

Utilities

Transition Tracker #9



Power demand witnessed a strong growth (+13% YoY) in 2QFY24. With the daily demand of 4.5-5.2BU, the average peak demand was 210/221GW in Sep'23/Aug'23 leading to higher merchant power tariff (INR 6.8/kWh in Oct'23 v/s INR 3.8/kWh in Oct'22). Polysilicon and module prices after a long downward trajectory showing signs of consolidation whereas the tariffs for RE projects are increasing which bodes well for solar capacity additions. International coal prices post consolidation are inching up on the back of increasing thermal demand and supply constraints. A total of 56/8/15GW of Solar, Wind and SW Hybrid; and 8/18/27GW of Nuclear/Hydro/Thermal projects are under construction. Here, we present a collection of 45 charts/exhibits representing important data points that help us track energy transition in India.

- **Power demand:** The power demand continued to remain strong in Sep'23. Monthly peak demand recorded 20% YoY growth whereas the energy demand grew by 9% YoY. All-India peak demand reached 239.98GW on 1st Sep'23; it breached the previous high of 237GW and 223GW in Aug'23 and Jun'23 resp. The shortage in power supply rose by 60% YoY to 499MU in Sep'23 against 311MU in Sep'22.
- **Power generation:** Total power generation improved by 8% YoY to 148BU during Sep'23 as compared to 137BU in Sep'22. The share of RE in total generation continues to grow, stood at 12.7% in Sep'23.
- **Renewables:** With a lot of policy actions, declining input costs and the upswing in tariffs (INR 2.7/kWh in CY23 from INR 2.4/kWh in CY21), the pace of solar project execution is expected to further pick up in ensuing months. Wind capacity installations in India rose 19% YOY to 1,552MW during the YTD FY24. We expect this momentum to increase going forward as the monsoon retreats.
- **Merchant Tariff:** Average merchant tariff in the day-ahead spot power market increased to INR 6.8/kWh in Oct'23 (INR 3.8/kWh in Oct'22) primarily on the back of increasing peak demand deficit.
- **PLF:** With rising demand, utilisation (PLF) of coal-fired power plants continues to improve; it stood at 69.8% in Sep'23 against 60.3% in Sep'22.
- **Generation capacity:** During Apr-Sep'23, 5,001MW of Solar, 1,552MW of Wind, 2,024MW of thermal and 700MW of nuclear capacities have been added. With this, the installed capacity (as of Sep'23) in the country stands at 425GW with non-fossil /RE contributing 186/132GW to the total base (72GW – solar; 44GW – Wind). A total of 56/8/15GW of Solar, Wind and SW Hybrid; and 8/18/26.7GW of Nuclear/Hydro/Thermal projects are under construction. Of the 26.7GW thermal plants under construction, 6-8 GW capacity is expected to commission in rest of FY24.
- **Coal:** Production of coal continues to rise, registering 12.1% YoY growth to 428MT in YTD FY24. Coal India (CIL) surpassed its target of 700MT in FY23 and is now targeting to produce 780MT in FY24. Indonesian coal prices (5,900kcal/kg) post consolidation have started inching up gradually. It stood at \$89/MT in Sep'23 (+2% MoM). Similarly, the South African coal and Australian coal prices have on an average, increased by 8-9% MoM in Sep'23 on the back of increased thermal demand.
- **Solar input material cost:** The prices of solar components, viz., polysilicon, wafers and, cells have declined upto Jun'23 from their highs due to global capacity expansions and systemic oversupply. Polysilicon prices, declined from USD 38.8/kg in Aug'22 to USD 7.8/kg in Jun'23 but have started gradually inching up to USD 9.9/kg in Oct'23. Solar cell prices declined from USD 0.17/piece in Aug'22 to USD 0.07/piece in Oct'23.

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Please see Appendix I at the end of this report for Important Disclosures and Disclaimers and Research Analyst Certification.

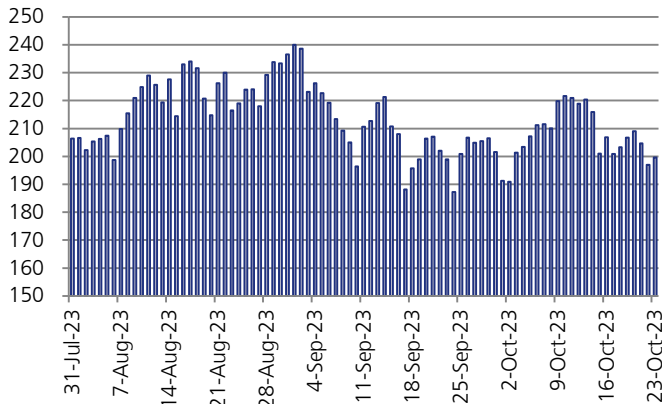
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Power Demand

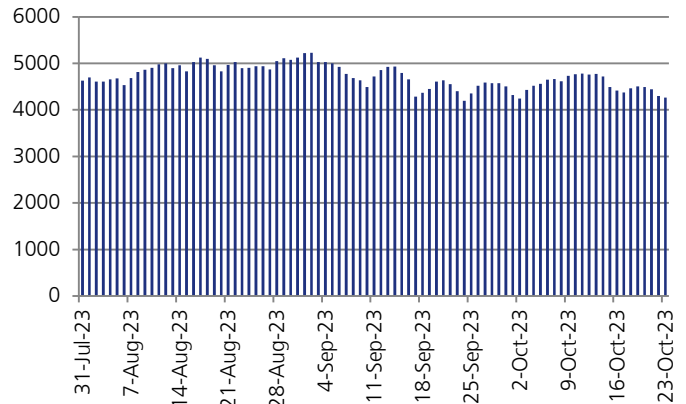
- India recorded its highest peak demand for CY23 of 239.98GW on 1st Sep'23. It breached the previous highs of 234GW in Aug'23 and 223.2GW in Jun'23.
- Overall power demand remained strong and grew 9% YoY. Energy demand ranged between 4,500-5,200MU during the month. Peak demand averaged 210GW in Sep'23 as compared to 221GW in Aug'23.
- Monthly peak demand recorded a 20% YoY growth whereas the energy demand grew by 9% YoY in Sep'23.

Exhibit 1. Peak demand (GW), daily



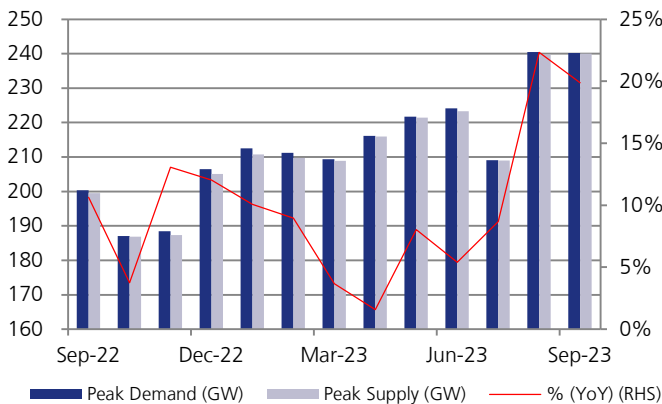
Source: CEA, JM Financial

Exhibit 2. Energy demand (MU), daily



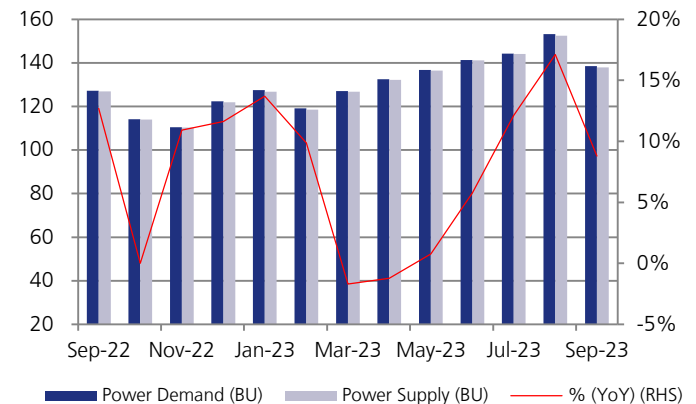
Source: CEA, JM Financial

Exhibit 3. Peak power demand and supply, monthly



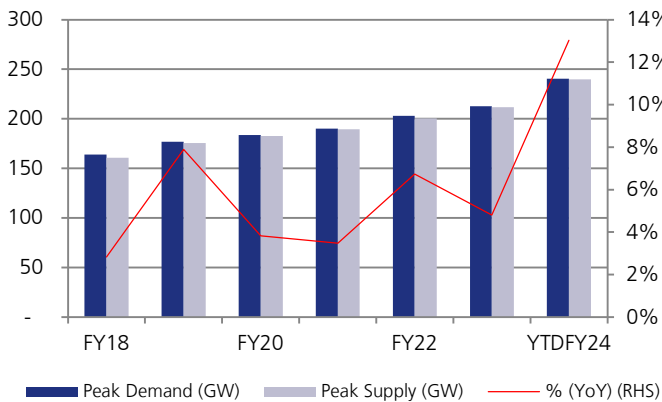
Source: CEA, JM Financial

Exhibit 4. Energy demand and supply, monthly



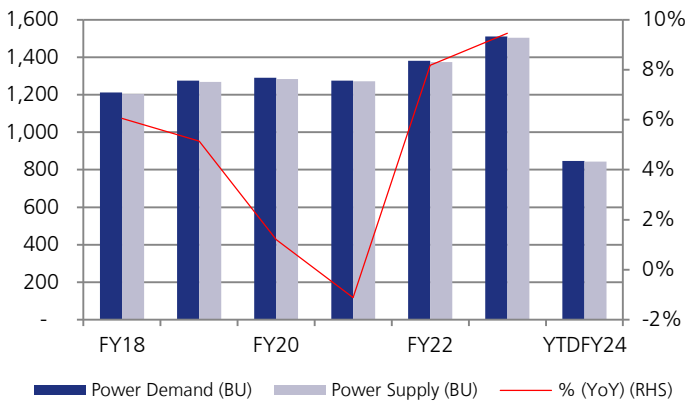
Source: CEA, JM Financial

Exhibit 5. Peak power demand and supply, annual



Source: CEA, JM Financial

Exhibit 6. Energy demand and supply, annual



Source: CEA, JM Financial

- Share of non-fossil/ renewables in total installed capacity has increased from 29% in FY15 to 43.7% in YTD FY24.

Exhibit 7. Installed generation capacity (MW)

Fuel Type	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	YTD FY24
Coal	164,636	185,173	192,163	197,172	194,445	198,735	202,675	204,080	205,236	207,046
Diesel	1,200	994	838	838	638	510	510	510	589	589
Gas	23,062	24,509	25,329	24,897	24,937	24,955	24,924	24,900	24,824	25,038
Total Fossil	188,898	210,675	218,330	222,907	226,279	230,810	234,728	236,109	237,269	239,293
Nuclear	5,780	5,780	6,780	6,780	6,780	6,780	6,780	6,780	6,780	7,480
Hydro (> 25MW)	41,267	42,783	44,478	45,293	45,399	45,699	46,209	46,723	46,850	46,850
Small hydro (<= 25 MW)	3,804	4,177	4,380	4,486	4,593	4,683	4,787	4,849	4,944	4,983
Wind	21,136	25,088	32,280	34,046	35,626	37,669	39,247	40,358	42,633	44,185
Biomass	4,014	4,551	8,182	8,701	9,104	9,861	10,146	10,206	10,248	10,262
Urban & industrial waste	107	127	130	138	138	140	169	477	554	574
Solar	2,632	4,879	12,289	21,652	28,181	34,406	40,085	53,997	66,780	71,781
Total Non-Fossil	78,740	87,385	108,519	121,096	129,821	139,239	147,423	163,388	178,790	186,114
Total Installed capacity	267,637	298,060	326,849	344,002	356,100	370,048	382,151	399,497	416,059	425,407

Source: CEA, JM Financial

- Share of RE in total annual generation increased from 5.6% in FY16 to 13.8% in YTD FY24.

Exhibit 8. Break-up of Generation (MU)

Fuel Type	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	YTD FY24
Thermal	943,788	994,230	1,037,059	1,072,224	1,042,748	1,032,514	1,114,715	1,206,211	654,247
Hydro	121,377	122,378	126,123	134,894	155,769	150,300	151,627	162,099	90,766
Nuclear	37,414	37,916	38,346	37,813	46,473	43,029	47,112	45,861	23,048
RE	65,781	81,548	101,840	126,759	138,337	147,248	170,912	203,552	124,100
Others	5,244	5,617	4,778	4,407	5,794	8,766	7,493	6,742	4,209
Total	1,173,603	1,241,689	1,308,146	1,376,096	1,389,121	1,381,855	1,491,859	1,624,465	896,370

Source: CMIE, JM Financial

- Annual RE capacity addition averages around 11GW over the last 5 years.

Exhibit 9. Capacity addition (MW)

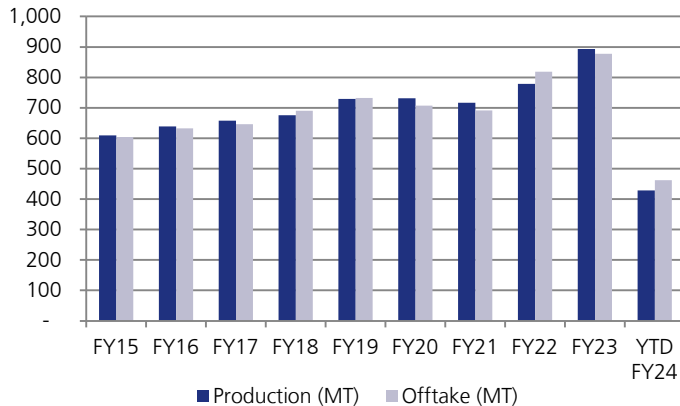
Fuel Type	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	YTD FY24
Thermal	20,643	21,777	7,655	4,577	3,373	4,530	3,919	1,381	1,160	2,024
Nuclear	1,000	-	1,000	-	-	-	-	-	-	700
Hydro	736	1,516	1,695	815	106	300	510	513	128	-
Renewables										
Solar		2,247	7,410	9,363	6,529	6,225	5,680	13,911	12,784	5,001
Wind		3,952	7,192	1,766	1,580	2,043	1,578	1,111	2,276	1,552
Others		931	3,837	633	510	849	417	430	215	72
Total Renewables	2,230	7,129	18,439	11,762	8,619	9,118	7,675	15,452	15,274	6,625
Total Capacity addition	24,608	30,423	28,789	17,154	12,098	13,948	12,103	17,345	16,562	9,348

Source: CMIE, JM Financial; *Net addition

Coal production, supply and prices

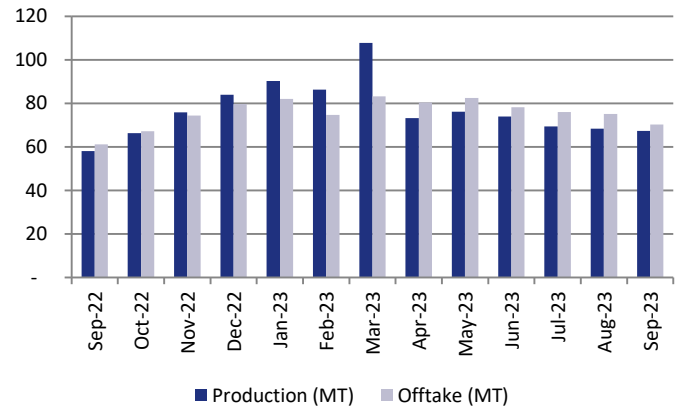
- Focus of government to reduce imports and stable demand led to higher coal production (428MT) and off-take (462MT) in YDFY24.
- The decline in international coal prices has been arrested and post consolidation is now moving up gradually on the back of increasing thermal demand. The South African coal and Australian coal prices have on an average, increased by 8-9% MoM in Sep'23 whereas Indonesian coal prices increased 2% MoM.
- Coal stock at power plants stood at 23mnt as of Sep'23.

Exhibit 10. Coal production and offtake (MT), annual



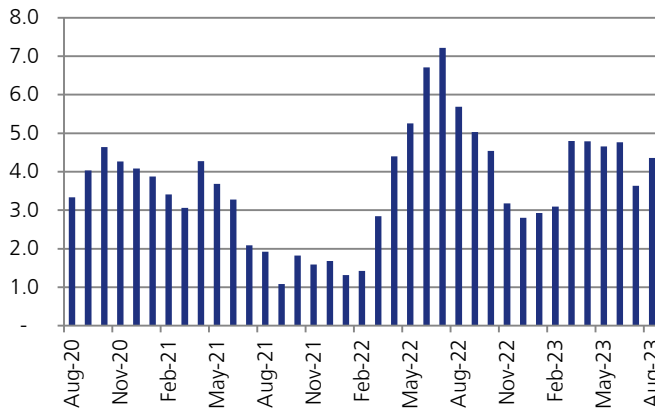
Source: CMIE, JM Financial

Exhibit 11. Coal production and offtake (MT), monthly



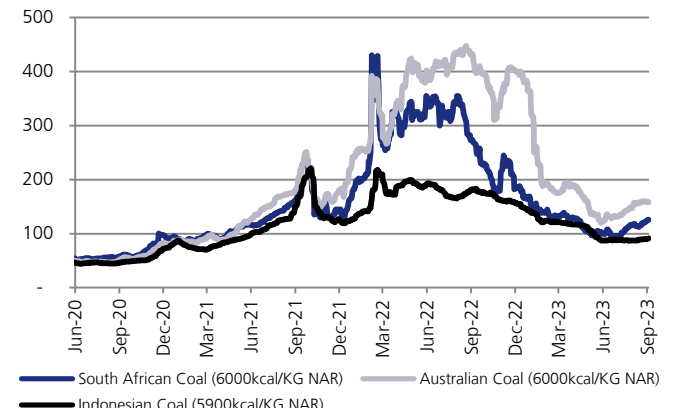
Source: CMIE, JM Financial

Exhibit 12. Coal imports (MT), monthly



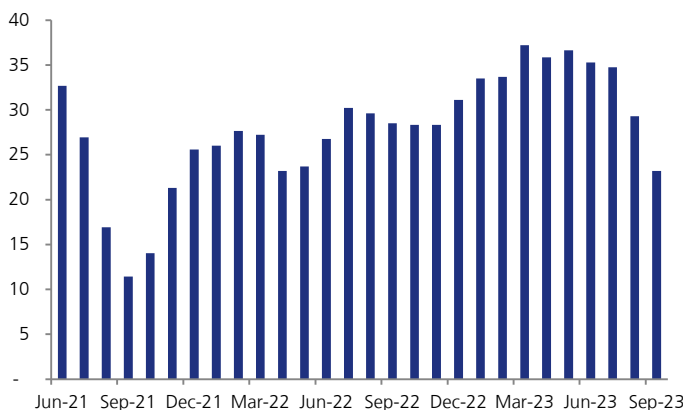
Source: Elekore, JM Financial

Exhibit 13. Imported coal price trend (\$/ton)



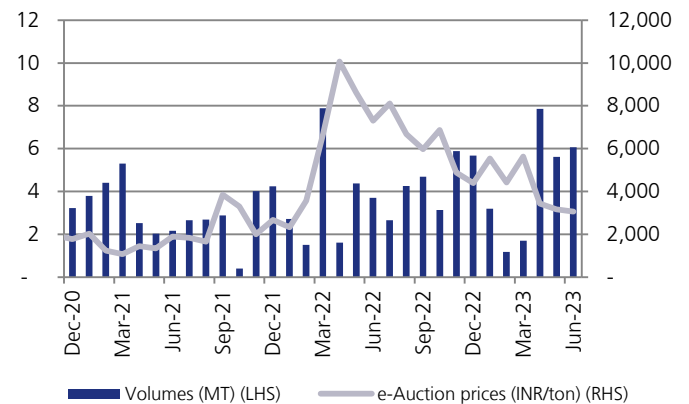
Source: Elekore, JM Financial

Exhibit 14. Coal stock at power plants, mnt



Source: Elekore, JM Financial

Exhibit 15. Coal e-auction volume and price, monthly

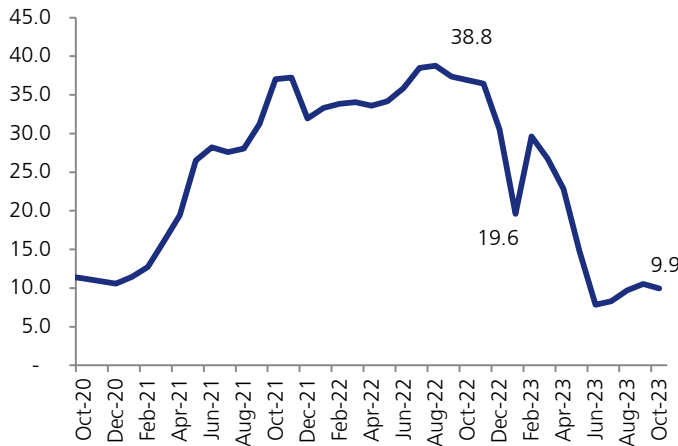


Source: Elekore, JM Financial *e-auction data pertains to power sector

Solar components prices

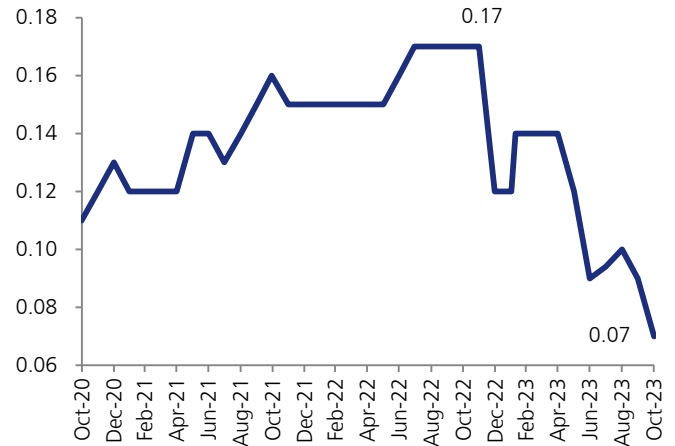
- Prices of components such as polysilicon and solar cell have declined sharply from their peaks in May-Jun'22 due to capacity expansions and consequent oversupply.
- Polysilicon prices, however declined from USD 38.8/kg in Aug'22 to USD 7.8/kg in Jun'23 but have started gradually inching up to USD 9.9/kg in Oct'23.
- Solar cell prices declined from USD 0.17/piece in Aug'22 to USD 0.07/piece in Oct'23.

Exhibit 16. Polysilicon prices (USD/kg)



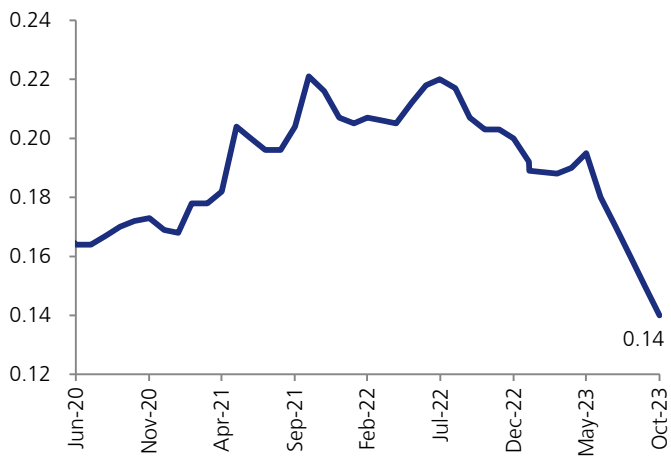
Source: Bloomberg

Exhibit 17. Solar cell prices (USD/watt)



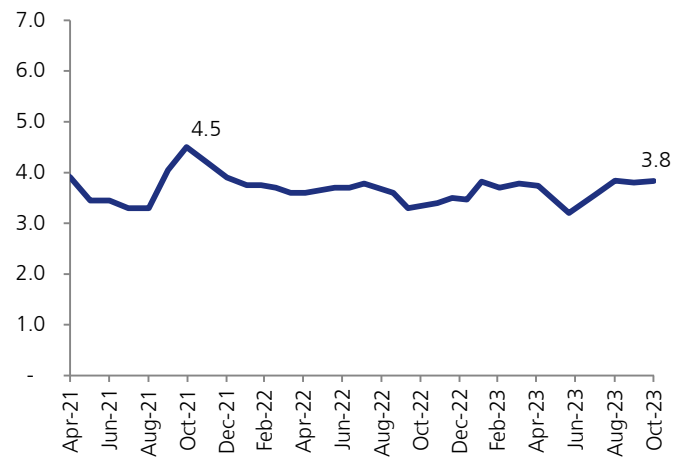
Source: Bloomberg

Exhibit 18. Solar module prices (USD/watt)*



Source: Bloomberg; * multi-silicon solar module price index

Exhibit 19. Prices of PV cell coating glass (USD/m2)

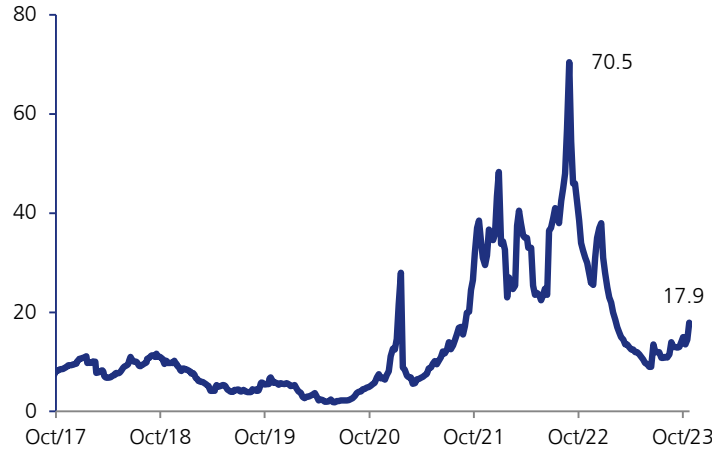


* The top of a traditional silicon monofacial module is rolled glass with a thickness of 3.2mm, and the back of a polymer layer, or backsheet. Bifacial modules are increasingly common and usually consist of two pieces of glass.
Source: Bloomberg

Raw material prices

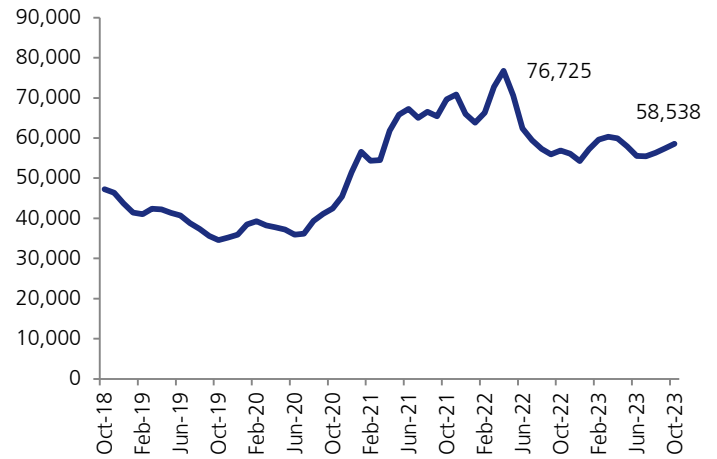
- Prices of key raw materials such as LNG, steel, silver and aluminium have moderated sharply, which bodes well for the entire Solar PV value chain.
- LNG prices moderated from USD 70/mmBtu in Aug'22 to USD 11/mmBtu in May'23 before increasing to USD 17.9/mmBtu in Oct'23.
- Domestic HRC steel prices declined from a high of INR 76K/t in Apr'22 to INR 58K/t in Oct'23.

Exhibit 20. Asia spot LNG weekly prices (USD/mmBtu)



Source: Bloomberg

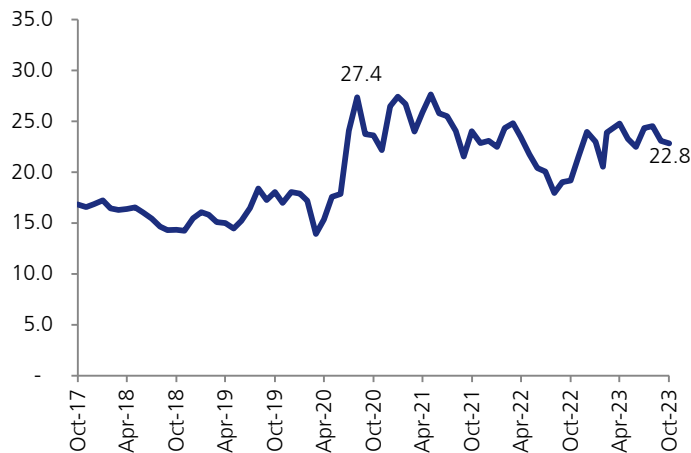
Exhibit 21. Domestic HRC steel prices (INR/ton)



Source: Bloomberg

- Silver prices moderated from a high of USD 27.4/troy ounce in Aug'20 to USD 17.9/troy ounce in Aug'22 before bouncing back to USD 22.8/troy ounce in Oct'23.
- Aluminium prices have declined from USD 3,369/MT in Feb'22 to USD 2,219/MT in Oct'23.

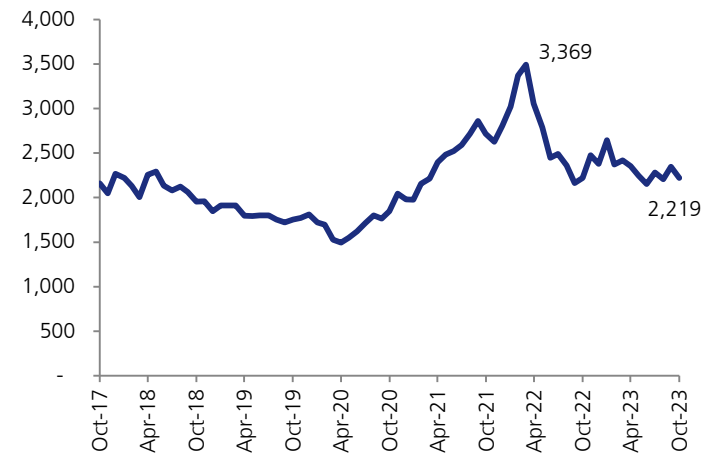
Exhibit 22. Silver prices (USD/troy ounce)



Source: Bloomberg

* Silver paste is the biggest cost component of making wafers into cells and accounts for about 6-7% of the cost for integrated module production. The avg. use of silver in silicon PV modules was 18.5 milligrams per watt in 2020.; 1 troy ounce= 31.1 g

Exhibit 23. Aluminium prices (USD/MT)



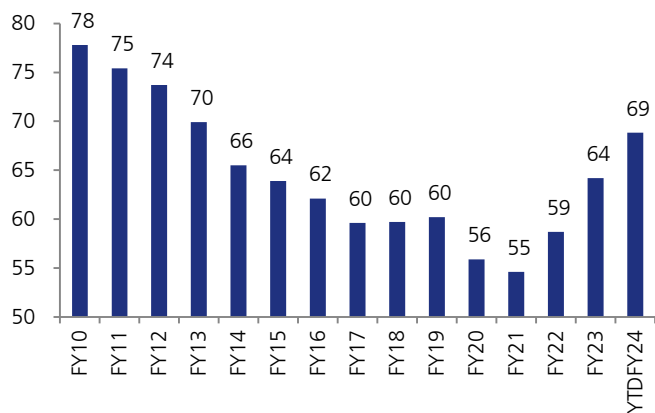
Source: Bloomberg

* Module frames are made of aluminium, making it one of the major cost components of module assembly. Typical consumption of aluminium in silicon PV modules is 5-6 grams per watt.

Plant Load Factor (PLF)

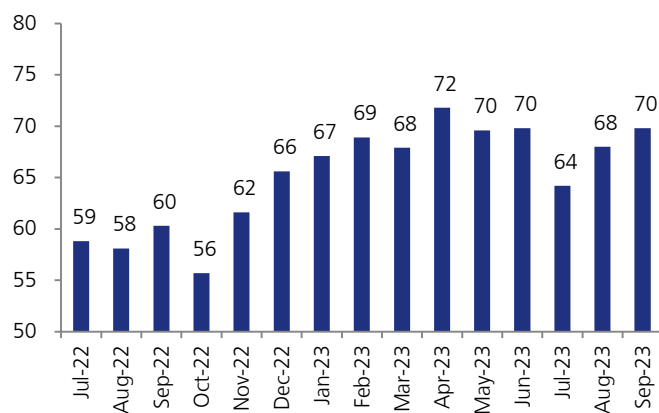
- Thermal PLFs remain strong (64% in FY23/ 69% in YTFY24) backed by increasing demand for power.
- Monthly PLFs have been improving and sustaining above 65% over the past few months. It touched 72% in the month of Apr'23 and YTFY24 average stands at 69%.
- Imported coal-fired plants are also expected to witness higher PLF with extension of Section-11 till Jun'24.

Exhibit 24. Annual PLF for coal-fired power plants (%)



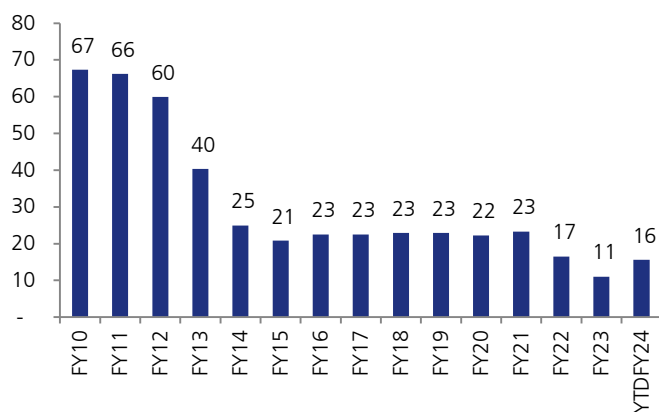
Source: CMIE, JM Financial

Exhibit 25. Monthly PLF for coal-fired power plants (%)



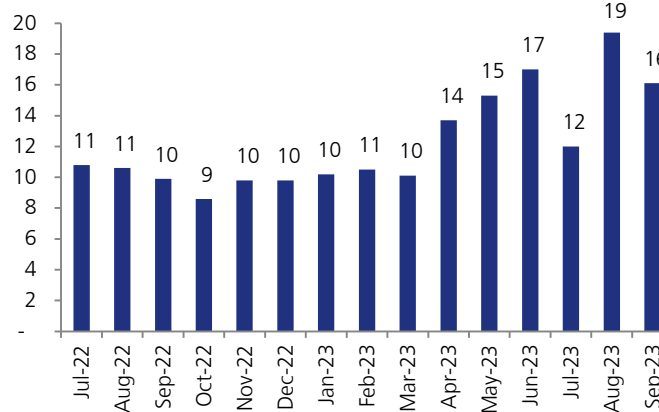
Source: CMIE, JM Financial

Exhibit 26. Annual PLF for gas-fired power plants (%)



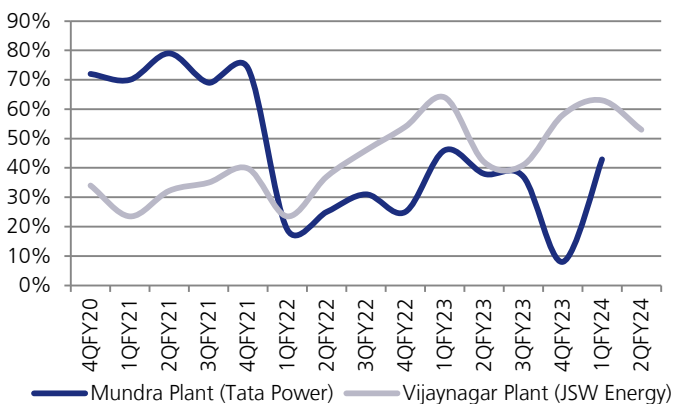
Source: CMIE, JM Financial

Exhibit 27. Monthly PLF for gas-fired power plants (%)



Source: CMIE, JM Financial

Exhibit 28. Imported coal-based plants, PLF (%)



Source: Company, JM Financial

Renewable tariff bidding trend

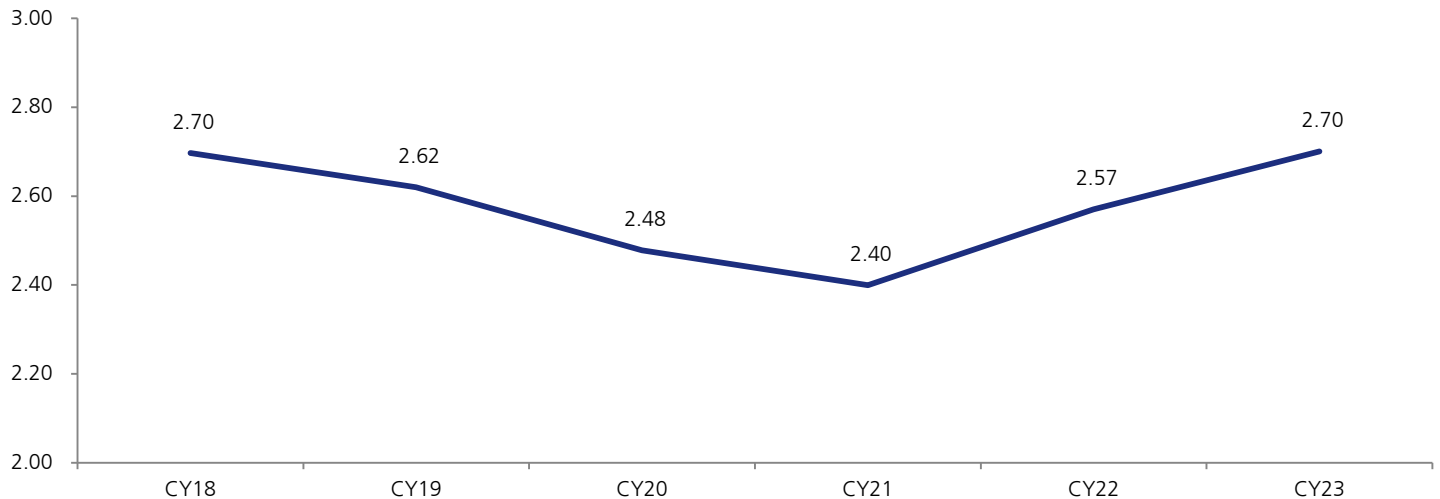
- Average tariff for floating solar /ground mounted solar/ wind/ RTC projects (INR/kWh) remained 3.5/2.6/3.0/3.9

Exhibit 29. Renewable tariff bidding trend (INR/kWh)



Source: Elekore, JM Financial

Exhibit 30. Solar projects – annual weighted average tariff bidding trend (INR/kWh)

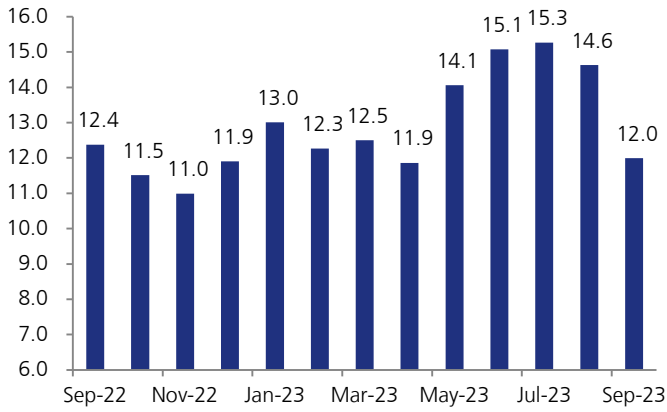


Source: Elekore, JM Financial

Share of renewables in total generation

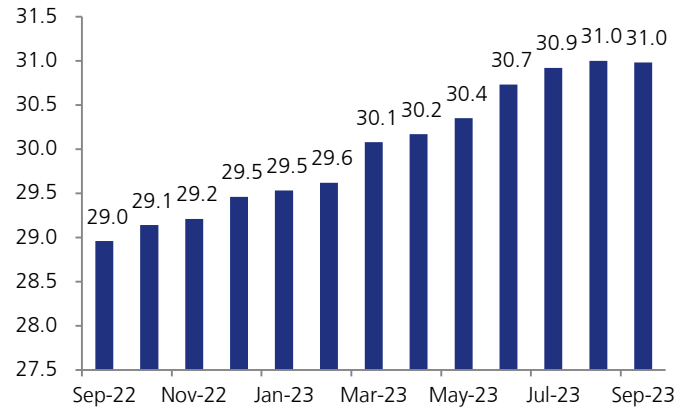
- Share of RE in total annual generation increased from 5.6% in FY16 to 13.8% in YTD FY24.
- Share of RE in total installed capacity increased from 12% in FY14 to 31% in YTD FY24.

Exhibit 31. Share of RE in total generation, monthly (%)



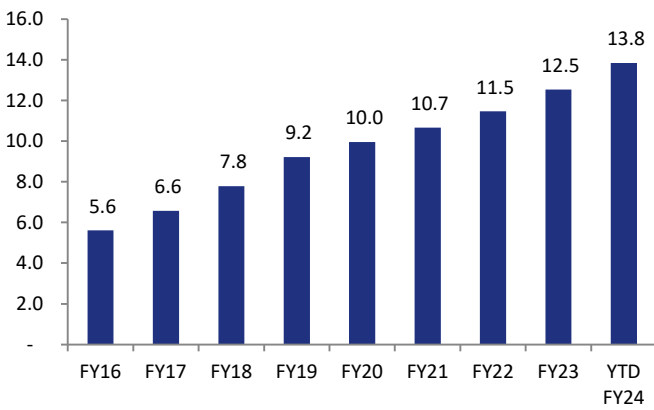
Source: CMIE, JM Financial

Exhibit 32. Share of RE in total installed capacity, monthly (%)



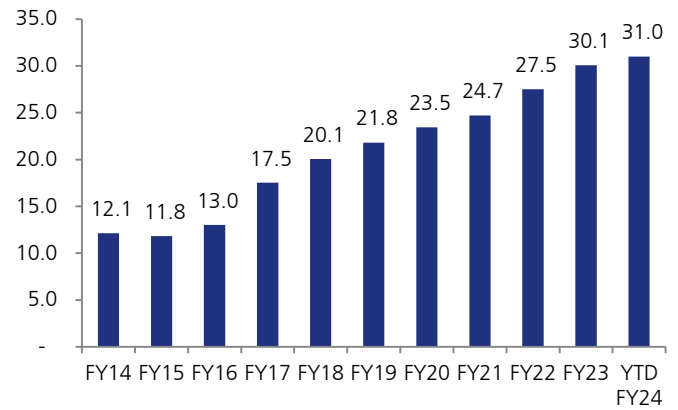
Source: CMIE, JM Financial

Exhibit 33. Share of RE in total generation, annual (%)



Source: CEA, JM Financial

Exhibit 34. Share of RE in total installed capacity, annual (%)

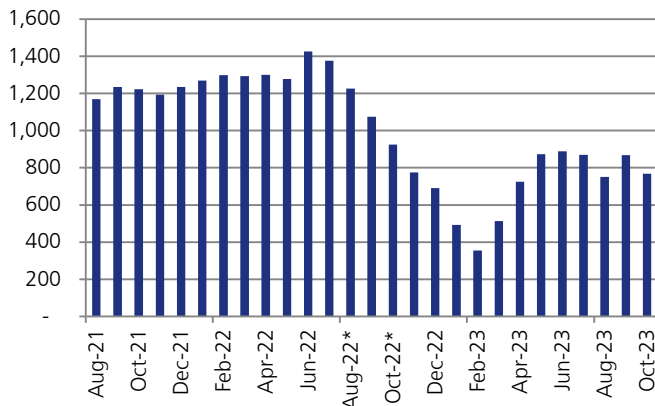


Source: CEA, JM Financial

Outstanding dues of discoms and other parameters

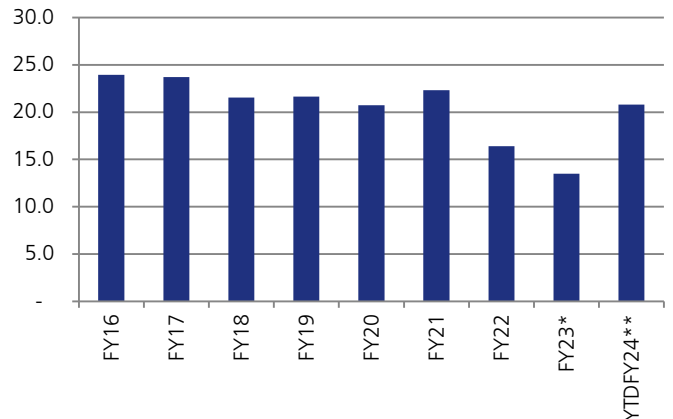
- Outstanding dues of discoms declined sharply from INR 1,384bn in Jun'22 to INR 768bn in Sep'23.
- AT&C losses are seen rising again in FY24 to 21% after having moderated to 13.5% in FY23 from 24% in FY16.
- Annual per capita consumption of electricity has witnessed a healthy growth from 1,075kWh in FY16 to 1,255kWh in FY22.
- The ST market prices on IEX have increased sharply from INR 4.5/kWh in Jul'23 to INR 6.8/kWh in Oct'23 on the back of increasing power demand and peak power deficit.

Exhibit 35. Discoms' current o/s dues to gencos (INR bn)



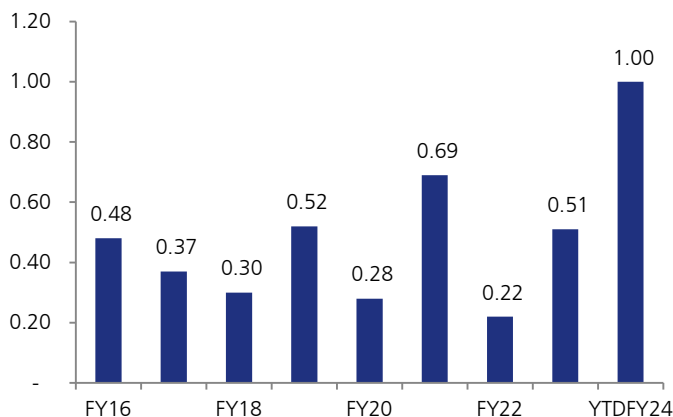
Source: Elekore, JM Financial; * O/s dues for Aug-Nov'22 are estimated

Exhibit 36. Trend in AT&C losses (%)



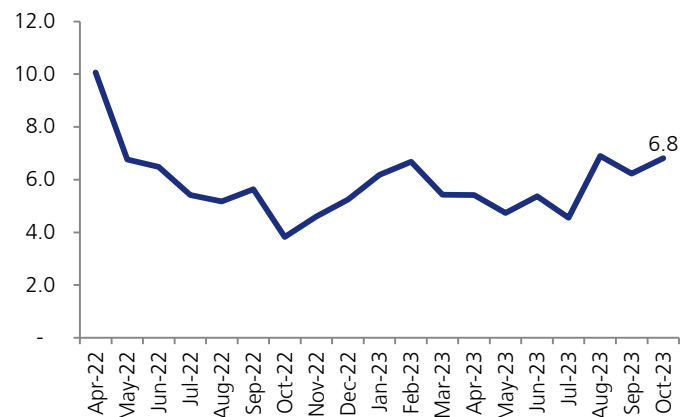
Source: CEA, MoP, UDAY, *Provisional, **Estimated

Exhibit 37. ACS-ARR gap (INR/kWh)



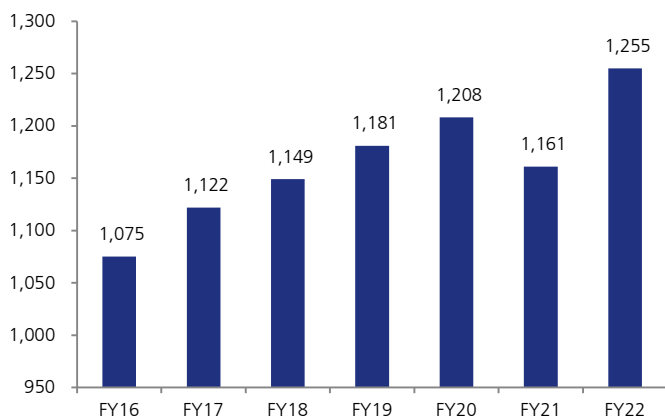
Source: MoP, UDAY; #ACS – Average Cost of Supply; ARR – Average Realizable Revenue *estimated

Exhibit 38. Short-term market prices (INR/kWh)



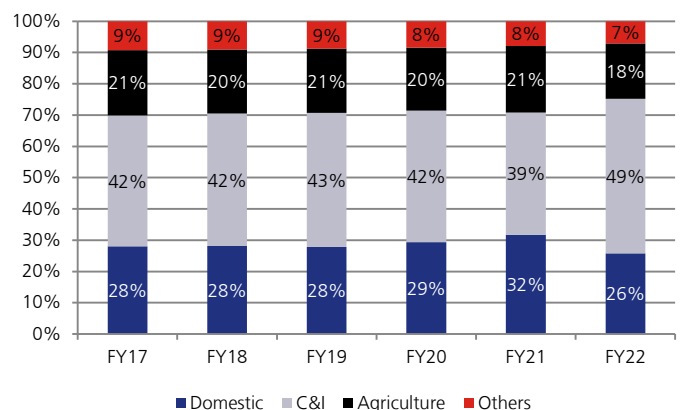
Source: IEX

Exhibit 39. Annual per capita consumption of electricity (kWh)



Source: MoP, CEA

Exhibit 40. Consumer-wise electricity consumption



Source: CMIE, Power Line

Projects under construction

Exhibit 41. Generation capacities under construction (MW)

Technology type	Total capacities under construction (MW)
Solar	55,847
Wind	8,363
Solar-Wind Hybrid	5,282
Solar-Wind Hybrid Storage	8,793
Floating Solar	814
Nuclear	8,000
Hydro	18,003
Thermal (coal)	26,750
Total	131,852

Source: CEA, DAE, Bridge to India, JM Financial

Status of Nuclear power projects

Exhibit 42. Status of nuclear power projects

State	Location	Project	Capacity (MW)	Expected Completion	Physical Progress (as of Oct-2022) /Status
Projects Under Construction					
Gujarat	Kakrapar	KAPP-4	1 X 700	2023	97.12%
Rajasthan	Rawatbhata	RAPP-7&8	2 X 700	2026	88.88%
Tamilnadu	Kudankulam	KKNPP-3&4	2 X 1000	2025	63.57%
		KKNPP-5&6	2 X 1000	2027	12.89%
	Kalpakkam	PFBR	1 x 500	2024	97.64%
Haryana	Gorakhpur	GHAVP-1&2	2 X 700	2029	Casting of foundation piles completed for Nuclear Building-1&2 and testing underway. Construction of other buildings & structures underway.
Projects Accorded Administrative Approval & Financial Sanction					
Karnataka	Kaiga	Kaiga-5&6	2 X 700	Progressively by 2031	Pre-project activities at sites and bulk procurement of long manufacturing cycle equipment are underway. Excavation has commenced in Kaiga-5&6.
Haryana	Gorakhpur	GHAVP-3&4	2 X 700		
Madhya Pradesh	Chutka	Chutka-1&2	2 X 700		
Rajasthan	Mahi Banswara	Mahi Banswara-1&2	2 X 700		
		Mahi Banswara-3&4	2 X 700		

Source: DAE, Dec'22, JM Financial

Status of Hydropower projects

Exhibit 43. Status of hydroelectric projects (above 25MW) under implementation

Sl. No.	Name of Scheme (Executing Agency)	State / UT	District	I.C. (No.XMW)	Cap. Under Execution(MW)	River/Basin	Date of finish/ commissioning
Central Sector							
1	Subansiri Lower (NHPC)	Arunachal Pradesh	Lower Subansiri	8x250	2000.00	Subansiri/ Brahmaputra	2023-26 (Dec'25) # {2 units during 2023-24}
2	Parbati St. II (NHPC)	Himachal Pradesh	Kullu	4x200	800.00	Parbati/Beas/Indus	2024-25 (Jun'24)
3	Luhri-I (SJVN)	Himachal Pradesh	Kullu/Shimla	2x80+2x25	210.00	Satluj/Indus	2025-26 (Jan'26)
4	Dhaulasidh (SJVN)	Himachal Pradesh	Hamirpur/ Kangra	2x33	66.00	Beas/Indus	2025-26 (Nov'25)
5	Pakal Dul (CVPPPL)	UT of Jammu & Kashmir	Kishtwar	4x250	1000.00	Marusadar/ Chenab / Indus	2026-27 (Sept'26)
6	Kiru (CVPPPL)	UT of Jammu & Kashmir	Kishtwar	4x156	624.00	Chenab/ Indus	2025-26 (Mar'26)
7	Teesta St. VI NHPC	Sikkim	South Sikkim	4x125	500.00	Teesta/Brahmaputra	2026-27 (Aug'26)
8	Vishnugad Pipalkoti (THDC)	Uttarakhand	Chamoli	4x111	444.00	Alaknanda/Ganga	2026-27 (Jun'26)
9	Naitwar Mori (SJVNL)	Uttarakhand	Uttarkashi	2x30	60.00	Tons/Yamuna/Ganga	2023-24 (Oct'23)
10	Tapovan Vishnugad (NTPC)	Uttarakhand	Chamoli	4x130	520.00	Dhauliganga / Alaknada & /Ganga	2025-26 (Dec'25)
11	Tehri PSS (THDC)	Uttarakhand	Tehri Garhwal	4x250	1000.00	Bhilangna/Bhagirathi/ Ganga	2024-25 (Sep'24)
12	Rammam-III (NTPC)	West Bengal	Darjeeling	3x40	120.00	Rammam/ Rangit/Teesta Brahmaputra	2026-27 (Sept'26)
13	Rangit-IV (NHPC)	Sikkim	West Sikkim	3x40	120.00	Rangit/ Teesta/ Brahmaputra	2024-25 (Aug'24)
14	Ratle (RHEPPL / NHPC)	UT of Jammu & Kashmir	Kishtwar	4x205 + 1x30	850.00	Chenab/Indus	2026-27 (May'26)
15	Kwar (CVPPPL)	UT of Jammu & Kashmir	Kishtwar	4x135	540.00	Chenab/Indus	2026-27 (Nov'26)
16	Sunni Dam (SJVN)	Himachal Pradesh	Shimla/Mandi	4x73+1x73+1x17	382.00	Satluj/Indus	2027-28 (Mar'28)
17	Dibang Multipurpose Project (NHPC)	Arunachal Pradesh	Lower Dibang Valley	12x240	2880.00	Dibang/Brahmaputra	2031-32 (Feb'32)
18*	Lata Tapovan (NTPC)	Uttarakhand	Chamoli	3x57	171.00	Dhauliganga /Alaknada & Ganga	*
Sub-Total: Central Sector					12,287.00		
State Sector							
19	Polavaram (APGENCO/ ID, A.P.)	Andhra Pradesh	East & West Godavari	12x80	960.00	Godavari/EFR	2024-26 (Mar'26)###
20	Lower Kopli (APGCL)	Assam	Dima Hasao & Karbi Anglong	2x55+2x2.5+1x5	120.00	Kopili/Brahmaputra	2024-25 (Mar'25)
21	Uhl-III (BVPCL)	Himachal Pradesh	Mandi	3x33.33	100.00	Uhl/Beas/ Indus	2024-25 (Dec'24)
22	Shongtong Karcham (HPPCL)	Himachal Pradesh	Kinnaur	3x150	450.00	Satluj/ Indus	2026-27 (Nov'26)
23	Parnai (JKSPDC)	UT of Jammu & Kashmir	Poonch	3x12.5	37.50	Jhelum/ Indus	2024-25 (Mar'25)
24	Pallivasal (KSEB)	Kerala	Idukki	2x30	60.00	Mudirapuzha/ Periyar/ Baypore Periyar/ WFR	2023-24 (Mar'24)
25	Thottiyar (KSEB)	Kerala	Idukki	1x30+1x10	40.00	Thottiyar/ Periyar/ / Baypore Periyar/ WFR	2023-24 (Mar'24)
26	Shahpurkandi (PSPCL/ ID, Pb.)	Punjab	Pathankot	3x33+3x33+1x8	206.00	Ravi/ Indus	2025-26 (Oct'25)
27	Kundah Pumped Storage Ph-I,II&III)	Tamil Nadu	Nilgiris	4x125	500.00	Kundah/Bhavani/ Cauvery/EFR	2024-25 (Oct'24)
28	Chanju-III (HPPCL)	Himachal Pradesh	Chamba	3x16	48.00	Chanju Nallah	2027-28 (Jun'27)
29	Mankulam (KSEB)	Kerala	Idukki	2x20	40.00	Melachery	2026-27 (May'26)
30	Lakhwar Multip. Project (UJVNL)	Uttarakhand	Dehradun & Tehri Garhwal	3x100	300.00	Yamuna	2028-29 (Oct'28)
31	Lower Sileru Extension (APGENCO)	Andhra Pradesh	Alluri Sitharamaraju	2x115	230.00	Sileru/Godavari	2025-26 (Mar'26)
32*	Lower Kalnai (JKSPDC)	UT of Jammu & Kashmir	Kishtwar	2x24	48.00	Chenab/ Indus	*
33*	Koyna Left Bank (WRD,MAH)	Maharashtra	Satara	2x40	80.00	Koyna/ Krishna/EFR	*
Sub-Total: State Sector					3,219.50		

	Private Sector						
34	Tidong-I (Statkraft IPL)	Himachal Pradesh	Kinnaur	3x50	150.00	Tidong/Satluj/Indus	2024-25 (Jun'24)
35	Kutehr (JSW Energy Ltd)	Himachal Pradesh	Chamba	3x80	240.00	Ravi/ Indus	2025-26 (Nov'25)
36	Pinnapuram (Greenko AP01 IREP Private Limited)	Andhra Pradesh	Kurnool	4x240+2x120	1200.00	Pennar Basin	2024-25 (Dec'24)
37*	Tangnu Romai (TRPG)	Himachal Pradesh	Shimla	2x22	44.00	Pabbar/Tons/ Yamuna/ Ganga	*
38*	Maheshwar (SMHPCL)	Madhya Pradesh	Khargone & Khandwa	10x40	400.00	Narmada/CIRS	*
39*	Bhasmey (Gati Infrastructure)	Sikkim	East Sikkim	2x25.5	51.00	Rangpo/ Teesta/ Brahmaputra	*
40*	Rangit-II (Sikkim Hydro)	Sikkim	West Sikkim	2x33	66.00	Greater Rangit/ Teesta/ Brahmaputra	*
41*	Panan (Himagiri)	Sikkim	North Sikkim	4x75	300.00	Rangyongchu/ Teesta/ Brahmaputra	*
42*	Phata Byung (LANCO)	Uttarakhand	Rudraprayag	2x38	76.00	Mandakini/Alaknanda Ganga	*
Sub-Total: Private Sector					2527.00		
Total					18,003.50		

Source: CEA as on Sep'23, JM Financial,

2 units (500 MW) likely during 2023-24 and remaining 6 units (1500 MW) during 2024-26

4 units (320 MW) likely during 2024-25 & 8 units (640 MW) during 2025-26

* The Project is presently stalled. Commissioning is subject to restart of works

Note:- Presently 42 no. of hydro electric project (above 25 MW) totalling to 18033.5 MW are under implementation . Out of these,33 no. HEPs totalling to 16797.5 MW are under active construction and 9 no. HEPs totalling to 1236 MW are presently stalled.

Exhibit 44. Thermal (coal) capacities under construction

Sr. No	Project Name	State Implementing Agency Boiler Turbine	LOA Date	Unit No	Cap. (MW)	Original Trial Run	Anticipated Trial Run (as per CEA)	Physical Progress %
Central Sector								
1	Barh STPP, St-I	BR NTPC Doosan Power M/c, Russia	Mar-05	U-3	660	Oct'11	Jul-24	88%
2	Buxar TPP	BR SJVN L&T L&T	Jun-19	U-1	660	May'23	Mar'24	83%
				U-2	660	Sep'23	Jul-24	71%
3	North Karanpura STPP	JH NTPC BHEL BHEL	Feb-14	U-2	660	Dec'18	Nov-23	92%
				U-3	660	Jun'19	Jun-24	81%
4	Patratu STPP	JH PVUNL BHEL BHEL	Mar-18	U-1	800	Jan'22	Jul-24	67%
				U-2	800	Jul'22	Dec-24	64%
				U-3	800	Jan'23	May-25	48%
5	Talcher TPP, St-III	OR NTPC BHEL BHEL	Sep-22	U-1	660	Nov'26	Nov-26	0%
				U-2	660	May'27	May-27	0%
6	Ghatampur TPP	UP L&T MHPS GE Power NUPPL	Aug-16	U-1	660	May'20	Nov'23	90%
				U-2	660	Nov'20	Feb'24	79%
				U-3	660	May'21	Apr'24	73%
7	Khurja SCTPP	UP L&T MHI THDC BHEL	Aug-19	U-1	660	Jul'23	Feb-24	73%
				U-2	660	Jan'24	Aug-24	63%
8	Telangana STPP, St- I	TS NTPC GE Power BHEL	Feb-16	U-1	800	May'20	Sep'23	97%
				U-2	800	Nov'20	Nov'23	96%
State Sector								
1	Dr. Narla Tata Rao TPS, St-V, Vijaywada	AP APGENCO BHEL BHEL	Dec-15	U-1	800	Apr'19	Jan'24	86%
2	Jawaharpur STPP	AP UPRVUNL Doosan Doosan	Dec-16	U-1	660	Dec'20	Nov'23	92%
				U-2	660	Apr'21	Apr'24	87%
3	Obra-C STPP	AP UPRVUNL Doosan India Doosan India (GE)	Dec-16	U-1	660	Dec'20	Oct'23	92%
				U-2	660	Apr'21	Apr'24	78%
4	Panki TPS Extn.	AP UPRVUNL BHEL BHEL	Mar-18	U-1	660	Sep'21	Sep'24	79%
5	Ennore SCTPP	TN TANGEDCO BHEL BHEL	Sep-14	U-1	660	Nov'17	Apr-25	65%
				U-2	660	Jan'18	Jul-25	66%
6	North Chennai TPP, St-III	TN TANGEDCO BHEL BHEL	Jan-16	U-1	800	Apr'19	Dec'23	94%
7	Udangudi STPP, St-I	TN TANGEDCO BHEL BHEL	Dec-17	U-1	660	Jan'21	Sep'24	72%
				U-2	660	Mar'21	Jan'25	69%
8	Uppur Super Critical TPP	TN TANGEDCO BHEL BHEL	Feb-16	U-1	800	Nov'20	On Hold	6%
				U-2	800	Nov'20	On Hold	5%

Sr. No	Project Name	State Implementing Agency Boiler Turbine	LOA Date	Unit No	Cap. (MW)	Original Trial Run	Anticipated Trial Run (as per CEA)	Physical Progress %
9	Yadadri TPS	TS TSGENCO BHEL BHEL	Oct-17	U-1	800	Oct'21	Dec'23	86%
				U-2	800	Oct'21	Dec'23	87%
				U-3	800	Jun'22	Sep'24	79%
				U-4	800	Jun'22	Aug'24	82%
				U-5	800	Oct'22	Apr'25	78%
10	Yelahanka CCPP	KN KPCL BHEL BHEL	Nov-15	GT+ST	370	Feb'18	Nov'23	97%
11	Bhusawal TPS	MH MAHAGENCO BHEL BHEL	Jan-18	U-6	660	May'22	Dec'23	90%
12	Sagardighi TPP, Ph-III	WB WBPCL BHEL BHEL	Dec-18	U-1	660	Jan'24	Jan'25	53%
					26,750			

Source: CEA as on Aug'23, JM Financial

Status of stressed power projects

- Total of 28 power projects having capacity of 24,365MW remain stressed as of Aug'23.

Exhibit 45. Status of stressed power projects

Sr No	State	Project Name / Implementation Agency/ EPC or BTG	LOA/ Date/ ordered date	Unit No	Capacity MW	Original Commissioning Schedule	Present Status/Remarks
CENTRAL SECTOR							
1	Rajasthan	Barsingar TPP ext/ NLC/ Reliance Infra/ Chinese	Nov'16	U-1	250	May'20	Project is held up due to withdrawal of PPA by Raj DISCOM. This project may not revive due to land issue in link mines and consequently higher tariff.
2	Rajasthan	Bithnok TPP/ NLC/ Reliance Infra/ Chinese	Nov'16	U-1	250	May'20	Project held up due to withdrawal of PPA by DISCOM. Consultant appointed for revival plan.
STATE SECTOR							
1	Tamil Nadu	Ennore exp. SCTPP/ Tangedco/ BTG Lanco (DEC- CHINA)	May'14	U-1	660	Jan'18	Awarded to M/s BGRESL "as is where is basis condition" on 23.06.2022 for revival.
PRIVATE SECTOR							
1	Andhra Pradesh	Bhavanapadu TPP Ph-I / East Coast Energy Ltd. / BTG DEC china	Sep'09	U-1	660	Oct'13	Liquidation order issued; assets sale process is on.
			Sep'09	U-2	660	Mar'14	
2	Andhra Pradesh	Thamminapatnam TPP stage-II / Meenakshi Energy Pvt. Ltd. SG-Cether vessels TG- Chinese	Dec'09	U-3	350	May'12	Bidding process recently got completed; Vedanta Ltd. declared Successful bidder. NCLT approved the plan. The project is likely to be commissioned during 2024-25.
			Dec'09	U-4	350	Aug'12	
3	Bihar	Siriya TPP (Jas Infra. TPP) / JICPL BTG- DEC China	Mar'11	U-1	660	Aug'14	Liquidation Order date 17.07.2020; The Enforcement directorate has attached the assets of the corporate debtor and as a result of which the auction of the assets are kept on hold.
			Mar'11	U-2	660	Dec'14	
			Mar'11	U-3	660	Apr'15	
			Mar'11	U-4	660	Aug'15	
4	Chhattisgarh	Akaltara TPP (Naiyara) / KSK Mahandi Power Co. Ltd./ Boiler- SEPCO CHINA/ TG- SEPCO (Dongfong China)	Apr'09	U-4	600	Apr'13	CIRP commenced on 3rd October 2019 & currently under NCLT. PPL and REC have submitted EOI on 21-7-2023 and shortlisted as PRAs.
			Apr'09	U-5	600	Aug'13	
			Apr'09	U-6	600	Dec'13	
5	Chhattisgarh	Binjkote TPP/ SKS Power Generation (Chhattisgarh) Ltd. Boiler-Cethar Vessels /Turbine-Harbin China	Mar'11	U-3	300	Mar'14	Reworked bids (seven) received from the Resolution Applicants. Voting completed. Plan submitted by Sarda Energy & Minerals filed with NCLT for approval. The plant is likely to be revived by 2030-31
			Mar'11	U-4	300	Jun'14	
6	Chhattisgarh	Lanco Amarkantak TPP- II/ LAP Pvt. Ltd. BTG-DEC china	Nov'09	U-3	660	Jan'12	Admitted to NCLT on 05.09.2019. PFC-REC consortium declared successful Resolution Applicant. LOI issued on 09-01-2023. CoC approved plan submitted by RP for approval of NCLT on 14-02-2023. Plant is likely to be revived by FY 2025-26.
			Nov'09	U-4	660	Mar'12	
7	Chhattisgarh	Singhitarai TPP/ Athena CG Power Ltd. BTG-DEC china	Dec'09	U-1	600	Nov'14	Vedanta Ltd. has bought the power plant under liquidation. Plant is likely to be revived by FY 2030-31
			Dec'09	U-2	600	Feb'15	
8	Chhattisgarh	Salora TPP / Vandana Vidyut/ Boiler- Cether Vessles / TG Harbin China	Sep'09	U-2	135	Sep'11	The liquidator successfully sold the assets of corporate debtor as per provision of IBC, 2016.
9	Chhattisgarh	Deveri (Visa) TPP / Visa Power Ltd. BTG-BHEL	Jun'10	U-1	600	Aug'13	Liquidation Order date 11.10.2018. Liquidation process started. BHEL claims certain unpaid lien on the assets available at the site of the Corporate Debtor and matter before the Supreme Court.
10	Jharkhand	Matrishri Usha TPP Ph-I / CorporatePower Ltd. EPC- BHEL	Dec'09	U-1	270	Apr'12	Admitted to NCLT on 19.02.2020. Compliant resolution plan awaited.
			Dec'09	U-2	270	May'12	
11	Jharkhand	Matrishri Usha TPP Ph-II / CorporatePower Ltd. EPC- BHEL	Mar'11	U-3	270	Oct'12	
			Mar'11	U-4	270	Jan'13	
12	Jharkhand	Tori TPP Ph-I/ Essar Power Ltd. BTG- Harbin China	Aug'08	U-1	600	Jul'12	Liquidation Order date 18.12.2019. Liquidation process is on.
			Aug'08	U-2	600	Sep'12	

Sr No	State	Project Name / Implementation Agency/ EPC or BTG	LOA/ Date/ ordered date	Unit No	Capacity MW	Original Commissioning Schedule	Present Status/Remarks
13	Jharkhand	Tori TPP Ph-II / Essar Power Ltd./ BTG- Harbin China	Feb'10	U-3	600	Dec'15	
14	Maharashtra	Amravati TPP Ph-II / Ratan India Power Pvt. Ltd. BTG- BHEL	Oct'10	U-1	270	Jul'14	Company has decided to drop Phase-II.
			Oct'10	U-2	270	Sep'14	
			Oct'10	U-3	270	Nov'14	
			Oct'10	U-4	270	Jan'15	
15	Maharashtra	Nasik TPP Ph-II / Ratan India Nasik Power Pvt. Ltd. BTG- BHEL	Nov'09	U-1	270	Apr'13	Admitted in NCLT on 19-09-2022.
			Nov'09	U-2	270	Jun'13	
			Nov'09	U-3	270	Aug'13	
			Nov'09	U-4	270	Oct'13	
16	Maharashtra	Lanco Vidarbha TPP / LVP Pvt. Ltd. EPC-LANCO/ Boiler- Dongfong China / Turbine- Harbin china	Nov'09	U-1	660	Jul'14	Liquidation Order date 30.06.2021. E-Auction sale as a going concern initiated.
			Nov'09	U-2	660	Nov'14	
17	Maharashtra	Bijora Ghanmukh TPP / Jinbhuvish Power Generation Pvt. Ltd.	Sep'11	U-1	300	Dec'16	Work held up due to financial constraints.
			Sep'11	U-2	300	Mar'17	
18	Maharashtra	Shirpur TPP ,Shirpur Power Pvt. Ltd./ BTG- BHEL	Nov'11	U-2	150	Apr'15	Liquidation order date 10.03.2021. The e-Auction of the company on Slump Sale basis is currently underway.
19	Madhya Pradesh	Gorgi TPP / D.B. Power (MP) Ltd. BTG- BHEL	Mar'11	U-1	660	Jun'13	Work is on hold at site due to Financial stress.
20	Odisha	Utkal TPP (Odisha)/ Ind Barath/ BTG-Cethar Vessels	May'09	U-2	350	Dec'11	Admitted to NCLT on 29-08-2018. NCLT vide order dated 25-07-2022 has approved the Resolution plan of JSW Energy and implementation of Resolution plan has been completed. Plant is likely to be revived by FY 2025-26
21	Odisha	KVK Nilanchal TPP/ KVK Nilanchal/ BTG-Harbin China	Nov'09	U-1	350	Dec'11	Liquidation Order date 17.12.2020. The Liquidator has initiated for E- Auction Sale as a going concern.
			Nov'09	U-2	350	Feb'12	
			Nov'09	U-3	350	Feb'12	
22	Odisha	Lanco Babandh TPP / LBP Ltd./ BTG- DEC Chinese	Nov'09	U-1	660	Apr'13	Liquidation Order date 27.11.2019. The Liquidator has partially sold the assets on a standalone basis through e-auction.
			Nov'09	U-2	660	Aug'13	
23	Odisha	Malibrahmani TPP / MPCL/ BTG-BHEL	Jun'10	U-1	525	Dec'12	Jindal Steel & Power has acquired the asset under liquidation; Plant is likely to be revived by FY 2024-25
			Jun'10	U-2	525	Feb'13	
24	Tamil Nadu	Tuticorin TPP (Ind- Barath) / IBPIL / BTG- Shangdong China	May'10	U-1	660	May'12	Liquidation Order date 22.04.2019. Stay on Liquidation Order.
25	West Bengal	Hiranmaye Energy Ltd (India Power corporation (Haldia) TPP / Haldia Energy Ltd/ EPC- MEIL / BTG- BHEL.	Sep'10	U-3	150	May'16	Project is currently under hold.
TOTAL PRIVATE SECTOR [No. of Projects:25, No. of Units:52]					23,205		
GRAND TOTAL [No. of Projects: 28, No. of Units: 55]					24,365		

Source: CEA, Aug'23, JM Financial

APPENDIX I

JM Financial Institutional Securities Limited

Corporate Identity Number: U67100MH2017PLC296081

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Hold	Price expected to move in the range of 10% downside to 10% upside from the current market price for stocks with market capitalisation in excess of INR 200 billion and REITs* and in the range of 10% downside to 15% upside from the current market price for all other stocks, over the next twelve months.
Sell	Price expected to move downwards by more than 10% from the current market price over the next twelve months.

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