



ICRA

A MOODY'S INVESTORS
SERVICE COMPANY

INDIAN RENEWABLE ENERGY SECTOR

**Large project pipeline, demand recovery
and competitive tariffs remain tailwinds
for renewable energy sector; domestic
solar OEM segment to witness large
investments**

SEPTEMBER 2021

Sabyasachi Majumdar
+91 124 4545 304
sabyasachi@icraindia.com

Girishkumar Kadam
+91 22 6114 3441
girishkumar@craindia.com

Vikram V
+91 40 4067 6518
vikram.v@icraindia.com

Jatin Arya
+91 124 4545 313
jatin.arya@icraindia.com

R Vinayak
+91 40 4067 6500
r.vinayak@icraindia.com



Table of Contents

OUTLOOK - STABLE.....	7
EXECUTIVE SUMMARY	9
Industry Trends	12
Capacity Addition Trends & IPP Profile	13
RE capacity addition improved sharply in 5M FY2022 on a YoY basis.....	14
Eight states in southern and western India account for majority of RE power capacity.....	16
Capacity addition being driven by the IPP segment supported by global private equity, sovereign and pension funds.....	17
Rising global bond issuances by Indian RE developers.....	19
Heightened M&A activity in the renewable energy sector in India	20
Key Demand Drivers & Bidding Trends.....	21
Demand drivers for renewables remain intact with capacity requirement of 69 GW in FY2024 to meet stipulated RPO targets.....	22
Progress under bidding schemes for solar, wind and hybrid power projects.....	26
A. Solar – Progress seen in signing of PPAs/PSAs; tendering pipeline remains large	27
B. Wind – Execution continues to remain slow for the capacity bid out so far; Strong response to recent SECI bids is a positive	31
C. Wind-Solar hybrid and Peak/RTC supply tenders.....	34
Renewable energy capacity addition estimates	36
Wind & Solar- Key Tariff Trends & Viability	38
Cost competitiveness of renewable energy	39
Module price levels remain elevated; nonetheless, tariffs remain below Rs. 2.5 per unit	41
Viability of solar power bids	42
Viability of wind power bids	43
Trends in RE Generation.....	44

Trends in renewable power generation	45
Key Policy & Regulatory Updates	46
Key policy and regulatory updates.....	47
Key updates on Central Public-Sector Undertaking (CPSU) scheme	53
Favourable policy developments expected to lead to large capital investments in the solar PV cell and module manufacturing	55
Implementation of proposed green energy open access rules to push adoption of RE power by C&I segment.....	60
Update on RPO trajectory and compliance	61
Counter-Party Credit Risk	63
Counter-party credit risks remain high in the key states given the continued weak performance of discoms.....	64
State-wise Overview of Solar and Wind Power Sector	67
State-wise overview of solar and wind power sector	68
Financial Performance Trend.....	70
Financial performance of ICRA-rated portfolio.....	71
Outlook for Renewable Energy Sector.....	72
Outlook for the renewable energy sector: Stable.....	73
ICRA Ratings for Wind and Solar IPPs	75

Table of EXHIBITS

EXHIBIT 1: Trends in cumulative RE installed capacity (MW)	14
EXHIBIT 2: Trends in annual RE capacity addition	14
EXHIBIT 3: Mix of renewable energy in all India installed capacity as of August-2021	15
EXHIBIT 4: Source wise mix of renewable energy capacity as of August-2021	15
EXHIBIT 5: Trends in state-wise mix of installed RE capacity	16
EXHIBIT 6: State-wise installed RE capacity as of August 2021	16
EXHIBIT 7: IPP wise operational renewable capacity as per the data in public domain in August 2021	17
EXHIBIT 8: Recent issuance of international green bonds by Indian developers	19
EXHIBIT 9: Trends in M&A activity in the renewable sector in India	20
EXHIBIT 10: Key demand drivers for renewables	22
EXHIBIT 11: RPO trajectory notified by Ministry of Power	24
EXHIBIT 12: Incremental wind and solar capacity requirement by FY2024 to meet RPO targets	24
EXHIBIT 13: Mix of projects awarded across wind, solar, hybrid and peak/ RTC tenders	26
EXHIBIT 14: Year-wise capacity tendered across various segments	26
EXHIBIT 15: Capacity commissioned till date under JNNSM up to Phase II Batch IV as of August 2021	27
EXHIBIT 16: Details on projects awarded under SBG route by central nodal agencies	28
EXHIBIT 17: Scheme wise tendered capacity awaiting signing of PPAs/PSAs	29
EXHIBIT 18: Program-wise solar capacity auctioned in different tariff bands	29
EXHIBIT 19: RE capacity under tendering by various agencies	30
EXHIBIT 20: Year wise average solar power tariffs	30
EXHIBIT 21: Wind power capacity awarded by SECI, NTPC and state distribution utilities	32
EXHIBIT 22: Year-wise wind capacity awards and average tariff discovered	33
EXHIBIT 23: Hybrid, RE+Peak and RE+RTC bids awarded by SECI and state distribution utilities	34
EXHIBIT 24: Projected mix of power generation capacity as of March 2025 vis-à-vis March 2021	37

EXHIBIT 25: Estimated mix of renewable power capacity by March 2025 vis-à-vis March 2021.....	37
EXHIBIT 26: Trends in competitively bid wind tariffs	39
EXHIBIT 27: Trends in competitively bid solar tariffs	39
EXHIBIT 28: Comparison of cost of generation with varying fuel mix vs wind and solar bids	40
EXHIBIT 29: Variable cost of power procurement (bottom 25% generators as per merit order dispatch) for discoms in key renewable energy states.....	40
EXHIBIT 30: Comparison of module prices, bid tariffs and estimated debt coverage ratios between December 2020 and August 2021	41
EXHIBIT 31: Sensitivity of cumulative DSCR for a solar power project to module prices and interest rates at bid tariff rate of Rs 2.0 per unit.....	42
EXHIBIT 32: Sensitivity of cumulative DSCR for a solar power project to module prices and bid tariff rate considering the impact of BCD on imported modules.....	42
EXHIBIT 33: Sensitivity of cumulative DSCR to capital cost and PLF for a wind power project at tariff of Rs 2.8 per unit	43
EXHIBIT 34: Sensitivity of cumulative DSCR to tariff rate and PLF for a wind power project with capital cost of Rs 7 crore per MW.....	43
EXHIBIT 35: Sensitivity of cumulative DSCR to capital cost and interest rate for a wind power project with tariff of Rs. 2.8 per unit and PLF of 32%	43
EXHIBIT 36: Mix of RE generation as a % of all India electricity generation	45
EXHIBIT 37: Mix of wind and solar generation as a % of overall RE generation	45
EXHIBIT 38: Key regulatory and policy updates and expected impact	47
EXHIBIT 39: CERC charges for deviation in a time block by a seller	51
EXHIBIT 40: CERC charges for deviation in a time block by a buyer	52
EXHIBIT 41: Overview of the capacity awarded under the CPSU scheme	54
EXHIBIT 42: ALMM List	56
EXHIBIT 43: Bids tendered by various players under the solar module PLI scheme	57
EXHIBIT 44: Module manufacturing capacity of key domestic players	58
EXHIBIT 45: Cell manufacturing capacity of key domestic players.....	58
EXHIBIT 46: Key takeaways from the draft green energy open access rules	60
EXHIBIT 47: RPO Trajectory specified by MOP.....	61
EXHIBIT 48: RPO Compliance by state distribution utilities.....	61
EXHIBIT 49: Trend in overdues from discoms in key RE states	64
EXHIBIT 50: Trends in book losses for discoms at all India level	64

EXHIBIT 51: Average receivable cycle for wind and solar IPPs from state discoms in key states and central intermediate procurers.....	65
EXHIBIT 52: State-wise overview of solar and wind power sector.....	68
EXHIBIT 53: Aggregate Financials of ICRA rated sample IPPs	71
EXHIBIT 54: Rating distribution for ICRA-rated wind and solar IPPs	76
EXHIBIT 55: Trends in rating upgrades and downgrades for wind and solar power IPPs.....	76
EXHIBIT 56: Key rating actions in 5M FY2022	77

OUTLOOK - STABLE

ICRA's outlook for the renewable energy (RE) sector is Stable because of factors such as strong policy support, large untapped potential, presence of creditworthy central nodal agencies as intermediary procurers and high tariff competitiveness

Central nodal agencies have made progress in signing of PPAs and PSAs for the projects awarded improving the capacity addition prospects

Large capacity addition plans announced by domestic solar OEMs to meet the growing demand for modules

Outlook for the Renewable Energy (RE) sector - Stable

ICRA maintains the outlook for the RE sector at Stable, driven by factors such as continued policy support from the Government of India amid the need to reduce the dependence on fossil fuels, large untapped potential, the presence of creditworthy central nodal agencies as intermediary procurers and high tariff competitiveness. These factors would continue to drive strong investment prospects in the RE sector. Thus, ICRA estimates an improvement in the capacity addition to ~11 GW in FY2022 from the level of 7.4 GW achieved in FY2021, backed by a healthy project pipeline of ~40 GW (excluding the manufacture-linked solar IPP tender of 12 GW). There is a potential for an upside in the capacity addition considering the imposition of basic customs duty (BCD) on imported modules w.e.f April 2022 and developers may look to prepone the project execution to take advantage of the duty-free window. The credit profile of ICRA-rated RE IPPs is supported by the presence of long-term power purchase agreements (PPAs), satisfactory generation performance, must-run status, liquidity buffer in the form of DSRA or working capital and relatively strong sponsor profile.

RE capacity addition rebounded in 5M FY2022; progress seen in signing of PPAs/PSAs – The RE capacity addition improved to 4.9 GW in 5M FY2022 from 1.8 GW added in 5M FY2021 led by the easing of execution challenges as seen in the corresponding period of previous year due to the nationwide lockdown. The capacity addition is led by the solar power segment, which added 4.4 GW in 5M FY2022. Moreover, the Solar Energy Corporation of India Limited's (SECI) progress in signing of power sale agreements (PSAs) for some of the tenders, including the 400 MW RTC supply tender, has helped reduce the capacity awaiting signing of PSAs to ~15 GW (excluding the recently awarded projects) from more than 20 GW over the past six months. More importantly, the manufacture-linked tender of 12-GW is expected to witness progress in signing of PSAs/PPAs with industry sources indicating that the winning developers are likely to reduce the quoted tariff to the levels acceptable to the discoms. Moreover, with the solar power tariffs remaining highly competitive at less than Rs. 2.5 per unit, despite the impact of rise in module prices and BCD on imported solar PV cells and modules, and the recovery in electricity demand growth, the signing of PPA/PSAs is likely to pick up pace.

While payments remain timely from NTPC/SECI/Gujarat utilities, mixed payment pattern from discoms in other key states – While the payments continue to remain timely from NTPC, SECI and discoms in Gujarat, the payment pattern from discoms remain mixed. There are significant delays in realising payments from discoms in Andhra Pradesh, Maharashtra (mainly for wind), Madhya Pradesh (mainly for wind), Telangana and Tamil Nadu. The overall dues from discoms to RE IPPs increased to Rs. 135.9 billion as of July 2021 from Rs. 118.4 billion as of April 2021, as per the data from the PRAAPTI portal. This is despite the release of payments under the liquidity support scheme approved

by the Government of India for the state discoms. A sustainable improvement in discom finances remains important to ensure timely payments to the RE IPPs and to enable timely signing of PPAs for the projects bid out under various schemes.

Domestic solar OEM segment witnesses large capacity addition announcements and entry of a major player - The demand outlook for the domestic solar OEMs remains strong over the medium term, given the greater policy thrust towards domestic manufacturing with imposition of BCD on imported cells and modules, the notification of the production linked incentive (PLI) scheme to improve the cost competitiveness of domestic manufacturers and the notification of the Approved List of Models and Manufacturers (ALMM) comprising only domestic manufacturers. The domestic manufacturers are poised to improve the capacity utilisation of existing facilities and add incremental capacity to meet the demand requirements. The domestic OEMs have announced expansion plans to augment the cell and module manufacturing capacity by 10.0 GW and 18.0 GW respectively, entailing investments of close to Rs. 100 billion. Further, bids aggregating to more than 50 GW have been received for setting up integrated solar module manufacturing capacities under the production linked incentive (PLI) scheme. Moreover, Reliance Industries Limited (RIL) has announced its entry in the RE sector with large capital commitments including setting up an integrated solar photovoltaic module factory. The entry of RIL into solar module manufacturing is likely to create a favourable ecosystem for the solar equipment manufacturing in the country.

ABOUT ICRA

ICRA Limited (formerly Investment Information and Credit Rating Agency of India Limited) was set up in 1991 by leading financial/investment institutions, commercial banks and financial services companies as an independent and professional investment Information and Credit Rating Agency.

Today, ICRA and its subsidiaries together form the ICRA Group of Companies (Group ICRA). ICRA is a Public Limited Company, with its shares listed on the Bombay Stock Exchange and the National Stock Exchange.

Alliance with Moody's Investors Service

The international Credit Rating Agency Moody's Investors Service is ICRA's largest shareholder. The participation of Moody's is supported by a Technical Services Agreement, which entails Moody's providing certain high-value technical services to ICRA. Specifically, the agreement is aimed at benefiting ICRA's in-house research capabilities, and providing it with access to Moody's global research base. The agreement also envisages Moody's conducting regular training and business seminars for ICRA analysts on various subjects to help them better understand and manage concepts and issues relating to the development of the capital markets in India. Besides this formal training programme, the agreement provides for Moody's advising ICRA on Rating-products strategy, and the Ratings business in general.

The ICRA Factor

Our services are designed to

- Provide information and guidance to institutional and individual investors/creditors;
- Enhance the ability of borrowers/issuers to access the money market and the capital market for tapping a larger volume of resources from a wider range of the investing public;
- Assist the regulators in promoting transparency in the financial markets;
- Provide intermediaries with a tool to improve efficiency in the funds raising process.

Business Contacts

Mr. L. Shivakumar
E-mail: shivakumar@icraindia.com
+91 22 6114 3406 / +91 98210 86490

Mr. Jayanta Chatterjee
E-mail: Jayantac@icraindia.com
Tel: +91 80 4332 6401 / +91 98450 22459

Media and Public Relations

Ms. Naznin Prodhani
E-mail: Communications@icraindia.com
Tel: +91 124 4545 860

Registered Office

1105, Kailash Building, 11th Floor,
26, Kasturba Gandhi Marg, New Delhi -
110 001
Tel: + 91 11 2335 7940-50

Corporate Office

Building No. 8, 2nd Floor,
Tower A, DLF Cyber City, Phase II,
Gurgaon - 122 002
Tel: +91-124-4545300

Ahmedabad

1809-1811, Shapath V,
Opp: Karnavati Club,
S.G.Highway, Ahmedabad - 380015
Tel: +91 79 4027 1500/501

Bengaluru 1

'The Millenia', Tower B Unit No. 1004,
10th Floor, 1 & 2 Murphy Road,
Bengaluru - 560 008
Tel: +91 80 4332 6400

Bengaluru 2

2nd Floor, Vayudooth Chamber
15-16, Trinity Circle, M.G. Road,
Bengaluru - 560 001
Tel: +91 80 4922 5500

Chennai

5th Floor, Karumuttu Centre
634, Anna Salai, Nandanam
Chennai - 600 035
Tel: +91 44 4596 4300

Hyderabad 1

4th Floor, 'Shoban'
6-3-927/A&B, Somajiguda
Raj Bhavan Road,
Hyderabad - 500 082
Tel: +91 40 4067 6500

Hyderabad 2

No. 7-1-58, 301, 3rd Floor, 'Concourse',
Above SBI-HPS Branch, Ameerpet,
Hyderabad - 500 016
Tel: +91 40 4920 0200

Kolkata

A-10 & 11, 3rd Floor,
FMC Fortuna 234/3A,
A.J.C. Bose Road,
Kolkata - 700 020
Tel: +91 33 7150 1100/01

Mumbai

3rd Floor, Electric Mansion
Appasaheb Marathe Marg,
Prabhadevi,
Mumbai - 400 025
Tel: +91 22 6169 3300

Pune

5A, 5th Floor, Symphony, S. No. 210
CTS 3202 Range Hills Road,
Shivajinagar, Pune - 411 020
Tel: +91 20 2556 1194

Email: Info@icraindia.com

Helpdesk: 9354738909

Website: www.icra.in/ www.lcrareserach.in