission Limited (PAPTL)	04.03.2020
61	Powergrid Fatehgarh Transmission Limited (PFTL)	04.03.2020
62	Lakadia Vadodara Transmission Project Limited (LVTPL)	04.03.2020
63	Jam Khambhaliya Transco Limited	24.03.2020
64	Vapi-II North Lakhimpur Transmission Limited	01.04.2021
65	Powergrid Ramgarh New Transmission Limited	31.05.2021
66	Powergrid Bikaner Transmission System Limited	15.07.2021
67	Powergrid Kala Amb Transmission Ltd (RTM Route)	22.03.2022
68	Koppal-Narendra Transmission Limited	28.03.2022
69	Powergrid Sikar Transmission Limited	27.05.2022
70	POWERGRID Aligarh Sikar Transmission Limited	28.05.2022
71	Karur Transmission Limited	16.06.2022
72	Khavda-Bhuj Transmission Limited	16.06.2022
73	Kallam Transmission Limited	18.07.2022
74	POWERGRID Southern Interconnector Transmission Ltd (RTM	18.07.2022

	Route)	
75	Gadag Transmission Limited	18.07.2022
76	Nangalbibra-Bongaigaon Transmission Limited	28.07.2022
77	Rajgarh Transmission Limited (RTL)	13.09.2022
78	Warora Kurnool Transmission Limited (RTM Route)	13.09.2022
79	Khetri-Narela Transmission Limited	26.09.2022
80	POWERGRID Bikaner Transmission System Limited (RTM Route)	21.11.2022
81	Power Grid Bhadla Transmission Limited,	25.11.2022
82	POWERGRID Neemuch Transmission System Limited,	27.12.2022
83	Khandukhal Rampura Transmission Limited	27.01.2023
84	POWERGRID ER NER Transmission Limited	04.02.2023
85	Gadag II-A Transmission Limited	26.02.2023
86	WRSR Power Transmission Limited	17.04.2023
87	Kishtwar Transmission Limited	12.05.2023
88	Patran Transmission Company Limited (RTM route)	13.06.2023
89	POWERGRID ERWR Power Transmission Limited	31.07.2023
90	Khavda II-C Transmission Limited	31.07.2023
91	POWERGRID Dharamjaigarh Transmission Limited	31.07.2023
92	POWERGRID KPS2 Transmission Limited	04.08.2023
93	Khavda II-A Transmission Limited	09.08.2023
94	POWERGRID Khavda RE Transmission System Limited	17.08.2023
95	POWERGRID Khavda II-B Transmission Limited	22.08.2023
96	POWERGRID Raipur Pool Dhamtari Transmission Limited	23.08.2023
97	POWERGRID Bhadla Sikar Transmission Limited	30.08.2023
98	POWERGRID KPS3 Transmission Limited	31.08.2023
99	KPS1 Transmission Limited	30.09.2023
100	NRSS XXIX Transmission Limited (RTM Mode)	01.11.2023
101	POWERGRID Bikaner Transmission System Limited	28.01.2024
102	Fatehgarh III Transmission Limited	28.01.2024
103	Fatehgarh IV Transmission Limited	30.01.2024
104	POWERGRID Bhadla III Transmission Limited	29.02.2024
105	POWERGRID Ananthpuram Kurnool Transmission Limited	29.02.2024
106	Beawar Transmission Limited	02.03.2024
107	Fatehgarh III Beawar Transmission Limited	05.03.2024
108	Kallam Transmission Limited	06.04.2024
109	POWERGRID Bikaner Neemrana Transmission Ltd	13.04.2024
110	POWERGRID Beawar Dausa Transmission Ltd	13.04.2024
111	POWERGRID Vataman Transmission Ltd	13.04.2024
112	POWERGRID Ramgarh II Transmission Limited	13.04.2024
113	TP Bikaner III Neemrana II Transmission Limited	15.04.2024
114	POWERGRID Ramgarh Transmission Limited	15.04.2024

115	Neemrana II Kotputli Transmission Limited	22.04.2024
116	Neemrana II Bareilly Transmission Limited	22.04.2024
117	Gurgaon Palwal Transmission Limited	22.04.2024
118	Butwal-Gorakhpur Cross Border Power Transmission Ltd	25.04.2024
119	POWERGRID KPS3 Transmission System Limited	03.05.2024
120	Halvad Transmission Limited	24.05.2024
121	POWERGRID Sikar Khetri Transmission Limited	28.05.2024
122	Fatehgarh IV Transmission Limited	28.05.2024
123	Karera Power Transmission Limited	28.05.2024
124	Khavda- Bhuj Transmission Limited	06.06.2024
125	Koppal-Narendra Transmission Limited	13.06.2024
126	Gadag Transmission Limited	13.06.2024
127	Pachora Power Transmission Limited	15.06.2024
128	Solapur Transmission Limited	23.06.2024
129	Warora Kurnool Transmission Limited	24.06.2024
130	Ishanagar Power Transmission Limited	25.06.2024
131	KPS1 Transmission Limited	04.07.2024
132	POWERGRID Parli Transmission Limited	15.07.2024
133	Koppal II Gadag II Transmission Limited	26.07.2024
134	Dhule Power Transmission Limited	09.08.2024
135	POWERGRID Ramgarh Transmission Limited	13.08.2024
136	WRSS XXI (A) Transco Limited	26.08.2024
137	NERES XVI Power Transmission Limited	10.09.2024
138	POWERGRID KPS2 Transmission System Limited	17.09.2024
139	Kallam Transco Limited	19.09.2024
140	POWERGRID Ananthpuram Kurnool Transmission Limited	30.09.2024
141	POWERGRID Bidar Transmission Limited	15.10.2024
142	POWERGRID Khavda IV-E2 Power Transmission Limited	11.11.2024
143	Sirohi Transmission Limited	25.11.2024
144	Bhadla-III Power Transmission Limited	15.12.2024
145	Khavda IVA Power Transmission Limited	27.12.2024
146	Tumkur- II REZ Power Transmission Limited	02.01.2025
147	POWERGRID Bhadla Bikaner Transmission Limited	14.01.2025
148	Khavda IV C Power Transmission Limited	14.01.2025
149	POWERGRID Beawar - Mandsaur Transmission Limited	31.01.2025
150	POWERGRID Bhadla III Transmission Limited	31.01.2025
151	Rajasthan IV C Power Transmission Limited	08.02.2025
152	POWERGRID Neemuch Transmission System Limited	14.02.2025
153	Rajasthan IV E Power Transmission Limited	14.02.2025
154	Rajasthan IV A Power Transmission Limited	14.02.2025
155	POWERGRID Vataman Transmission Limited	21.02.2025

156	POWERGRID Bikaner Neemrana Transmission Limited	05.03.2025
157	Karur Transmission Limited	12.03.2025
158	Khavda IVA Power Transmission Limited	14.03.2025
159	POWERGRID Ramgarh Transmission Limited	19.03.2025
160	POWERGRID Jam Khambhaliya Transmission Limited	21.03.2025
161	POWERGRID Kurawar Transmission Limited	25.03.2025
162	Barmer I Transmission Limited	26.03.2025
163	Khavda PS1 and 3 Transmission Limited	26.03.2025
164	KHAVDA V-A Power Transmission Ltd	26.03.2025
165	POWERGRID Siwani Transmission Limited	26.03.2025
166	POWERGRID Bikaner Transmission System Limited	27.03.2025

Annexure-II

List of Trading Licensee as on 31.03.2025

Sr. No.	Name of Trading Licensee	Date of Issue of License	Category of License
1	Tata Power Trading Company Ltd	09.06.2004	I
2	Powerpulse Trading Solutions Ltd	09.06.2004	I
3	PTC India Ltd.	30.06.2004	I
4	NTPC Vidyut Vyapar Nigam Ltd	23.07.2004	I
5	National Energy Trading & Services Ltd	23.07.2004	III
6	Instinct Infra & Power Ltd	07.09.2005	IV
7	JSW Power Trading Company Ltd.	25.04.2006	IV
8	Greenko Energies (P) Ltd	22.01.2008	III
9	Ambitious Power Trading Company Ltd	16.09.2008	IV
10	RPG Power Trading Company Ltd	23.09.2008	II
11	GMR Energy Trading Ltd	14.10.2008	I
12	Knowledge Infrastructure Systems (P) Ltd	18.12.2008	IV
13	Kreate Energy (I) (P) Ltd.	12.02.2009	II
14	Shree Cement Ltd	16.03.2010	IV
15	ABJA Power (P) Ltd.	26.04.2011	III
16	Customised Energy Solutions India (P) Ltd	08.06.2011	V
17	Statkraft Markets (P) Ltd	21.06.2012	I
18	Manikaran Power Ltd	29.06.2012	I
19	Arunachal Pradesh Power Corporation (P) Ltd	11.09.2012	II
20	Vedprakash Power (P) Ltd.	19.08.2013	IV
21	Solar Energy Corporation of India	01.04.2014	I
22	Saranyu Power Trading (P) Ltd	10.02.2015	III
23	Gita Power & Infrastructure (P) Ltd	20.10.2015	V
24	Phillip Commodities India (P) Ltd.	21.01.2016	IV
25	Atria Energy Services (P) Ltd	20.06.2017	V
26	NHPC Limited	23.04.2018	I
27	NLC India Ltd.	13.07.2018	I
28	Refex Energy Ltd.	30.08.2018	V
29	NTPC Limited	08.07.2019	I
30	Amp Energy Markets India (P) Ltd.	15.04.2021	V
31	Altilium Energies (P) Ltd.	23.05.2021	V
32	Shubheksha Advisors (P) Ltd.	31.07.2021	V
33	Reneurja Power LLP	31.07.2021	V
34	ReNew Energy markets (P) Ltd.	28.11.2021	IV
35	Shell Energy Marketing and Trading India (P) Ltd.	22.12.2021	V

36	SJVN Limited	10.01.2022	I
37	Instant Ventures (P) Ltd.	09.02.2022	V
38	Refex Industries Ltd.	21.03.2022	I
39	Ideal Energy Solutions (P) Ltd.	22.03.2022	V
40	AEI New Energy Trading (P) Ltd.	25.03.2022	III
41	Kundan International (P) Ltd.	29.04.2022	II
42	Saini Power Transactor	06.07.2022	V
43	Powerfull Energy Trading (P) Ltd.	09.08.2022	V
44	Visual Percept Solar Projects (P) Ltd.	27.11.2022	III
45	REL Power Trading LLP	13.12.2022	V
46	VEH Global India (P) Ltd.	26.12.2022	IV
47	Renesys Solar (P) Ltd	23.04.2023	V
48	THDC India Ltd.	06.05.2023	IV
49	Embassy Classic (P) Ltd.	14.07.2023	V
50	Adarsh Stainless (P) Ltd.	15.08.2023	IV
51	Energyedge Power Trading (P) Ltd.	18.09.2023	V
52	Elsa Consultancy	23.10.2023	V
53	Viviid Power Trading (P) Ltd.	11.01.2024	V
54	Yggdrasil Commodities India (P) Ltd.	11.01.2024	V
55	Radiance Green Markets (P) Ltd.	02.03.2024	V
56	Serentica Renewables India 2 (P) Ltd.	15.03.2024	V
57	NEFA Power Trading (P) Ltd.	21.03.2024	V
58	Enfinity Global Power Management (P) Ltd.	04.07.2024	V
59	Fusionx Asia Pacific (P) Ltd.	01.08.2024	V
60	Juniper Green Power Trading (P) Ltd.	26.08.2024	V
61	ENGIE Energy Marketing India (P) Ltd.	03.12.2024	I
62	Avaada Power Trading (P) Ltd.	16.12.2024	V
63	ERO POWER LLP	30.12.2024	IV
64	REC Power Development & Consultancy Ltd.	14.01.2025	I
65	Sunsure Power Markets (P) Ltd.	10.03.2025	V
66	KVK Energy & Infrastructure (P) Ltd.	16.03.2025	IV

Note: This list is exclusive of Global Energy (P) Ltd.

Historical Volatility Formula:

$$\sigma = \sqrt{\frac{1}{(n-1)}\sum_{y=1}^{n}(\ln\frac{y_i}{y_{i-1}} - \mu)^2}$$

$$\mu = \frac{1}{n}\sum_{y=1}^{n}(\ln\frac{y_i}{y_{i-1}})$$

where

1. Daily prices returns = Ln (y_i / y_{i-1}).
2. y_i is price for today; y_{i-1} is price on previous day.
3. Ln is natural logarithm
4. n is the number of observations
5. u is the average daily returns

Herfindahl-Hirschman Index (HHI)

Formula for computing the HHI is as under:

$$HHI = \sum_{i=1}^{N} s_i^2$$

where, s_i is the market share of firm i in the market, and N is the number of firms.

The Herfindahl-Hirschman Index (HHI) ranges from 1/N to 1, where N is the number of firms in the market. Equivalently, if percentages are used as whole numbers, as in 75 instead of 0.75, the index can range up to 100^2 or 10,000.

- HHI below 0.01 (or 100) indicates a highly competitive index.
- HHI below 0.15 (or 1,500) indicates an unconcentrated index.
- HHI between 0.15 to 0.25 (or 1,500 to 2,500) indicates moderate concentration.
- HHI above 0.25 (above 2,500) indicates high concentration.

There is also a normalized Herfindahl index. Whereas, the Herfindahl index ranges from 1/N to 1, the normalized Herfindahl index ranges from 0 to 1.



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