

# Renewable Energy

India

Sector View:

NIFTY-50: 23,708

January 08, 2025

## Long runway for growth; rising competition—structural risk

We believe India's solar sector is primed for growth with an 18% CAGR in utility scale solar capacity additions until FY2030. Indian solar companies are well-positioned for strong growth in domestic and US markets, aided by trade and non-trade barriers. Over the medium term, we believe that integrated Indian manufacturers (from ingot to module) and companies with local US manufacturing presence would continue to enjoy a competitive advantage over peers, resulting in superior profitability. We initiate coverage on Premier Energies and Waaree Energies with SELL ratings.

### Solar sector primed for growth

India's total capacity addition is expected to reach 641GW in FY2030 from 442GW, as of FY2024, with approximately 66% of the incremental addition coming from solar (KIE utilities analyst's estimate). We expect solar capacity to reach 214GW by FY2030 from 82GW in FY2024, driven by (1) utility level additions, (2) PM Surya Ghar Muft Bijli Yojana (rooftop solar), (3) PM-KUSUM Scheme (solar pumps) and (4) captive industrial addition. Additionally, any pick-up in the National Green Hydrogen Mission could provide a further upside to our demand estimates.

### Government policy—a key growth enabler

The Indian government has implemented multiple trade (basic custom duty) and non-trade barriers (ALMM, DCR, PLI). Similarly, the US has imposed a 50% tariff on Chinese solar imports and implemented the Uyghur Forced Labor Prevention Act in June 2022 (UFLP Act). These measures have been key to the Indian solar manufacturing sector's exponential growth. Sustenance of such policies over the medium term is key to ensuring the scaling up of the industry.

### Vertical integration key to long-term differentiation

Indian manufacturers have primarily concentrated on module assembly (with a sharp focus on the domestic and export markets). Currently, many companies are entering solar cell manufacturing due to the implementation of ALMM List II from FY2027. Over the medium term, we expect that completely backward-integrated Indian manufacturers (from ingot to module) and companies with local US manufacturing presence would continue to have an advantage over peers.

### Initiate on Premier Energies (SELL) and Waaree Energies (SELL)

The current valuation of Indian solar manufacturing companies implies that the sector will continue to see exponential growth over the medium term, which we agree with (we estimate an 18% CAGR in capacity addition over FY2024-30E), but sustenance of unit economics at current levels is unlikely, given the increasing competitive intensity. We expect heightened competitive intensity to start impacting margins from 2028. We initiate coverage on Waaree Energies and Premier Energies with SELL ratings.

#### Company data and valuation summary

Company	Mcap (US\$ mn)	Rating	FV (Rs)	Upside/ (downside) (%)
Waaree Energies	9,192	SELL	2,550	-7%
Premier Energies	6,707	SELL	770	-40%

Source: Bloomberg, Company data, Kotak Institutional Equities estimates

Prices in this report are based on the market close of January 07, 2025

[Full sector coverage on KINSITE](#)

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## Executive Summary: Primed for growth, competitive intensity and extent of backward integration will determine profitability over the medium term

India's solar sector is poised for exponential growth over the next decade, as the country aims to reach 500GW of renewable energy capacity by 2030. We expect India's solar capacity to reach 214GW by FY2030 from 82GW in FY2024, driven by (1) utility level additions, (2) rooftop solar, (3) solar pumps and (4) captive industrial addition. Indian solar equipment manufacturers are expected to be key beneficiaries of this growth, led by supportive domestic and export policies such as (1) import tariffs on Chinese solar equipment, (2) non-trade barriers such as ALMM and DCR in India and (3) Uyghur Forced Labor Prevention Act in the US. When we evaluate the unit economics and return profile of the current seven manufacturing options available to Indian companies, we see that near margins and return profiles are attractive across most categories. However, with large capacity expansion plans announced by multiple players over the medium term, we foresee normalization of margins and return ratios. We expect integrated Indian manufacturers (from ingot to module) and companies with local US manufacturing presence would have superior profitability and higher utilization over the medium term.

In our view, Premier Energies and Waaree Energies are two credible domestic solar equipment manufacturers. Premier has taken an integrated capital-intensive approach and has an earlier mover advantage due to its operational solar cell capacity. In our view, Waaree Energies has strong growth potential, driven by (1) large domestic module capacity and (2) established presence in the highly lucrative US market. We see Waaree having strong cash flow generation due to higher profits from the US, which we expect to help the company reinvest in domestic backward integration. Valuations are at a premium across Indian pure-play solar equipment companies, extrapolating recent good times; hence, we initiate on Premier and Waaree Energies with SELL ratings.

### Indian solar sector primed for growth; overcapacity remains a key risk for equipment manufacturers

#### Domestic demand tailwinds

India's total capacity addition is expected to reach 641GW in FY2030 from 442GW, as of FY2024, with approximately 66% of the incremental addition to be added through solar (KIE utilities analyst's estimate). The solar capacity is expected to reach 214GW by FY2030 from 82GW in FY2024, driven by (1) utility level additions, (2) PM Surya Ghar Muft Bijli Yojana, (3) PM-KUSUM scheme and (4) captive industrial addition. Additionally, any pick up in the National Green Hydrogen Mission could provide a further upside to our solar PV module demand estimates.

**We expect India’s utility scale solar installed capacity to reach 214GW by FY2030 (installed capacity to reach 280GW, including rooftop solar, pumps and industrial customers)**

**Exhibit 1: India’s renewable and solar capacity addition, March fiscal year-ends, 2020-30E (in GW)**

	2020	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Based on Kotak Estimates</b>											
India Installed capacity (in GW)	370	382	399	416	442	474	503	533	565	601	641
Renewable installed capacity(ex-Hydro) (in GW)	87	94	110	125	144	164	187	213	241	274	310
Incremental renewable capacity addition (in GW)		7	15	15	18	20	23	25	28	32	36
Solar share in renewable capacity						80%	80%	80%	80%	80%	80%
<b>Annual utility scale solar capacity addition in GW</b>						<b>16</b>	<b>18</b>	<b>20</b>	<b>23</b>	<b>26</b>	<b>29.2</b>
<b>Annual solar addition in GW</b>											
Utility scale addition						16	18	20	23	26	29
Roof top solar						3	5	5	5	5	6
Solar pumps						3	5	5	5	5	6
Industrial captive addition						1.0	1.1	1.2	1.3	1.5	1.6
<b>Total AC solar addition (in GW)</b>						<b>23.4</b>	<b>29.5</b>	<b>31.6</b>	<b>34.1</b>	<b>38.0</b>	<b>41.8</b>
AC/DC Factor						1.4	1.4	1.4	1.4	1.4	1.4
<b>Total DC capacity addition (in GW)</b>						<b>31.5</b>	<b>39.3</b>	<b>42.2</b>	<b>45.8</b>	<b>51.0</b>	<b>56.3</b>
Note AC/DC conversion not applicable for solar pumps since they are not grid connected											
<b>Installed utility scale solar power capacity (in GW)</b>	<b>35</b>	<b>40</b>	<b>54</b>	<b>67</b>	<b>82</b>	<b>98</b>	<b>117</b>	<b>137</b>	<b>160</b>	<b>186</b>	<b>215</b>
<b>Installed solar power capacity including pumps, rooftop solar and industrial captive customer (in GW)</b>	<b>105</b>	<b>135</b>	<b>166</b>	<b>200</b>	<b>238</b>	<b>280</b>					

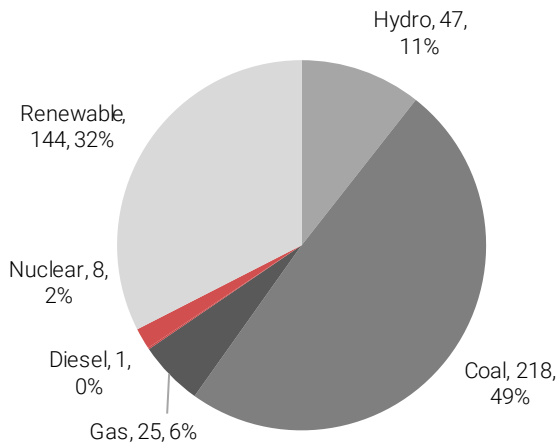
Note:

(a) AC/DC conversion not applicable for solar pumps, since they are not grid connected

Source: CEA, Kotak Institutional Equities estimates

**India’s current installed capacity is 442GW, as of March 2024, with 33%of installed base from renewable sources (ex-hydro)**

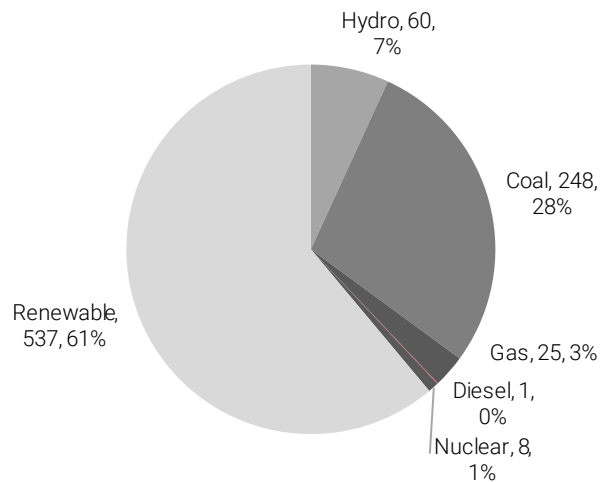
**Exhibit 2: India’s installed power capacity, March fiscal year-ends, 2024 (in GW, %)**



Source: CEA

**We expect India’s installed capacity to double over the next 11 years with 90% of incremental capacity coming from renewables**

**Exhibit 3: India’s installed power capacity, March fiscal year-ends, 2035 (in GW, %)**



Source: Kotak Institutional Equities estimates

### Domestic manufacturing landscape

India has 70GW of installed capacity of solar module and 7GW of solar cell capacity, as of FY2024. The Indian solar manufacturing sector has seen exponential growth over the past five years, driven by multiple trade (basic custom duty) and non-trade barriers (ALMM, DCR and PLI), which have been put in place to incentivize domestic solar manufacturing in the country. With the 90GW additional solar module capacity addition announcements made, we think module manufacturing capacity is heading into an oversupply zone, which could potentially make operations less viable for some smaller players that are focused on module manufacturing. On the domestic cell side with the Indian government’s intention to introduce ALMM List-II for cells and make use of domestic cells mandatory for all ALMM modules, the end-market demand of domestic cell is expected to see exponential growth over the next coming years. The ability to stabilize large cell capacity earlier than peers could give companies a competitive advantage until cell capacity catches up, which is likely in FY2028.

### Solar module manufacturing nameplate capacity could potentially double over the next three years based on capacity expansion announcements

Exhibit 4: Announced module capacity expansion by various Indian companies, March fiscal year-ends, 2024-27E (GW)

Solar Module capacity (in GW)				
Company Name	2024	2025E	2026E	2027E
Reliance Industries		10	20	20
Waaree Energies	13	13	20	20
Vikram Solar	4	5	11	15
Renew Power	6	6	6	12
Premier Energies	4	4	8	10
Mundra Solar (Adani Enterprises)	4	6	8	10
Saatvik Green Energy Pvt. Ltd	4	6	6	8
Renew Sys India	3	5	5	7
Grew Energy Private Limited	1	3	3	6
Goldi Solar	3	6	6	6
Shirdi Sai	0	1	3	5
Tata Power Solar	5	5	5	5
Insolation Energy	1	1	2	4
Solex energy	1	2	3	4
Rayzon Solar	4	4	4	4
First Solar	3	3	4	4
Others	15	19	23	23
<b>Total India Capacity</b>	<b>70</b>	<b>97</b>	<b>135</b>	<b>162</b>

Source: Company announcements

**Solar cell capacity worth 84GW is expected to be added over the next three years (however, given the longer lead time requirement the actual capacity could be substantially lower than what has been announced)**

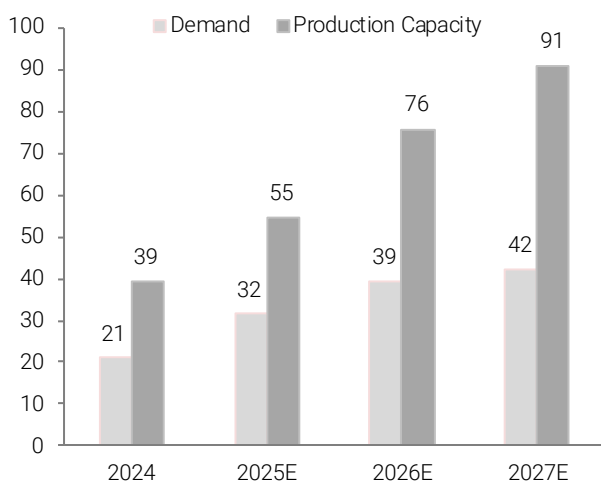
Exhibit 5: Announced cell capacity expansion by various Indian companies, March fiscal year-ends, 2024-27E (GW)

Solar Cell capacity (in GW)				
Company Name	2024	2025E	2026E	2027E
Reliance Industries	—	10.0	20.0	20.0
Waaree Energies	—	5.0	5.0	11.0
Mundra Solar (Adani Enterprises)	4.0	6.0	8.0	10.0
ReNew Power	—	2.5	2.5	8.5
Premier Energies	2.0	3.0	3.0	7.0
Goldi Solar	—	—	—	5.0
Shirdi Sai	—	—	0.5	5.0
Tata Power	0.5	4.0	4.0	4.0
Jupiter Solar	0.8	0.8	0.8	3.8
Renew Sys India	0.1	1.1	2.1	3.1
Vikram Solar	—	—	3.0	3.0
Grew Energy Private Limited	—	—	—	2.8
Jakson Engineers Ltd.	—	—	1.3	2.5
Websol Energy	0.6	0.6	2.4	2.4
Saatvik Solar	—	—	2.0	2.0
Solex energy	—	—	—	2.0
Insolation Energy	—	—	0.6	1.2
<b>Total India Capacity</b>	<b>8.1</b>	<b>33.0</b>	<b>54.6</b>	<b>92.1</b>

Source: Company announcements

**Module demand to account for only 45% of production capacity**

Exhibit 6: Demand versus production capacity of Indian modules, March fiscal year-end, 2024-27E (GW)



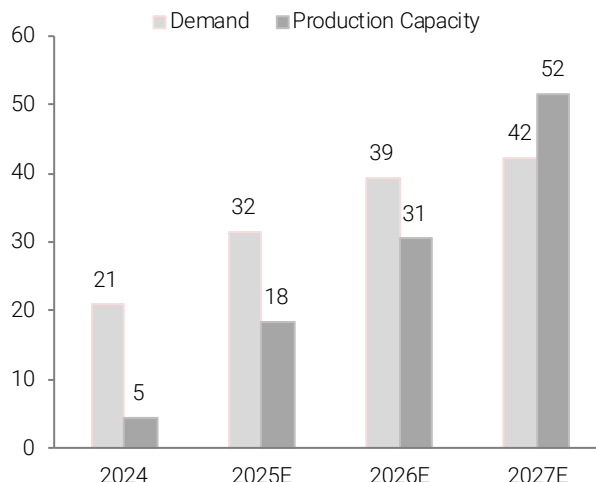
Note:

(a) Production capacity = ~60% of nameplate capacity

Source: Company, Kotak Institutional Equity estimates

**Cell to head into oversupply zone by FY2027/28**

Exhibit 7: Demand versus production capacity of Indian cells, March fiscal year-end, 2024-27E (GW)



Note:

(a) Production capacity = ~60% of nameplate capacity

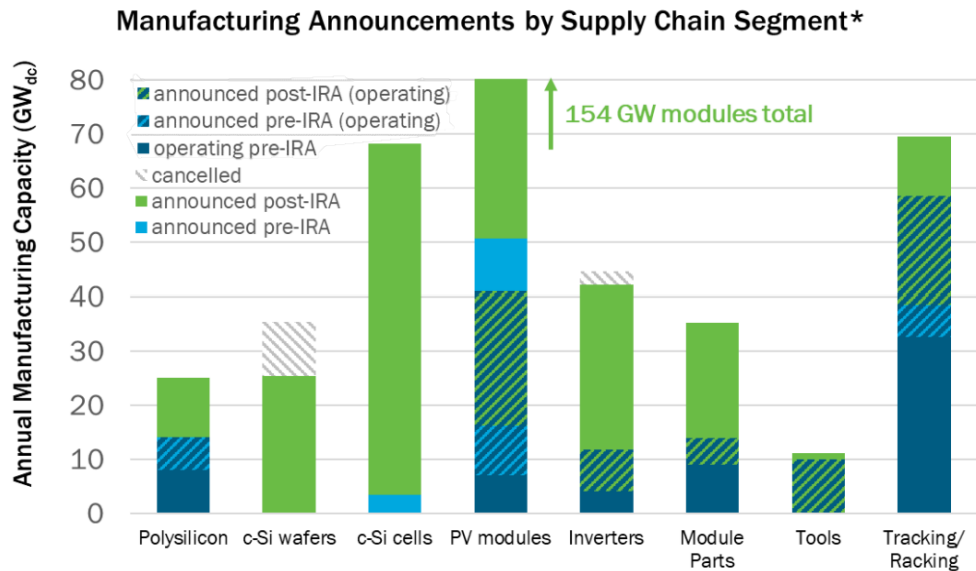
Source: Company, Kotak Institutional Equity estimates

**Export opportunity: A short-term play with onshoring in the US a more sustainable long-term bet**

Trade and non-trade barriers on the import of Chinese solar modules and cells have created a favorable environment for India and other Southeast Asian countries to increase their exports to the US. We expect the next couple of years to be strong for the exports of solar modules from India, but with local US module manufacturing capacity being set up with the help of Inflation Reduction Act (IRA) incentive, we see Indian players with local US module and cell manufacturing facilities, and exports of cells in India to continue to see strong demand over the medium term. Potential policy changes in the US and uncertainty regarding the continuation of current policies remain key near-term monitorable.

**Large US capacity expansion announcements made under IRA could lower long-term export opportunity**

Exhibit 8: Announced solar capacity expansion by various US companies (in GWdc)



Source: Wood Mackenzie, Solar Energy Industries Association

**Solar cell and module unit economics**

Profitability and return profile of a solar manufacturing company depends primarily on the (1) level of backward integration, (2) end markets, (3) competitive intensity and (4) location of manufacturing (India or the US). When we evaluate the unit economics and return profile of the current seven manufacturing options available to Indian companies, we see that module export to the US and US module manufacturing as the most profitable markets for Indian companies. Over the medium term, we see that completely backward-integrated Indian manufacturers (from ingot to module) and companies with local US manufacturing presence would continue to enjoy a significant advantage over peers, resulting in higher utilization and superior profitability.

**Module export to the US and US module manufacturing are the most profitable markets for Indian companies**

Exhibit 9: Unit economics for solar modules and cells; December 2024 (US\$ cents/wp)

	Solar PV Manufacturing						
	India manufacturing				US Manufacturing		
	Non DCR Module	DCR Module	DCR Cell	Module export to US	US Module	US Cell	US Module +Cell
Realization (US\$ cents/wp)	17	25	13	28	28	15	28
Gross Margin (%)	16	39	54	26	28	11	10
EBITDA Margin (%)	10	33	43	20	44	28	40
<b>RoCE (%)</b>	<b>23</b>	<b>28</b>	<b>22</b>	<b>72</b>	<b>89</b>	<b>7</b>	<b>23</b>

Note:

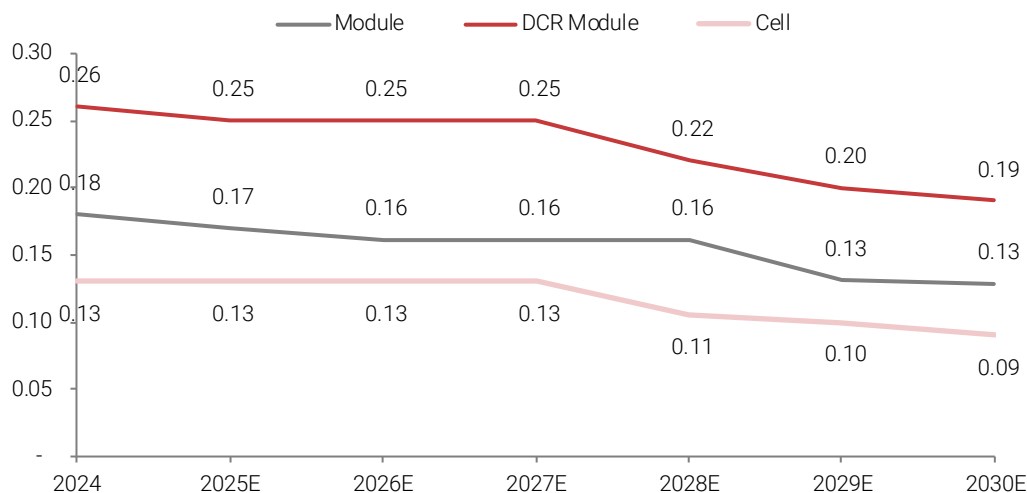
(a) US EBITDA includes IRA AMPC rebate, utilization assumed at 60% for modules and 70% of cells and cells + module for RoCE calculation

Source: Kotak Institutional Equities estimates



**We estimate 28%, 27% and 31% drops in module, DCR module and cell prices, respectively, in FY2024-30E**

Exhibit 10: India manufacturing module, DCR module, cell pricing, March fiscal year-ends, 2024-30E (US\$ cents/wp)



Source: Company filings, Kotak Institutional Equity estimates

**Heightened competitive intensity would bring down the return ratio of DCR modules down to 12% by 2030**

Exhibit 11: Unit economics for DCR solar modules; March fiscal year-ends, 2024-30E (US\$ cents/wp)

Solar PV Manufacturing		
	DCR module 2024	DCR module 2030
Realization (US\$/wp)	25	19
Gross Margin (%)	39	27
EBITDA Margin (%)	33	19
<b>RoCE (%)</b>	<b>28</b>	<b>12</b>

Source: Kotak Institutional Equities estimates

**Global takeaways: Overcapacity remains a key risk for Indian solar industry**

On analyzing the major Chinese and US solar companies, we find the following: (1) Chinese companies have the largest scale and are most vertically integrated, but their margins are impacted due to overcapacity, which offsets any benefits of vertical integration and has led to record low realizations. While Indian companies currently enjoy benefits of trade and non-trade barriers along with lower capacity, large capacity expansions by all Indian players could lead to a similar situation locally. (2) When we analyze First Solar, a leading US manufacturer of solar PV modules, we find that after the implementation of the IRA and Uyghur Forced Labor Prevention Act, the company has seen a sharp improvement in its growth and EBITDA margins, which is what Indian companies can potentially expect over the next few years, driven by the implementation of ALMM List II from 1<sup>st</sup> June 2026.

**Valuation implies current unit economics to sustain**

The current valuation of Indian solar manufacturing companies implies that the Indian solar sector will continue to see exponential growth over the medium term, which we agree with (we estimate an 18% CAGR in capacity addition over FY2024-30E), but sustenance of unit economic pricing at current levels is unlikely, given heightened competitive intensity. We expect the heightened competitive intensity to start impacting margins from 2028. We initiate coverage on Waaree Energies and Premier Energies with SELL ratings.

### Waaree Energies—metamorphosing into global integrated solar manufacturing leader

- ▶ Waaree is the largest domestic solar module manufacturer, commanding an 18% capacity share (2X the second-largest player). We expect Waaree to continue its dominance, driven by rapid capacity expansion plans and see Waaree reaching 19.3GW module, 11.4GW cell and 6GW wafer capacities by 2027. Vertical integration will help Waaree expand its EBITDA margins from 13.8% in FY2024 to 23.7% in FY2027. In the US, we see Waaree expanding its capacity from 1.6GW in FY2025 to 5GW by FY2027, with an aim to meet local US demand. Furthermore, strong growth from its EPC subsidiary WRTL and newer growth areas of hydrogen electrolyzers and BESS systems will be key drivers of future growth.
- ▶ We forecast Waaree's growth to be driven by 3 key factors—(1) India capacity expansion and backward integration, (2) expansion into US cell manufacturing and (3) higher capacity utilization. We expect Waaree Energies' margins to expand from 13.8% in FY2024 to 23.7% in FY2027, largely driven by vertical integration from ingot to module. However, increasing competitive intensity would start impacting margins from 2028. Operating cash flows and IPO proceeds will be sufficient to fund incremental capex required for growth.
- ▶ We initiate coverage on Waaree Energies with a SELL rating and DCF-based Fair Value of Rs2,550, which implies 13.1X March 2027 EPS estimate. Our FV implies: (1) Waaree Energies' capacity to increase at a CAGR of 12% for module, with module and cell capacity reaching 40GW and 32GW, respectively, by FY2035, (2) 14% volume CAGR for Waaree's module volumes by FY2035, driven by capacity addition and utilization levels of 70%+ for modules, (3) stable EBITDA margins of ~19% in the long term, with an exit FY2035 margin of 19.4%, (4) cost of equity of 13% & WACC of 12.6% and (5) terminal value of 2X FY2035 book value, in line with Chinese peers.

### Premier Energies—first-mover advantage with rapid expansion plans

- ▶ Premier Energies has a first-mover advantage in cell manufacturing over peers, since it is a complex process with extensive utilities management and high capex costs. We expect Premier to capitalize on its cell manufacturing capabilities and increase its domestic module and cell capacity to 17.4GW and 13GW, respectively, by FY2030 from 3.36GW and 2GW, as of FY2024. In the US, we expect Premier's JV with Heliene to give the company an early mover advantage in the cell market. We see US cell demand increasing exponentially over the next five years (50GWdc module is expected to be produced locally in CY2027 versus 7GWdc in CY2023), driven by local US module manufacturing (aided by IRA benefits). This we believe will be a key demand driver for Premier and would see its US cell capacity reach 3.2GW by FY2030.
- ▶ We forecast Premier's growth to be driven by three key factors: (1) India capacity expansion and backward integration, (2) expansion into US cell manufacturing and (3) higher capacity utilization. Margins are likely to peak at 25% levels in 2027 due to supernormal realization in the DCR market. However, increasing competitive intensity would hurt margins from 2028. Operating cash flows and IPO proceeds will be sufficient to fund incremental capex required for growth.
- ▶ We initiate coverage on Premier Energies, with a SELL rating and a DCF-based Fair Value of Rs770, implying a 21.8X March 2027 EPS estimate. Our FV implies (1) Premier Energies' capacity to increase at a CAGR of 20% and 27% for module and cell capacity, respectively, reaching 25.9GW and 27GW by 2035, (2) the 29% and 34% volume CAGR for Premier's module and cell volumes, respectively, until FY2035, driven by capacity addition and utilization levels of 70%+ for modules and 85% for cells on effective capacity, (3) stable EBITDA margins of 20% in the long term, with an exit FY2035 EBITDA margin of 18.6%, (4) a cost of equity of 13% and WACC of 10.5% and (5) terminal value of 2.3X FY2035 book value (10% premium to current Chinese solar valuations).

### Key risks

**Change in government regulation and policies:** Currently, the Indian solar manufacturing sector has seen exponential growth over the past five years, driven by multiple trade (basic custom duty) and non-trade barriers (ALMM, DCR, PLI), which have ensured that the domestic solar manufacturing sector is preferred for majority of solar projects versus Chinese peers. Similarly, the US has imposed a 50% import tariff on solar cells and modules from China. Furthermore, there have been various barriers on imports from China, including (1) antidumping or countervailing duty tariffs, (2) section 201 and 301 tariffs and (3) implementation of the Uyghur Forced Labor Prevention Act in June 2022 (UFLP Act), all of which have helped Indian manufacturers export solar products to the US. We believe Indian solar manufacturers cannot match Chinese solar manufacturing costs due to the difference in scale and level of backward integration. Hence, any change in government policy in India or the US could severely impact the demand outlook for Indian companies.

**Change in unit economics:** The profitability and return profile of a solar manufacturing company depends primarily on the (1) level of backward integration, (2) end markets, (3) competitive intensity and (4) location of manufacturing (India or the US). Based on the large capacity expansion plans announced by companies, we expect increasing competitive intensity in India and across the globe to impact profitability for solar companies in the coming years. However, any major change in policy from the Chinese government on capacity addition (restricting newer capacity) could potentially imply better profitability for most companies.

**Stronger-than-expected demand environment:** Our solar capacity addition estimate for utility is 214GW currently (based on KIE utilities analyst’s estimates), 25% lower than the government’s target of 280GW of solar capacity by 2030. Furthermore, we do not bake in any impact of newer solar power plants required for green hydrogen production. A faster-than-expected ramp-up of solar capacity and a pick-up in green hydrogen production could lead to higher-than-expected demand, in our view.

### Relative valuation table

Waaree Energies trades at a substantial discount to its peer Premier Energies on FY2027E earnings. This is due to large capacity expansion coming on stream for Waaree over the short term, while for Premier the impact of majority of the expansion would only be seen beyond FY2027. Furthermore, Premier Energies has an already operational cell manufacturing facility and lower exposure to the US geography, both of which reduce uncertainty on near-term earnings. By FY2030E, we expect margins and return ratios to converge for the two companies, with the only major difference being the scale of operations.

### Indian players trade at a significant premium to global peers, driven by a large runway for growth and superior margin profile

Exhibit 12: Valuation comparable metric for Indian solar manufacturing companies, March fiscal year-ends, 2025-27E

Company	Mkt Cap. (US\$ mn)	Price (LC)	Year end	EV (US\$ mn)	EV/EBITDA (X)			P/E (X)			P/B (X)			RoAE (%)		
					2025E	2026E	2027E	2025E	2026E	2027E	2025E	2026E	2027E	2025E	2026E	2027E
<b>India</b>																
Waaree Energies	9,192	2,742	Mar	8,859	31.1	16.9	10.8	46.7	24.6	14.1	8.1	6.3	4.4	24.2	29.4	36.6
Premier Energies	6,707	1,275	Mar	6,618	40.2	25.5	18.2	78.4	47.2	36.1	19.9	14.0	10.1	41.6	34.9	32.5
					<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>
<b>Global</b>																
First Solar	19,959	186	Dec	19,383	10.1	6.6	4.8	14.1	9.0	6.5	2.5	2.0	1.5	18.7	23.4	25.3
LONGI Green Energy	15,688	15	Dec	15,122		14.9	8.7		54.0	16.9	2.1	2.0	1.8	(11.0)	4.1	9.3
Jinko Solar	9,948	7	Dec	12,229	10.7	7.8	6.0	48.1	18.9	14.4	2.1	1.9	1.7	4.3	9.1	12.5
JA Solar	5,899	13	Dec	9,152	14.6	7.9	5.4		22.3	10.4	1.5	1.5	1.4	(3.5)	5.8	11.2
Trina Solar	5,493	18	Dec	10,659	14.4	10.9	7.6	439.8	17.8	11.3	1.3	1.2	1.1	0.3	7.9	9.5
Canadian Solar	788	12	Dec	5,936	10.3	7.3	5.0	23.2	52.1	4.0	0.3	0.2	0.3	1.5	4.7	8.8
<b>Median (China peers)</b>					<b>14.4</b>	<b>9.4</b>	<b>6.8</b>	<b>243.9</b>	<b>20.6</b>	<b>12.8</b>	<b>1.8</b>	<b>1.7</b>	<b>1.6</b>	<b>(1.6)</b>	<b>6.8</b>	<b>10.3</b>

Note:

- (a) All global companies ending December have valuation ratios for CY2024/25/26. All domestic companies ending March have valuation ratios for FY2025/26/27
- (b) China peers include LONGI Green Energy, Jinko Solar, JA Solar and Trina Solar

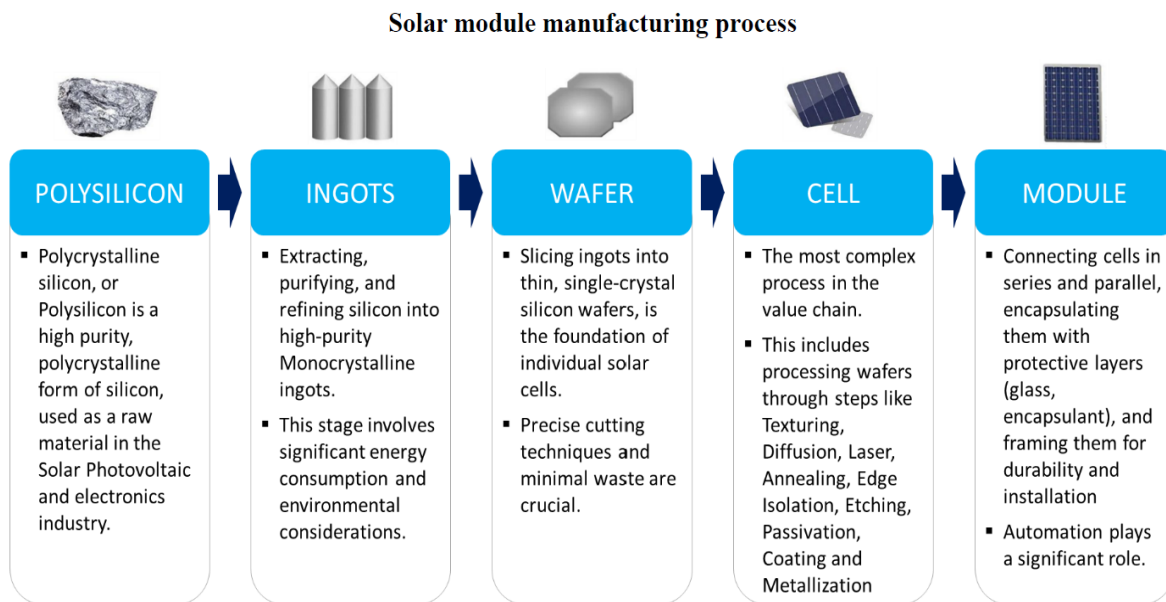
Source: Bloomberg, Kotak Institutional Equities estimates

# 2

## Solar PV manufacturing: Vertical integration—a key long-term differentiator

The solar PV module manufacturing value chain encompasses five critical processes for transforming raw materials, i.e., polysilicon, into finished solar panels that are ready for electricity generation. It is a complex and globalized network, with each step contributing to the final product's cost, performance and sustainability. Of the five processes, the manufacturing of polysilicon and solar cells is the most complex. We see module assembly and wafer slicing as steps with relatively lower value addition. Most solar PV manufacturers are vertically integrated from ingot to module (which is what we see Indian companies replicating), with polysilicon manufacturing being done by specialized companies.

Exhibit 13: Solar module manufacturing process



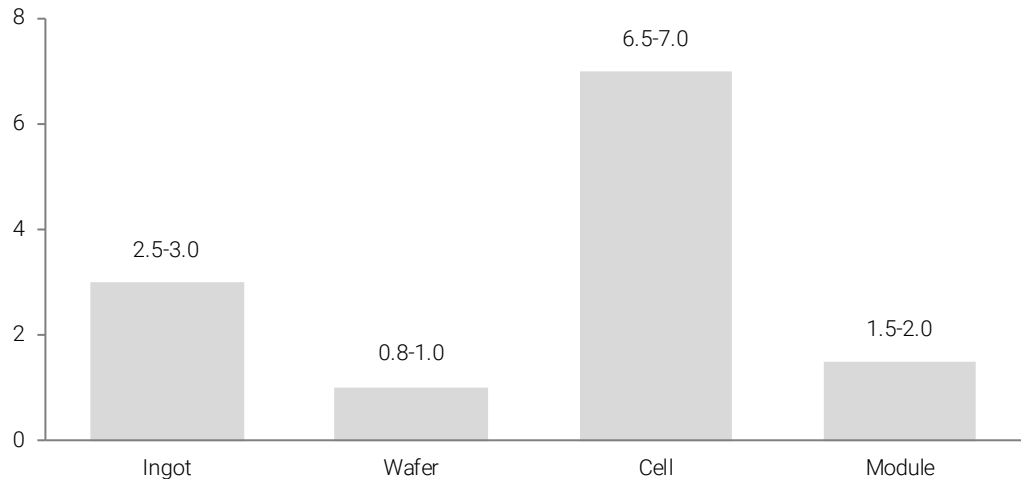
Source: Energy.gov

- ▶ **Polysilicon production:** Polysilicon is a high-purity, fine-grained crystalline silicon product, typically in the shape of rods or beads, depending on the method of production. The manufacturing process consists of two distinct steps: (1) The metallurgical silicon is turned into trichlorosilane (TCS) gas, which is then purified and (2) the TCS gas is deposited on silicon seed rods using chemical vapor deposition as high-purity polysilicon, which is then broken up to poly-Si chunks. The manufacturing process requires highly reactive gases, synthesized primarily using metallurgical-grade silicon (obtained from quartz sand), hydrogen and chlorine.
- ▶ **Ingot and wafer production:** The ingot/wafering step in the value chain is the conversion of highly purified poly-Si chunks, a few centimeters in size, into Si wafers. This step consists of two parts—firstly, the poly-Si chunks are melted and cylindrical monocrystalline silicon ingots over 200 mm in diameter and over 5 m in length are grown and pulled from the melt; then these ingots are cut into wafers with a thickness of 150-165 micrometers using diamond-wire saws.
- ▶ **Cell fabrication:** Silicon wafers are then fabricated into photovoltaic cells. The first step is the chemical texturing of the wafer surface, which removes saw damage and increases how much light gets into the wafer when it is exposed to sunlight. The subsequent processes vary significantly depending on device architecture. Most cell types require the wafer to be exposed to a gas containing an electrically active dopant and coating the surfaces of the wafer with layers that improve the performance of the cell. Screen printing of silver metallization for electrical contacts is also very common among cell types.

► **Module assembly:** At a module assembly facility, copper ribbons plated with a solder connect the silver busbars on the front surface of one cell to the rear surface of an adjacent cell in a process known as tabbing and stringing. The interconnected set of cells is arranged face-down on a sheet of glass covered with a sheet of polymer encapsulant. A second sheet of encapsulant is placed on top of the face-down cells, followed by a tough polymer back sheet or another piece of glass. The whole stack of materials is laminated in an oven to make the module waterproof, then fitted with an aluminum frame, edge sealant and a junction box in which the ribbons are connected to diodes that prevent any backward flow of electricity. Electrical cables from the junction box convey the current produced by the module to an adjacent module or to the system’s power electronics.

**Cell and ingot manufacturing have higher capex costs as compared with module and wafer**

Exhibit 14: Capex analysis across solar value chain (for setting up 1GW capacity) (Rs bn)



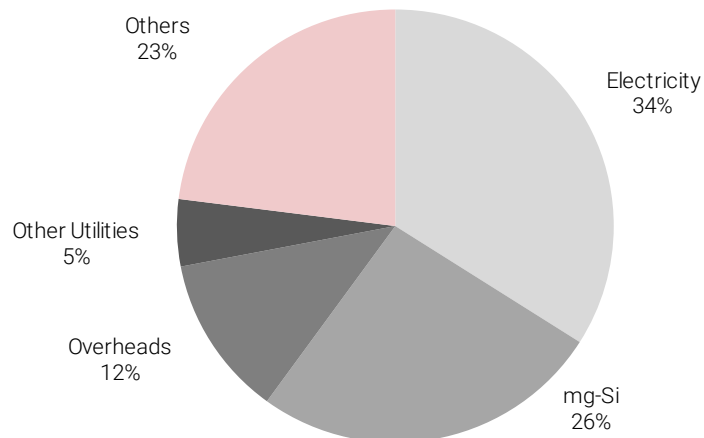
Source: Frost and Sullivan, company reports, Kotak Institutional Equities estimates

**Cost analysis of key elements of solar PV value chain**

**Polysilicon manufacturing—access to low-cost electricity is critical to polysilicon production**

Polysilicon (poly-Si) manufacturing is the conversion of commoditized metallurgical silicon (mg-Si) chunks (a few cm in diameter) with a purity of about 99% to high-purity poly-Si chunks with a purity of 99.9999% (6N) and higher. The manufacturing process is carried out in large chemical factories with significant land and energy requirements, benefiting countries with low-cost land parcels and cheap industrial electricity prices.

Exhibit 15: Percentage contribution of key inputs required in producing polysilicon (%), Dec 2023



Source: Australian PV Institute, Kotak Institutional Equities

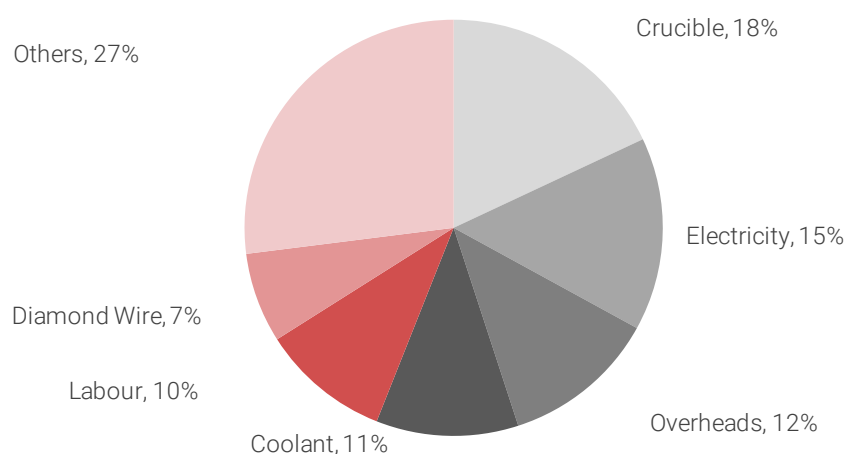
### Ingot/wafer manufacturing—crucibles are the most critical input used in ingot manufacturing

Ingots can be produced through three methods, which are (1) Czochralski (Cz), (2) float zoning method and (3) directionally solidified silicon. Czochralski is the dominant method for producing ingots, as float zoning is not commercially viable for solar production, while directionally solidified silicon, despite being easy to produce, has much lower quality than Cz ingots. Wafering is completely dominated by diamond wire sawing due to substantially reduced cost and lower kerf loss compared with other methods.

As of today, China is the largest player in wafer manufacturing, with the lowest conversion cost across the globe. Electricity is less important compared with Poly-Si production, but still significant (15% of cost, excluding polysilicon). Hence, access to low-cost electricity, though important, is not as critical relative to polysilicon manufacturing.

Most critical input (apart from Poly-Si itself) are the crucibles that are used to hold the molten silicon from which the ingot is pulled. Crucibles are made from very high-purity quartz material and are subject to price volatility.

Exhibit 16: Percentage contribution of key inputs required in producing wafer (ex-polysilicon) (%), Dec 2023



Source: Australian PV Institute, Kotak Institutional Equities

### Cell manufacturing—a complex process, which involves extensive utilities management

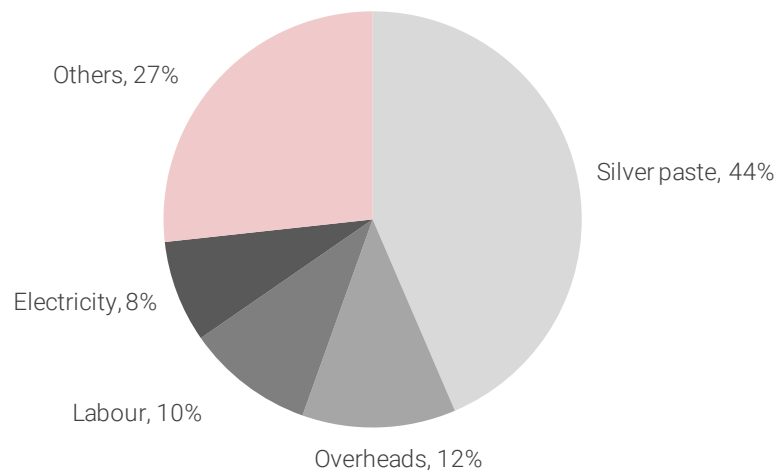
Solar cells are manufactured in highly automated clean room facilities. The typical scale of a solar cell manufacturing facility ranges from 100 MWs to several GWs. The current mainstream silicon solar cell technology is 'Passivated Emitter and Rear Cell' (PERC) technology, has an 80% market share, as of Dec 2023. PERC cells can potentially reach 22-23% efficiency, but tend to reduce to 21.5-21.7% due to losses during module assembly. As per Australian PV institute, leading PERC producers typically use 5 mg/w of silver.

'Tunnelling Oxide Passivated Contact' (TOPCon) is another technology that has emerged in solar cell manufacturing. It is expected to be the dominant technology within a few years as it offers higher efficiency (25-26%) relative to PERC. At present, TOPCon is the highest-performing mainstream commercial technology with low capex requirement and high throughput. As per Australian PV institute leading producers currently use 12 mg/w of silver, but we believe that this needs to be reduced by 60% to enable TW scale manufacturing.

The third type of technology is the silicon heterojunction (SHJ) technology, which currently has low single digit market share, but can potentially capture significant portion of the market as this technology offers significantly higher efficiency (28.5% theoretical maximum), for which 26.8% has already been demonstrated at the laboratory scale. However, SHJ producers need 20 mg/w of silver, the highest among all cell technologies and its capex requirement is twice that of TOPCon.

As per Australian PV institute, the conversion cost of a cell (ex-wafer) was US\$3.4 cents/wp, as of December 2023. In this, Silver is the highest non-wafer cost (44%) for the fabrication of TOPCon solar cells. With the growing demand for silver from the PV industry and shift to TOPCon, which requires more silver than PERC, demand for silver from the PV industry could lead to price volatility, thus negatively impacting the cost of solar cell production.

Exhibit 17: Percentage contribution of key inputs required in producing solar cells (ex-wafer) (%), Dec 2023



Source: Australian PV Institute, Kotak Institutional Equities

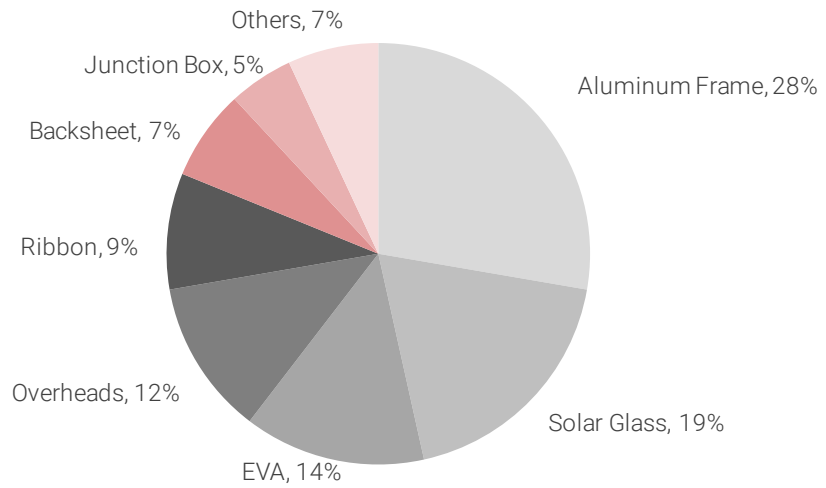
#### Module assembly—highly automated assembly process

The assembly of solar cells into a solar module includes a series of distinct manufacturing steps. Initially, the solar cells are interconnected to create strings using conductive ribbons. The strings of solar cells are then encapsulated between glass and a back sheet or between two sheets of glass using encapsulating films and heated to around 200°C for 10-15 minutes. Finally, a junction box and aluminum frame are added to produce a solar module that will generate renewable energy for 25 years or more.

The conversion cost of solar cells to modules at a large-scale plant is estimated at US\$6-7 cents/wp, excluding the cost of the incoming solar cell.

The largest share of conversion costs is the procurement of key components required for the module assembly process. The said components include solar glass (19% cost), aluminum frame (28%), encapsulant EVA (14%), ribbon (9%), back sheet (7%) and junction box (5%).

**Exhibit 18: Percentage contribution of key inputs required in producing solar modules (ex-cell) (%), Dec 2023**



Source: Australian PV Institute, Kotak Institutional Equities

**Deep dive into solar cell and module manufacturing process**

**Solar cell and module technology**

**Exhibit 19: Types of solar cell and module technologies**

Stage	High level product specification
Solar cell	MONO PERC(T), TOPCon, HJT, IBC, TBC Mono-facial vs bifacial
Solar module	Full cell vs Half cut Glass/glass vs glass/back sheet Frame vs Frameless

Source: Kotak Institutional Equities

**Solar cell manufacturing—a highly complex process with extensive utilities management**

According to a Frost and Sullivan analysis, solar cell manufacturing is the most complex and technical process within the solar module production value chain, which requires multiple chemical and gas-based stages and encompasses intricate procedures such as texturing, diffusion, selective emitter laser, polishing and oxidation annealing to convert raw silicon wafers into effective sunlight-to-electricity converters, known as solar cells.

**Complexities involved in utilities management for solar cell manufacturing**

Each cell manufacturing process step involves several high-purity semiconductor-grade gases and chemicals as inputs. Effective management of utilities is crucial for safe, efficient and high-yield solar cell production. Below is a breakdown of the key complexities involved:

- ▶ **Acid and alkaline exhaust systems:** Some of the cell process steps involving chemicals such as potassium hydroxide, hydrochloric acid, hydrogen peroxide and hydrofluoric acid emit alkaline and acidic fumes in the tool, which need to be exhausted out and treated using scrubbers’ neutralization and proper treatment of exhaust fumes generated during various processes are essential for environmental compliance.



- ▶ **Waste gas management:** Thermal tools such as diffusion, annealing and PECVD tools use gases such as nitrogen, silane, ammonia, nitrous oxide, methane, hydrogen, phosphene, boron trichloride and oxygen, which are released as waste gases after processing the wafers. The waste gases need to be treated in thermal scrubbers to break them down into non-hazardous compounds and exhaust hot air, while capturing the non-hazardous materials.
- ▶ **Demineralized (DI) water management:** A 1GW cell line consumes a significant amount of water (approximately 1 mn liters per day). This necessitates a comprehensive water treatment system involving effluent treatment, water recovery through reverse osmosis and generation of ultra-pure water with stringent quality parameters (18 MQ.cm resistivity, total organic carbon below 10 parts per billion and bacterial count less than 10 colony-forming unit per mm).
- ▶ **Safe and efficient gas and chemical handling:** Manufacturing utilizes a variety of semiconductor-grade (99.999%) gases such as silane, ammonia, nitrous oxide, oxygen, hydrogen, methane, phosphene, boron trichloride, nitrogen, and chemicals such as hydrochloric acid, potassium hydroxide, hydrogen peroxide, trimethyl ammine and hydrofluoric acid. Implementing procedures for safe and efficient handling of these gases and chemicals; their distribution and usage within the process is paramount. Disposal of waste gases and chemicals in a safe method through appropriate equipment such as gas and chemical scrubbers, and effluent treatment plants is quite crucial for operating a solar cell line.
- ▶ **Power management:** A 1GW cell line requires substantial power (around 10 MW), along with associated switchgear and auxiliary equipment. Any interruption in power to the process tools will result in discarding the entire batch under processing, causing losses and will require considerable time to reset the whole process to ensure uninterrupted operation; a 100% backup power system with diesel generators and uninterruptible power supply for critical equipment is mandatorily provided for safe operation of the plant.
- ▶ **Process cooling water:** Maintaining optimal temperature within tools in thermal processes and metallization equipment is crucial. Almost all tools in the process require process cooling water with varied pressure and flow rates. Designing and maintaining such a system with standby pumps to ensure 100% availability is quite challenging.
- ▶ **24/7 utility operation:** For optimal cell line operation and high productivity, uninterrupted utility operation is essential. The quality of utilities directly impacts both cell yield and efficiency. Hence, all systems are designed with redundancy to ensure 100% availability of the utility.

Exhibit 20: MonPERC solar cell manufacturing steps



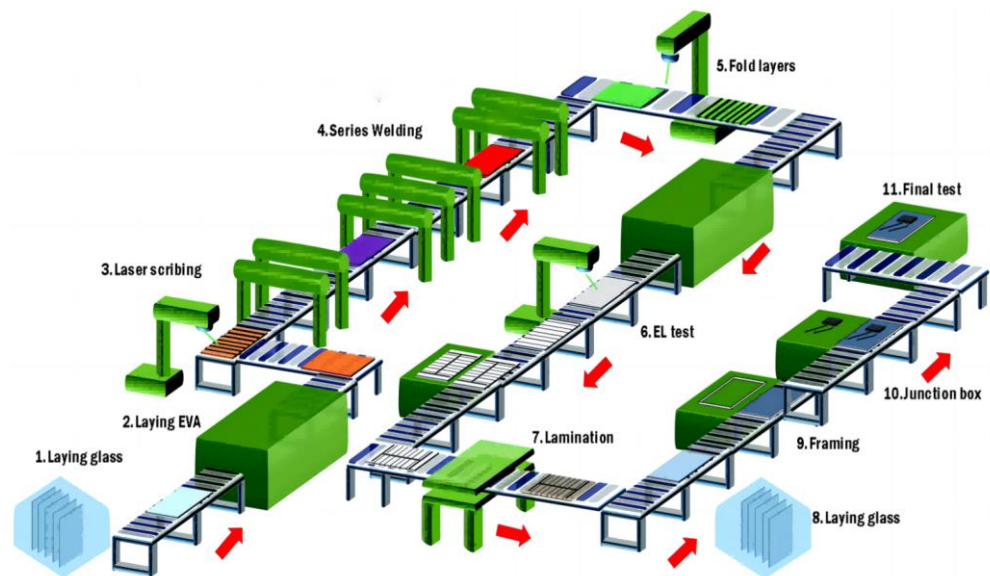
Source: Frost and Sullivan analysis

### Solar module assembly—not a complex, but a highly automated process

A solar module is constructed through a series-parallel configuration of individual solar cells. This interconnected array is then safeguarded from the elements with layers of glass, encapsulant and back sheet material. Additionally, a junction box is integrated to facilitate the extraction of electrical power from the module.

From the meticulous selection of individual solar cells to the rigorous quality checks that guarantee performance, the module assembly process leverages robotic precision for handling delicate components. Advanced automation flawlessly manages material flow, minimizing human error and material loss. Simultaneously, sophisticated testing procedures guarantee dependable power generation. Other than solar cells, various other components used in the module assembly are ethylene vinyl acetate (EVA), back sheets, solar glass, metal frames, busbars, cables, connectors, junction boxes and others. Most solar module manufacturers are moving toward completely automated solar module production lines. This is important as this reduces the incidence of human error and possible degradation in the quality of the modules that the company produces.

Exhibit 21: Solar module manufacturing process



Source: Maysunsolar

### Complexities involved in solar cell versus solar module manufacturing

Due to complexity, solar cell manufacturing requires approximately three to four times higher capex than solar module manufacturing.

**Exhibit 22: Complexities involved in solar cell versus solar module manufacturing**

<b>Complexity Factor</b>	<b>Solar Cell manufacturing</b>	<b>Solar Module manufacturing</b>
Raw Material Processing	Solar cell fabrication necessitates the utilization of ultra-high-purity silicon, demanding intricate refining and processing procedures	Solar module assembly relies on pretreated silicon cells, streamlining the processing complexities
Technological Requirements	Solar cell production entails sophisticated technologies aimed at maximizing cell efficiency and refining intricate production techniques.	Solar module manufacturing primarily focuses on assembly technologies, with less emphasis on cell-level technological innovations.
Capital Investment	The capital outlay for solar cell manufacturing is substantial, attributable to the acquisition of specialized equipment for silicon refinement and cell fabrication	Solar module manufacturing demands comparatively lower capital investment, primarily driven by the assembly process and the absence of highly specialized machinery.
Skilled Labor	Solar cell fabrication mandates a proficient workforce adept in chemical processing and semiconductor manufacturing techniques	Solar module assembly requires skilled labor, albeit with less specialization compared to cell fabrication, encompassing assembly and quality control domains
Production Scale	Solar cell production operates at a relatively smaller scale due to meticulous handling requirements, constraining throughput capacity.	Solar module manufacturing enjoys scalability benefits, facilitated by streamlined assembly processes and reduced intricacies, enabling larger-scale operations.
Technological Advancement	The dynamic nature of technological advancements poses a significant risk in solar-cell manufacturing, potentially rendering current methodologies obsolete rapidly.	Solar module manufacturing experiences a slower pace of technological evolution, with advancements typically affecting incremental improvements rather than rendering existing processes obsolete
Supply Chain Management	Solar cell manufacturing entails complex supply chain management owing to the diverse array of raw materials and chemicals involved in the process	Solar module manufacturing involves comparatively simpler supply chain dynamics, predominantly revolving around procurement of cells and ancillary components.

Source: Kotak Institutional Equities

# 3

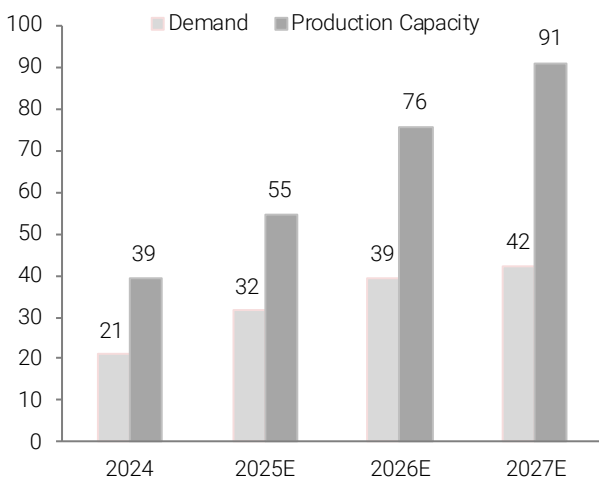
## Solar sector primed for growth, overcapacity—a key risk for equipment players

India’s total power capacity is expected to reach 641GW in FY2030 from 442GW, as of FY2024, with 66% of the incremental addition done through solar (KIE utilities analyst’s estimate). We expect installed solar capacity to reach 214GW by FY2030 from 82GW in FY2024, driven by (1) utility level additions, (2) PM Surya Ghar Muft Bijli Yojana (rooftop solar), (3) PM-KUSUM Scheme (solar pumps) and (4) captive industrial addition. Additionally, any pick-up in the National Green Hydrogen Mission could provide further upside to our solar PV module demand estimates.

In terms of solar equipment supply, India has 70GW of installed capacity of solar module and 8GW of solar cell capacity, as of FY2024. With the Indian government incentivizing domestic solar manufacturing through multiple trade (basic custom duty) and non-trade barriers (ALMM, DCR, PLI), Indian manufacturing has seen rapid growth over the past five years, which we expect will continue. However, with 90GW solar module capacity addition announcements made, we think module manufacturing capacity is heading into an oversupply zone, which could potentially make operations less viable for some smaller players. On the domestic cell side with the Indian government introducing ALMM List-II for cells, which makes use of domestic cells mandatory for all ALMM modules, the end-market demand for domestic cells is expected to see exponential growth over the next coming years. The ability to stabilize large cell capacity earlier than peers could give companies a competitive advantage for a couple of years.

### Module demand to account for only 45% production capacity

Exhibit 23: Demand versus production capacity of Indian modules, March fiscal year-ends, 2024-27E (GW)



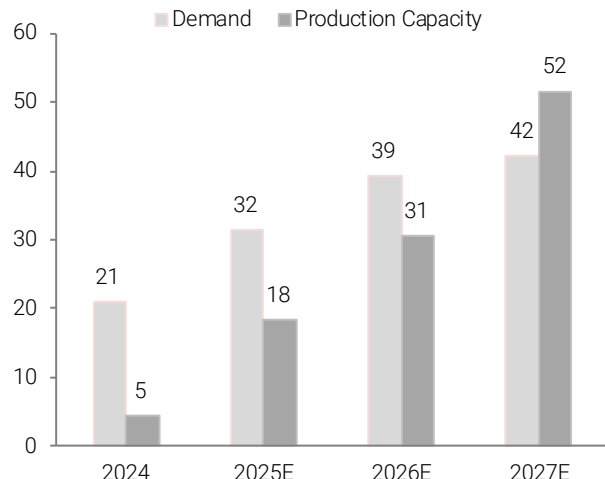
Note:

(a) Production capacity = ~60% of nameplate capacity

Source: Company, Kotak Institutional Equity estimates

### Cell to head into oversupply zone by FY2027/28

Exhibit 24: Demand versus production capacity of Indian cells, March fiscal year-ends, 2024-27E (GW)



Note:

(a) Production capacity = ~60% of nameplate capacity

Source: Company, Kotak Institutional Equity estimates

### Demand drivers—utility scale addition to be primary driver of domestic demand growth

We see utility scale addition as the primary driver for domestic solar modules, aided by the rooftop and solar pumps scheme. We expect the annual utility scale solar addition to increase from the current 15GW to reach 29GW by the end of 2030. Overtime, tenders for round-the-clock (RTC) through battery energy storage (BESS) or firm and dispatchable RE (FDRE) power tenders are expected to pick up, where actual solar capacity added is higher than nameplate capacity, which would imply a higher demand for solar manufacturers. Lastly, any pick-up in the National Green Hydrogen Mission could provide further upside to our demand estimates.

**Utility scale addition—we expect utility scale solar additions to reach 29GW by the end of 2030**

The Indian government has an ambitious plan to achieve 500GW of renewable energy by CY2030, out of which 280GW will come from solar. The Ministry of New & Renewable Energy has launched a program to hold annual auctions for a massive 50GW of renewable energy (RE) capacity. This substantial increase aims to rapidly expand India’s clean energy infrastructure—80% of this targeted capacity is specifically earmarked for solar power projects. Lastly, given the variable nature of solar power, the government has taken initiatives to ensure that RE power is available round-the-clock (RTC) through battery energy storage systems (BESS)-based bidding, pumped storage plants (PSP) and others.

We expect the annual utility scale solar addition to increase from the current 15GW to reach 29GW by the end of 2030. Furthermore, we expect 6GW of demand coming from the Kusum Scheme and Rooftop Scheme, along with 1GW from the industrial captive customer addition. Overall, we expect the utility solar addition to reach 214GW by 2030 (280GW total solar addition in a best-case scenario, including rooftop solar, pumps and industrial customers). In tenders for round-the-clock (RTC) through battery energy storage (BESS) or firm and dispatchable RE (FDRE) power tenders, the actual solar capacity added is higher than the nameplate capacity, which would imply a higher demand for solar manufacturers as compared with the nameplate capacity addition (RTC and FDRE projects are expected to be around 15% of solar tenders currently, with their share expected to increase in the coming years).

**Indian solar capacity has increased at a CAGR of 24% over the past 4 years, led by utility scale solar additions**

**Exhibit 25: India’s renewable and solar capacity addition, March fiscal year-ends, 2020-24 (in GW)**

	2020	2021	2022	2023	2024
Renewable installed capacity (in GW)	87	94	110	125	144
Incremental renewable capacity addition (in GW)		7	15	15	18
Installed solar power capacity (in GW)	35	40	54	67	82
Incremental solar capacity addition (in GW)		5	14	13	15
Solar share in renewable capacity (in GW) in %	40	42	49	53	57
<b>Breakdown of Installed solar power capacity(in GW)</b>					
Ground Mounted Solar	32	36	46	54	64
Roof top solar	3	4	7	10	12
Hybrid Solar Comp	—	—	—	—	3
Off-grid Solar/ KUSUM	1	1	2	3	3

Source: CEA

**We expect India’s utility scale solar installed capacity to reach 214GW by FY2030 (installed capacity to reach 280GW, including rooftop solar, pumps and industrial customers)**

**Exhibit 26: India’s renewable and solar capacity addition, March fiscal year-ends, 2020-30E (in GW)**

	2020	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Based on Kotak Estimates</b>											
India Installed capacity (in GW)	370	382	399	416	442	474	503	533	565	601	641
Renewable installed capacity(ex-Hydro) (in GW)	87	94	110	125	144	164	187	213	241	274	310
Incremental renewable capacity addition (in GW)		7	15	15	18	20	23	25	28	32	36
Solar share in renewable capacity						80%	80%	80%	80%	80%	80%
<b>Annual utility scale solar capacity addition in GW</b>						<b>16</b>	<b>18</b>	<b>20</b>	<b>23</b>	<b>26</b>	<b>29.2</b>
<b>Annual solar addition in GW</b>											
Utility scale addition						16	18	20	23	26	29
Roof top solar						3	5	5	5	5	6
Solar pumps						3	5	5	5	5	6
Industrial captive addition						1.0	1.1	1.2	1.3	1.5	1.6
<b>Total AC solar addition (in GW)</b>						<b>23.4</b>	<b>29.5</b>	<b>31.6</b>	<b>34.1</b>	<b>38.0</b>	<b>41.8</b>
AC/DC Factor						1.4	1.4	1.4	1.4	1.4	1.4
<b>Total DC capacity addition (in GW)</b>						<b>31.5</b>	<b>39.3</b>	<b>42.2</b>	<b>45.8</b>	<b>51.0</b>	<b>56.3</b>
Note AC/DC conversion not applicable for solar pumps since they are not grid connected											
<b>Installed utility scale solar power capacity (in GW)</b>	<b>35</b>	<b>40</b>	<b>54</b>	<b>67</b>	<b>82</b>	<b>98</b>	<b>117</b>	<b>137</b>	<b>160</b>	<b>186</b>	<b>215</b>
<b>Installed solar power capacity including pumps, rooftop solar and industrial captive customer (in GW)</b>	<b>105</b>	<b>135</b>	<b>166</b>	<b>200</b>	<b>238</b>	<b>280</b>					

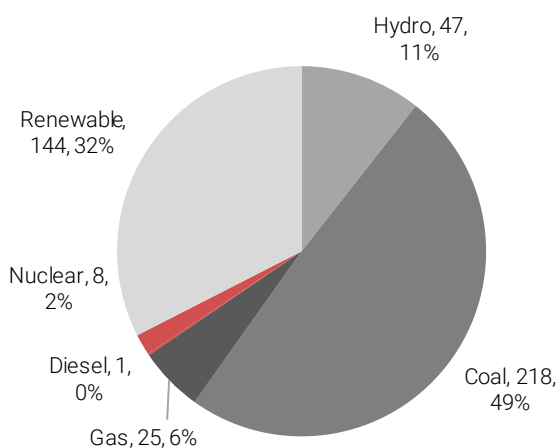
Note:

(a) AC/DC conversion not applicable for solar pumps since they are not grid connected

Source: CEA, Kotak Institutional Equities estimates

**India’s current installed capacity is 442GW, as of March 2024, with 33% of installed base from renewable sources (ex-hydro)**

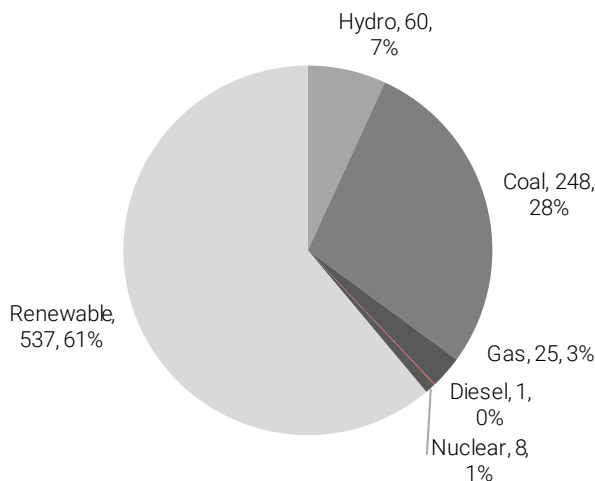
**Exhibit 27: India’s installed power capacity, March fiscal year-ends, 2024 (in GW, %)**



Source: CEA

**We expect India’s installed capacity to double over the next 11 years with 90% of incremental capacity coming from renewables**

**Exhibit 28: India’s installed power capacity, March fiscal year-ends, 2035 (in GW, %)**



Source: Kotak Institutional Equities estimates

**PM Kusum scheme—potential 34.8GW of solar pump demand**

The PM Kusum Scheme (Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan) was launched with the aim of reducing diesel use in agriculture and boosting farmers' income. It offers central government subsidies of up to 30-50% for installing standalone solar pumps and solarizing existing grid-connected pumps. The scheme, implemented by state departments, targets adding 34,800 MW of solar capacity by March 2026, with a total central financial support of Rs344.22 bn

The scheme has three components, as follows:

- ▶ **Component A:** Setting up 10,000MW of decentralized ground/stilt-mounted solar power plants on barren/fallow/pasture/marshy/cultivable land of farmers. Such plants can be installed by individual farmers, solar power developers, cooperatives, panchayats and farmers producer organizations.
- ▶ **Component B:** Installation of 1.4 mn standalone solar water pumps in off-grid areas.
- ▶ **Component C:** Solarization of 3.5 mn grid-connected agriculture pumps through (1) individual pump solarization and (2) feeder level solarization.

The PM Kusum Scheme is one of the key focus areas for companies such as Premier Energies, since this scheme mandates the usage of DCR solar modules.

**PM Kusum Scheme targets adding 34.8GW of solar capacity**

**Exhibit 29: Targets and achievements under PM-KUSUM, as of September 2024**

Components	Sanctioned	Installed (as of 30th Sept 2024)
Component A (MW)	9,110	298.83
Component B (Nos in mn)	1.354	0.499
Component C (Nos)	IPS-171,640 FLS-3,385,494	IPS-4,759 FLS-32,512

IPS-Individual Pump Solar, FLS-Feeder Level Solar

Source: Ministry of New and Renewable Energy

**Rooftop solar—25-30GW of incremental demand to be driven by the PM Surya Ghar Muft Bijli Yojana Scheme**

**PM Surya Ghar Muft Bijli Yojana (25-30GW)**

The Indian government in February 2024 announced the PM Surya Ghar Muft Bijli Yojana, a rooftop solar scheme. The scheme has an allocation of Rs750 bn and it aims to provide financial assistance through capital subsidies, facilitating the installation of rooftop solar panels and granting up to 300 units of free electricity every month to approximately 10 mn households across India.

The PM Surya Ghar Muft Bijli Yojana Scheme is one of the key focus areas for companies such as Premier Energies, since this scheme mandates the usage of DCR solar modules.

The government has proposed to provide the below subsidies for the implementation of this program:

- ▶ For up to 2 kW—Rs30,000 per kW
- ▶ For additional capacity up to 3 kW—Rs18,000 per kW
- ▶ Total subsidy for systems larger than 3 kW—maximum Rs78,000

This scheme is expected to generate 25-30GW of rooftop solar installation opportunities, if implemented across states.

**National Green Hydrogen Mission—125GW of power required to manufacture 5MMT of green hydrogen**

The National Green Hydrogen Mission was launched in August 2021 by the Indian government, the mission aims to produce 5 mn metric ton of green hydrogen by CY2030, with an estimated investment of Rs8 tn. Approximately 125GW of renewable power (solar) would be required to produce 5 MMT of green hydrogen. However, we currently do not bake in any impact from the green hydrogen mission, as the development of green hydrogen projects is at a nascent stage and could provide an additional upside to our solar module demand forecasts.

**Supply-side dynamics—solar modules in an overcapacity zone, solar cells poised for growth**

Indian domestic solar manufacturing has seen exponential growth over the past five years, driven by multiple trade (basic custom duty) and non-trade barriers (ALMM, DCR, PLI). In terms of solar equipment supply, India has 70GW of installed capacity of solar module and 8GW of solar cell capacity, as of FY2024. However, with 90GW solar module capacity addition announcements made, we think the module manufacturing capacity is heading into an oversupply zone. On the domestic cell side with the Indian government introducing ALMM List-II for cells, which makes use of domestic cells mandatory for all ALMM modules, the end-market demand of domestic cell is expected to see exponential growth over the next coming years.

**Basic custom duty—initially set to incentivize domestic solar equipment**

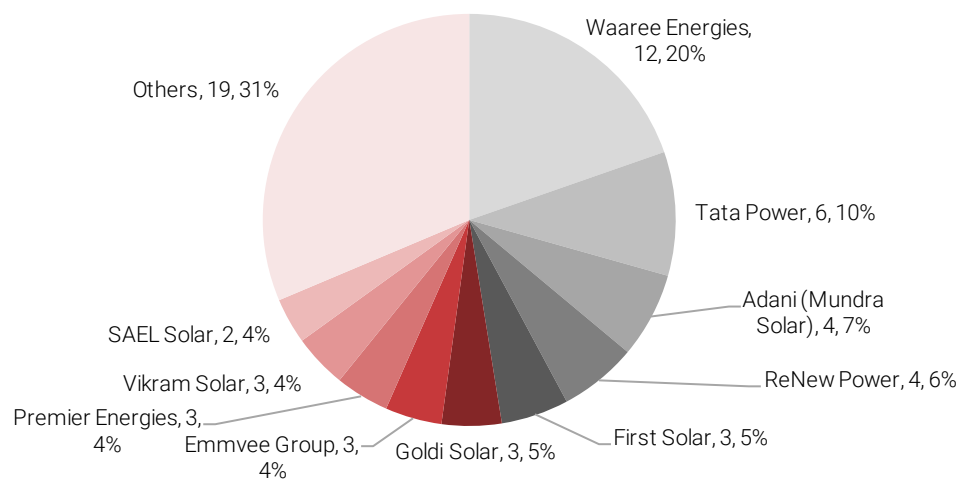
The first layer of protection given to domestic manufacturers of solar modules and cells has been through the imposition of basic custom duty (BCD). From April 1, 2022, the Indian government has imposed a BCD of 40% on solar modules and 25% on solar cells. The BCD applies to all imports of solar modules and cells, regardless of the country of origin, and was put in place to make domestic manufacturing cost competitive and provide incentive for investment in India. Furthermore, there are exemptions of GST and BCD on capital goods used in solar panel manufacturing.

**Approved List of Modules and Manufacturers (ALMM)—key non-trade barrier that restricts use of imported modules and cells**

The second policy, which has been key in developing domestic solar module capacity, is ALMM. The Ministry of New and Renewable Energy (MNRE) introduced the ALMM framework in 2019 as a mechanism to regulate the quality of solar modules. Only solar modules and cells that have been certified by the Bureau of Indian Standards can be eligible for use in government projects/government assisted-projects/projects under government schemes and programs/open access/net-metering projects, which together account for nearly 90-95% of all solar additions in the country. The ALMM order consists of two lists (1) LIST-I for solar PV modules and (2) LIST-II for solar PV cells. The ALMM policy has been enforced for solar modules from April 1, 2024, and as of October 28, 2024, the ALMM capacity is 60GW. With only domestically manufactured modules included under ALMM, it has become a non-tariff trade barrier, which encourages the domestic solar manufacturing sector.

**India's ALMM-approved domestic manufacturing capacity has now reached 60GW, with top-10 players having 69% share**

Exhibit 30: ALMM-approved solar module manufacturing capacity by companies in India, as of October 2024 (in GW and % share)



Source: Ministry of New and Renewable Energy

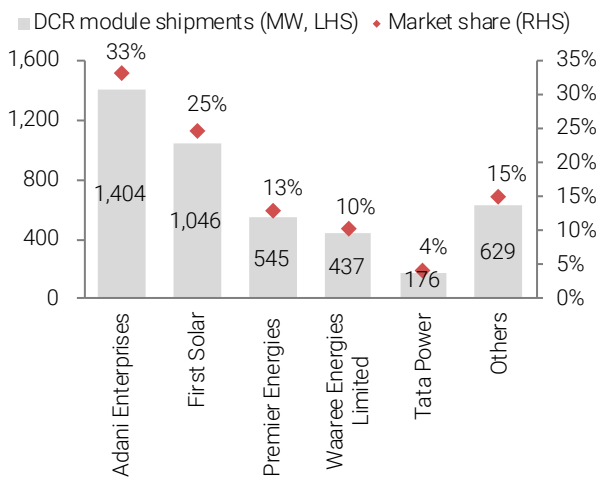


**Domestic content requirement (DCR)**

The third policy, in addition to BCD and ALMM, is DCR, which has been key in ensuring that domestically manufactured cells are being used in the solar module. The DCR is a policy that mandates a specific percentage of components, including cells and modules used in solar power projects, particularly those funded by the government, to be sourced from domestic manufacturers. This percentage has been steadily increasing over the years; going forward, the 40% minimum domestic content requirement is set to increase annually, to 45% for projects starting construction in CY2025, 50% in CY2026 and 55% thereafter. Government schemes such as PM Suryaghar Yojana (rooftop solar), CPSU Scheme and PM KUSUM are the main schemes where DCR modules are mandated. These schemes would account for 20% of overall solar module demand in the country. All these schemes have a Central Financial Assistance (CFA)/VGF component to cover the cost difference between imported and domestic solar cells and modules.

**4.3GW of DCR modules have been shipped in total with top-4 players having an 81% share, as of December 10, 2024**

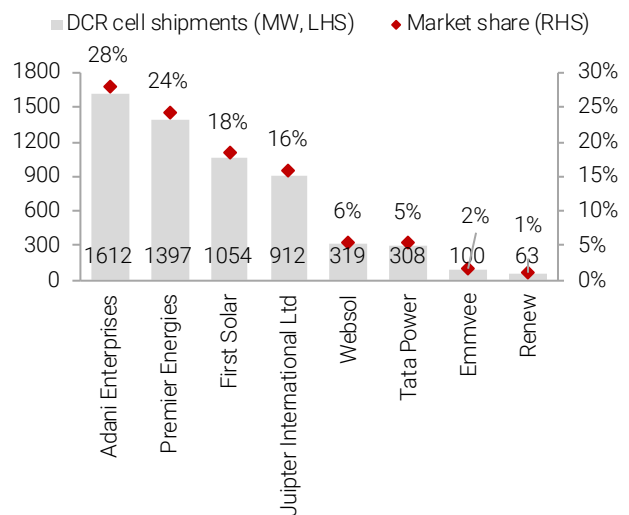
Exhibit 31: DCR module shipments (in MW and % share)



Source: Ministry of New and Renewable Energy

**5.8GW of DCR cells have been shipped by eight cell manufacturers as of Dec 10, 2024**

Exhibit 32: DCR cell shipments (in MW and % share)



Source: Ministry of New and Renewable Energy

**Govt issues ALMM List II implementation for solar cells by June 1, 2026**

The Ministry of New and Renewable Energy (MNRE) has issued the amendment (link) for the implementation of Approved List of Models and Manufacturers (ALMM) for solar PV cells, which shall be effective from June 1, 2026. The ALMM framework, which acts as a non-tariff barrier to aid domestic manufacturing, was introduced in 2019 (kept in abeyance until March 31, 2024) and was focused on regulating the quality of solar modules. The ALMM List I specify the list of approved models and manufacturers of solar modules (module capacity under ALMM now stands at ~60GW, as of Oct 2024). The ALMM had a provision for a list of solar cells (list II); however, it was kept in abeyance due to low solar cell capacity. Once list II becomes effective on June 1, 2026, all solar projects under the ALMM's purview and that are mandated to use solar modules listed in ALMM List I, must use cells listed in ALMM List II.

According to the order, from June 1, 2026, all solar module manufacturers who are unable to procure cells from ALMM List II can potentially be delisted from ALMM List I; this will likely give approved cell manufacturers disproportionate pricing power, which in turn, will further improve their margins and aid return ratios. However, after May 31, 2026, a separate ALMM List I (a) would be maintained and this list would contain solar PV modules, which are enlisted in ALMM, but do not use solar PV cells from ALMM List II (for solar PV cells); this ALMM List I (a) (for solar PV modules) would be applicable only for such projects, which are mandated to use solar PV modules from ALMM, but are exempt from using solar PV cells from ALMM List II.

**Production-linked incentive (PLI) scheme for high-efficiency solar PV modules**

The Government of India, through the Ministry of New and Renewable Energy, has introduced a PLI Scheme with a total outlay of Rs240 bn in two tranches to help develop the local solar module manufacturing value chain. Under this scheme, manufacturers will be given incentives for a period of five years after commissioning of their manufacturing capacity based on (1) sales volume, (2) tapering factor and (3) local value addition. However, recently we have seen a lot of capacity announcements by companies that are not part of the PLI scheme as well, driven largely by the ALMM mandate for cells and modules and the expectation of increased solar addition over the next couple of years.

**Indian government has allocated Rs240 bn to the solar PV PLI manufacturing scheme for setting up 48GW of solar module and cell manufacturing capacity**

Exhibit 33: Capacity awarded (in MW) under the PLI scheme (Tranche-I and II)

Player	Polysilicon	Wafer	Cells	Modules
Shirdi Sai Electricals Ltd	4,000	4,000	4,000	4,000
Reliance New Energy Solar Ltd	4,000	4,000	4,000	4,000
Adani Infrastructure Pvt. Ltd	737	737	737	737
<b>Total PLI Tranche 1</b>	<b>8,737</b>	<b>8,737</b>	<b>8,737</b>	<b>8,737</b>
Indosol Solar Private Limited	6,000	6,000	6,000	6,000
Reliance New Solar Energy Limited	6,000	6,000	6,000	6,000
FS India Solar Ventures Private Limited	3,400	3,400	3,400	3,400
Waaree Energies Limited		6,000	6,000	6,000
Avaada Electro Private Limited		3,000	3,000	3,000
ReNew Photovoltaics Private Limited		4,800	4,800	4,800
JSW Renewable Technologies Limited		1,000	1,000	1,000
Grew Energy Private Limited		2,000	2,000	2,000
VSL Green Power Private Limited			2,400	2,400
AMPIN Solar One Private Limited			1,000	1,000
TP Solar Limited			4,000	4,000
<b>Total PLI Tranche II</b>	<b>15,400</b>	<b>32,200</b>	<b>39,600</b>	<b>39,600</b>
<b>Total PLI Tranche I+II</b>	<b>24,137</b>	<b>40,937</b>	<b>48,337</b>	<b>48,337</b>

Source: MNRE, SECI, IREDA

**Solar module: Domestic capacity heading into an oversupply zone**

Since FY2017, India’s solar module manufacturing capacity witnessed a phenomenal increase, from 4.2GW to 39.5GW at end-FY2023 at a CAGR of 45.3%. The capacity has further increased to 70GW in FY2024 and ALMM-approved capacity, as of Oct 2024, is 60GW. If we take all the announcements made by various companies on capacity expansion plans, then India has potential to reach up to 162GW of nameplate solar module capacity by end-FY2027 (32% CAGR FY2024-27E). With India demand expected to be closer to 40GWdc of the demand in best case scenario, this could imply that only 35% utilization at an aggregate industry basis (including 15GW of module exports), which could potentially make operations less viable for some smaller players in the module player manufacturing industry.

**Solar module manufacturing nameplate capacity could potentially double over the next three years based on capacity expansion announcements**

Exhibit 34: Announced module capacity expansion by various Indian companies, March fiscal year-ends, 2024-27E (GW)

Solar Module capacity (in GW)				
Company Name	2024	2025E	2026E	2027E
Reliance Industries		10	20	20
Waaree Energies	13	13	20	20
Vikram Solar	4	5	11	15
Renew Power	6	6	6	12
Premier Energies	4	4	8	10
Mundra Solar (Adani Enterprises)	4	6	8	10
Saatvik Green Energy Pvt. Ltd	4	6	6	8
Renew Sys India	3	5	5	7
Grew Energy Private Limited	1	3	3	6
Goldi Solar	3	6	6	6
Shirdi Sai	0	1	3	5
Tata Power Solar	5	5	5	5
Insolation Energy	1	1	2	4
Solex energy	1	2	3	4
Rayzon Solar	4	4	4	4
First Solar	3	3	4	4
Others	15	19	23	23
<b>Total India Capacity</b>	<b>70</b>	<b>97</b>	<b>135</b>	<b>162</b>

Source: Company announcements

**Solar cell: Domestic capacity to see exponential growth driven by ALMM List-II**

At present in India there are only a handful of companies involved in manufacturing solar cells. Adani Enterprises, Premier Energies and Tata Power Solar are the leading solar cell manufacturers in India. At the end of FY2024, India’s domestic solar manufacturing capacity stood at 8.1GW. Domestic solar cells are primarily used in DCR end-markets currently—(1) PM KUSUM Scheme, (2) PM Surya Ghar Muft Bijli Yojana and (3) CPSU Scheme. However, with the Indian government’s intention to introduce ALMM List-II for cells and make use of domestic cells mandatory for all ALMM modules, the end-market demand for domestic cells is expected to see exponential growth over the coming years. As a result, more than 15 companies are planning to set up various levels of integrated solar manufacturing plants, including solar cells through the PLI Scheme or on an independent basis. Given the 2+ year timeline in setting up these plants, most of the newly announced capacity will come on stream by the end of FY2027 or in FY2028. The ability to stabilize large cell capacity earlier than peers could give companies a competitive advantage for a couple of years.

**Solar cell capacity worth 84GW is expected to be added over the next three years (however, given the longer lead time requirement, the actual capacity could be substantially lower than what has been announced)**

Exhibit 35: Announced cell capacity expansion by various Indian companies, March fiscal year-ends, 2024-27E (GW)

Solar Cell capacity (in GW)				
Company Name	2024	2025E	2026E	2027E
Reliance Industries	—	10.0	20.0	20.0
Waaree Energies	—	5.0	5.0	11.0
Mundra Solar (Adani Enterprises)	4.0	6.0	8.0	10.0
ReNew Power	—	2.5	2.5	8.5
Premier Energies	2.0	3.0	3.0	7.0
Goldi Solar	—	—	—	5.0
Shirdi Sai	—	—	0.5	5.0
Tata Power	0.5	4.0	4.0	4.0
Jupiter Solar	0.8	0.8	0.8	3.8
Renew Sys India	0.1	1.1	2.1	3.1
Vikram Solar	—	—	3.0	3.0
Grew Energy Private Limited	—	—	—	2.8
Jakson Engineers Ltd.	—	—	1.3	2.5
Websol Energy	0.6	0.6	2.4	2.4
Saatvik Solar	—	—	2.0	2.0
Solex energy	—	—	—	2.0
Insolation Energy	—	—	0.6	1.2
<b>Total India Capacity</b>	<b>8.1</b>	<b>33.0</b>	<b>54.6</b>	<b>92.1</b>

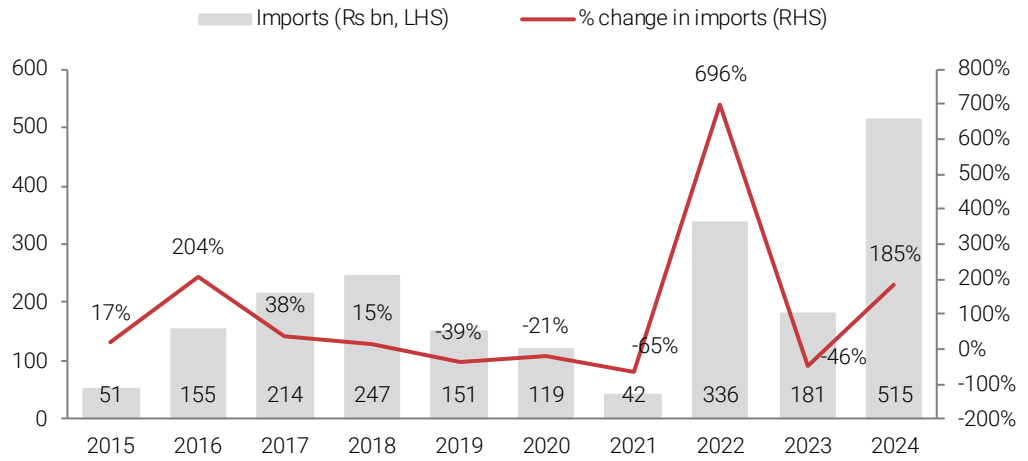
Source: Company announcements

**Imports—ALMM to make imports less relevant in the coming years**

India historically has been an importer of solar modules, with majority of these imports coming from China directly. From April 1, 2022, the Indian government has imposed a BCD of 40% on solar modules and 25% on solar cells, but this had a negligible impact on imports, given the lower cost of Chinese modules. Going ahead, we see imports forming a smaller part of the overall mix, as except for captive industrial customers, all other customers would be required to use ALMM-compliant solar modules (95%+ of total demand) and current Indian ALMM-compliant modules are produced at a similar cost as Chinese modules, given the large domestic capacity; hence, we see a lower threat from direct module imports, going ahead.

**India solar imports saw a surge in FY2024 due to ALMM policy becoming mandatory from FY2025**

**Exhibit 36: India solar module import data and yoy growth, March fiscal year-ends, 2015-24 (Rs bn, %)**



Source: Ministry of Commerce

# 4

## Indian exports—short-term play with onshoring in US more sustainable long-term bet

Trade and non-trade barriers on the import of Chinese solar modules and cells have created a favorable environment for India and other Southeast Asian countries to increase their exports to the US. While we expect the next couple of years to be strong for exports of solar modules from India. However, with local US module and cell manufacturing capacity being set up with the help of the Inflation Reduction Act (IRA) incentive, we see Indian players with local US module manufacturing facilities and exports of cells to continue to see strong demand over the medium term. Potential policy changes for the US solar sector and uncertainty regarding the continuation of current policies remain a key near-term monitorable.

### US—the primary geography of exports from India

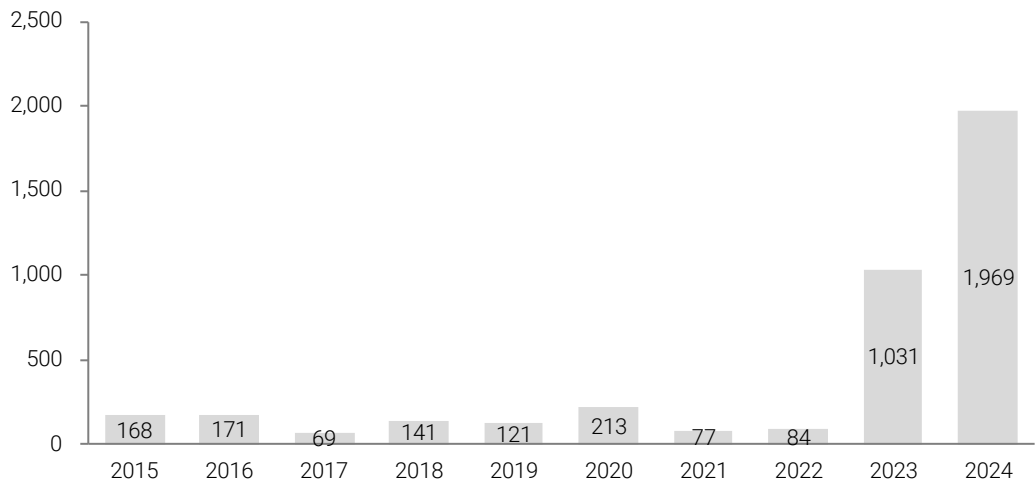
Indian solar module exports have seen a sharp uptick over the past two years with US\$2 bn (6.1GW) of solar modules being exported from India in FY2024.

Nearly all the exports from India are for the US market, driven by multiple duties and restrictions on imports from China. The US has a 50% import tariff on solar cells and modules from China. Furthermore, there have been various barriers on imports from China, including (1) antidumping or countervailing duty tariffs, (2) Sections 201 and 301 tariffs and (3) implementation of the Uyghur Forced Labor Prevention Act in June 2022 (UFLP Act), all of which have significantly impacted the export of modules from China. Under the UFLP Act, importers are required to furnish evidence that the goods they import were produced without the use of forced labor. This requirement extends to goods that are entirely or partially manufactured in the Xinjiang Autonomous Region (“XAUR”) and impacts nearly 45% of global PV-grade polysilicon facilities.

As a result, US module prices are at a significant (100%) premium to global module prices; this helps Indian module manufacturers enjoy superior realization and margins by focusing on US exports.

### India’s solar module exports have seen a sharp rally over the past two years, driven by sales to US

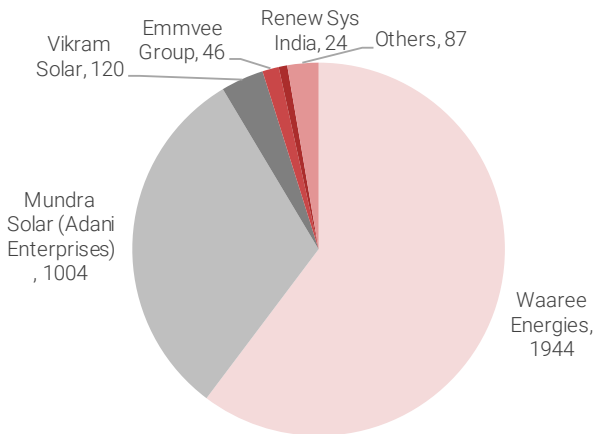
Exhibit 37: Exports of solar modules from India in value terms, March fiscal year-ends, 2015-24 (US\$ mn)



Source: Ministry of Commerce

**India exported 3.3GW solar modules (97% to the US) in 2023**

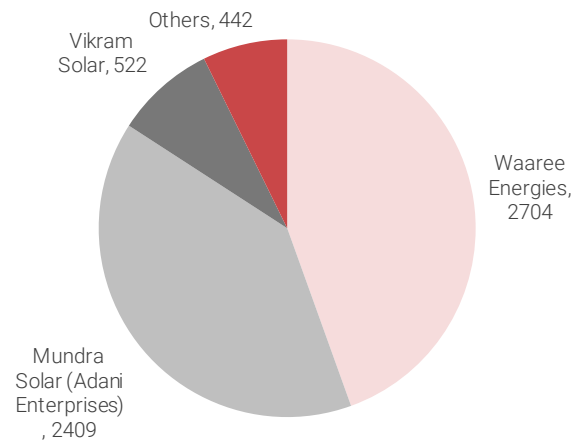
**Exhibit 38: Export of solar modules from India in FY2023 (MW)**



Source: CRISIL

**India exported 6.1GW solar modules (99% to the US) in 2024**

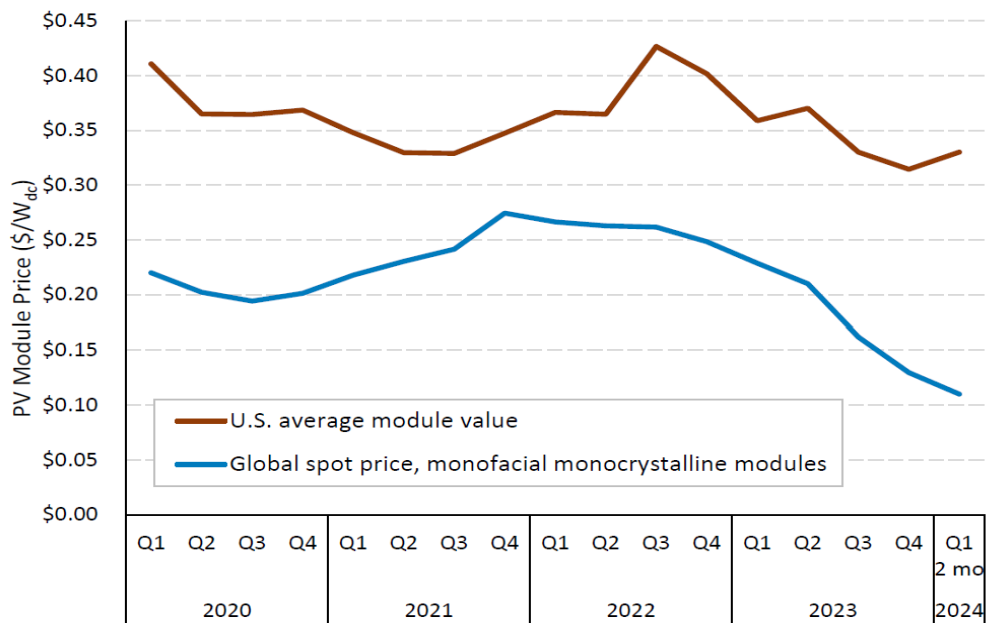
**Exhibit 39: Export of solar modules from India in FY2024 (MW)**



Source: CRISIL

**Driven by the fact that US module prices have been at 100%+ premium to global spot prices**

**Exhibit 40: Quarterly PV Module Price in \$/W<sub>dc</sub>, December fiscal year-end, CY2020-23**



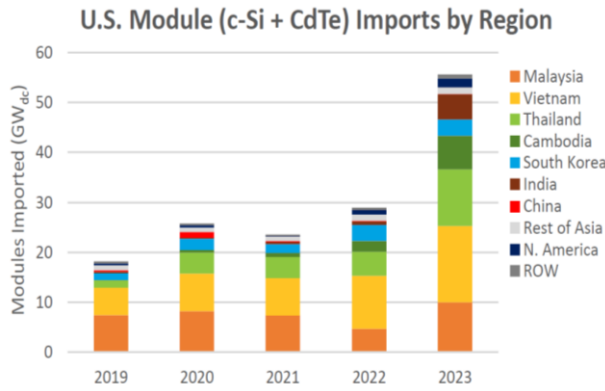
Source: National Renewable Energy Laboratory, United States Department of Energy

**Anti-dumping duties on Southeast Asian exports could aid Indian manufacturers**

When we look at the annual US module imports, we see that in 2023, the US imported 55.6GW of modules, with 78% of imports coming in from four Southeast Asian countries (Malaysia, Vietnam, Thailand and Cambodia). However, with the US government initiating an antidumping investigation against these four countries, any imposition of anti-dumping (AD) and countervailing duties (CVD), with no import restrictions on India; this could act as a near-term catalyst for Indian module exporters.

**Asian countries together accounted for 78% of solar module imports into the US**

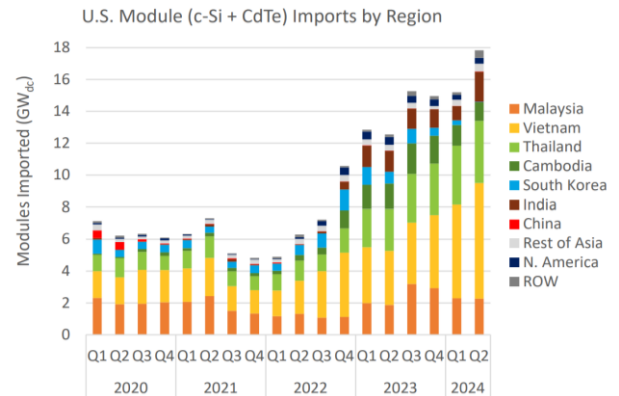
Exhibit 41: Annual US module imports by region, December fiscal year-end, CY2019-23 (GWdc)



Source: National Renewable Energy Laboratory, United States Department of Energy

**Indian solar exports to the US started from 4QCY22 (9% of module imports in CY2023 were from India)**

Exhibit 42: Quarterly US module imports by region, December fiscal year-end, CY2020-2Q24 (GWdc)



Source: National Renewable Energy Laboratory, United States Department of Energy

**Indian solar exports to be temporary solution, with onshoring a more long-term situation**

In CY2023, according to the Solar Energy Industries Association, the US added 40GWdc of solar capacity in the Utility, Residential and Non-Residential segments combined and it expects US to add 250GWdc from CY2024-29. While the US is predominantly dependent on imports of solar modules currently, 55.6GWdc of modules were imported and only 7GWdc of modules were locally manufactured in CY2023.

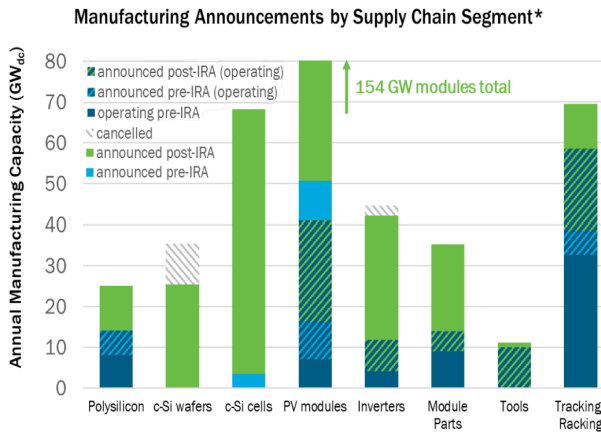
In order to incentivize local manufacturing, under Section 45X of the IRA, the US government provides tax credits for local manufacturing of solar modules (7 cents per WDC capacity) and cells (4 cents per WDC capacity).

Projects for a total module capacity of 154GW have been announced, with the US seeing 10GW of module manufacturing capacity being added over the past one year (2QCY23-2QCY24). The current US module capacity, as of 2QCY24, is 31GW versus less than 10GW when IRA was passed in 3QCY22. Once the US reaches 65-70GW of capacity and with a 70% normalized capacity utilization, the US would become self-sufficient. We see that by FY2028, the US should reach self-sufficiency in terms of module capacity, after which we expect policies that would largely restrict the import of solar modules. Hence, Indian companies with manufacturing capacity in the US would be the only ones that could continue to potentially supply modules to US energy companies. The India-based capacity, which was dedicated to exports, would now be only supplying the domestic market, creating a potential oversupply situation in the local market.



**154GW of nameplate module capacity announcement has been done, with majority announcements coming after IRA**

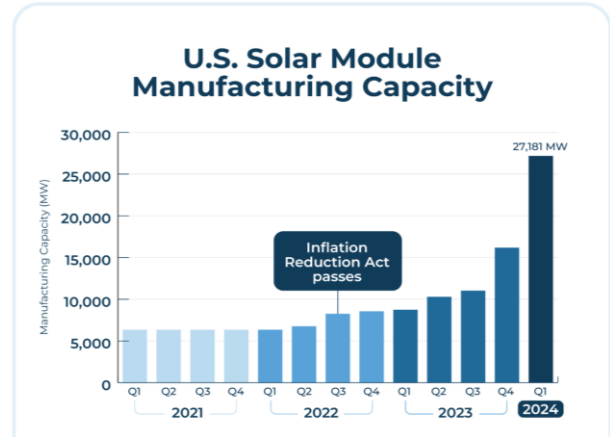
Exhibit 43: Announced solar capacity expansion by various US companies (in GWdc)



Source: Wood Mackenzie, Solar Energy Industries Association

**US solar module nameplate manufacturing capacity has reach of 27GW, as of 1QCY24 (31GW as of 2QCY24)**

Exhibit 44: US solar module manufacturing capacity, December fiscal year-end, 1Q2021-1Q2024 (GWdc)

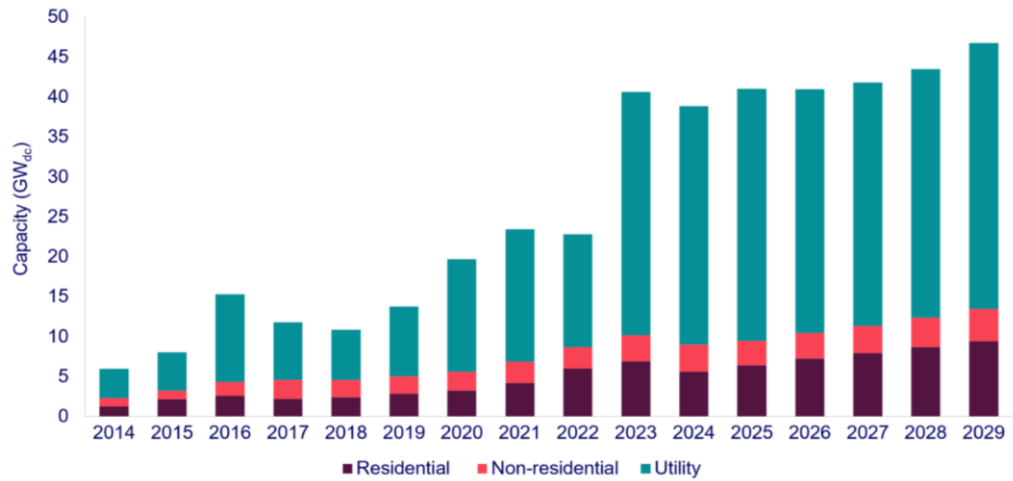


Source: Wood Mackenzie, Solar Energy Industries Association

**According to SEIA, the US is expected to add 250GWdc solar capacity from CY2024-29**

Exhibit 45: US solar PV installations and forecasts by segments, December fiscal year-end, CY2014-29E (GWdc)

**US solar PV installations and forecasts by segment, 2014-2029**

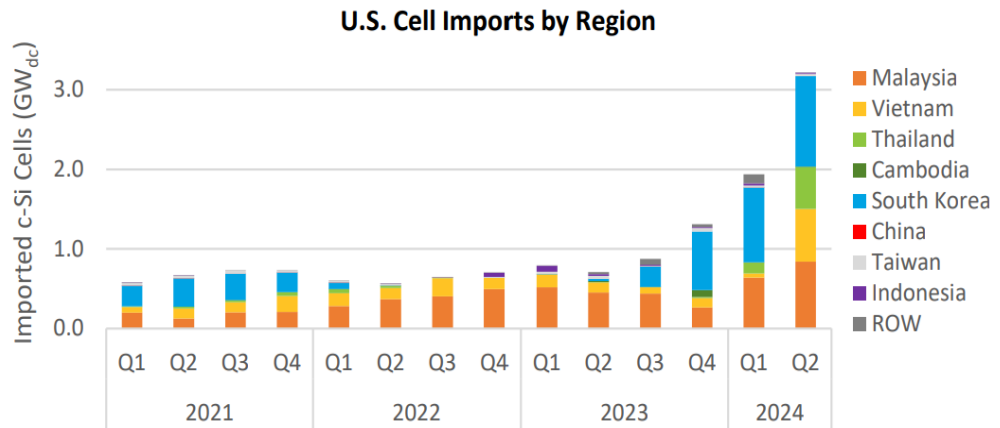


Source: Wood Mackenzie, Solar Energy Industries Association

**Domestic solar module capacity to drive up imports of solar cell into the US**

**The US predominantly has been importing modules, as a result solar cell imports have been modest at 3.7GWdc in 2023**

Exhibit 46: US cell imports by region, December fiscal year-end, CY2021-2QCY24 (GWdc)



Source: National Renewable Energy Laboratory, United States Department of Energy

In 2023, the US imported 55.6GW of modules and produced only 7GW of PV modules. Given modules were directly imported and only a small percentage of modules were locally manufactured, the requirement for US solar cell imports was low at 3.5GWdc in CY2023. However, with increasing local manufacturing of US modules and lower incentives offered to US cell manufacturing even with higher capex requirements (7 cents per WDC capacity for modules and 4 cents per WDC capacity for cells), we expect a larger requirement for sourcing of cells in the US, part of which would be done through local capacities and majority driven through imports.

Given the longer gestation period required for solar cell plants and large module manufacturing capacity coming on stream over the next two years, we expect US solar cell import demand to pick up substantially. Currently, India accounts for a very minuscule share of US cell imports (only Premier Energies exported a small volume of cells to the US in FY2024). While India’s share of imports would be small, it could potentially see a multifold increase based on the availability of Indian cell capacity and domestic requirements. Companies, which are setting up local US cell manufacturing capacity such as Premier Energies in a JV with Heliene, could continue to enjoy a robust demand environment over the next 3-4 years until substantial local capacity comes up in the US.

**Potential impact of change in US administration**

Near-term uncertainty on the continuation of the current IRA and other incentives to the solar sector remains a key overhang, given the change in the US administration after the recently concluded US presidential election.

Any measures to selectively reduce IRA benefits or restrict the ability of foreign firms to claim incentives could potentially impact all foreign entities trying to build capacity in the US.

Currently, we see the following three scenarios, which could potentially impact Indian solar manufacturers:

**1) Reduction of IRA and increase of tariffs on solar imports**

**Impact on industry:** A reduction in IRA incentives, along with an increase in tariffs, could substantially impact the financial viability of US solar power plants, domestic solar manufacturing capacities and increase the cost of solar module imports into the US. Combined, these actions could lead to a surge in US module prices, impacting the viability of solar power plants, and potentially reduce the export demand from India to the US, impacting all major module and cell exporters.

**2) No change in IRA and increase of tariffs on solar imports**

**Impact on industry:** This scenario would lead to a quicker shift of domestic manufacturing to the US, since tariff increases would lead to a surge in US module prices, thus benefiting domestic module manufacturers. An increase in tariffs would make exports from India less viable and only Indian companies that are setting up local US manufacturing capacities such as Premier Energies and Waaree Energies will benefit, once their capacities come on stream.

**3) No change in IRA and no change in tariffs**

**Impact on industry:** In case of no policy change, domestic manufacturing will continue to grow aggressively due to capacity expansions planned under the IRA, while manufacturers will continue to export to the US until demand-supply parity is achieved and then local manufacturing capacities of Indian companies would continue to see demand based on US solar capacity addition plans.

# 5

## Solar cell and module unit economics

The profitability and return profile of a solar manufacturing company depends primarily on the (1) level of backward integration, (2) markets which the company is selling to, (3) competitive intensity and (4) location of manufacturing (India or the US). When we analyze the unit economics and return profile of the current seven manufacturing options available to Indian companies, we see that module exports to the US and US module manufacturing are the most profitable markets for Indian companies. Over the medium term, we see that completely backward-integrated Indian manufacturers (from ingot to module) and companies with local US manufacturing presence could continue to enjoy the highest barriers to entry and will have better profitability.

### Module export to the US and US module manufacturing are most profitable markets for Indian companies

Exhibit 47: Unit economics for solar modules and cells; Dec 24 (US\$ cents/wp)

	Solar PV Manufacturing						
	India manufacturing				US Manufacturing		
	Non DCR Module	DCR Module	DCR Cell	Module export to US	US Module	US Cell	US Module +Cell
Realization (US\$ cents/wp)	17	25	13	28	28	15	28
Gross Margin (%)	16	39	54	26	28	11	10
EBITDA Margin (%)	10	33	43	20	44	28	40
<b>RoCE (%)</b>	<b>23</b>	<b>28</b>	<b>22</b>	<b>72</b>	<b>89</b>	<b>7</b>	<b>23</b>

Note:

(a) US EBITDA includes IRA AMPC rebate

(b) Utilization assumed at 60% for modules and 70% of cells and cells + module for RoCE calculation

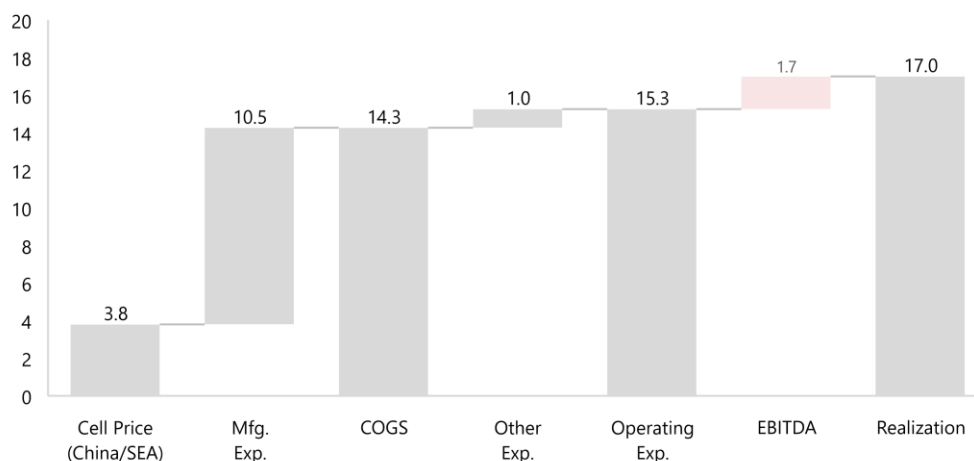
Source: Kotak Institutional Equities estimates

### Domestic ALMM-compliant modules (domestically manufactured modules with Chinese cells)

Domestic module manufacturers (non-DCR), primarily use imported Chinese/SEA cells, which cost (excluding BCD) US\$3.8 cents/wp, as of November 2024. Manufacturers spend US\$10.5 cents/wp on cell custom duty (25%: US\$1 cent/wp), acquisition of other components (glass, EVA, back sheet, aluminum frame and junction box) and conversion costs, based on the prevalent rate of US\$17 cents/wp. Module manufacturers are expected to make gross and EBITDA margins of US\$2.7 cents/wp (15%) and US\$1.7 cents/wp (10%), respectively.

### Domestic module manufacturers estimated to make 15% gross and 10% EBITDA margins at current prices

Exhibit 48: Unit economics for India-manufactured module; December 2024 (US\$ cents/wp)



Source: Bloomberg, OPIS, Kotak Institutional Equities estimates

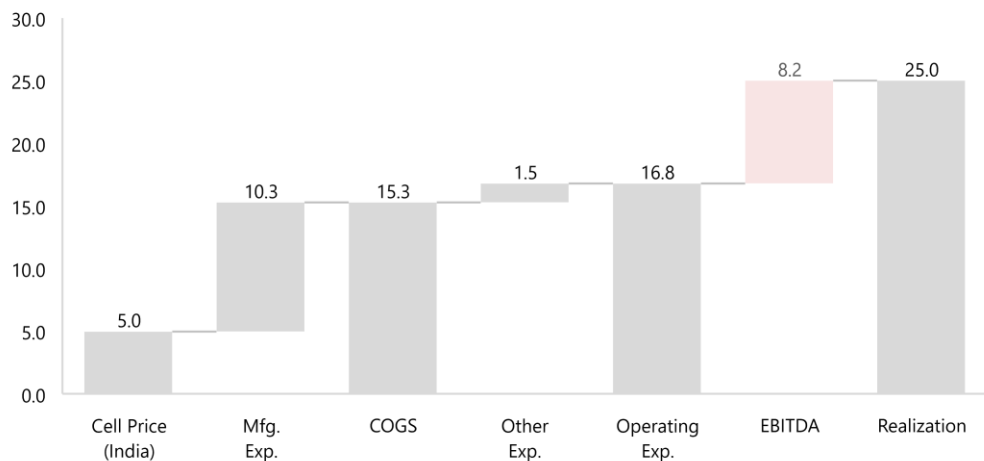
**DCR solar modules (cell and module both manufactured in India)**

DCR solar modules are ones, wherein the solar module and the cells are manufactured in India. Given higher realization in the DCR module and the potential implementation of ALMM List II by fiscal 2026, many leading manufacturers have announced backward integration by setting up solar cell manufacturing facilities in India.

DCR modules use India-manufactured cells, which cost US\$5 cents/wp (comprises of US\$2 cents/wp of wafer cost and US\$3 cents/wp of direct conversion cost), as of December 2024. Additionally, manufacturers spend US\$10.3 cents/wp on the acquisition of key components and conversion costs. Based on the current market rate of US\$25 cents/wp, DCR module manufacturers are expected to make gross and EBITDA margins of US\$9.7 cents/wp (40%) and US\$8.2 cents/wp (33%), respectively. Driven by the shortage of cell capacity in India, the DCR module currently trades at a 40-50% premium to other modules, but the gap is expected to reduce in the next few years, reaching US\$20 cents/wp by fiscal 2028.

**DCR module manufacturers estimated to generate 40% and 33% gross and EBITDA margins, respectively, at current prices**

Exhibit 49: Unit economics for India-manufactured DCR module; December 2024 (US\$ cents/wp)



Source: Bloomberg, OPIS, Kotak Institutional Equities estimates

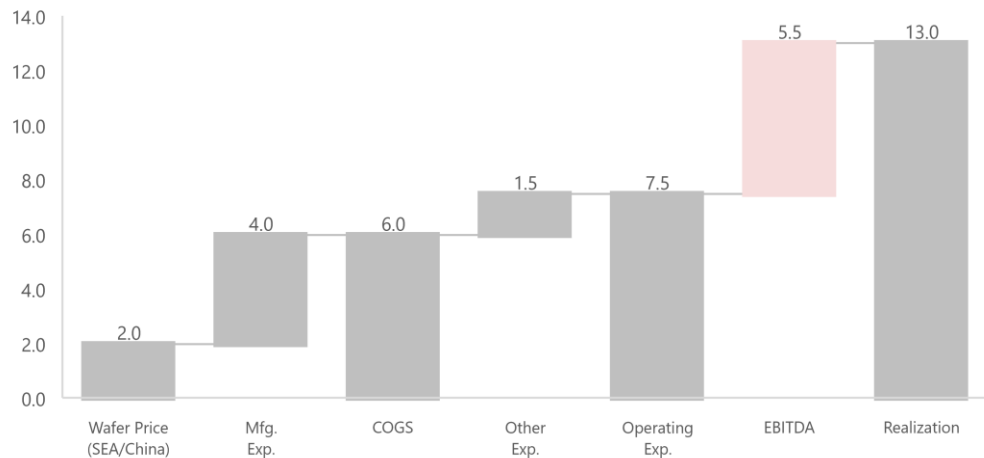
**India-manufactured cells**

Solar cells manufactured in India are typically used for making DCR modules either by the cell manufacturers themselves or sold to other ALMM-approved module manufacturers. An acute shortage of domestic cells has allowed cell manufacturers such as Premier Energies and Websol Energy realize exorbitant prices of US\$13-15 cents/wp, 3X the cost of an imported cell (US\$5 cents/wp post-BCD).

To manufacture cells, wafers are imported from China/SEA, which cost US\$2 cents/wp, as of December 2024. Additionally, manufacturers spend US\$4 cents/wp on the acquisition of key components and conversion costs. Assuming the current market rate of US\$13 cents/wp, we estimate cell manufacturers are making gross and EBITDA margins of 7 cents/wp (55%) and 5.5 cents/wp (43%), respectively. Although the current cell price is elevated due to a demand-supply mismatch, the same is expected to come down to US\$10 cents/wp in the next 2-3 years, as more cell capacities go online.

**Domestic cell manufacturers estimated to generate 55% and 43% gross and EBITDA margins, respectively, at current prices**

**Exhibit 50: Unit economics for India-manufactured cells; December 2024 (US\$ cents/wp)**



Source: Bloomberg, OPIS, Kotak Institutional Equities estimates

**Export (modules made in India and exported to the US using Chinese cells, with no exposure to the Xinjiang province)**

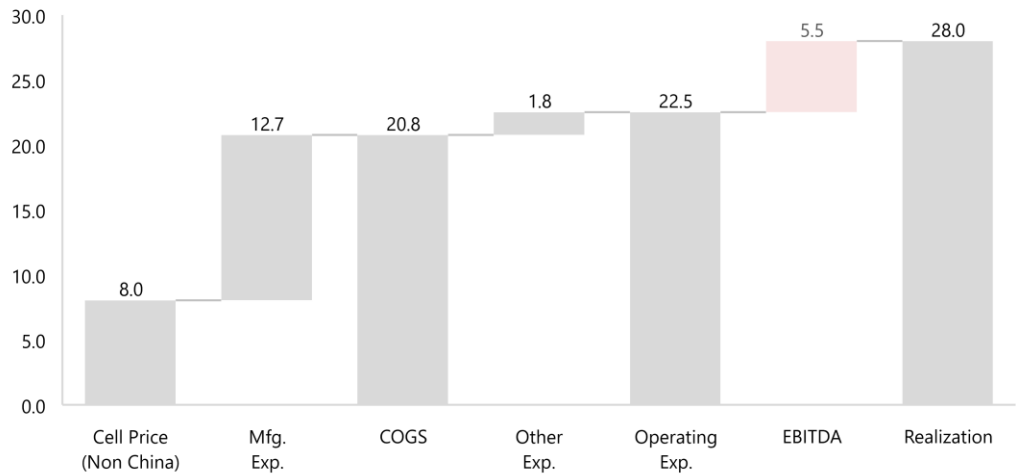
Leading Indian solar module manufacturers such as Waaree, Adani, Vikram and Premier have witnessed a surge in export revenue. India’s solar module exports hit US\$1.97 bn in fiscal 2024, up 91% from fiscal 2023. The US was the biggest destination for exports, totaling US\$1.94 bn (98.5% of total module exports).

Solar module exports are expected to continue growing over the medium term, driven by (1) rising adoption of renewable energy and (2) reducing dependence on Chinese/SEA manufacturers.

The US, which will remain the key market for Indian players, has implemented a sanction named the Uyghur Forced Labor Prevention Act (UFLPA), barring solar modules built from polysilicon made in the Xinjiang region of China. This has increased the cost for Indian players, which now have to acquire cells at US\$8 cents/wp versus US\$3.8 cents/wp. Manufacturers spend an additional 12.7 cents to manufacture the solar panel—this cost encompasses BCD (2.5 cents), purchase of components and conversion cost. Assuming prevailing module prices in the US remain stable, exporters are estimated to make gross profit and EBITDA of US\$7.3 cents/wp (25%) and US\$ 5.5 cents/wp (20%), respectively.

**Module exporters estimated to generate 25% gross and 20% EBITDA margins at current price levels**

Exhibit 51: Unit economics for modules manufactured in India exported to the US; December 2024 (US\$ cents/wp)



Source: Bloomberg, OPIS, Kotak Institutional Equities estimates

**Manufacturing in the US**

US is adding solar capacity at an unprecedented pace, which is second only to China. Capacity added across residential, commercial, industrial, and utility-scale applications is expected to grow from nearly 39GW in 2024 to roughly 67GW in 2033 at a CAGR of 6.3%.

However, the US faces a shortage in domestic module production and has close to negligible capability in cell, wafer, ingot and polysilicon. To promote domestic production, the US government has announced a US\$7 cents/wp incentive on module and US\$4 cents/wp incentive on cell under the Advanced Manufacturing Product Credit within the IRA.

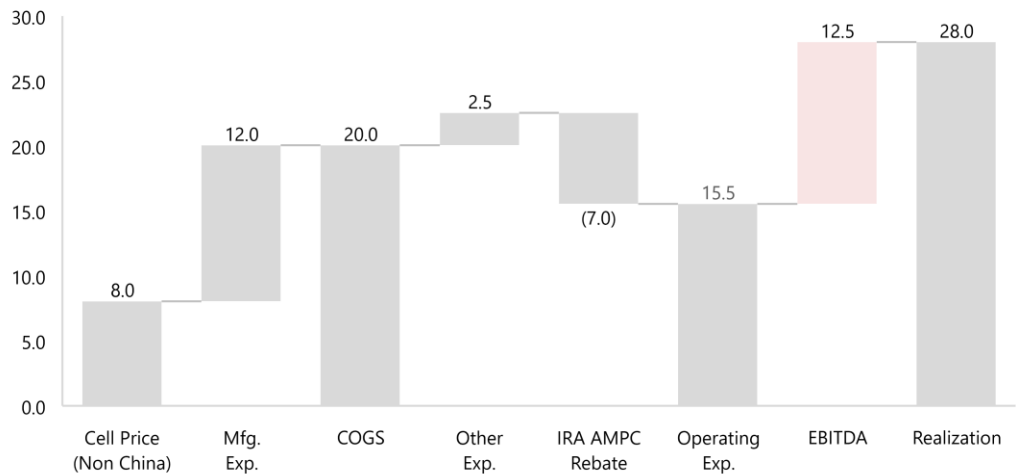
This has led many Indian module manufacturers to announce capacity addition in the US such as Waaree whose 1.6GW module plant is expected to go online in fiscal 2025, with the potential to expand it to 5GW by fiscal 2027.

**Modules manufactured in the US**

Modules manufactured in the US use UFLPA-compliant cells that cost US\$8 cents/wp. Manufacturers spend US\$12 cents/wp, 25% more than Indian manufacturers due to higher freight, component and conversion costs. Based on the current module price of US\$28 cents/wp and IRA AMPC rebate of US\$7 cents/wp companies generate EBITDA of US\$12.5 cents/wp (45% margin).

**US domestic module manufacturers estimated to generate 45% EBITDA margins at current price levels**

Exhibit 52: Unit economics for US-manufactured modules; December 2024 (US\$ cents/wp)



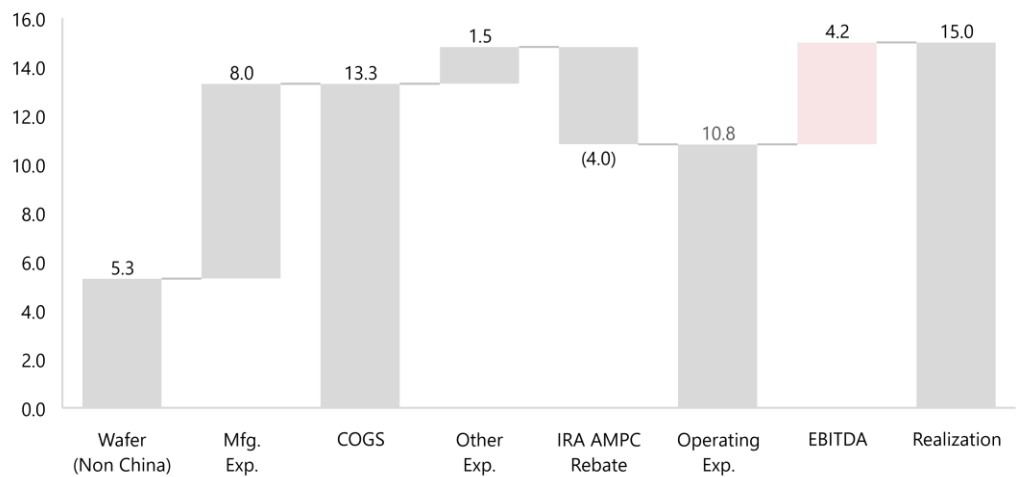
Source: Bloomberg, OPIS, Kotak Institutional Equities estimates

**Cells manufactured in the US**

Cells manufactured in the US use UFLPA-compliant wafers that cost US\$5.3 cents/wp. Manufacturers spend US\$8 cents/wp, 100% more than Indian manufacturers due to higher freight, component and conversion costs. Based on current cell prices of US\$ 15 cents/wp and IRA AMPC rebate of US\$4 cents/wp companies generate EBITDA of US\$4.2 cents/wp (28% margin).

**US domestic cell manufacturers estimated to generate 28% EBITDA margins at current price levels**

Exhibit 53: Unit economics for US-manufactured cells; December 2024 (US\$ cents/wp)



Source: Kotak Institutional Equities estimates

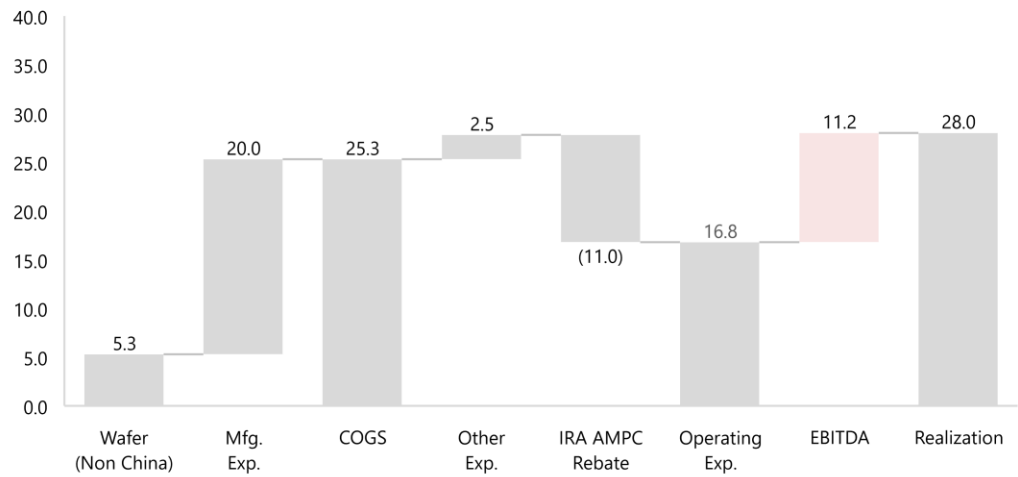
**Module and cells both manufactured in the US**

Integrated module + cell manufacturing facilities in the US, use UFLPA-compliant wafers, which cost US\$5.3 cents/wp. We estimate that manufacturers incur US\$20 cents/wp on converting wafers to cell to module—this includes freight, energy, component and other conversion costs. Based on the current module price of US\$28 cents/wp and IRA AMPC rebate of US\$11 cents/wp, manufacturers are expected to generate EBITDA of US\$11.2 cents/wp (40% margin).



**US integrated manufacturers estimated to generate 40% EBITDA margins at current price levels**

**Exhibit 54: Unit economics for US-manufactured module + cell; December 2024 (US\$ cents/wp)**



Source: Bloomberg, OPIS, Kotak Institutional Equities estimates

# 6

## Indian solar manufacturing landscape: Strong solar capacity addition and trade restrictions have driven revenue growth with improving margins

The Indian solar manufacturing industry has seen a surge in investments, driven by favorable government policies such as ALMM, DCR and BCD. However, we find that most Indian manufacturers have very small capacities currently (less than 1GW) and are primarily involved in the assembly of solar modules. We find that only a handful of firms have (1) large capacities (greater than 2GW) and are undertaking rapid expansions, (2) backward integration into cell manufacturing (with plans to backward integrate into ingot and wafer) and (3) have sizeable exposure to US markets (with plans to set up US manufacturing facilities). We believe overtime these companies would be the ones that will have sizeable advantage, in terms of scale and cost competitiveness versus the rest of the market.

### Indian solar companies to see robust growth over the next four years, driven by favorable policies and rapid capacity expansion

When we analyze the revenue growth profile for the top-11 Indian solar manufacturing companies over the past five years, we see that Indian companies have reported a CAGR of 41%. Currently, we see that players with sizeable capacity or US exports (Waaree, Adani Enterprises, Vikram Solar and Premier Energies) are the only ones with a reasonable revenue base. However, with ALMM applicable from FY2025 (market for direct Chinese solar imports has reduced substantially) and large capacity expansion plans (many companies have indicated doubling of capacity and backward integration into cells), we expect Indian solar manufacturers to enjoy a substantially higher growth rate for the next 3 to 4 years.

### Indian solar manufacturing revenue has increased at a CAGR of 41% over the past five years, largely driven by module revenues

Exhibit 55: Revenue of solar manufacturing companies, March fiscal year-ends, 2020-24 (Rs mn)

Revenue	2020	2021	2022	2023	2024
Waaree Energies	19,958	19,530	28,543	67,509	113,976
Mundra Solar (Adani Enterprises)	21,490	29,720	25,580	35,670	87,410
Premier Energies	9,474	7,015	7,429	14,285	31,438
Vikram Solar	16,397	16,101	17,303	20,732	25,110
Renew Sys India	8,081	7,902	11,936	17,914	21,623
Goldi Solar	3,973	3,971	5,464	14,872	18,554
Tata Power			2,975	7,347	13,405
Saatvik Solar	1,088	1,538	5,047	6,212	11,070
Insolation Energy	888	1,627	2,154	2,794	7,372
Jupiter Solar	2,630	3,134	3,013	4,304	5,792
WebsoL Energy	1,955	1,579	2,178	172	259
Emmvee solar	4,634	3,485	4,612	5,384	
Gautam Solar	1,246	1,428	2,405	3,523	

Note:

(a) Tata Power data is from TPSSL segmental revenue details

(b) FY2024 revenue numbers for certain players include provisional revenue numbers as disclosed by rating agencies

Source: Company filings, credit rating reports

### Vertically integrated players or exporters enjoy higher margins than domestic module manufacturers

We see among Indian solar manufacturing companies, generally exporters (companies that exports modules to the US) or vertically integrated players (players with cell capacity) enjoy higher margins due to better realization and lower competitive intensity. Over the past four years (FY2020-23), Indian solar companies have reported EBITDA margins in the 7-11% range on average, with only export-oriented companies having slightly higher margins. With many module and cell capacities coming on stream, we have seen margins substantially improve in FY2024 for most players due to better utilization.

Currently, pure cell manufacturers are enjoying EBITDA margins in the range of 35-40%, driven by higher DCR demand and lack of capacity. Export and DCR module have margins in the range of 25%+ due to better realization, with ALMM module assembly manufacturers having margins in the range of 7-14%. We expect profitability to improve over the next couple of years, driven by higher demand for domestic modules due to ALMM and higher capacity additions, along with higher vertical integration (many players backward integrating into cells). However, should there be an overcapacity in the market due to a large capacity addition by multiple players, then despite vertical integration, we can see margins come off for most companies over the medium term (beyond FY2027).

**Companies, which are backward integrated into cells or export modules to the US, generally have higher margin than domestic module manufacturers**

Exhibit 56: EBITDA margin of solar manufacturing companies, March fiscal year-ends, 2020-24 (%)

Revenue	2020	2021	2022	2023	2024
Mundra Solar (Adani Enterprises)	14	28	15	12	26
Jupiter Solar	16	32	16	5	20
Vikram Solar	9	11	3	9	16
Premier Energies	10	8	4	5	15
Waaree Energies	5	5	4	12	14
Insolation Energy	13	12	11	10	13
Websol Energy	6	20	14	(44)	5
Renew Sys India	5	14	8	7	
Goldi Solar	6	4	3	6	
Gautam Solar	9	9	7	6	
Saatvik Solar	7	6	4	4	

Note:

(a) FY2024 EBITDA margin for certain players includes provisional EBITDA margin numbers as disclosed by rating agencies

Source: Company filings, credit rating reports

# 7

## Global solar industry: Overcapacity remains a key risk for Indian solar industry

On analyzing the major Chinese and US solar companies, we find that (1) Chinese companies have the largest scale and are most vertically integrated; however, their margins are impacted due to overcapacity, which offsets any benefits of vertical integration and has led to record low realizations. While Indian companies currently enjoy the benefits of trade and non-trade barriers along with lower capacity, large capacity expansions by all Indian players could lead to a similar situation locally. (2) When we analyze First Solar, a leading US manufacturer of solar PV modules, we find that after the implementation of the IRA and Uyghur Forced Labor Prevention Act, the company has seen a sharp improvement in its growth and EBITDA margins, which is what Indian companies can potentially expect over the next couple of years.

### China: Overcapacity more than offsets the benefits of vertical integration

China is the largest market for solar PV modules and the top-six firms in China account for majority of the market capacity. Furthermore, Chinese companies account for 80% of the global solar PV capacity and are the major exporters of solar modules. Most of these players are vertically integrated, i.e., these companies manufacture ingots to modules with these companies’ selling wafers, cells and modules to external customers. In terms of technical capability, Chinese firms are at the forefront in terms of commercially producing the latest solar modules.

However, we see that while Chinese companies have increased revenue by 38% CAGR over the past five years, the revenue growth seen by these firms is much lower than volume growth, as overcapacity has led to a sharp fall in realizations. Furthermore, given the weak realizations and overcapacity, these companies have increasingly resorted to selling products even below the cost of production, leading to huge losses seen in calendar year 2024. While Indian companies are increasingly highlighting higher margins due to scale and backward integration, we see that in case of overcapacity, competitive pressures far outweigh the benefits of vertical integration. With large capacity announcements in the Indian domestic PV market, an overcapacity situation could impact Indian markets in a similar way over the medium term.

### Large Chinese players are vertically integrated (ingot to module) and each have a capacity of 100GW

Exhibit 57: Nameplate capacity of leading Chinese solar manufacturers as of CY2023 (in GW)

Major Chinese player-Name plate capacity						
Sr No	Longi	Jinko	Trina	JA Solar	Tongwei	Candian Solar
<b>Ingot/Wafer</b>						
Capacity in GW	170	85	55	86		21
<b>Cell</b>						
Capacity in GW	80	90	75	86	95	50
<b>Module</b>						
Capacity in GW	120	110	95	95	75	61

Source: Company, China Photovoltaic Industry Association (CPIA),

**Chinese solar companies' revenue and profitability have lagged capacity growth due to lower realizations**

**Exhibit 58: Key financial metrics of solar companies with large Chinese manufacturing presence, December fiscal year-end, CY2019-23 (US\$ mn, %)**

Revenue	2019	2020	2021	2022	2023	9MFY24	4 yr CAGR (2019-23)
LONGi Solar	4,763	7,919	12,549	19,183	18,287	8,138	40
Trina Solar	3,377	4,268	6,897	12,648	16,013	8,768	48
Jinko Solar	4,307	5,097	6,330	12,362	16,759	9,970	40
JA Solar	3,063	3,750	6,404	10,854	11,517	7,546	39
Canadian Solar	3,201	3,476	5,277	7,469	7,614		24
Risen Energy	2,086	2,331	2,920	4,370	4,989	2,069	24
<b>Total</b>	<b>20,796</b>	<b>26,840</b>	<b>40,377</b>	<b>66,885</b>	<b>75,179</b>	<b>36,491</b>	<b>38</b>

EBITDA margin	2019	2020	2021	2022	2023	9MFY24
LONGi Solar	23	21	17	10	9	(13)
Trina Solar	8	9	7	7	8	1
Jinko Solar	9	9	7	4	12	4
JA Solar	18	16	13	11	14	(2)
Canadian Solar	14	13	9	8	10	
Risen Energy	13	10	0	6	10	(8)

PAT margin	2019	2020	2021	2022	2023	9MFY24
LONGi Solar	16	16	11	11	8	(11)
Trina Solar	3	4	4	4	5	(1)
Jinko Solar	3	1	2	1	3	(2)
JA Solar	6	6	5	8	9	(1)
Canadian Solar	5	4	2	3	4	
Risen Energy	7	1	(0)	3	4	(11)

Source: Bloomberg

**US—First Solar: Trade and non-trade barriers have aided revenue and margin performance**

First Solar is one the largest Solar PV module manufacturers in the US. First Solar enjoys similar benefits as Indian companies—(1) trade restriction on Chinese companies due to higher tariff (50% import duty on Chinese imports) and non-trade barriers (Uyghur Forced Labor Prevention Act), (2) manufacturing incentives under the IRA. We see that from CY2023 since the implementation of the IRA Act and Uyghur Forced Labor Prevention Act, the company has seen a sharp improvement in its growth and EBITDA margins. First Solar is an integrated player, which is what many Indian companies aim to become; however, given First Solar works on thin film Cadmium telluride photovoltaic modules, the unit economics would be different from Indian players that work on crystalline solar silicon.

**First Solar's profitability has seen a sharp improvement in CY2023 since the passage of IRA**

**Exhibit 59: Key financial metrics of First Solar, December fiscal year-end, CY2019-23 (US\$ mn, %)**

US\$ mn	2019	2020	2021	2022	2023
Revenue	3,063	2,711	2,923	2,619	3,319
yoy growth %	36	(11)	8	(10)	27
EBITDA	66	569	864	257	1,177
EBITDA margin %	2	21	30	10	35
PAT	(115)	398	469	(44)	831
PAT margin %	(4)	15	16	(2)	25

Source: Bloomberg

# A1

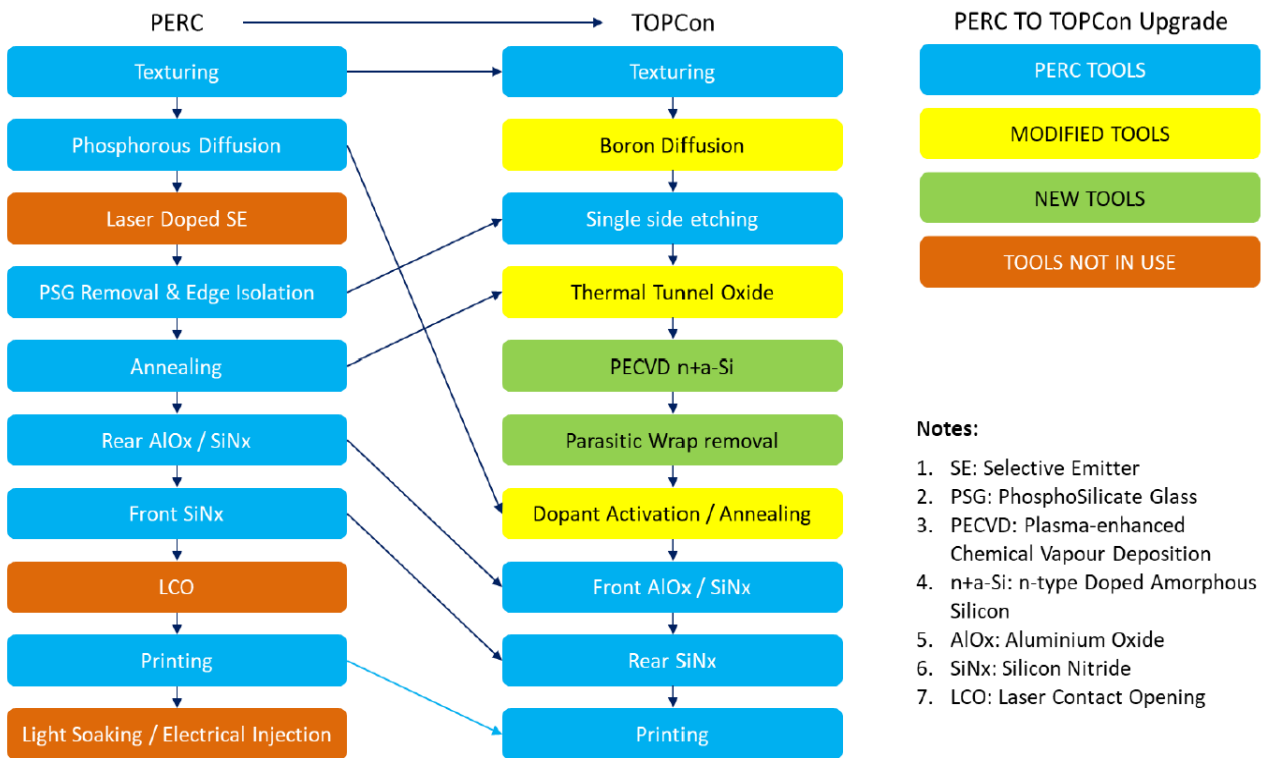
## Appendix 1: Key solar cell technologies

The solar cell industry has undergone a remarkable transformation, driven by a constant quest for efficiency and cost-effectiveness. Initially, poly-Si dominated the market, offering a simple and affordable solution. However, its ability to convert sunlight into electricity was limited. A significant breakthrough occurred with the introduction of PERC technology. PERC cells address the efficiency limitations of poly-Si by incorporating surface texturing and passivating layers on both sides. These features enhance light capture and reduce electron loss, leading to a significant boost in efficiency. This shift toward PERC had propelled the industry forward, enabling the production of more powerful and cost-competitive solar panels. The monocrystalline PERC technology is an advanced technology used to increase the efficiency of standard solar modules. The electrons that form an electric current in the solar cells have greater room to move because the cells are made up of a single crystal. As a result, solar cells are significantly more efficient. These high-end solar cells are space-efficient and long-lasting, and have a more streamlined appearance.

The solar technology landscape is witnessing an active transformation, with numerous next-generation panels showcasing cutting-edge photovoltaic cell designs and advancements. These innovations are collectively driving improvements in efficiency, degradation resistance and overall reliability. Following the PERC breakthrough, the latest solar PV cell technologies are TOPCon and HJT.

PERC and TOPCon are compatible technologies. While PERC has become widely accepted in the solar panel industry, advancements in process technology such as heterojunction and TOPCon technology are anticipated to provide significant competition. TOPCon requires additional equipment to be integrated into the production line of monocrystalline PERC for manufacturing TOPCon cells. On the other hand, HJT solar cell manufacturing necessitates the complete replacement of the existing PERC manufacturing line, demanding substantial capital investment. Going forward, Premier Energies is investing in TOPCon lines to produce more efficient solar cells.

Exhibit 60: Upgrade steps to be undertaken from MonoPERC to TOPCon production line



Source: Frost and Sullivan analysis

# Premier Energies (PREMIERE)

Renewable Energy

**SELL**

CMP(₹): **1,305**

Fair Value(₹): **770**

Sector View:

NIFTY-50: **23,708**

January 07, 2025

## First-mover advantage in solar cells, rich valuations

Premier Energies is India's 2<sup>nd</sup> largest integrated solar cell and solar module manufacturer with rapid capacity expansion plans in the next couple of years. We expect Premier to have a robust 44% earnings CAGR over FY2024-30E, driven by (1) India capacity expansion and backward integration; (2) expansion into US cell manufacturing; and (3) higher capacity utilization. However, heightened competitive intensity will likely impact margins and return ratios from FY2028. We initiate with a SELL rating and a FV of Rs770 (40% downside) due to elevated valuations.

### Initiate with a SELL rating; Fair Value of Rs770

We initiate coverage on Premier Energies with a SELL rating and a DCF-based Fair Value of Rs770 (21.8X March 2027E EPS). Our FV implies (1) Premier Energies' capacity to see 20%/27% CAGR for module and cell capacities, respectively; (2) 29%/34% volume CAGR for Premier's module and cell volumes until FY2035, driven by capacity addition and utilization levels of 70%+ for modules and 85% for cells; (3) stable EBITDA margins of 20% in the long term, with exit FY2035 EBITDA margin of 18.6%; (4) cost of equity of 13% and WACC of 10.4%; and (5) terminal value-2.3X FY2035 book value (10% premium to Chinese solar companies valuations). We see FY2030 earnings as normalized earnings for the company, reflecting the full impact of capacity expansion and margins.

### Capitalizing on solar cell capabilities with rapid expansion in India and US

Premier Energies has a first-mover advantage over peers since cell manufacturing is a complex process with high capex requirements. We expect Premier to capitalize on its cell manufacturing capabilities and increase its domestic module and cell capacity to 17.4 GW and 13 GW by FY2030, respectively, from 3.36 GW and 2 GW as of FY2024. In the US, Premier's JV with Heliene should give it an early-mover advantage. We see US cell demand increasing exponentially in the next five years (50 GWdc modules are expected to be produced locally in CY2027 versus 7 GWdc in CY2023), driven by the expansion of local US module manufacturing (aided by IRA benefits). This could be a key demand driver, and we see its US cell capacity reaching 3.2 GW by FY2030.

### Financials: Expect 44% PAT CAGR over FY2024-30E

We forecast Premier's growth to be driven by three key factors: (1) India capacity expansion and backward integration; (2) expansion into US cell manufacturing; and (3) higher capacity utilization. We estimate margins to peak at 25% in FY2027, driven by higher realization and strong EBITDA margins in the DCR market. However, heightened competitive intensity could start impacting margins from FY2028. Operating cash flows and IPO proceeds will be sufficient to fund incremental capex required for growth.

### Risks: Changes in regulatory policy and heightened competitive intensity

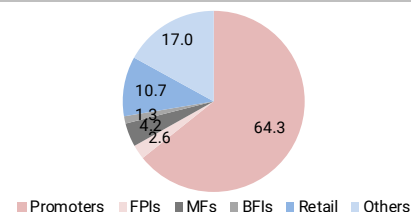
The key long-term risks are: (1) change in any trade and non-trade barrier by Indian or US governments; (2) faster-than-expected ramp-up of cell capacity by competitors.

#### Company data and valuation summary

##### Stock data

CMP(Rs)/FV(Rs)/Rating	1,305/770/SELL
52-week range (Rs) (high-low)	1,388-802
Mcap (bn) (Rs/US\$)	588/6.9
ADTV-3M (mn) (Rs/US\$)	0/0.0

##### Shareholding pattern (%)



Price performance (%)	1M	3M	12M
Absolute	3	0	0
Rel. to Nifty	7	0	0
Rel. to MSCI India	8	0	0

Forecasts/Valuations	2025E	2026E	2027E
EPS (Rs)	16.3	27.0	35.3
EPS growth (%)	196.6	65.8	30.8
P/E (X)	80.3	48.4	37.0
P/B (X)	20.4	14.4	10.3
EV/EBITDA (X)	41.2	26.1	18.7
RoE (%)	41.6	34.9	32.5
Div. yield (%)	0.0	0.0	0.0
Sales (Rs bn)	64	103	128
EBITDA (Rs bn)	14	23	32
Net profits (Rs bn)	7.3	12	16

Source: Bloomberg, Company data, Kotak Institutional Equities estimates

Prices in this report are based on the market close of January 07, 2025

#### Forecasts/Valuations

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## Financial overview: Expect 44% PAT CAGR over FY2024-30E

We expect Premier's adjusted EPS to grow 43% over FY2024-30E

Exhibit 1: Key financial metrics of Premier Energies Ltd (consolidated), March fiscal year-end, 2021-30E

	Net sales		EBITDA		Adj. PAT		Adj. EPS		EV/EBITDA	P/E	P/B	RoACE	RoAE
	(Rs mn)	yoy chg. (%)	(Rs mn)	margin (%)	(Rs mn)	margin (%)	(Rs)	yoy chg. (%)	(X)	(X)	(X)	(%)	(%)
2021	7,015		537	7.7	258	3.7	1.0		1,074.6	1,229.9	142.9	4.6	11.4
2022	7,429	5.9	296	4.0	(144)	(1.9)	(0.4)	-143%	1,951.7	(2,877.7)	105.1	0.3	(4.7)
2023	14,285	92.3	782	5.5	(133)	(0.9)	(0.4)	-10%	741.6	(3,191.4)	103.5	4.4	(3.3)
2024	31,438	120.1	4,778	15.2	2,314	7.4	5.5	-1473%	122.3	232.4	83.1	19.5	43.7
2025E	64,348	104.7	14,098	21.9	7,329	11.4	16.3	197%	40.2	78.4	19.9	37.7	41.6
2026E	102,599	59.4	22,800	22.2	12,155	11.8	27.0	66%	25.5	47.2	14.0	27.9	34.9
2027E	128,058	24.8	32,399	25.3	15,904	12.4	35.3	31%	18.2	36.1	10.1	25.1	32.5
2028E	165,534	29.3	38,309	23.1	19,284	11.6	42.8	21%	15.4	29.8	7.5	23.0	29.0
2029E	176,707	6.7	36,342	20.6	17,451	9.9	38.7	-10%	16.2	32.9	6.1	16.0	20.6
2030E	210,429	19.1	39,774	18.9	20,828	9.9	46.2	19%	14.4	27.6	5.0	16.0	20.0
<b>CAGR (2024-30E)</b>	<b>37%</b>		<b>42%</b>		<b>44%</b>		<b>43%</b>						

Source: Company, Kotak Institutional Equities estimates

Exhibit 2: Summary financials of Premier Energies Ltd (consolidated), March fiscal year-ends, 2021-30E (Rs mn)

	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Income statement</b>										
<b>Net revenues</b>	<b>7,015</b>	<b>7,429</b>	<b>14,285</b>	<b>31,438</b>	<b>64,348</b>	<b>102,599</b>	<b>128,058</b>	<b>165,534</b>	<b>176,707</b>	<b>210,429</b>
Total operating expenses	(6,478)	(7,133)	(13,503)	(26,660)	(50,250)	(79,799)	(95,659)	(127,226)	(140,365)	(170,656)
<b>EBITDA</b>	<b>537</b>	<b>296</b>	<b>782</b>	<b>4,778</b>	<b>14,098</b>	<b>22,800</b>	<b>32,399</b>	<b>38,309</b>	<b>36,342</b>	<b>39,774</b>
Depreciation & Amortization	(217)	(430)	(686)	(1,212)	(1,702)	(3,524)	(5,456)	(7,044)	(8,875)	(10,111)
<b>EBIT</b>	<b>320</b>	<b>(134)</b>	<b>96</b>	<b>3,566</b>	<b>12,396</b>	<b>19,276</b>	<b>26,943</b>	<b>31,265</b>	<b>27,466</b>	<b>29,663</b>
Other income	348	242	347	275	1,089	2,027	2,465	5,207	9,449	13,751
Interest expense	(217)	(430)	(686)	(1,212)	(1,702)	(3,524)	(5,456)	(7,044)	(8,875)	(10,111)
<b>PBT</b>	<b>552</b>	<b>(169)</b>	<b>(90)</b>	<b>2,880</b>	<b>9,842</b>	<b>16,328</b>	<b>21,367</b>	<b>25,910</b>	<b>23,447</b>	<b>27,985</b>
Tax expense	300	(13)	56	580	2,520	4,180	5,470	6,633	6,002	7,164
<b>Net profit</b>	<b>258</b>	<b>(144)</b>	<b>(133)</b>	<b>2,314</b>	<b>7,329</b>	<b>12,155</b>	<b>15,904</b>	<b>19,284</b>	<b>17,451</b>	<b>20,828</b>
<b>Reported PAT</b>	<b>258</b>	<b>(144)</b>	<b>(133)</b>	<b>2,314</b>	<b>7,329</b>	<b>12,155</b>	<b>15,904</b>	<b>19,284</b>	<b>17,451</b>	<b>20,828</b>
<b>Recurring EPS</b>	<b>1</b>	<b>(0)</b>	<b>(0)</b>	<b>5</b>	<b>16</b>	<b>27</b>	<b>35</b>	<b>43</b>	<b>39</b>	<b>46</b>
<b>Balance sheet</b>										
<b>Shareholders' funds</b>	<b>2,221</b>	<b>3,946</b>	<b>4,112</b>	<b>6,469</b>	<b>28,798</b>	<b>40,953</b>	<b>56,857</b>	<b>76,141</b>	<b>93,593</b>	<b>114,421</b>
Share capital	250	263	263	263	451	451	451	451	451	451
Reserves & surplus	1,971	3,683	3,849	6,205	28,347	40,502	56,407	75,691	93,142	113,970
Debt	3,452	4,533	7,635	13,922	18,822	39,070	60,533	78,179	98,527	112,251
Deferred tax liabilities	189	76	84	307	307	307	307	307	307	307
Minority interest and other liabilities	778	932	838	1,123	1,123	1,123	1,123	1,123	1,123	1,123
<b>Total sources of funds</b>	<b>6,639</b>	<b>9,488</b>	<b>12,670</b>	<b>21,821</b>	<b>49,050</b>	<b>81,453</b>	<b>118,820</b>	<b>155,750</b>	<b>193,549</b>	<b>228,101</b>
Net fixed assets	4,206	5,864	9,334	12,172	15,528	39,478	62,100	76,746	92,346	96,523
Net working capital (ex-cash)	525	1,120	186	4,071	5,733	8,760	10,774	13,740	14,624	17,292
Investments	1,113	908	1,216	1,551	1,551	1,551	1,551	1,551	1,551	1,551
Cash and bank balances and current investments	794	1,597	1,935	4,027	26,238	31,663	44,395	63,713	85,028	112,735
<b>Total application of funds</b>	<b>6,639</b>	<b>9,488</b>	<b>12,670</b>	<b>21,821</b>	<b>49,050</b>	<b>81,453</b>	<b>118,820</b>	<b>155,750</b>	<b>193,549</b>	<b>228,101</b>
<b>Free cash flow</b>										
Operating profit before wcap. changes	839	424	877	4,842	13,493	21,310	29,415	36,479	36,922	43,421
Change in working capital / other adjustments	1,667	(255)	(407)	(3,688)	(1,662)	(3,027)	(2,014)	(2,965)	(884)	(2,668)
Direct tax paid	(138)	(119)	(103)	(252)	(2,520)	(4,180)	(5,470)	(6,633)	(6,002)	(7,164)
<b>Net cashflow from operating activities</b>	<b>2,369</b>	<b>50</b>	<b>367</b>	<b>902</b>	<b>9,311</b>	<b>14,103</b>	<b>21,931</b>	<b>26,880</b>	<b>30,036</b>	<b>33,589</b>
Capex	(3,245)	(1,987)	(2,760)	(4,514)	(7,000)	(28,925)	(30,662)	(25,208)	(29,069)	(19,606)
<b>Free cash flow (CFO + net capex)</b>	<b>(876)</b>	<b>(1,938)</b>	<b>(2,394)</b>	<b>(3,612)</b>	<b>2,311</b>	<b>(14,822)</b>	<b>(8,732)</b>	<b>1,673</b>	<b>967</b>	<b>13,983</b>
<b>Growth (%)</b>										
Revenue growth		5.9	92.3	120.1	104.7	59.4	24.8	29.3	6.7	19.1
EBITDA growth		(44.9)	164.4	511.0	195.1	61.7	42.1	18.2	(5.1)	9.4
Recurring PAT growth		(155.8)	(7.4)	(1,834.9)	216.8	65.8	30.8	21.3	(9.5)	19.3
<b>Key ratios</b>										
EBITDA margin (%)	7.7	4.0	5.5	15.2	21.9	22.2	25.3	23.1	20.6	18.9
Net debt/equity (X)	1.2	0.7	1.4	1.5	(0.3)	0.2	0.3	0.2	0.1	(0.0)
Net debt/EBITDA (X)	5.0	9.9	7.3	2.1	(0.5)	0.3	0.5	0.4	0.4	(0.0)
Book value per share (Rs)	9	12	12	15	64	91	126	169	208	254
RoAE (%)	11	(5)	(3)	44	42	35	33	29	21	20
RoACE (%)	5	0	4	20	38	28	25	23	16	16

Source: Company, Kotak Institutional Equities estimates



# 2

## Valuation: Initiate with SELL rating and Fair Value of Rs770

We initiate coverage on Premier Energies with a SELL rating and a DCF-based Fair Value of Rs770 (40% downside from current levels), implying 21.8X P/E on March 2027E consolidated earnings. Premier Energies is India’s second-largest integrated solar cell and solar module manufacturer with plans to expand capacity multi-folds in the next couple of years. We forecast the company’s earnings to increase at a CAGR of 44% over FY2024-30E, driven by (1) India capacity expansion and backward integration; (2) expansion into US cell manufacturing; and (3) higher capacity utilization. We expect Premier’s margins to peak at 25% in FY2027E, driven by higher realization and elevated EBITDA margins in the DCR market due to (1) Premier’s first-mover advantage in cell manufacturing and (2) the implementation of ALMM list II by June 1, 2026. However, heightened competitive intensity would likely start impacting margins and return ratios from 2028.

### Our DCF-based valuation implies 40% downside from CMP

We value Premier Energies using a DCF model. In our forecast period (FY2024-35E), we build in (1) Premier Energies’ capacity to see 20%/27% CAGR for module/cell capacity, reaching 25.9 GW/27 GW by FY2035; (2) 29%/34% volume CAGR for Premier’s module/cell volumes until FY2035, driven by capacity addition and utilization levels of 70%+ for modules and 85% cells on effective capacity; (3) stable EBITDA margins of close to 20% in the long term, with exit FY2035 EBITDA margin of 18.6%; (4) cost of equity of 13% and WACC of 10.4%; and (5) terminal value: 2.3X FY2035E book value (a 10% premium to current Chinese solar companies valuations). Our DCF-based FV of Rs770 implies 11X EV/EBITDA FY2027E and 21.8X March 2027E P/E.

We believe that Premier Energies will be in a capacity addition phase in the next couple of years, with the 4 GW integrated cell and module plant and 1.2 GW US cell facility impacting earnings only from FY2028. Furthermore, near-term EBITDA margins for the company will be elevated, given the lack of domestic cell capacity. However, we expect EBITDA margin multiples to normalize after FY2027, once large cell capacity from competitors comes on stream. Hence, we believe that FY2030 earnings would reflect the full impact of major capacity expansion announced, along with normalized margin levels (we do not include the impact of IRA incentives in our EBITDA margin estimates—the same is included in other income).

### We arrive at a valuation of Rs 770/share for Premier Energies

Exhibit 3: Premier Energies’ DCF model, March fiscal year-ends, 2021-35E (Rs mn)

	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E	2033E	2034E	2035E
<b>Consolidated revenue</b>	7,015	7,429	14,285	31,438	64,348	102,599	128,058	165,534	176,707	210,429	238,745	275,844	300,700	322,154	349,330
YoY (%)		5.9	92.3	120.1	104.7	59.4	24.8	29.3	6.7	19.1	13.5	15.5	9.0	7.1	8.4
EBITDA	537	296	782	4,778	14,098	22,800	32,399	38,309	36,342	39,774	46,188	53,245	57,575	60,852	65,049
EBITDA Margin (%)	7.7	4.0	5.5	15.2	21.9	22.2	25.3	23.1	20.6	18.9	19.3	19.3	19.1	18.9	18.6
Consolidated EBIT	420	20	250	3,817	10,455	17,825	24,359	27,747	22,873	24,345	28,694	33,730	36,552	38,361	41,121
<b>NOPAT</b>	<b>192</b>	<b>18</b>	<b>405</b>	<b>3,048</b>	<b>7,778</b>	<b>13,262</b>	<b>18,123</b>	<b>20,644</b>	<b>17,018</b>	<b>18,112</b>	<b>21,349</b>	<b>25,095</b>	<b>27,195</b>	<b>28,541</b>	<b>30,594</b>
Depreciation	116	276	532	961	3,644	4,974	8,041	10,562	13,468	15,429	17,494	19,515	21,023	22,491	23,928
Inc/dec in working capital	1,437	(920)	(140)	(3,245)	(1,662)	(3,027)	(2,014)	(2,965)	(884)	(2,668)	3,646	(2,021)	(1,354)	(1,168)	(1,480)
Capex	(3,245)	(1,987)	(2,760)	(4,514)	(7,000)	(28,925)	(30,662)	(25,208)	(29,069)	(19,606)	(20,649)	(20,208)	(15,078)	(14,687)	(14,364)
<b>FCFF</b>	<b>(1,500)</b>	<b>(2,613)</b>	<b>(1,964)</b>	<b>(3,749)</b>	<b>2,760</b>	<b>(13,715)</b>	<b>(6,513)</b>	<b>3,032</b>	<b>534</b>	<b>11,267</b>	<b>21,839</b>	<b>22,381</b>	<b>31,785</b>	<b>35,176</b>	<b>38,678</b>
Post tax cost of debt (%)	7.1														
Risk free rate (%)	7.0														
Risk premium (%)	4.9														
Beta	1.2														
Cost of equity	12.6														
FY2025 debt	18,822														
FY2025 equity	28,798														
<b>WACC (%)</b>	<b>10.4</b>														
Price to book multiple (X)	2.3														
Sum of discounted cash flow	92,575														
Terminal value	269,527														
Enterprise value	362,102														
Net debt/(cash) - March 2027	16,227														
<b>Equity value</b>	<b>345,875</b>														
<b>Equity value per share (Rs)</b>	<b>770</b>														
<b>Fair value (Rs)</b>	<b>770</b>														

Source: Company, Kotak Institutional Equities estimates

### We expect revenues to see 37% CAGR in FY2024-30E

We bake in a revenue CAGR of 37% over FY2024-30E, driven by (1) **India expansion**: we expect Premier's domestic module and cell capacity to reach 17.4 GW/13 GW by 2030 from 3.36 GW/2 GW as of FY2024. In addition, Premier is backward-integrating to wafer and aluminum frames, with a potential expansion into ingots as well. (2) **US expansion**: Premier has signed an MoU with Heliene to set up a 1.2 GW cell manufacturing facility in the US, which we estimate will reach 3.2 GW by FY2030. (3) **Capacity utilization**: we expect cell and module capacity utilization on effective capacity to remain stable at 80-85% and 75%, respectively, resulting in a utilization of nameplate capacity of 57-60% and 70%+ for module and cell, respectively.

### We estimate a 37% revenue CAGR over FY2024-30E, driven by capacity expansion across India and US, backward integration and higher utilization

Exhibit 4: Segmental revenue breakdown of Premier Energies, March fiscal year-ends, 2022-30E (Rs mn)

	Manufacturing	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Installed Capacity (GW)</b>										
Module	India	1.2	1.4	3.4	5.4	9.4	11.4	13.4	15.4	17.4
Cell	India	0.5	0.8	2.0	3.0	3.0	7.0	9.0	11.0	13.0
Cell	US	–	–	–	–	–	–	1.2	2.2	3.2
Wafer	India	–	–	–	–	2.0	2.0	2.0	4.0	6.0
<b>Capacity Utilization (%)</b>										
Module	India	19.2	35.6	30.9	47.2	50.9	52.2	61.2	54.2	56.9
Cell	India	22.0	30.4	38.5	66.7	95.2	57.1	68.9	70.3	71.3
Cell	US	–	–	–	–	–	–	42.5	61.0	65.9
Wafer	India	–	–	–	–	67.5	67.5	67.5	52.5	57.5
<b>Actual Production (GW)</b>										
Module	India	0.2	0.5	1.0	2.5	4.8	5.9	8.2	8.3	9.9
Cell	India	0.1	0.2	0.8	2.0	2.9	4.0	6.2	7.7	9.3
Cell	US	–	–	–	–	–	–	0.5	1.3	2.1
Wafer	India	–	–	–	–	1.4	1.4	1.4	2.1	3.5
<b>Realization (US\$/wp)</b>										
Non DCR Module	India				0.17	0.17	0.16	0.16	0.15	0.15
DCR Module	India				0.25	0.25	0.25	0.22	0.20	0.19
Cell	India				0.13	0.13	0.13	0.11	0.10	0.09
Cell	US				0.15	0.15	0.15	0.15	0.15	0.15
Wafer	India									
<b>Revenue (Rs mn)</b>										
Solar cell (India + US)	India	336	1,856	7,066	17,680	16,010	13,644	–	–	–
DCR Modules (India)	India				8,500	30,789	61,222	121,334	139,564	161,194
Non DCR Modules (India)	India	2,843	9,567	20,221	30,797	47,691	44,274	27,590	8,177	8,409
Solar cell (US)	US				–	–	–	6,800	18,174	28,954
Trading and Other Business		4,250	2,863	4,151	7,371	8,108	8,919	9,811	10,792	11,872
<b>Total</b>		<b>7,429</b>	<b>14,285</b>	<b>31,438</b>	<b>64,348</b>	<b>102,599</b>	<b>128,058</b>	<b>165,534</b>	<b>176,707</b>	<b>210,429</b>

Source: Company, Kotak Institutional Equities estimates

### DCR, backward integration, US manufacturing and operating leverage to be key margin drivers

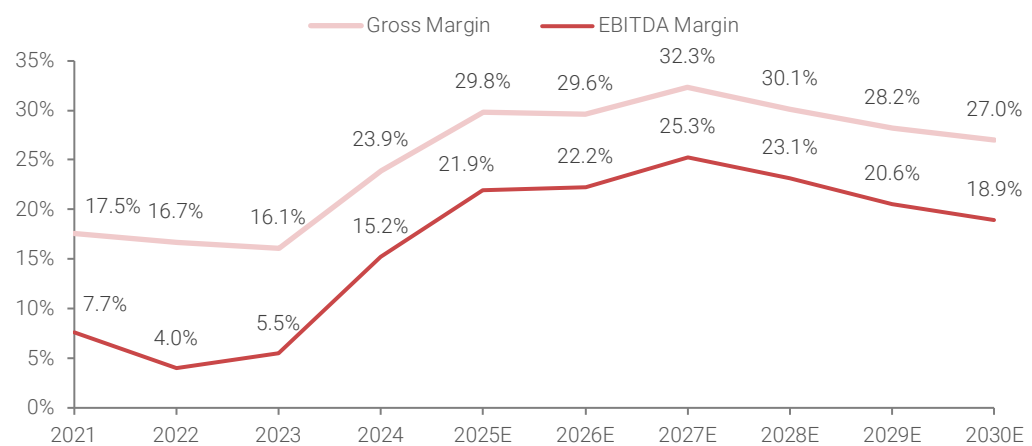
We bake in a 370 bps margin improvement over FY2024-30E; margins to decline after FY2027 due to heightened competitive intensity.

We expect margins to peak around 25% in FY2027, driven by higher realization and strong EBITDA margins in the DCR market due to the first-mover advantage that Premier enjoys in the domestic cell market. In addition, backward integration into wafer and aluminum frames should support margins. However, heightened competitive intensity could impact margins from 2028. In our EBITDA margin estimates, we do not bake in the IRA incentive of US\$4 cents/wp, as we consider this as part of other income.

- ▶ **Higher contribution from DCR:** Premier’s domestic cell manufacturing capacity is estimated to increase from 2 GW in FY2025E to 13 GW in FY2030E. The sharp rise in cell capacity on account of (1) the implementation of the ALMM list II from June 1, 2026; (2) supply-demand mismatch (8.1 GW nameplate capacity versus 15 GW India solar capacity addition in FY2024); and (3) elevated realization for DCR modules (US\$25 cents/wp versus US\$17 cents/wp for standard module). We factor in the DCR market aiding Premier’s margins until FY2027E, after which increased competition will likely starting impacting DCR margins.
- ▶ **Backward integration:** Premier is a vertically integrated player with both cell and module manufacturing capabilities. The company is further expanding its presence by entering into wafer and aluminum frame manufacturing, which should help support margins.
- ▶ **US manufacturing:** The US government’s push toward clean energy and domestic manufacturing through the Inflation Reduction Act has led to a sharp surge in domestic module manufacturing. Higher domestic module capacity will lead to an increase in demand for solar cell, which will be met via imports and domestic US cell capacity. Additionally, the IRA AMPC offers domestic cell manufacturers US\$4 cents/wp rebate, making unit economics attractive.

**Gross margin/EBITDA margin to peak at 32.3%/25.3% in FY2027**

Exhibit 5: Gross and EBITDA margins of Premier Energies, March fiscal year-ends, 2021-30E (%)



Source: Company, Kotak Institutional Equities estimates

**Balance sheet: High capital intensity and lean working capital cycle**

**Capital intensity to remain high given the capacity expansion plans**

Premier Energies has always been a vertically integrated player with a presence in the asset-light module business and asset-heavy cell business. As a result, capex intensity for Premier Energies has historically been higher than most peers that have traditionally focused only on module manufacturing. Looking ahead, we see Premier undertaking multiple expansion projects: (1) 1 GW cell and module capacity expansion in FY2025, (2) 4 GW integrated cell and module capacity using IPO proceeds expected to be operational by FY2027, (3) 1.2 GW US cell manufacturing facility in JV with Heliene, (4) backward integration into 2GW wafer and 36,000 MTPA aluminum frame manufacturing and (5) Premier has announced additional 1GW module capacity expansion by March 2025. Consequently, we estimate that Premier Energies will have a capex spend of Rs140 bn over FY2024-30E, translating into FATR of 2.2X by FY2030. We expect Premier Energies to reach a capacity of 17.4 GW/16.2 GW/6 GW for modules/cells/wafers by FY2030 across India and the US.

**We estimate that Premier Energies will undertake capex worth Rs140 bn over FY2024-30E**

**Exhibit 6: Capital expenditure buildup of Premier Energies, March fiscal year-ends, 2024-30E (GW, Rs mn)**

	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Year End Capacity (GW)</b>							
Module (India)	3.4	5.4	9.4	11.4	13.4	15.4	17.4
Cell (India)	2.0	3.0	3.0	7.0	9.0	11.0	13.0
Cell(US)	–	–	–	–	1.2	2.2	3.2
Cell - Upgrade				2.0			
Wafer	–	–	2.0	2.0	2.0	4.0	6.0
<b>Capacity Addition (GW)</b>							
Module (India)	2.0	2.0	4.0	2.0	2.0	2.0	2.0
Cell (India)	1.3	1.0	–	4.0	2.0	2.0	2.0
Cell(US)	–	–	–	–	1.2	1.0	1.0
Cell - Upgrade	–	–	–	2.0		–	–
Wafer	–	–	2.0	–	–	2.0	2.0
<b>Cost/GW (Rs mn)</b>							
Module (India)	–	1,500	1,500	1,425	1,354	1,286	1,222
Cell (India)	–	8,000	8,000	7,200	6,480	5,832	5,249
Cell(US)	–	8,000	8,000	7,200	6,480	5,832	5,249
Cell - Upgrade				2,000			
Wafer	–	–	4,000	3,600	3,240	2,916	2,624
<b>Capex (Rs mn)</b>							
Module (India)	–	3,000	6,000	2,850	2,708	2,572	2,444
Cell (India)	–	4,000	9,000	19,320	12,488	9,496	3,873
Cell(US)	–	–	3,000	3,000	7,600	8,000	4,000
Cell - Upgrade	–	–	–	4,000	–	–	–
Wafer	–	–	8,000	–	–	5,832	5,249
Aluminium Frame			2,300				
Maintenance Capex		–	625	1,492	2,412	3,168	4,041
<b>Total capex (Rs mn)</b>		<b>7,000</b>	<b>28,925</b>	<b>30,662</b>	<b>25,208</b>	<b>29,069</b>	<b>19,606</b>

Source: Company, Kotak Institutional Equities estimates

**Working capital to remain steady, aided by customer advances**

We expect Premier Energies’ working capital to remain range-bound at 29 days. Solar module and cell manufacturers receive advances from customers to lock in price given the high price volatility, helping manufacturers have a minimal working capital requirement.

**We expect working capital as days of sales to remain in line with FY2024 levels**

**Exhibit 7: Net working capital days of Premier Energies, March fiscal year-ends, 2021-30E (Rs mn)**

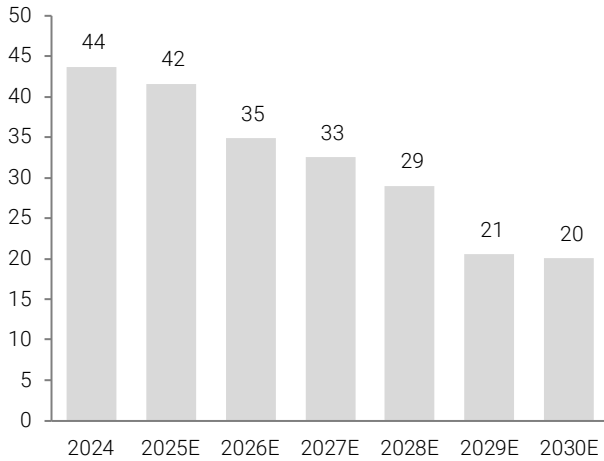
	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
Receivable Days	84	71	15	71	71	71	71	71	71	71
Inventory Days	33	107	162	117	117	117	117	117	117	117
Payable Days	84	133	102	113	113	113	113	113	113	113
OCL (Includes Customer Advances) days	78	60	114	46	46	46	46	46	46	46
<b>NWC days</b>	<b>(46)</b>	<b>(14)</b>	<b>(38)</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>29</b>

Source: Company, Kotak Institutional Equities estimates

**Return ratios remains healthy despite lower asset turn and margin pressure**

**We anticipate moderation in RoAE as a result of declining profitability and reduced asset turnover**

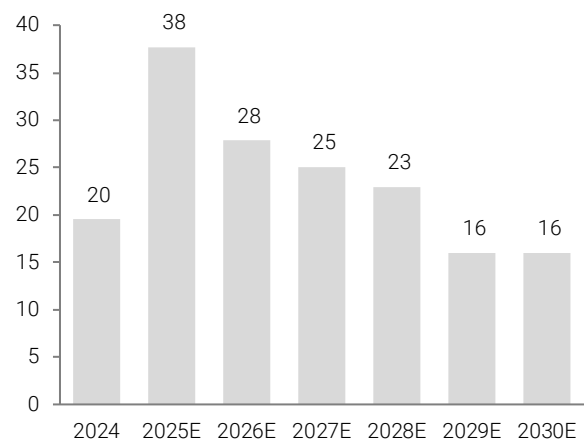
Exhibit 8: RoAE of Premier Energies, March fiscal year-ends, 2024-30E (%)



Source: Company, Kotak Institutional Equities estimates

**RoACE to witness decline post 2025E amid increasing competitive intensity**

Exhibit 9: RoACE of Premier Energies, March fiscal year-ends, 2024-30E (%)



Source: Company, Kotak Institutional Equities estimates

**Cash flow: Strong OCF generation and IPO proceeds to be reinvested in expanding capacities**

Operating cash flow for Premier Energies should see a sharp uptick from FY2025, driven by the stabilization of cell facility and an ability to fully utilize module capacities that were commissioned in the last five quarters. However, significant amount of operating cash flows and funds raised via the recently concluded IPO would be used to fund the 4 GW integrated cell and module plant (Rs 34 bn capex), the expansion of the US cell capacity and to set up a wafer and aluminum frame manufacturing facility.

Premier Energies is estimated to generate Rs137 bn in operating cashflow over FY2024-30E, primarily allocated to Rs140 bn capacity expansion. We expect the company to generate healthy FCF in 2030E (We do not bake in any impact of SPECs capital subsidy, according to which the company expects Rs 4-5 bn of capital rebate in 2027 once its 4 GW integrated cell and module plant becomes operational.)

**Relative valuation table**

Premier Energies trades at a substantial premium to Waaree Energies on FY2027E earnings. This reflects that impact of Waaree’s capacity expansion will be seen in the near term, whereas the majority of the company’s expansion effects will materialize only beyond FY2027. Furthermore, Premier has an already operational cell manufacturing facility and a lower exposure to the US geography, both of which should reduce any uncertainty on near-term earnings. By FY2030, we see both margins and return ratios converging for the two companies, with only major difference being scale of operations.

**Exhibit 10: Valuation comparable metric for Indian solar manufacturing companies, March fiscal year-ends, 2025-27E**

Company	Mkt Cap. (US\$ mn)	Price (LC)	Year end	EV (US\$ mn)	EV/EBITDA (X)			P/E (X)			P/B (X)			RoAE (%)		
					2025E	2026E	2027E	2025E	2026E	2027E	2025E	2026E	2027E	2025E	2026E	2027E
<b>India</b>																
Waaree Energies	9,192	2,742	Mar	8,859	31.1	16.9	10.8	46.7	24.6	14.1	8.1	6.3	4.4	24.2	29.4	36.6
Premier Energies	6,707	1,275	Mar	6,618	40.2	25.5	18.2	78.4	47.2	36.1	19.9	14.0	10.1	41.6	34.9	32.5
					<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>
<b>Global</b>																
First Solar	19,959	186	Dec	19,383	10.1	6.6	4.8	14.1	9.0	6.5	2.5	2.0	1.5	18.7	23.4	25.3
LONGI Green Energy	15,688	15	Dec	15,122		14.9	8.7		54.0	16.9	2.1	2.0	1.8	(11.0)	4.1	9.3
Jinko Solar	9,948	7	Dec	12,229	10.7	7.8	6.0	48.1	18.9	14.4	2.1	1.9	1.7	4.3	9.1	12.5
JA Solar	5,899	13	Dec	9,152	14.6	7.9	5.4		22.3	10.4	1.5	1.5	1.4	(3.5)	5.8	11.2
Trina Solar	5,493	18	Dec	10,659	14.4	10.9	7.6	439.8	17.8	11.3	1.3	1.2	1.1	0.3	7.9	9.5
Canadian Solar	788	12	Dec	5,936	10.3	7.3	5.0	23.2	52.1	4.0	0.3	0.2	0.3	1.5	4.7	8.8
<b>Median (China peers)</b>					<b>14.4</b>	<b>9.4</b>	<b>6.8</b>	<b>243.9</b>	<b>20.6</b>	<b>12.8</b>	<b>1.8</b>	<b>1.7</b>	<b>1.6</b>	<b>(1.6)</b>	<b>6.8</b>	<b>10.3</b>

**Note:**

(a) All global companies ending Dec have valuation ratios for CY2024/25/26. All domestic companies ending March have valuation ratios for FY2025/26/27

(b) China peers include LONGI Green Energy, Jinko Solar, JA Solar and Trina Solar

Source: Bloomberg, Kotak Institutional Equities estimates

# 3

## Premier Energies: First-mover advantage in solar cells

Premier Energies is currently India’s second-largest solar cell manufacturer in terms of capacity. This gives it a first-mover advantage over peers since cell manufacturing is a highly complex process with extensive utilities management and high capex costs that act a significant entry barrier. Currently, solar cells are primarily used in DCR (Domestic Content Requirement market is 30% of the total market). However, with the announcement of ALMM list II, we expect domestic market for solar cells to expand exponentially (95% of the domestic market). While we have seen capacity expansion announcements by multiple peers, the ability to scale up cell manufacturing would give any company an edge over peers, which we believe works in Premier’s favor since it is one of the select few companies to have an operational cell line.

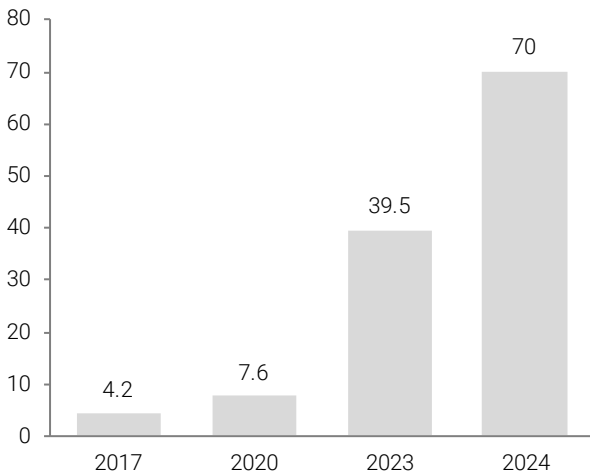
### Solar cell capacity: First-mover advantage to incumbents

Since FY2017, India’s solar module manufacturing capacity witnessed a phenomenal increase, from 4.2 GW to 39.5 GW at end-FY2023 at a CAGR of 45.3%. The capacity has further increased to 70 GW in FY2024 and ALMM approved capacity as of Oct 2024 is 60 GW. If we take all the announcements made by various companies on capacity expansion plans than India has a potential to reach up to 162 GW of nameplate solar module capacity by end of FY2027 (32% CAGR FY2024-27E). With India demand expected to be closer to 40 GWdc in best case scenario this could imply that only 35% utilization at an aggregate industry basis (including 15GW of module exports), which could potentially make operations less viable for some of the smaller players in the module player manufacturing industry.

However, when we look at solar cells, at present in India, there are only a handful of companies involved in manufacturing solar cells. Adani Enterprises, Premier Energies and Tata Power Solar are the leading solar cell manufacturers in India. At end-FY2024, India’s domestic solar cell manufacturing capacity stood at 8 GW. This is primarily due to higher capex requirements and the complex process involved in cell manufacturing.

#### India has seen a sharp rise in domestic module capacity aided by ALMM

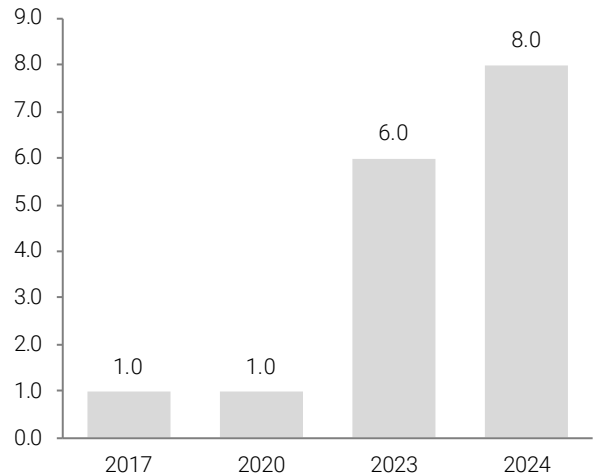
Exhibit 11: India solar module capacity, March fiscal year-ends, 2017-24 (GW)



Source: Bloomberg

#### However, domestic cell capacity remains a modest 8 GW

Exhibit 12: India solar cell capacity, March fiscal year-ends, 2017-24 (GW)



Source: Bloomberg

### Solar cell manufacturing: A highly complex process with extensive utilities management

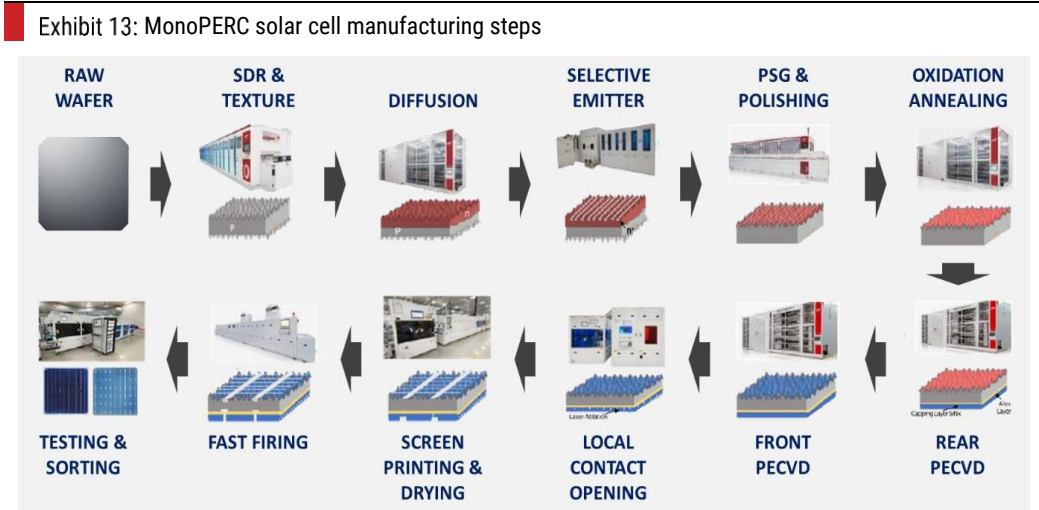
Solar cell manufacturing is the most complex and technical process within the solar module production value chain, which requires multiple chemical and gas-based stages and encompasses intricate procedures such as texturing, diffusion, selective emitter laser, polishing and oxidation annealing to convert raw silicon wafers into effective sunlight-to-electricity converters, known as solar cells.

#### Complexities involved in utilities management for solar cell manufacturing

Each of the cell manufacturing process steps involves several high-purity semiconductors-grade gases and chemicals as inputs. Effective management of utilities is crucial for safe, efficient and high-yield solar cell production. Below is a breakdown of the key complexities involved:

- ▶ **Acid and alkaline exhaust systems:** Some of the cell process steps involving chemicals such as Potassium Hydroxide, Hydrochloric Acid, Hydrogen Peroxide, and Hydro Fluoric Acid emit alkaline and acidic fumes in the tool, which need to be exhausted out and treated using scrubbers' neutralization. Proper treatment of exhaust fumes generated during various processes is essential for environmental compliance.
- ▶ **Waste gas management:** Thermal tools such as diffusion, annealing and PECVD tools use gasses such as Nitrogen, Silane, Ammonia, Nitrous Oxide, Methane, Hydrogen, Phosphene, Boron Trichloride, Oxygen, which are released as waste gasses after processing the wafers. The waste gasses need to be treated in thermal scrubbers to break them down into non-hazardous compounds and exhaust hot air while capturing the non-hazardous materials.
- ▶ **Demineralized (DI) water management:** A 1 GW cell line consumes a significant amount of water (approximately 1 mn litres per day). This necessitates a comprehensive water treatment system involving effluent treatment, water recovery through reverse osmosis and generation of ultra-pure water with stringent quality parameters (18 MΩ.cm resistivity, total organic carbon below 10 parts per billion and bacterial count less than 10 colony-forming unit per mm).
- ▶ **Safe and efficient gas and chemical handling:** Cell manufacturing utilizes a variety of semiconductor grade (99.999%) gases such as Silane, Ammonia, Nitrous Oxide, Oxygen, Hydrogen, Methane, Phosphene, Boron Trichloride, Nitrogen and chemicals like Hydrochloric Acid, Potassium Hydroxide, Hydrogen Peroxide, Trimethyl Ammine and Hydrofluoric Acid. Implementing procedures for safe and efficient handling of these gases and chemicals and their distribution and usage within the process is paramount. The disposal of waste gases and chemicals in a safe method through appropriate equipment, such as gas and chemical scrubbers and effluent treatment plants, is quite crucial for operating a solar cell line.
- ▶ **Power management:** A 1 GW cell line requires substantial power (around 10 MW), along with associated switchgear and auxiliary equipment. Any interruption in power to the process tools will result in discarding entire batch under processing causing losses and additionally considerable amount of time is required to reset the whole process for ensuring uninterrupted operations. 100% backup power system with diesel generators and uninterruptible power supply for critical equipment is mandatory for safe operation of the plant.
- ▶ **Process cooling water:** Maintaining optimal temperature within tools in thermal processes and metallization equipment is crucial. Almost all the tools in the process requires cooling water with varied pressure and flow rates. Designing and maintaining such a system with standby pumps to ensure 100% availability is quite challenging.
- ▶ **24/7 utility operation:** For optimal cell line operation and high productivity, uninterrupted utility operation is essential. The quality of utilities directly impacts both cell yield and efficiency. Hence, all systems are designed with redundancy to ensure 100% availability of the utility.





Source: Frost and Sullivan analysis

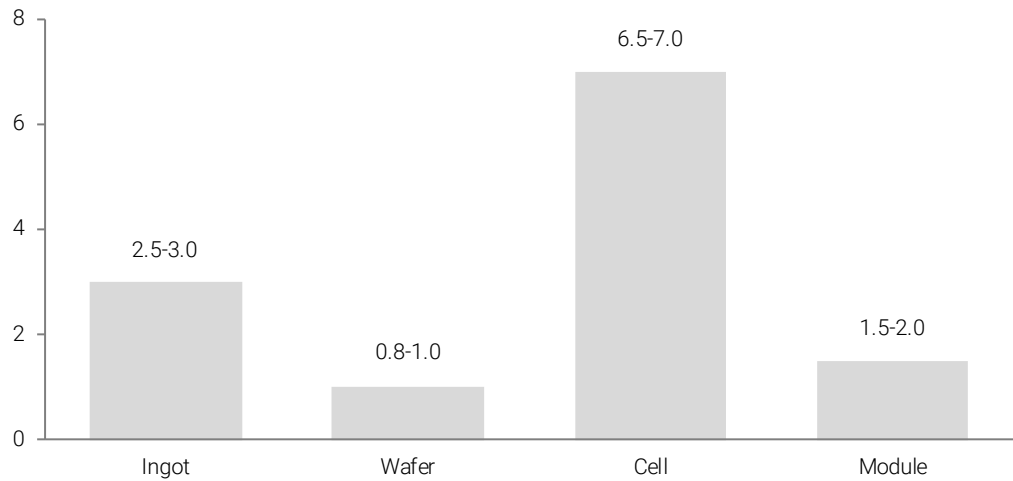
**Exhibit 14: Complexities involved in solar cell versus solar module manufacturing**

Complexity Factor	Solar Cell manufacturing	Solar Module manufacturing
Raw Material Processing	Solar cell fabrication necessitates the utilization of ultra-high-purity silicon, demanding intricate refining and processing procedures	Solar module assembly relies on pretreated silicon cells, streamlining the processing complexities
Technological Requirements	Solar cell production entails sophisticated technologies aimed at maximizing cell efficiency and refining intricate production techniques.	Solar module manufacturing primarily focuses on assembly technologies, with less emphasis on cell-level technological innovations.
Capital Investment	The capital outlay for solar cell manufacturing is substantial, attributable to the acquisition of specialized equipment for silicon refinement and cell fabrication	Solar module manufacturing demands comparatively lower capital investment, primarily driven by the assembly process and the absence of highly specialized machinery.
Skilled Labor	Solar cell fabrication mandates a proficient workforce adept in chemical processing and semiconductor manufacturing techniques	Solar module assembly requires skilled labor, albeit with less specialization compared to cell fabrication, encompassing assembly and quality control domains
Production Scale	Solar cell production operates at a relatively smaller scale due to meticulous handling requirements, constraining throughput capacity.	Solar module manufacturing enjoys scalability benefits, facilitated by streamlined assembly processes and reduced intricacies, enabling larger-scale operations.
Technological Advancement	The dynamic nature of technological advancements poses a significant risk in solar-cell manufacturing, potentially rendering current methodologies obsolete rapidly.	Solar module manufacturing experiences a slower pace of technological evolution, with advancements typically affecting incremental improvements rather than rendering existing processes obsolete
Supply Chain Management	Solar cell manufacturing entails complex supply chain management owing to the diverse array of raw materials and chemicals involved in the process	Solar module manufacturing involves comparatively simpler supply chain dynamics, predominantly revolving around procurement of cells and ancillary components.

Source: Kotak Institutional Equities

**Solar cell manufacturing is the most capex-intensive step across the solar value chain (ex-polysilicon)**

**Exhibit 15: Capex analysis across solar value chain (for setting up 1 GW capacity) (Rs bn)**



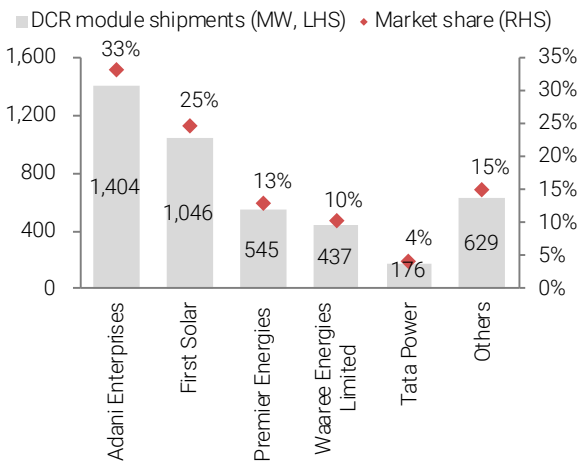
Source: Frost and Sullivan, Company Reports, Kotak Institutional Equities estimates

**DCR (Domestic Content Requirement): The primary market for Indian solar cells today**

Domestic solar cells were primarily used in DCR end-markets currently: (1) PM KUSUM scheme, (2) PM Surya Ghar Muft Bijli Yojana and (3) CPSU scheme. However, with the Indian government’s plan to introduce ALMM List-II for cells from June 2026, the use of domestic cells will become mandatory for all ALMM modules. As a result, end-market demand for domestic cells is expected to see exponential growth in the next few years. Given the 2+ year timeline in setting up these plants, companies that have a proven track record in setting up and stabilizing cell lines have a competitive advantage over peers.

**4.3 GW of DCR modules have been shipped in total with top 4 players having 81% share as of Dec 10,2024**

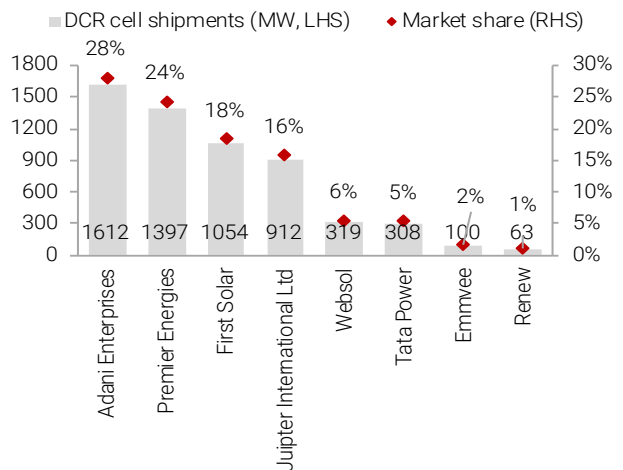
**Exhibit 16: DCR module shipments (in MW and % share)**



Source: Ministry of New and Renewable Energy

**5.8 GW of DCR cells have been shipped by eight cell manufacturers as of Dec 10,2024**

**Exhibit 17: DCR cell shipments (in MW and % share)**



Source: Ministry of New and Renewable Energy

### Cell demand to see an exponential growth driven by ALMM List-II

The Ministry of New and Renewable Energy (MNRE) has issued the amendment ([link](#)) for the implementation of ALMM (Approved List of Models and Manufacturers) for solar PV cells, effective from June 1, 2026. The ALMM framework, which acts as a non-tariff barrier to aid domestic manufacturing, was introduced in 2019 (kept in abeyance until March 31, 2024), and was focused on regulating the quality of solar modules. The ALMM list I specifies the list of approved models and manufacturers of solar modules (module capacity under ALMM now stands at ~60 GW as of Oct 2024). The ALMM had a provision for list for solar cells (list II). However, it was kept in abeyance due to low solar cell capacity. Once the list II becomes effective from June 1, 2026, all solar projects under the ALMM's purview and that are mandated to use solar modules listed in ALMM list I, must use cells listed in ALMM list II.

As per the order, from June 1, 2026, all solar module manufacturers who are unable to procure cell from ALMM list II can potentially be delisted from the ALMM list I. This will likely give approved cell manufacturers disproportionate pricing power, which in turn will further improve their margins and aid return ratios. However, after May 31, 2026, a separate ALMM list I (a) would be maintained and this list would contain solar PV modules, which are enlisted in ALMM but do not use solar PV cells from ALMM list II (for solar PV cells) and this ALMM list I (a) (for solar PV modules) would be applicable only for such projects, which are mandated to use solar PV modules from ALMM but are exempt from using solar PV cells from ALMM list II.

Currently, Indian solar cells are used mainly in schemes where DCR (Domestic Content Requirement) policy is mandated (PM Suryaghar Yojana—rooftop solar program, PM KUSUM scheme—solar pumps, and CPSU scheme), which potentially accounts for 30% of the overall market. However, after the implementation of the ALMM policy for solar cells, domestic cells would have to be used in 90-95% of projects, which would be a positive for domestic cell manufacturers.

### Solar cell capacity worth 84 GW is expected to be added in the next three years (however, given the longer lead time requirement the actual capacity could be substantially lower than what has been announced)

Exhibit 18: Announced cell capacity expansion by various Indian companies, March fiscal year-ends, 2024-27E (GW)

Solar Cell capacity (in GW)				
Company Name	2024	2025E	2026E	2027E
Reliance Industries	—	10.0	20.0	20.0
Waaree Energies	—	5.0	5.0	11.0
Mundra Solar (Adani Enterprises)	4.0	6.0	8.0	10.0
ReNew Power	—	2.5	2.5	8.5
Premier Energies	2.0	3.0	3.0	7.0
Goldi Solar	—	—	—	5.0
Shirdi Sai	—	—	0.5	5.0
Tata Power	0.5	4.0	4.0	4.0
Jupiter Solar	0.8	0.8	0.8	3.8
Renew Sys India	0.1	1.1	2.1	3.1
Vikram Solar	—	—	3.0	3.0
Grew Energy Private Limited	—	—	—	2.8
Jakson Engineers Ltd.	—	—	1.3	2.5
Websol Energy	0.6	0.6	2.4	2.4
Saatvik Solar	—	—	2.0	2.0
Solex energy	—	—	—	2.0
Insolation Energy	—	—	0.6	1.2
<b>Total India Capacity</b>	<b>8.1</b>	<b>33.0</b>	<b>54.6</b>	<b>92.1</b>

Source: Company announcements

# 4

## Expanding geographic presence (JV with Heliene)

We expect Premier’s JV with Heliene will give the company an early-mover advantage in the US cell market. We see US cell demand increasing exponentially in the next five years (50 GWdc module is expected to be produced locally in CY2027 versus 7 GWdc in CY2023), driven by local US module manufacturing (aided by IRA benefits) versus imports currently. Driven by significant IRA AMPC rebate of US\$4 cents/wp, we expect US cell manufacturers to make a healthy 28% EBITDA margin. However, with the change in US government, uncertainty around the solar policy remains a key short-term risk, in our view.

### Premier Energies to be a key beneficiary of rising US cell demand

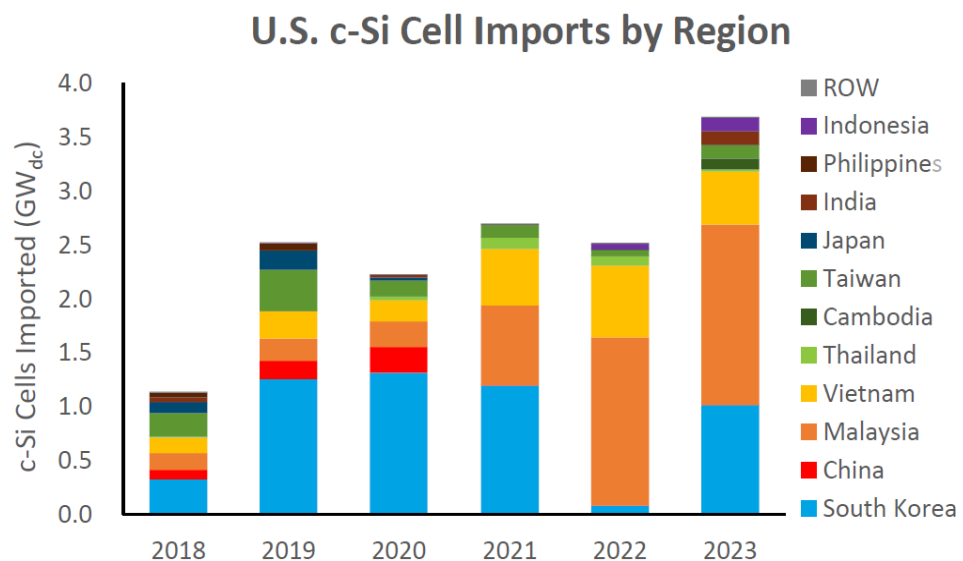
Premier has announced a JV with Heliene Inc, a Canadian solar PV module manufacturer, to set up 1.2 GW solar cell manufacturing capacity in the US, which gives the company an early-mover advantage in the US market. The initial capacity planned will be primarily used for captive consumption (for modules manufactured by Heliene). This will help Premier establish its credibility in the US market without actively having to look for external clients.

In 2023, the US imported 55.6 GWdc of modules and produced only 7 GWdc of PV modules. Given modules were directly imported and only a small percentage of modules were locally manufactured the requirement for US solar cell imports was low 3.5 GWdc in CY2023. However, with increasing local manufacturing of modules in the US and incentives offered to cell manufacturers (US\$7 cents per Wdc capacity for modules and US\$4 cents per Wdc capacity for cells), we expect a larger requirement for sourcing of cells in the US, part of which would be done via local capacities and majority driven via imports.

Taking into account the longer gestation period required for solar cell plants and large module manufacturing capacity coming on stream in the next two years, we expect short-term US solar cell import demand to pick up substantially. In the medium term, companies that are setting up local US cell manufacturing capacity, such as Premier in JV with Heliene, would continue to enjoy robust demand environment without any risk from potential higher import restriction via duties or non-trade barriers.

### US predominantly has been importing modules as a result solar cell imports have been modest at 3.7 GWdc

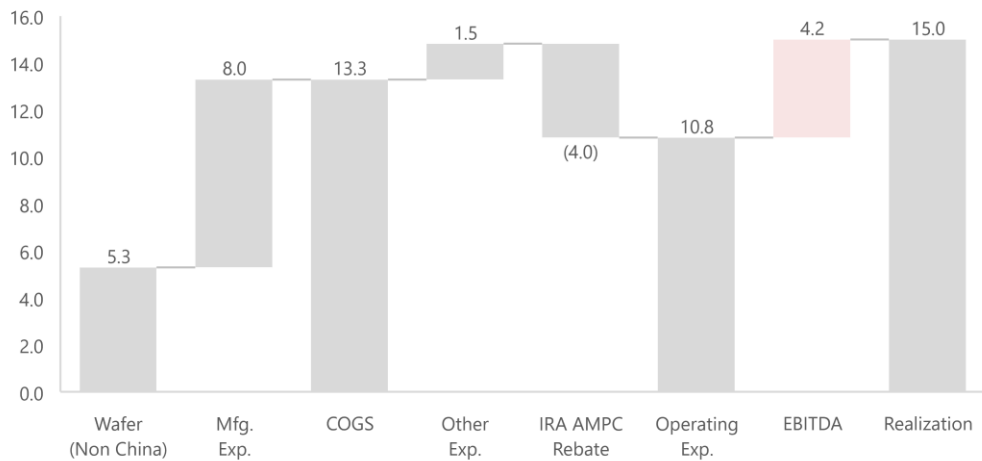
Exhibit 19: Annual US cell imports by region, December fiscal year-ends, 2019-23 (GWdc)



Source: National Renewable Energy Laboratory, United States Department of Energy

**We expect US manufactured cell manufacturers would make 28% EBITDA margins aided by IRA incentives**

Exhibit 20: Unit economics for US manufactured cell; Dec 24 (US\$ cents/wp)



Source: Kotak Institutional Equities estimates

**We estimate Premier’s US cell manufacturing capacity to reach 3.2 GW by FY2030 with revenues of Rs29 bn**

Exhibit 21: US cell manufacturing segmental financials of Premier Energies, March fiscal year-ends, 2025-30E (Rs mn)

	Unit	2028E	2029E	2030E
<b>Capacity</b>	<b>GW</b>	<b>1.2</b>	<b>2.2</b>	<b>3.2</b>
Production	GW	0.5	1.3	2.1
Utilization	%	43	61	66
<b>Revenue</b>	<b>Rs mn</b>	<b>6,800</b>	<b>18,174</b>	<b>28,954</b>
Realization	US\$ / wp	0.15	0.15	0.15

Source: Kotak Institutional Equities estimates

Near-term uncertainty on the continuation of the current Inflation Reduction Act and other incentives to solar sector remains a key overhang, given the change in US administration. The financial impact currently on Premier Energies is insignificant since the company has just announced US manufacturing plans and so far, not undertaken any capex.

Any measures to selectively reduce IRA benefits or restrict the ability of foreign firms to claim incentives could potentially impact Premier’s plans on trying to build capacity in the US.

Currently, we see three scenarios which could potentially impact Premier Energies.

**1) Reduction in IRA and Increase in tariffs on solar imports**

**Impact on Premier Energies:** A reduction in IRA incentives, along with an increase in tariffs, could substantially impact the financial viability of US solar power plants, domestic solar manufacturing capacities and increase the cost of solar cell imports into the US. Together, these actions could lead to a surge in US module prices, impacting solar capacity addition and potentially reduce the export demand from India to the US as well as demand for local US produced cells.

**2) No change in IRA and increase in tariffs on Solar imports**

**Impact on Premier Energies:** This scenario would lead to quicker shift of domestic manufacturing to the US, since tariff increase would lead to surge in US module prices thus benefitting domestic module and manufacturers. The increase in tariffs would make exports from India less viable; however, with Premier’s negligible exposure to exports and plans to set up local capacity it is likely to be a net beneficiary.

### 3) No change in IRA and no change in tariffs

**Impact on Premier Energies:** In case of no policy change, domestic manufacturing will continue to grow aggressively due to capacity expansions planned under the IRA, while Premier can export to the US until demand supply parity is achieved, after which local manufacturing capacities of Premier Energies would continue to see demand based on US solar capacity addition plans.

#### Reduction in IRA incentives and increase in US tariffs to significantly impact Premier's US expansion plans

Exhibit 22: Scenario analysis for Premier Energies, March fiscal year-ends, 2025-30E (Rs mn)

Premier Energies scenarios analysis			
Rs bn	Base case	Scenario 1	Scenario 2
IRA Act	No change in IRA	Reduction in IRA	No change in IRA
US tariffs	No change in tariffs	Increase in US tariffs	Increase in US tariffs
Revenue (FY2030)	210	181	209
EBITDA margin FY2030 (%)	18.9	18	18.0
RoCE (FY2030) (%)	16	15	15
<b>Fair Value</b>	<b>770</b>	<b>580</b>	<b>750</b>

Source: Kotak Institutional Equities estimates

# 5

## Deep-dive into key drivers of Premier’s profitability

Premier Energies currently enjoys higher margins relative to peers, driven by (1) vertical integration into cells, (2) higher realization and margins in the DCR market due to low competitive intensity. We expect margins to peak at 25% in FY2027, driven by higher realization and strong EBITDA margins in the DCR market due to the first-mover advantage that Premier enjoys in the domestic cell market. Furthermore, backward integration into wafer and aluminum frames is expected support margins in the long term. However, heightened competitive intensity will potentially start impacting margins from 2028. In our EBITDA margin estimates, we do not bake in the IRA incentive of US\$4 cents/wp since it will be discontinued after 2032. Instead, we consider this as part of other income.

### Superior margin profile relative to peers

Premier has seen a marked improvement in profitability, with EBITDA margins surging from 4% in FY2022 to 23% in 1HFY2025, similar to the peer median of 3% and 14% in FY2022 and 1HFY25, respectively. The company has generated superior margins relative to module-only peers to the tune of 3-9% in the past six quarters, which can be attributed to (1) better realizations on cells and DCR modules due to a lack of competition and (2) stabilization of cells lines leading to better utilization of cell capacity. Given the two-year timeline required to set up and stabilize a cell line, Premier Energies should continue to generate superior margins as compared to its peers amid a lack of domestic cell capacity.

### Premier Energies’ margin profile has grown in line with other manufacturers with cell capacity

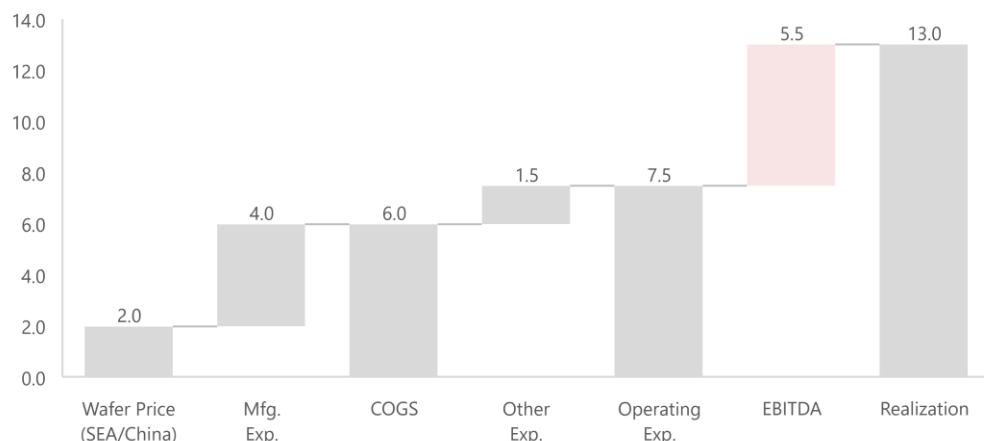
Exhibit 23: EBITDA margin of India solar manufacturers, March fiscal year-ends, 2022-1HFY2025

	2022	2023	2024	1HFY2025
Waaree Energies	4%	12%	14%	15%
<b>Mundra Solar (Adani)</b>	—	<b>12%</b>	<b>28%</b>	<b>39%</b>
<b>Premier Energies</b>	<b>4%</b>	<b>5%</b>	<b>15%</b>	<b>23%</b>
Tata Power Solar	—	—	—	10%
Vikram Solar	3%	9%	16%	—
Insolation Energy	6%	7%	11%	13%
Solex Energy	3%	7%	8%	9%
Alpex Solar	2%	6%	9%	14%
<b>Websol Energy Systems</b>	<b>2%</b>	<b>-75%</b>	<b>-29%</b>	<b>42%</b>
<b>Median</b>	<b>3%</b>	<b>7%</b>	<b>11%</b>	<b>14%</b>

Source: Company

### DCR cell manufacturers enjoy 42% EBITDA margins currently due to a lack of domestic cell capacity

Exhibit 24: Unit economics of India DCR cell sales; Dec 24 (US\$ cents/wp)



Source: OPIS, Bloomberg, Kotak Institutional Equity estimates

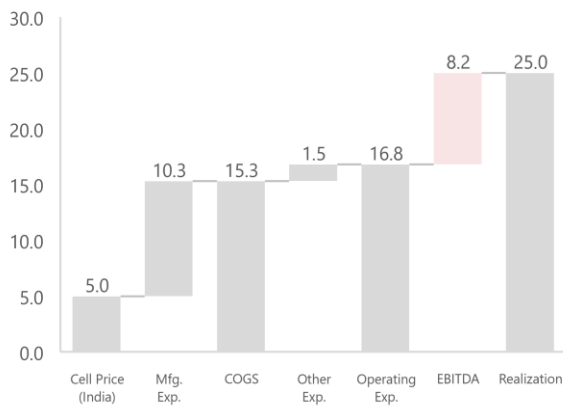
**Current unit economics: DCR market versus non-DCR market**

We currently see DCR module manufacturers with integrated cell manufacturing capacity are able to enjoy a much higher realization of US\$25 cents/wp and EBITDA margins of 33%, given that very few players have domestic cell capacity and the competitive intensity in this market is relatively low. However, when we look at the non-DCR market, where module manufacturers rely on Chinese cells to make solar modules, we see heightened competitive intensity due to the large domestic capacity that has impacted both realization and margins.

Given the implementation of ALMM list II, we see the market moving toward a 100% DCR market in the next two years and other players also incrementally putting in cell capacity, which we expect will become live from FY2028. As a result, Premier Energies will likely maintain a superior margin profile for the next three years.

**DCR module manufacturers enjoy 33% EBITDA margins**

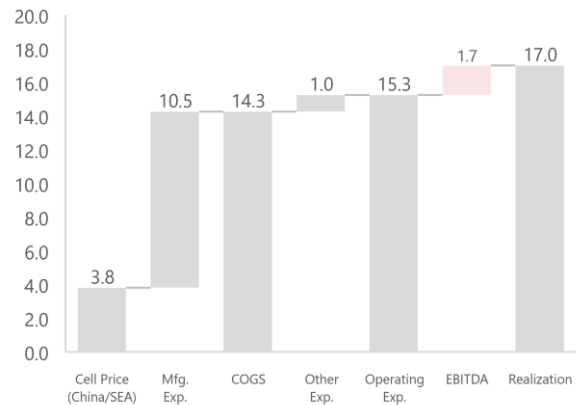
Exhibit 25: Unit economics India DCR module; Dec 24 (US\$ cents/wp)



Source: OPIS, Bloomberg, Kotak Institutional Equity estimates

**Non DCR module manufacturers make 10% EBITDA margins due to heightened competitive intensity**

Exhibit 26: Unit economics India Non-DCR module; Dec 24 (US\$ cents /wp)



Source: OPIS, Bloomberg, Kotak Institutional Equity estimates

**Backward integration to help maintain margins at elevated levels**

Premier Energies has been one of the few vertically integrated players with both cell and module manufacturing capacities. Going forward, the company is looking to further backward-integrate into wafer and aluminum frames with potential plans to set up Ingot manufacturing facility as well.

By increasing backward integration measures, Premier aims to have a greater control over quality and availability of materials, which, in turn, will help it reduce dependence on Chinese/ASEAN suppliers. Given that the ALMM list II for cell will be effective from June 1, 2026 and similar regulation for ingot and wafer can be potentially implemented in the medium term, players that are vertically integrated stand to benefit over pure module manufacturing-focused peers. We see backward integration as a set up for Premier to maintain its operating margins at an elevated level versus peers.

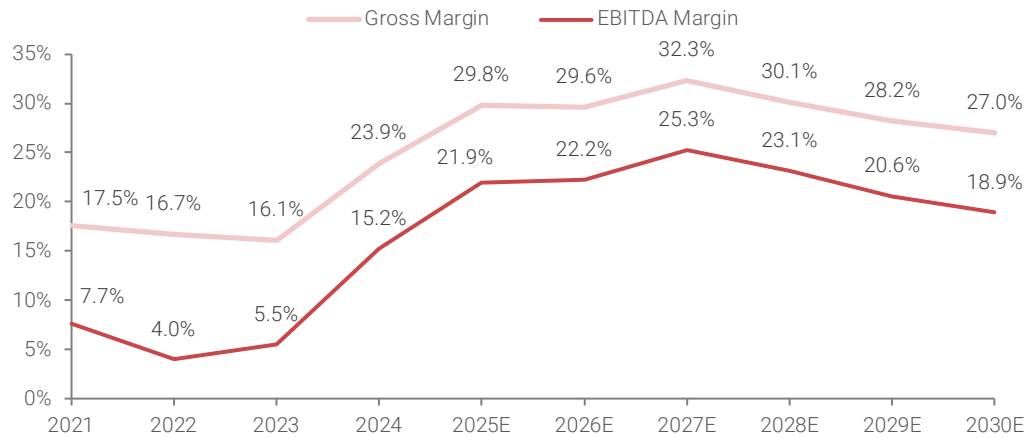
**Margins to peak in FY2027**

We estimate a 1,000 bps improvement in EBITDA margins, rising from 15.2% to 25.3% over FY2024-27E. After 2028, we expect a gradual reduction in profitability settling at 18.9% in FY2030E, driven by higher competitive intensity leading to lower realization as competitors' cell capacity catches up.



**Gross and EBITDA margin to peak at 32.3% and 25.3%, respectively, in FY2027**

**Exhibit 27: Gross & EBITDA margin of Premier Energies, March fiscal year-ends, 2021-30E (%)**



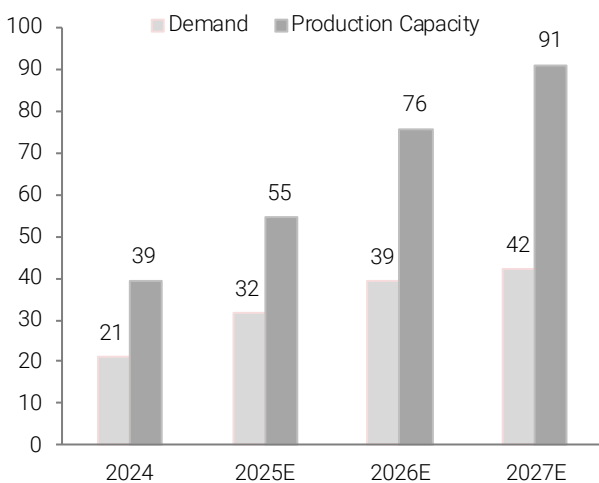
Source: Company, Kotak Institutional Equities estimates

**High competitive intensity**

India’s solar manufacturing sector has seen a surge of investments by a multitude of players in the last five years. This has been driven by rising domestic solar demand, attractive export economics and favorable government policies such as the imposition of trade (BCD) and non-trade barriers (ALMM, DCR, PLI). With the announcement of 90 GW capacity addition in module in the next three years, we expect modules heading into a massive oversupply zone, potentially making the business unviable for smaller/non-integrated players. Despite cell being the most complex and capex-heavy element of the solar value chain, with 85 GW of announced capacity addition, we believe it too will be in oversupply by FY2027/28. Assuming only 80% and 70% of the announced module and cell capacity will come on stream and industry standard of 70% utilization of module and 80% of cell, domestic demand will only constitute about 45% and 80% production capacity utilization for modules and cells, respectively.

**Module demand to account for only 45% production capacity**

**Exhibit 28: Demand versus production capacity of Indian modules, March fiscal year-end, 2024-27E (GW)**



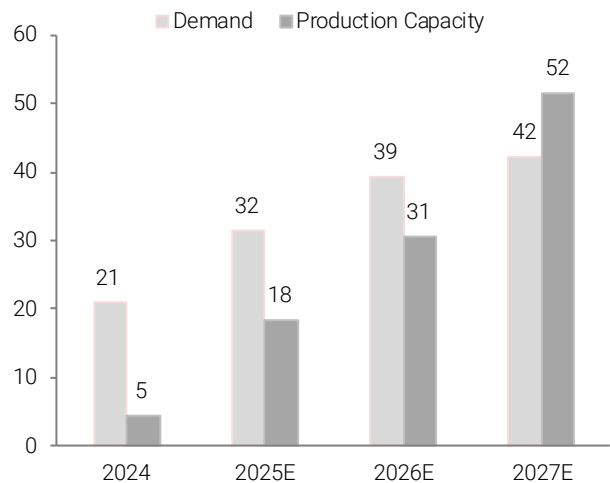
Note:

(a) Production capacity = ~60% of nameplate capacity

Source: Company, Kotak Institutional Equity estimates

**Cell to head into oversupply zone by FY2027/28**

**Exhibit 29: Demand versus production capacity of Indian cells, March fiscal year-end, 2024-27E (GW)**



Note:

(a) Production capacity = ~60% of nameplate capacity

Source: Company, Kotak Institutional Equity estimates

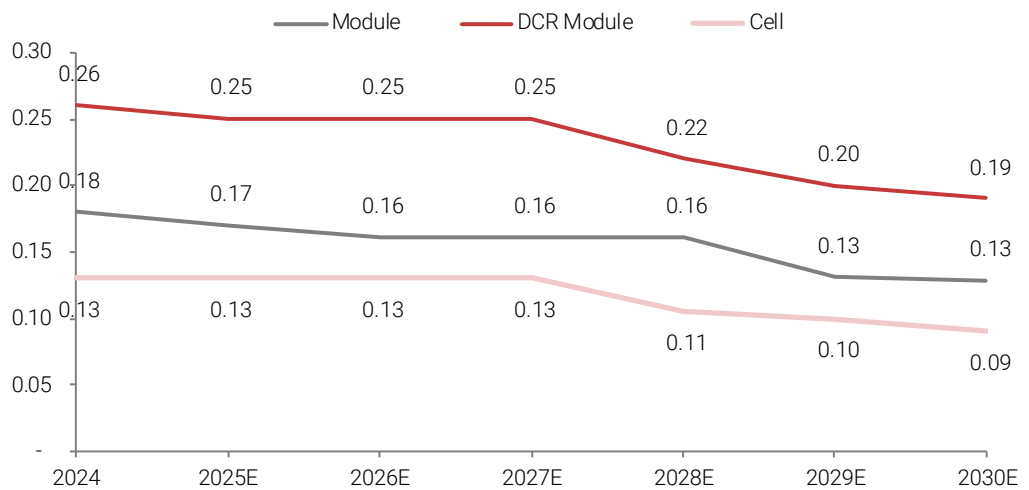
**Reduction in domestic module and cell prices**

We bake in a gradual reduction of module and cell prices over FY2025-30E on account of (1) the oversupply of modules and (2) cell supply catching up with demand by FY2028.

- ▶ **Module:** Although the ALMM list II will be effective from June 1, 2026, we believe that cell supply will not be able to meet domestic demand by then. We expect cell supply catching up with demand in the later part of FY2027 or early FY2028. Taking this into account, we forecast a gradual reduction in module prices from US\$18 cents/wp in FY2024 to US\$16 cents/wp in FY2028, after which there will likely be a sharp drop in module prices, reaching US\$13 cents/wp by FY2030, significantly impacting module-only players.
- ▶ **DCR module:** DCR modules currently constitute 20-30% of total domestic demand. After the implementation of ALMM list II, close to 90% of all projects will be required to use DCR modules, creating a strong demand environment in turn, ensuring high price realization for DCR modules. Hence, we expect the existing elevated prices of US\$25 cents/wp to sustain until FY2027, after which there will be potentially be a sharp correction as cell supply catches up with domestic demand. We forecast DCR module prices to drop from US\$25 cents/wp to US\$19 cents/wp on account of (1) the erosion of cell supply-demand mismatch (2) heightened competitive intensity and (3) lower cost of manufacturing.
- ▶ **Cell:** Similar to DCR modules, cells should see a surge in demand after the implementation of the ALMM list II on June 1, 2026. We expect cell supply to catch up with domestic demand only in the later part of FY2027 or early FY2028. This will ensure elevated price of US\$13 cents/wp until FY2027, after which we forecast a sharp decline, with prices reaching US\$9 cents/wp by FY2030.

**We estimate 28%/27%/31% drop in module/DCR module/cell prices over FY2024-30E**

Exhibit 30: India mfg. module, DCR module, cell pricing, March fiscal year-ends, 2024-30E (US\$/wp)



Source: Company Filings, Kotak Institutional Equity estimates

## 6

**Key risks: Vulnerability to India and US solar policy; faster ramp-up by peers**

The key risks to Premier Energies' long-term growth story are (1) changes in Indian regulatory and policy environment, (2) changes in US import policies, (3) reduction in IRA APMC for foreign entities, (4) technology obsolescence risk, (5) faster-than-expected ramp-up of competitors' cell capacities.

**Changes in domestic regulatory and policy environment**

The current government's policies such as 1) basic customs duty of 25% on solar cells and 40% on solar modules, 2) ALMM (Approved List of Models and Manufacturers) and 3) DCR (Domestic Content Requirement) are all designed to create a favorable demand environment for domestically manufactured solar cells and modules.

Further, to enhance the viability of solar energy projects, both the central and state governments in India provide incentives that support the generation and sale of solar energy, including renewable power purchase obligations, preferential tariffs for solar power assets under long-term power purchase agreements; preferential charges on transmission, wheeling and banking facilities; M-SIPS and SPECS; and tax incentives. Any government policy that results in the curtailment of renewable energy generation or reduces the restrictions on imports of solar cells and module could adversely impact the revenue and margin profile of Premier Energies.

**Changes in US import policy**

Indian solar exports have seen a sharp uptick in the last couple of years (US\$2 bn worth of exports from India to the US in FY2024). Premier Energies' 14% of sales in FY2024 came from exports of solar cells to the US (although exports are expected to be 10% in the coming years). This was enabled by import tariffs and anti-dumping/countervailing duties on China, Cambodia, Malaysia, Thailand and Vietnam. Any unfavorable change in import policy such as higher duty on India import, etc. can severely impact Premier's US export's revenue visibility and profitability.

**Reduction in IRA AMPC on foreign entities**

Premier has announced a JV with Heliene Inc, a Canadian solar PV module manufacturer, to set up 1.2 GW Solar manufacturing capacity in the US. A reduction in IRA rebate from US\$4 cents/wp can significantly impact both profitability and future expansion plans. As per KIE estimates, without the IRA rebate, Premier Energies' US facility EBITDA margin will reduce from US\$4 cents/wp (28% margin) to US\$0.2 cents/wp (1.2% margins).

**Technology obsolescence risk**

Premier Energies is currently transitioning from a monocrystalline passivated emitter and rear cell ("PERC") cell line to a TOPCon cell line. If competing technologies such as HJT achieve greater performance efficiencies and have other inherent advantages over TOPCon, it could render the TOPCon upgrade obsolete. Premier Energies would then potentially have to take a write off on existing investments and undertake capex to develop HJT cell lines, which could severely impact the operations and cash flows of the company. However, if technologies such as tandem and perovskite come up then it would mean additional investment on existing TOPCon cell lines, similar to what we are seeing with the ongoing transition from MonoPERC to TOPCon globally.

**Faster-than-expected capacity ramp-up by competitors**

Premier Energies today has an early mover advantage when it comes to solar cells. Premier has the second-largest domestic solar cell capacity (25% capacity share as of FY2024). This helps the company command a better pricing; hence, higher margins in the case of DCR solar module and cell requirements. Given the two-year timeline required to set up a solar cell line, Premier would continue to enjoy this advantage for the next couple of years. However, with many peers indicating plans to set up large solar cell capacities, over time, Premier could see its margin compress. A faster-than-expected commissioning of these facilities by peers could have a further adverse impact on our future revenue and margin estimates.



## Financials: We expect 44% PAT CAGR over FY2024-30E

We forecast Premier’s growth to be driven by three key factors: (1) India capacity expansion and backward integration; (2) expansion into US cell manufacturing; and (3) higher capacity utilization. We estimate margins to peak at 25% in FY2027, driven by higher realization and strong EBITDA margins in the DCR market. However heightened competitive intensity is expected to start negatively impacting margins from 2028. Operating cash flows and IPO proceeds are expected to be sufficient to fund incremental capex required for growth.

### Capacity expansion, backward integration, steady utilization to be key revenue drivers

#### We expect revenues to see 37% CAGR in FY2024-30E

We bake in a revenue CAGR of 37% over FY2024-30E, driven by (1) **India expansion**: We expect Premier’s domestic module and cell capacity to reach 17.4 GW/13 GW by 2030 from 3.36 GW/2 GW as of FY2024. Furthermore, Premier is backward-integrating into wafer and aluminum frames, with a potential expansion into Ingots as well. (2) **US expansion**: Premier has signed an MoU with Heliene to set up a 1.2 GW cell manufacturing facility in the US, which we estimate will reach 3.2 GW by 2030. (3) **Capacity utilization**: We expect cell and module capacity utilization on effective capacity to remain stable at 80-85% and 70%, respectively, resulting in the utilization of nameplate capacity at 57-60% and 70%+ for modules and cells, respectively.

**India expansion**: Premier Energies is a vertically integrated player with 3.36 GW of module capacity and 2GW of cell capacity as of FY2024. Premier Energies has multiple expansions planned: (1) 1 GW of cell and module capacity planned in 2025 (module capacity is already operational from July 2024); (2) 4 GW of cell and module capacity using IPO proceeds (to be operational by FY2027); (3) 2 GW wafer and 36,000 MTPA aluminum frame manufacturing; and (4) Premier has further announced an additional 1 GW module capacity expansion by March 2025. We estimate module, cell, wafer capacities to reach 17.4 GW, 13.2 GW and 6 GW, respectively, by 2030E. With the government’s push toward indigenization of the solar supply chain and ALMM list II implementation, it will likely benefit cell manufacturers and reduce the market for module-only players.

### DCR modules contribution to reach 89% of Premier’s India business by FY2030E

Exhibit 31: India revenue breakup of Premier Energies, March fiscal year-ends, 2021-30E (Rs mn)

		2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Revenue Contribution - India Business</b>										
Non DCR Modules (Chinese cell)	India	2,843	9,567	20,221	30,797	47,691	44,274	27,590	8,177	8,409
% of domestic revenue		39	67	75	51	48	36	17	5	5
DCR Module (Indian Cell)	India	–	–	–	8,500	30,789	61,222	121,334	139,564	161,194
% of domestic revenue		–	–	–	14	31	49	76	88	89
External solar cell sales	India+US	268	1,781	2,669	13,260	12,008	10,233			
% of domestic revenue		4	13	10	22	12	8	–	–	–
Trading and Other Business	India	4,250	2,863	4,151	7,371	8,108	8,919	9,811	10,792	11,872
% of domestic revenue		58	20	15	12	8	7	6	7	7
<b>Total</b>		<b>7,361</b>	<b>14,210</b>	<b>27,041</b>	<b>59,928</b>	<b>98,597</b>	<b>124,648</b>	<b>158,735</b>	<b>158,533</b>	<b>181,475</b>

Source: Company, Kotak Institutional Equities estimates

**US expansion**: Premier Energies has announced a JV with Heliene Inc, a Canadian solar PV module manufacturer, to set up 1.2 GW solar manufacturing capacity in the US. The initial capacity planned will be primarily used for captive consumption (for modules manufactured by Heliene). We estimate the US capacity to reach 3.2 GW by FY2030 subject to no material change in the IRA AMPC policy.

**Capacity utilization**: We expect cell and module capacity utilization on effective capacity to remain stable at 80-85% and 70%, respectively. As a result, capacity utilization on nameplate capacity will reach 57-60% for modules. In cells, we see the capacity utilization reaching 70%+.

All the aforementioned factors could result in a 37% CAGR for Premier Energies over FY2024-30E. Domestic revenue is expected to grow 7-fold from Rs27 bn in FY2024 to Rs181 bn in FY2030. We

estimate the US manufacturing business to reach Rs29 bn in FY2030, driven by higher capacity and utilization.

**We estimate a 37% revenue CAGR over FY2024-30E, driven by capacity expansion across India and US, backward integration and higher utilization**

Exhibit 32: Segmental revenue breakdown of Premier Energies, March fiscal year-ends, 2022-30E (Rs mn)

	Manufacturing	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E	CAGR 2024-30E (%)
<b>Installed Capacity (GW)</b>											
Module	India	1.2	1.4	3.4	5.4	9.4	11.4	13.4	15.4	17.4	
Cell	India	0.5	0.8	2.0	3.0	3.0	7.0	9.0	11.0	13.0	
Cell	US	–	–	–	–	–	–	1.2	2.2	3.2	
Wafer	India	–	–	–	–	2.0	2.0	2.0	4.0	6.0	
<b>Capacity Utilization (%)</b>											
Module	India	19.2	35.6	30.9	47.2	50.9	52.2	61.2	54.2	56.9	
Cell	India	22.0	30.4	38.5	66.7	95.2	57.1	68.9	70.3	71.3	
Cell	US	–	–	–	–	–	–	42.5	61.0	65.9	
Wafer	India	–	–	–	–	67.5	67.5	67.5	52.5	57.5	
<b>Actual Production (GW)</b>											
Module	India	0.2	0.5	1.0	2.5	4.8	5.9	8.2	8.3	9.9	
Cell	India	0.1	0.2	0.8	2.0	2.9	4.0	6.2	7.7	9.3	
Cell	US	–	–	–	–	–	–	0.5	1.3	2.1	
Wafer	India	–	–	–	–	1.4	1.4	1.4	2.1	3.5	
<b>Realization (US\$/wp)</b>											
Non DCR Module	India				0.17	0.17	0.16	0.16	0.15	0.15	
DCR Module	India				0.25	0.25	0.25	0.22	0.20	0.19	
Cell	India				0.13	0.13	0.13	0.11	0.10	0.09	
Cell	US				0.15	0.15	0.15	0.15	0.15	0.15	
Wafer	India										
<b>Revenue (Rs mn)</b>											
Solar cell (India + US)	India	336	1,856	7,066	17,680	16,010	13,644	–	–	–	
DCR Modules (India)	India				8,500	30,789	61,222	121,334	139,564	161,194	
Non DCR Modules (India)	India	2,843	9,567	20,221	30,797	47,691	44,274	27,590	8,177	8,409	
Solar cell (US)	US				–	–	–	6,800	18,174	28,954	
Trading and Other Business		4,250	2,863	4,151	7,371	8,108	8,919	9,811	10,792	11,872	
<b>Total</b>		<b>7,429</b>	<b>14,285</b>	<b>31,438</b>	<b>64,348</b>	<b>102,599</b>	<b>128,058</b>	<b>165,534</b>	<b>176,707</b>	<b>210,429</b>	<b>37.3</b>

Source: Company, Kotak Institutional Equities estimates

**DCR, backward integration, US manufacturing and operating leverage to be key margin drivers**

**We bake in a 370-bps margin improvement over FY2024-30E; margins to decline after 2027 due to heightened competitive intensity.**

We estimate margins to peak at 25% in 2027E, driven by higher realization and strong EBITDA margins in the DCR market due to the first-mover advantage that Premier enjoys in the domestic cell market. Further, backward integration into wafer and aluminum frames should support margins. However, heightened competitive intensity should start impacting margins from 2028. In our EBITDA margin estimates, we do not bake in the IRA incentive of US\$4 cents/wp. We consider this as part of other income.

**Higher contribution from DCR:** Premier’s domestic cell manufacturing capacity is estimated to increase from 2 GW in FY2025E to 13 GW in FY2030E. The sharp rise in cell capability to be on account of (1) the implementation of ALMM list II by June 1, 2026; (2) supply-demand mismatch (8.1 GWdc nameplate capacity versus 15 GWac India solar capacity addition in FY2024); and (3) elevated realization for DCR modules (US\$25 cents/wp versus US\$17 cents/wp for standard module). We see the DCR market aiding

Premier’s margin until 2027, after which heightened competitive intensity should starting impacting DCR margins, in our view.

**DCR modules to grow at 87% over FY2025-30E, generating 33% EBITDA margin in 2025E, later tapering to 19% by 2030E due to higher competition and potential overcapacity**

Exhibit 33: DCR module segmental financials of Premier Energies, March fiscal year-ends, 2025-30E (Rs mn)

	Unit	2025E	2026E	2027E	2028E	2029E	2030E
<b>Net Sales</b>	<b>Rs mn</b>	<b>8,500</b>	<b>30,789</b>	<b>61,222</b>	<b>121,334</b>	<b>139,564</b>	<b>161,194</b>
as % of total revenue	(%)	14	31	49	76	88	89
Realization	US\$ / wp	0.25	0.25	0.25	0.22	0.20	0.19
Gross Margin	(%)	39	40	41	35	29	27
<b>EBITDA Margin</b>	<b>(%)</b>	<b>33</b>	<b>34</b>	<b>35</b>	<b>28</b>	<b>22</b>	<b>19</b>

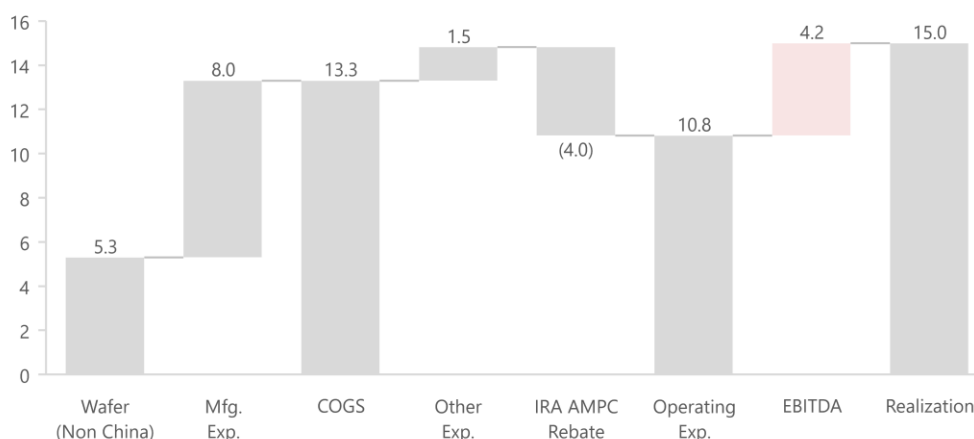
Source: Company, Kotak Institutional Equities estimates

**Backward integration:** Premier has been a vertically integrated player having both cell and module manufacturing. The company is further expanding its presence by entering the wafer and aluminum frame manufacturing, which will help it maintain margins.

**US manufacturing:** The US government’s push toward clean energy and domestic manufacturing through the Inflation Reduction Act has led to a sharp rise in domestic module manufacturing. Enhanced domestic module manufacturing could lead to an increase in the demand for solar cells, partly met via imports and domestic US cell capacity. Further, the IRA AMPC offers domestic manufacturers US\$4 cents/wp rebate, making unit economics attractive.

**We estimate 28% EBITDA margin for US cell manufacturers at current prices: US\$15 cent/wp with US\$4 cents/wp IRA incentive**

Exhibit 34: Unit economics for US cell manufacturers (US\$ cents/wp)



Source: Kotak Institutional Equities estimates

**We expect revenues/EBITDA to see 37%/42% CAGR over FY2024-30E**

**Exhibit 35: Consolidated income statement of Premier Energies, March fiscal year-ends, 2021-30E (Rs mn)**

	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E	CAGR 2024-30E (%)
<b>Net sales</b>	<b>7,015</b>	<b>7,429</b>	<b>14,285</b>	<b>31,438</b>	<b>64,348</b>	<b>102,599</b>	<b>128,058</b>	<b>165,534</b>	<b>176,707</b>	<b>210,429</b>	<b>37.3</b>
Cost of material	(5,784)	(6,187)	(11,985)	(23,910)	(45,148)	(72,222)	(86,650)	(115,652)	(126,874)	(153,571)	
Employee expense	(197)	(246)	(448)	(615)	(1,158)	(1,847)	(2,305)	(2,980)	(3,181)	(3,788)	
Other expenses	(497)	(700)	(1,070)	(2,135)	(3,943)	(5,730)	(6,704)	(8,594)	(10,310)	(13,297)	
<b>Total expenses</b>	<b>(6,478)</b>	<b>(7,133)</b>	<b>(13,503)</b>	<b>(26,660)</b>	<b>(15,505)</b>	<b>(25,861)</b>	<b>(41,764)</b>	<b>(60,324)</b>	<b>(84,853)</b>	<b>(118,327)</b>	
<b>EBITDA</b>	<b>537</b>	<b>296</b>	<b>782</b>	<b>4,778</b>	<b>14,098</b>	<b>22,800</b>	<b>32,399</b>	<b>38,309</b>	<b>36,342</b>	<b>39,774</b>	<b>42.4</b>
<b>EBITDA (incl. other income)</b>	<b>885</b>	<b>537</b>	<b>1,129</b>	<b>5,053</b>	<b>15,187</b>	<b>24,827</b>	<b>34,864</b>	<b>43,516</b>	<b>45,790</b>	<b>53,524</b>	
Depreciation	(116)	(276)	(532)	(961)	(3,644)	(4,974)	(8,041)	(10,562)	(13,468)	(15,429)	<b>58.8</b>
<b>EBIT</b>	<b>420</b>	<b>20</b>	<b>250</b>	<b>3,817</b>	<b>10,455</b>	<b>17,825</b>	<b>24,359</b>	<b>27,747</b>	<b>22,873</b>	<b>24,345</b>	
Other income	348	242	347	275	1,089	2,027	2,465	5,207	9,449	13,751	
Interest	(217)	(430)	(686)	(1,212)	(1,702)	(3,524)	(5,456)	(7,044)	(8,875)	(10,111)	
<b>Profit before tax</b>	<b>552</b>	<b>(169)</b>	<b>(90)</b>	<b>2,880</b>	<b>9,842</b>	<b>16,328</b>	<b>21,367</b>	<b>25,910</b>	<b>23,447</b>	<b>27,985</b>	<b>46.1</b>
Tax expense	300	(13)	56	580	2,520	4,180	5,470	6,633	6,002	7,164	
<b>Adjusted PAT</b>	<b>258</b>	<b>(144)</b>	<b>(133)</b>	<b>2,314</b>	<b>7,329</b>	<b>12,155</b>	<b>15,904</b>	<b>19,284</b>	<b>17,451</b>	<b>20,828</b>	<b>44.2</b>
<b>Reported PAT</b>	<b>258</b>	<b>(144)</b>	<b>(133)</b>	<b>2,314</b>	<b>7,329</b>	<b>12,155</b>	<b>15,904</b>	<b>19,284</b>	<b>17,451</b>	<b>20,828</b>	
<b>Adjusted EPS (Rs)</b>	<b>1.0</b>	<b>(0.4)</b>	<b>(0.4)</b>	<b>5.5</b>	<b>16.3</b>	<b>27.0</b>	<b>35.3</b>	<b>42.8</b>	<b>38.7</b>	<b>46.2</b>	<b>42.7</b>
<b>Key ratios</b>											
Raw material expense/sales	82.5	83.3	83.9	76.1	70.2	70.4	67.7	69.9	71.8	73.0	
Employee expense/sales	2.8	3.3	3.1	2.0	1.8	1.8	1.8	1.8	1.8	1.8	
Other expenses/sales	7.1	9.4	7.5	6.8	6.1	5.6	5.2	5.2	5.8	6.3	
<b>EBITDA margin (%)</b>	<b>7.7</b>	<b>4.0</b>	<b>5.5</b>	<b>15.2</b>	<b>21.9</b>	<b>22.2</b>	<b>25.3</b>	<b>23.1</b>	<b>20.6</b>	<b>18.9</b>	
Effective tax rate (%)	54.4	7.6	(62.1)	20.1	25.6	25.6	25.6	25.6	25.6	25.6	
Adjusted PAT margin (%)	3.7	(1.9)	(0.9)	7.4	11.4	11.8	12.4	11.6	9.9	9.9	
<b>Yoy growth (%)</b>											
Net sales		5.9	92.3	120.1	104.7	59.4	24.8	29.3	6.7	19.1	
EBITDA		(44.9)	164.4	511.0	195.1	61.7	42.1	18.2	(5.1)	9.4	
Adjusted PAT		(155.8)	(7.4)	(1,834.9)	216.8	65.8	30.8	21.3	(9.5)	19.3	

Source: Company, Kotak Institutional Equities estimates

**Balance sheet: High capital intensity and lean working capital cycle**

**Capital intensity to remain high given the capacity expansion plans**

Premier Energies has always been a vertically integrated player with presence in the asset-light module business and the asset-heavy cell business. As a result, the capex intensity for Premier Energies has been higher than most peers that have traditionally focused only on the module business. Looking ahead, we see Premier undertaking multiple expansion projects: (1) 1 GW cell and module capacity expansion in FY2025, (2) 4 GW integrated cell and module capacity using IPO proceeds (it is expected to be operational by FY2027), (3) 1.2 GW cell manufacturing facility in JV with Heliene, (4) backward integration into 2 GW wafer manufacturing and 36,000 tons per annum aluminum frame manufacturing business and (5) Premier has also recently announced an additional 1 GW module capacity expansion by March 2025. As a result, we estimate that Premier Energies will have a capex spend of Rs140 bn over FY2024-30, translating into an FATR of 2.2X by FY2030. By FY2030, we expect Premier Energies to have a capacity of 17.4 GW/16.2 GW/6 GW of modules/cells/wafers present both in India and the US.

**We estimate Premier Energies will undertake capex worth Rs140 bn over FY2024-30E**

**Exhibit 36: Capital expenditure buildup of Premier Energies, March fiscal year-ends, 2024-30E (GW, Rs mn)**

	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Year End Capacity (GW)</b>							
Module (India)	3.4	5.4	9.4	11.4	13.4	15.4	17.4
Cell (India)	2.0	3.0	3.0	7.0	9.0	11.0	13.0
Cell(US)	–	–	–	–	1.2	2.2	3.2
Cell - Upgrade				2.0			
Wafer	–	–	2.0	2.0	2.0	4.0	6.0
<b>Capacity Addition (GW)</b>							
Module (India)	2.0	2.0	4.0	2.0	2.0	2.0	2.0
Cell (India)	1.3	1.0	–	4.0	2.0	2.0	2.0
Cell(US)	–	–	–	–	1.2	1.0	1.0
Cell - Upgrade	–	–	–	2.0	–	–	–
Wafer	–	–	2.0	–	–	2.0	2.0
<b>Cost/GW (Rs mn)</b>							
Module (India)	–	1,500	1,500	1,425	1,354	1,286	1,222
Cell (India)	–	8,000	8,000	7,200	6,480	5,832	5,249
Cell(US)	–	8,000	8,000	7,200	6,480	5,832	5,249
Cell - Upgrade				2,000			
Wafer	–	–	4,000	3,600	3,240	2,916	2,624
<b>Capex (Rs mn)</b>							
Module (India)	–	3,000	6,000	2,850	2,708	2,572	2,444
Cell (India)	–	4,000	9,000	19,320	12,488	9,496	3,873
Cell(US)	–	–	3,000	3,000	7,600	8,000	4,000
Cell - Upgrade	–	–	–	4,000	–	–	–
Wafer	–	–	8,000	–	–	5,832	5,249
Aluminium Frame			2,300				
Maintenance Capex		–	625	1,492	2,412	3,168	4,041
<b>Total capex (Rs mn)</b>		<b>7,000</b>	<b>28,925</b>	<b>30,662</b>	<b>25,208</b>	<b>29,069</b>	<b>19,606</b>

Source: Company, Kotak Institutional Equities estimates

**Working capital to remain steady, aided by customer advances**

We expect Premier Energies’ working capital days to remain range-bound at 29 days. Solar module and cell manufacturers receive advances from customers to lock in prices, given the high price volatility, helping them maintain minimal working capital requirement.

**We expect working capital as days of sales to remain in line with FY2024 levels**

**Exhibit 37: Net working capital days of Premier Energies, March fiscal year-ends, 2021-30E (#)**

	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
Receivable Days	84	71	15	71	71	71	71	71	71	71
Inventory Days	33	107	162	117	117	117	117	117	117	117
Payable Days	84	133	102	113	113	113	113	113	113	113
OCL (Includes Customer Advances) days	78	60	114	46	46	46	46	46	46	46
<b>NWC days</b>	<b>(46)</b>	<b>(14)</b>	<b>(38)</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>29</b>

Source: Company, Kotak Institutional Equities estimates

**Asset turns to stabilize post FY2028**

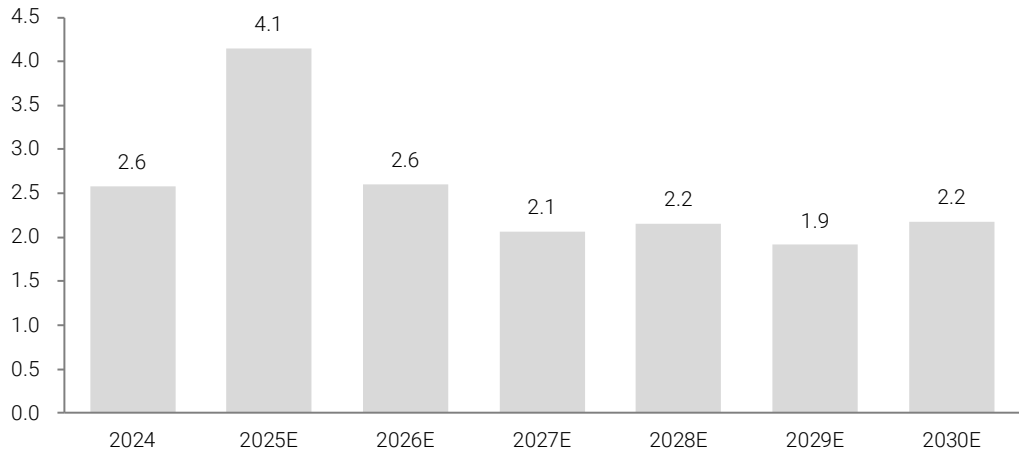
At the current price levels, gross asset turns at normalized utilization levels (85% for cells and 65-70% for modules on effective capacity) for (1) non-DCR modules (modules assembled using Chinese cells) is 4.5-5X, (2) cell segment is 1X and (3) DCR modules (own cell +module) is 2X. Given that Premier



already follows a vertically integrated business model for manufacturing both cells and modules, we expect net fixed asset turnover ratio to remain range-bound near 2.2X.

**We estimate net asset turn to decline as Premier continues to add module and cell lines**

**Exhibit 38: Net fixed asset turnover ratio of Premier Energies, March fiscal year-ends, 2024-30E (X)**

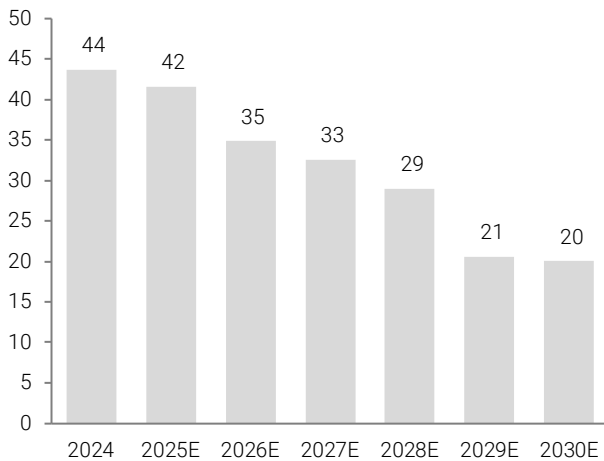


Source: Companies, Kotak Institutional Equities estimates

**Return ratios remain healthy despite lower asset turn and margin pressure**

**We expect moderation in RoE, driven by a reduction in profit margins and lower asset turnover**

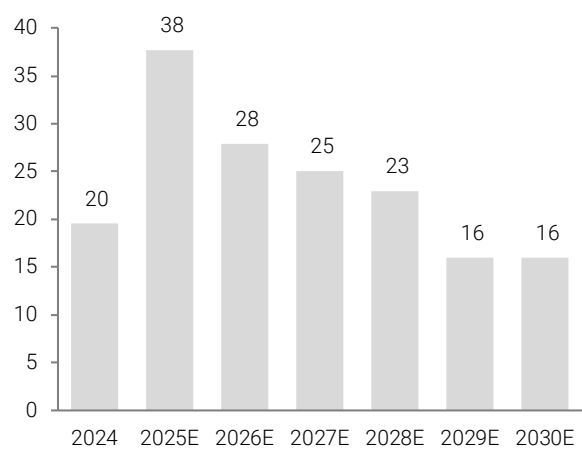
**Exhibit 39: RoAE of Premier Energies, March fiscal year-ends, 2024-30E (%)**



Source: Company, Kotak Institutional Equities estimates

**RoCE to witness a declining trend post 2025E, driven by increasing competitive intensity**

**Exhibit 40: RoACE of Premier Energies, March fiscal year-ends, 2024-30E (%)**



Source: Company, Kotak Institutional Equities estimates

**We expect Premier Energies to remain in an investment phase expanding capacity in India and US**

**Exhibit 41: Consolidated balance sheet of Premier Energies, March fiscal year-ends, 2021-30E (Rs mn)**

	2021	2022	2023	2024E	2025E	2026E	2027E	2028E	2029E	2030E
<b>Shareholders funds</b>	<b>2,221</b>	<b>3,946</b>	<b>4,112</b>	<b>6,469</b>	<b>28,798</b>	<b>40,953</b>	<b>56,857</b>	<b>76,141</b>	<b>93,593</b>	<b>114,421</b>
Equity share capital	250	263	263	263	451	451	451	451	451	451
Reserves and surplus	1,971	3,683	3,849	6,205	28,347	40,502	56,407	75,691	93,142	113,970
Loan funds	3,452	4,533	7,635	13,922	18,822	39,070	60,533	78,179	98,527	112,251
Deferred tax liabilities	189	76	84	307	307	307	307	307	307	307
Deferred income										
Minority Interest and other liabilities	778	932	838	1,123	1,123	1,123	1,123	1,123	1,123	1,123
<b>Total sources of funds</b>	<b>6,639</b>	<b>9,488</b>	<b>12,670</b>	<b>21,821</b>	<b>49,050</b>	<b>81,453</b>	<b>118,820</b>	<b>155,750</b>	<b>193,549</b>	<b>228,101</b>
Net block	4,196	4,714	5,836	11,887	15,243	39,193	61,815	76,461	92,061	96,238
CWIP	10	1,149	3,497	285	285	285	285	285	285	285
<b>Net fixed assets</b>	<b>4,206</b>	<b>5,864</b>	<b>9,334</b>	<b>12,172</b>	<b>15,528</b>	<b>39,478</b>	<b>62,100</b>	<b>76,746</b>	<b>92,346</b>	<b>96,523</b>
Investments + Goodwill	1,113	908	1,216	1,551	1,551	1,551	1,551	1,551	1,551	1,551
Cash and bank balances	794	1,597	1,935	4,027	26,238	31,663	44,395	63,713	85,028	112,735
<b>Current assets</b>	<b>3,655</b>	<b>5,047</b>	<b>8,623</b>	<b>17,792</b>	<b>34,732</b>	<b>54,423</b>	<b>67,528</b>	<b>86,819</b>	<b>92,571</b>	<b>109,930</b>
Inventories	626	2,169	6,329	10,093	20,659	32,940	41,114	53,145	56,732	67,559
Sundry debtors	1,620	1,452	595	6,090	12,465	19,874	24,806	32,065	34,230	40,762
Loans and advances	18	7	4	9	9	9	9	9	9	9
Other current assets	1,390	1,419	1,696	1,600	1,600	1,600	1,600	1,600	1,600	1,600
<b>Current liabilities</b>	<b>3,130</b>	<b>3,927</b>	<b>8,437</b>	<b>13,720</b>	<b>28,999</b>	<b>45,663</b>	<b>56,754</b>	<b>73,080</b>	<b>77,947</b>	<b>92,638</b>
Trade payables	1,623	2,699	3,979	9,746	19,947	31,805	39,697	51,315	54,778	65,232
Other current liabilities	1,502	1,219	4,453	3,965	9,042	13,848	17,047	21,755	23,159	27,396
Provisions	4	9	5	10	10	10	10	10	10	10
<b>Net current assets (excl. cash)</b>	<b>525</b>	<b>1,120</b>	<b>186</b>	<b>4,071</b>	<b>5,733</b>	<b>8,760</b>	<b>10,774</b>	<b>13,740</b>	<b>14,624</b>	<b>17,292</b>
<b>Total application of funds</b>	<b>6,639</b>	<b>9,488</b>	<b>12,670</b>	<b>21,821</b>	<b>49,050</b>	<b>81,453</b>	<b>118,820</b>	<b>155,750</b>	<b>193,549</b>	<b>228,101</b>

**Key ratios**

Debt / equity (X)	1.6	1.1	1.9	2.2	0.7	1.0	1.1	1.0	1.1	1.0
Net debt / equity (incl. acceptances) (X)	1.2	0.7	1.4	1.5	(0.3)	0.2	0.3	0.2	0.1	(0.0)
Net FATR (X)	1.7	1.3	1.5	2.6	4.1	2.6	2.1	2.2	1.9	2.2
BVPS (Rs)	9	12	12	15	64	91	126	169	208	254
RoAE (%)	11.4	(4.7)	(3.3)	43.7	41.6	34.9	32.5	29.0	20.6	20.0
RoACE (%)	4.6	0.3	4.4	19.5	37.7	27.9	25.1	23.0	16.0	16.0

**Working capital as days of sales**

<b>Current assets</b>	<b>183</b>	<b>247</b>	<b>220</b>	<b>207</b>	<b>198</b>	<b>198</b>	<b>198</b>	<b>198</b>	<b>198</b>	<b>198</b>
Inventories	33	107	162	117	117	117	117	117	117	117
Sundry debtors	84	71	15	71	71	71	71	71	71	71
Loans and advances	1	0	0	0	0	0	0	0	0	0
Other current assets	65	69	43	19	10	10	10	10	10	10
<b>Current liabilities</b>	<b>162</b>	<b>209</b>	<b>259</b>	<b>170</b>	<b>164</b>	<b>162</b>	<b>162</b>	<b>161</b>	<b>161</b>	<b>161</b>
Trade payables	84	133	102	113	113	113	113	113	113	113
Other current liabilities	78	60	114	46	46	46	46	46	46	46
Provisions	—	17	43	11	5	3	3	2	2	2
<b>Net current assets (excl. cash) as days</b>	<b>20</b>	<b>38</b>	<b>(38)</b>	<b>37</b>	<b>34</b>	<b>36</b>	<b>36</b>	<b>37</b>	<b>37</b>	<b>37</b>

Source: Company, Kotak Institutional Equities estimates

**Cash flow: Strong OCF generation and IPO proceeds to be reinvested in expanding capacities**

Operational cash flow for Premier Energies should see a sharp uptick from FY2025, driven by the stabilization of cell facility and ability to fully utilize module capacities that were commissioned in the last five quarters. However, significant amount of operating cash flows and funds raised via the recently concluded IPO would be used to fund 4 GW integrated cell and module plants (Rs34 bn capex) and expansion in the US cell plant, wafer plant and aluminum frames.

We expect Premier Energies to generate operational cash flow of Rs137 bn over FY2024-30E, which will be primarily used for capacity expansion of Rs140 bn. We expect Premier Energies to generate healthy FCF in 2030E (We do not bake in any impact of SPECs capital subsidy, according to which, the company expects Rs4-5 bn of capital rebate in 2027, once its 4 GW integrated cell and module plant becomes operational.)

**Exhibit 42: Consolidated cash flow statement of Premier Energies, March fiscal year-ends, 2021-30E (Rs mn)**

	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Cash flow from operating activities</b>										
Net profit before tax	558	(157)	(78)	2,894	9,849	16,335	21,374	25,917	23,454	27,992
Add: Depreciation	217	416	622	961	3,644	4,974	8,041	10,562	13,468	15,429
Add: Net interest	(36)	(92)	(120)	(137)	—	—	—	—	—	—
Others	101	257	453	1,124	—	—	—	—	—	—
<b>Op. Profit before Working Capital Changes</b>	<b>839</b>	<b>424</b>	<b>877</b>	<b>4,842</b>	<b>13,493</b>	<b>21,310</b>	<b>29,415</b>	<b>36,479</b>	<b>36,922</b>	<b>43,421</b>
Changes in Working capital	1,667	(255)	(407)	(3,688)	(1,662)	(3,027)	(2,014)	(2,965)	(884)	(2,668)
Taxes	(138)	(119)	(103)	(252)	(2,520)	(4,180)	(5,470)	(6,633)	(6,002)	(7,164)
<b>Cash flow from operating activities</b>	<b>2,369</b>	<b>50</b>	<b>367</b>	<b>902</b>	<b>9,311</b>	<b>14,103</b>	<b>21,931</b>	<b>26,880</b>	<b>30,036</b>	<b>33,589</b>
<b>Cash flow from investing activities</b>										
Capex	(3,245)	(1,987)	(2,760)	(4,514)	(7,000)	(28,925)	(30,662)	(25,208)	(29,069)	(19,606)
Investments	—	—	—	—	—	—	—	—	—	—
Others	(283)	(192)	(278)	47	—	—	—	—	—	—
<b>Cash flow from investing activities</b>	<b>(3,528)</b>	<b>(2,179)</b>	<b>(3,039)</b>	<b>(4,466)</b>	<b>(7,000)</b>	<b>(28,925)</b>	<b>(30,662)</b>	<b>(25,208)</b>	<b>(29,069)</b>	<b>(19,606)</b>
<b>Cash flow from financing activities</b>										
Debt	1,299	1,081	3,102	6,287	4,900	20,247	21,464	17,645	20,348	13,724
Equity	15	1,714	—	—	15,000	—	—	—	—	—
Interest	(219)	(418)	(625)	(785)	—	—	—	—	—	—
Dividend	—	—	—	—	—	—	—	—	—	—
Others	(3)	409	39	(13)	—	—	—	—	—	—
<b>Cash flow from financing activities</b>	<b>1,091</b>	<b>2,786</b>	<b>2,517</b>	<b>5,489</b>	<b>19,900</b>	<b>20,247</b>	<b>21,464</b>	<b>17,645</b>	<b>20,348</b>	<b>13,724</b>
<b>FCF</b>	<b>(876)</b>	<b>(1,938)</b>	<b>(2,394)</b>	<b>(3,612)</b>	<b>2,311</b>	<b>(14,822)</b>	<b>(8,732)</b>	<b>1,673</b>	<b>967</b>	<b>13,983</b>
<b>Total cash flow</b>	<b>(68)</b>	<b>656</b>	<b>(155)</b>	<b>1,924</b>	<b>22,211</b>	<b>5,426</b>	<b>12,732</b>	<b>19,318</b>	<b>21,315</b>	<b>27,707</b>
Opening cash	212	145	801	646	2,570	24,781	30,206	42,938	62,256	83,572
Other bank balances	—	—	—	—	—	5,426	12,732	19,318	21,315	27,707
Closing cash	145	801	646	2,570	24,781	30,206	42,938	62,256	83,572	111,278

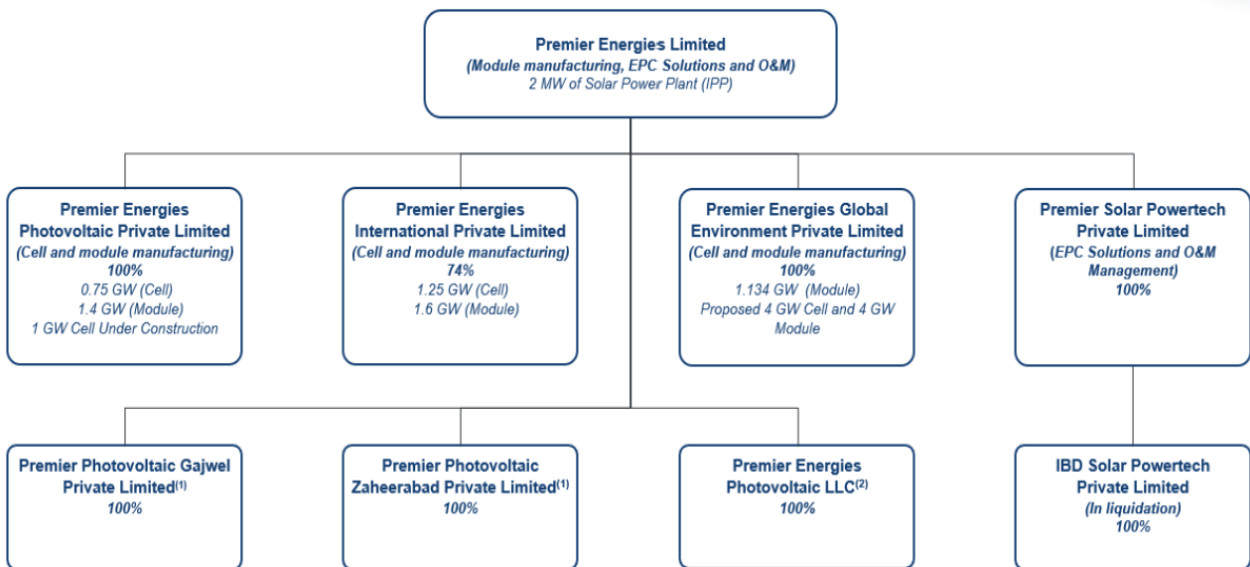
Source: Company, Kotak Institutional Equities estimates

# A1

## Appendix 1: Company profile

Premier Energies has 29 years of experience in the solar industry. During this time, it has grown to become India’s second-largest integrated solar cell and solar module manufacturer (2 GW for solar cells and 4.13 GW for solar modules) in terms of annual installed capacity as of September 30, 2024. With respect to solar cells, Premier is the second largest domestic manufacturer in terms of (annual installed capacity) as of September 30, 2024. The company’s business operations include: (1) manufacturing of solar photovoltaic (PV) cells; (2) manufacturing of solar modules, including custom-made panels for specific applications; (3) execution of EPC projects, (4) independent power production; (5) O&M services with respect to EPC projects executed by the company; and (5) sale of other solar-related products.

Exhibit 43: Premier Energies group structure as of June 30, 2024



Notes:

- (1) Non-operating.
- (2) As of June 30, 2024, Premier Energies Photovoltaic LLC is yet to commence operations

Source: Company

Premiers Energies has five manufacturing locations all located in Hyderabad, Telangana, India. The company has six areas of business operations.

### Solar cells

Premier Energies currently derives 24% of its revenues from the sale of solar cells (as of FY2024). The primary product for Premier Energies is cells produced using monocrystalline PERC technology has an efficiency of between 23.2% and 23.7% (i.e., indicating the maximum solar energy conversion to electricity). Going ahead, Premier plans to transition to TOPCon technology, which builds upon the existing PERC technology and has the capability of achieving efficiencies between 24.5% and 25.2%.

### Solar modules

Premier Energies derives 70% of its revenues from the sale of solar modules (as of FY2024). The company currently manufactures modules using monocrystalline PERC solar cells as well as TOPCon solar cells, which it procures from third-parties. Premier Energies’ products are differentiated on the basis of module technology, cell size and quantity, and are sold across different power output ranges. It is capable of producing both monofacial and bifacial modules.

**Other solar products**

Premier Energies has the ability to manufacture a number of solar products on an ad hoc basis. For example, it currently produces customized bespoke solar tiles for a company in the US and has previously produced unique products such as panels for a European pay-for-parking services provider.

**EPC solutions**

Premier provides EPC solutions as a contractor through the company and subsidiary, PSPPL. Premier has 12 years of experience in providing EPC solutions, which include end-to-end solar services for ground-mounted, rooftop, floating, canal bank, canal top and hybrid power generation systems with a track record of 266.26 MW ground mounted projects and 22.86 MW roof top projects.

Premier also provides solar water pumps under its EPC solutions. These solar water pumps feature solar modules manufactured by Premier and pumps sourced from external vendors.

**O&M solutions**

Premier Energies has a presence in the O&M segment through the provision of O&M solutions for its EPC solution customers. Premier currently provide O&M services for 178.38 MW of solar ground mount and rooftop solar solutions as well as for the solar water pumps it has installed.

**Independent power production**

Premier Energies has a 2 MW solar power plant, which was commissioned in 2012 under Jawaharlal Nehru National Solar Mission in Jharkhand, India.

**Premier Energies has grown to become India’s second-largest integrated solar cell and solar module manufacturer**

Exhibit 44: Key expansion projects undertaken by Premier Energies for increasing solar cell and module manufacturing capabilities, March fiscal year-ends, 2011-24

Year	Milestone	Total Solar Cell Capacity (MW)	Total Solar Module Capacity (MW)
2011	Established a solar cell line with an annual capacity of 75 MW and a solar module line with an annual capacity of 100 MW in Unit I	75	100
2017	Expanded the installed capacity of the solar module line in Unit I by 370 MW	75	470
2021	Established a fully integrated 500 MW capacity solar cell line and a 750 MW capacity solar module line in Unit II	500	1,220
2022	Expanded the installed capacity of the solar cell and module lines in Unit II by 250 MW and 150 MW, respectively	750	1,370
2023	(1) Established a solar cell line in Unit III with an annual capacity of 1,250 MW (2) Established a solar module line in Unit IV with an annual capacity of 1,600 MW (3) Expanded the installed capacity of the solar module line in Unit II by 500 MW	2,000	3,260
2024	(1) Established a solar module line in Unit V with an annual capacity of 100 MW (2) Expanded the installed capacity of the solar module line in Unit V by 1,034 MW	2,000	4,134

Source: Company, Kotak Institutional Equities

In terms of customer mix, the company caters to three main segments: IPPs, OEM (Solar Pump and Rooftop solar OEMs), government customers (primarily PSUs utilities). The primary geographic exposure in terms of exports is the US, where Premier supplies cells to Heliene. Premier also supplies cells to other domestic module manufacturers that currently do not have cell capacity. This is the primary contributor of others segment. Premier’s key customers include NTPC, TATA Power Solar Systems Limited, Panasonic Life Solutions Private Limited, Continuum, Shakti Pumps, First Energy, Bluepine Energies Private Limited, Luminous, Hartek Solar Private Limited, Green Infra Wind Energy Limited (a subsidiary of Sembcorp Green Infra Limited), Madhav Infra Projects Limited, SolarSquare Energy Private Limited and Axitec Energy India Private Limited.

**IPPs, OEM (solar pumps and roof top solar), government (PSUs) as well exports are the key end-markets for Premier Energies**

Exhibit 45: Break up of revenue exposure by geography and customer type; March fiscal year-ends, 2021-24 (Rs mn, %)

Particulars	2021		2022		2023		2024	
	Rs mn	as % of revenue from operations	Rs mn	as % of revenue from operations	Rs mn	as % of revenue from operations	Rs mn	as % of revenue from operations
<b>Domestic</b>	<b>6,924</b>	<b>98.7%</b>	<b>7,361</b>	<b>99%</b>	<b>14,210</b>	<b>99%</b>	<b>27,041</b>	<b>86%</b>
IPP	1,205	17.2%	1,793	24%	3,166	22%	10,949	35%
OEM	1,572	22.4%	2,337	31%	5,825	41%	4,008	13%
Government	2,173	31.0%	1,692	23%	1,727	12%	2,415	8%
Others	1,974	28.1%	1,538	21%	3,491	24%	9,668	31%
<b>Export</b>	<b>91</b>	<b>1.3%</b>	<b>68</b>	<b>1%</b>	<b>75</b>	<b>1%</b>	<b>4,397</b>	<b>14%</b>
<b>Total</b>	<b>7,015</b>	<b>100.0%</b>	<b>7,429</b>	<b>100%</b>	<b>14,285</b>	<b>100%</b>	<b>31,438</b>	<b>100%</b>

Source: Company

# A2

## Appendix 2: Key management personnel

**Exhibit 46: Brief background of Premier’s Board of Directors**

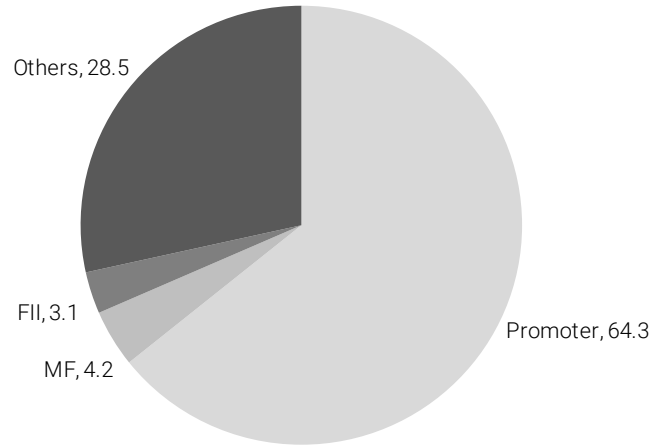
Name	Position	Remarks
Surender Pal Singh Saluja	Chairman and Whole-Time Director	Surender Pal Singh Saluja is the Chairman and Whole-Time Director and one of the Promoters of the Company. He has been associated with the company since its incorporation. He is responsible for providing strategic advice to the Board, and developing and executing the company’s business strategies. He has a bachelor’s in engineering (mechanical) degree from Karnatak University, Dharwad, Karnataka. He was awarded the National Award for Outstanding Entrepreneurship in Micro and Small Enterprises by the Ministry of Micro, Small and Medium Enterprises, Government of India in 2007.
Chiranjeev Singh Saluja	Managing Director	Chiranjeev Singh Saluja is the Managing Director of our company and one of the Promoters of the company. He has been associated with the company since 1997. He is responsible for the overall operations of the company and leading the company’s short and long-term strategy and setting strategic goals. He was honoured with a professional doctorate in global leadership and management by the European International University, Paris, France. He is a member of the Indian Solar Manufacturers Association, and the Federation of Indian Chambers of Commerce and Industry and a director of the All India Solar Industries Association.
Revathi Rohini Buragadda	Executive Director	Revathi Rohini Buragadda is an Executive Director of the company. She has been associated with the company since June 17, 2019. She is responsible for overseeing indirect taxation, relations with governmental agencies, and general insurance for the company and its subsidiaries. She holds a bachelor of science degree in agriculture from Andhra Pradesh Agricultural University. She has previously served as a Deputy Commissioner of Commercial Taxes with the State Government of Andhra Pradesh.
Abhishek Loonker	Non-Executive Director	Abhishek Loonker is a Non-Executive Director of the company and a nominee of South Asia Growth Fund II Holdings LLC and South Asia EBT Trust. He has been associated with the company since September 28, 2021. He holds a bachelor’s degree in business administration from the B.K. Majumdar Institute of Business Administration, Gujarat University and a post graduate diploma in business management (international business) from MATS School of Business and IT, where he secured a first rank. He has also received a certificate for completion of a programme on “Corporate Restructuring, Mergers and Acquisitions: Creating Value in Turbulent Times” from Harvard Business School. He is a chartered financial analyst charterholder with the CFA Institute. Abhishek has been recognised as one of the ‘40 under 40’ alternative investment professionals in India by the Association of International Wealth Management of India for 2017-2018.
Sridhar Narayan	Non-Executive Director	Sridhar Narayan is a Non-Executive Director of the company and a nominee of South Asia Growth Fund II Holdings LLC and South Asia EBT Trust. He has been associated with our Company since September 28, 2021. He holds a post graduate diploma in management from the Indian Institute of Management, Bangalore. He has also served on the board of directors of Renew Power Private Limited and Shakti Pumps (India) Limited
Uday Sudhir Pilani	Independent Director	Uday Sudhir Pilani is an Independent Director of our company. He has been associated with the company since March 18, 2020. He holds a bachelor’s degree in commerce from Osmania University, Hyderabad. He has previously served as a director on the board of our Subsidiary PSPPL.
Rohan Mehta	Independent Director	Rohan Mehta is an Independent Director of our Company. He has been associated with our Company since March 18, 2020. He holds a certificate of practice from the Institute of Chartered Accounts of India. He has been a member of the board of Simplex Consultants and Infra Private Limited and Pakeeza Infrastructure Development Company Private Limited since 2013, and 2015, respectively.
Raghunathan Kannan	Independent Director	Raghunathan Kannan is an Independent Director of our Company. He has been associated with our Company since March 12, 2024. He is a fellow of the Institute of Chartered Accountants of India. He has previously served as a director on the board of Trust AMC Trustee Private Limited.
Jasbir Singh Gujral	Independent Director	Jasbir Singh Gujral is an Independent Director of the company. He has been associated with the company since March 12, 2024. He has passed the bachelors of commerce (honours) examination from the University of Delhi. He is a fellow of the Institute of Chartered Accountants of India and an associate member of the Institute of Internal Auditors Inc., New York. He was previously associated with Triveni Engineering Works Limited. He is currently the managing director of Syrma SGS Technology Limited.
Priyanka Gulati	Independent Director	Priyanka Gulati is an Independent Director of the company. She has been associated with the company since March 12, 2024. She is an associate of the Institute of the Chartered Accountants of India. She was awarded the Outstanding Woman Entrepreneur of the Year at the third FLO Women Awards of Uttar Pradesh, 2017-2018 by FICCI. She is currently a partner at Grant Thornton Bharat LLP. She is also one of the co-founders of Manthan Management Solutions Private Limited and has served as a manager in Accenture Services Private Limited.

Source: Company

# A3

## Appendix 3: Shareholding pattern

Exhibit 47: Shareholding pattern of Premier Energies Ltd for the period ending September 2024 (%)



Source: BSE



# Waaree Energies (WAAREEN)

Renewable Energy

**SELL**

CMP(₹): 2,769

Fair Value(₹): 2,550

Sector View:

NIFTY-50: 23,708

January 07, 2025

## Transitioning into a global integrated solar player

Waaree Energies is India's largest module manufacturer, with plans to vertically integrate into ingots, wafers and cells. The company also undertakes solar EPC projects, with future plans to enter into hydrogen electrolyser manufacturing and BESS systems. We forecast Waaree's earnings to record a 35% CAGR over FY2024-30E, driven by (1) India capacity expansion and backward integration; (2) expansion into US module manufacturing; and (3) higher capacity utilization. However, heightened competitive intensity should start impacting margins and return ratios from FY2028. We initiate coverage on Waaree with a SELL rating and a Fair Value of Rs 2,550 (7% downside) due to elevated valuations.

### Initiate with a SELL rating; Fair Value of Rs2,550

We initiate coverage on Waaree Energies with a SELL rating and a DCF-based Fair Value of Rs2,550, implying 13.1X March 2027E EPS. Our FV implies (1) Waaree Energies' capacity to see 12% CAGR for module, with module/cell capacity reaching 40 GW/32 GW by 2035; (2) 14% volume CAGR for Waaree's module volumes until FY2035, driven by capacity addition and utilization levels of 70%+ for modules; (3) stable EBITDA margins of ~19% in the long term, with exit FY2035 margin of 19.4%; (4) cost of equity of 13% and WACC of 12.6%; and (5) terminal value=2X FY2035E book value, in line with Chinese peers.

### Transitioning to an integrated player in India and near-shoring in US

Waaree is the largest domestic solar module manufacturer, commanding 18% capacity share (~2X the 2<sup>nd</sup> largest player). We expect Waaree to continue its dominance, driven by rapid capacity expansion plans, and see it reach 19.3 GW module, 11.4 GW cell and 6GW wafer capacity by 2027. Vertical integration should help Waaree improve its EBITDA margins from 13.8% in FY2024 to 23.6% in FY2027. In the US, we see Waaree expanding its capacity from 1.6 GW in FY2025 to 5GW by FY2027 and near-shoring to meet local US demand. Further, strong growth from its EPC subsidiary WRTL and newer growth areas of electrolysers and BESS systems will be key drivers of future growth.

### Financials: We forecast 35% PAT CAGR over FY2024-30E

We forecast Waaree's growth will be driven by three key factors: (1) India capacity expansion and backward integration; (2) expansion into US cell manufacturing; and (3) higher capacity utilization. We see Waaree's margins expand from 13.8% in FY2024 to 23.6% in FY2027, largely driven by vertical integration from ingot to module. However, heightened competitive intensity should start impacting margins from FY2028. We estimate operating cash flows and IPO proceeds to be sufficient for funding incremental capex required for growth.

### Risks: Change in regulatory policy and inability to vertically integrate

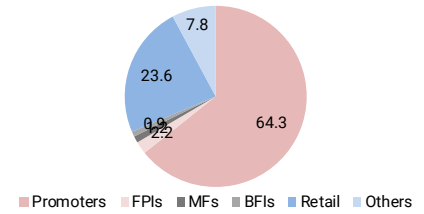
Key long-term risks are (1) change in any trade/non-trade barriers by Indian or US govt; and (2) faster-than-expected ramp-up of cell capacity by competitors.

#### Company data and valuation summary

##### Stock data

CMP(Rs)/FV(Rs)/Rating	2,769/2,550/SELL
52-week range (Rs) (high-low)	3,743-2,295
Mcap (bn) (Rs/US\$)	795/9.3
ADTV-3M (mn) (Rs/US\$)	0/0.0

##### Shareholding pattern (%)



Price performance (%)	1M	3M	12M
Absolute	(5)	0	0
Rel. to Nifty	(1)	0	0
Rel. to MSCI India	(0)	0	0

Forecasts/Valuations	2025E	2026E	2027E
EPS (Rs)	58.7	111.3	194.9
EPS growth (%)	22.6	89.7	75.1
P/E (X)	47.2	24.9	14.2
P/B (X)	8.2	6.4	4.4
EV/EBITDA (X)	31.4	17.0	10.9
RoE (%)	24.2	29.4	36.6
Div. yield (%)	0.0	0.0	0.0
Sales (Rs bn)	146	218	284
EBITDA (Rs bn)	24	44	67
Net profits (Rs bn)	16	32	56

Source: Bloomberg, Company data, Kotak Institutional Equities estimates

Prices in this report are based on the market close of January 07, 2025

[Full sector coverage on KINSITE](#)

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## Financial Overview: We forecast 35% PAT CAGR over FY2024-30E

Waaree is trading at 14.1X FY2027E EPS; we forecast EPS to grow at CAGR of 33% over FY2024-30E

Exhibit 1: Financial forecast & valuation ratios of Waaree Energies, March fiscal year-ends, 2021-30E

	Net sales		EBITDA		Adj. PAT		Adj. EPS		EV/EBITDA	P/E	P/B	RoACE	RoAE
	(Rs mn)	yoy chg. (%)	(Rs mn)	margin (%)	(Rs mn)	margin (%)	(Rs)	yoy chg. (%)	(X)	(X)	(X)	(%)	(%)
2021	19,530		957	4.9	415	2.1	2.1		826.1	1,184.4	153.2	9.3	14.0
2022	28,543	46.1	1,109	3.9	756	2.6	3.8	82%	711.0	714.4	126.3	8.5	19.4
2023	67,509	136.5	8,346	12.4	5,033	7.5	22.5	486%	92.8	127.0	33.4	71.3	42.6
2024	113,976	68.8	15,744	13.8	8,959	7.9	34.7	54%	48.1	57.3	17.3	53.3	41.8
2025E	145,667	27.8	23,581	16.2	16,187	11.1	58.7	69%	31.1	46.7	8.1	40.2	24.2
2026E	217,703	49.5	43,962	20.2	32,037	14.7	111.3	90%	16.9	24.6	6.3	37.7	29.4
2027E	283,673	30.3	67,056	23.6	56,110	19.8	194.9	75%	10.8	14.1	4.4	36.3	36.6
2028E	301,640	6.3	64,246	21.3	55,416	18.4	192.5	-1%	10.7	14.2	3.3	25.7	26.5
2029E	299,461	-0.7	57,071	19.1	49,874	16.7	173.2	-10%	11.3	15.8	2.8	18.8	19.1
2030E	334,112	11.6	62,747	18.8	54,566	16.3	189.5	9%	9.4	14.5	2.3	19.8	17.4
<b>CAGR (2024-30E)</b>	<b>20%</b>		<b>26%</b>		<b>35%</b>		<b>33%</b>						

Source: Company, Kotak Institutional Equities estimates

Exhibit 2: Waaree Energies – summary of P&L, BS, and CFS, March fiscal year-ends, 2021-30E (Rs mn)

	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Income statement</b>										
<b>Net revenues</b>	<b>19,530</b>	<b>28,543</b>	<b>67,509</b>	<b>113,976</b>	<b>145,667</b>	<b>217,703</b>	<b>283,673</b>	<b>301,640</b>	<b>299,461</b>	<b>334,112</b>
Total operating expenses	(18,573)	(27,433)	(59,162)	(98,232)	(122,087)	(173,740)	(216,617)	(237,394)	(242,390)	(271,365)
<b>EBITDA</b>	<b>957</b>	<b>1,109</b>	<b>8,346</b>	<b>15,744</b>	<b>23,581</b>	<b>43,962</b>	<b>67,056</b>	<b>64,246</b>	<b>57,071</b>	<b>62,747</b>
Depreciation & Amortization	(323)	(433)	(1,641)	(2,768)	(3,002)	(6,536)	(10,912)	(14,471)	(17,032)	(19,049)
<b>EBIT</b>	<b>635</b>	<b>677</b>	<b>6,705</b>	<b>12,976</b>	<b>20,578</b>	<b>37,426</b>	<b>56,143</b>	<b>49,775</b>	<b>40,039</b>	<b>43,698</b>
Other income	300	916	1,095	2,352	3,695	13,227	25,664	30,239	31,632	33,396
Interest expense	(309)	(409)	(823)	(1,399)	(1,804)	(6,758)	(5,466)	(4,466)	(3,466)	(2,466)
<b>PBT</b>	<b>625</b>	<b>1,184</b>	<b>6,977</b>	<b>13,929</b>	<b>22,470</b>	<b>43,895</b>	<b>76,341</b>	<b>75,547</b>	<b>68,205</b>	<b>74,628</b>
Tax expense	(209)	(387)	(1,769)	(4,598)	(5,752)	(11,237)	(19,543)	(19,340)	(17,460)	(19,105)
<b>Net profit</b>	<b>456</b>	<b>756</b>	<b>4,828</b>	<b>12,372</b>	<b>16,187</b>	<b>32,037</b>	<b>56,110</b>	<b>55,416</b>	<b>49,874</b>	<b>54,566</b>
Exceptional items	41	–	(206)	3,413	–	–	–	–	–	–
<b>Adjusted / Recurring PAT</b>	<b>415</b>	<b>756</b>	<b>5,033</b>	<b>8,959</b>	<b>16,187</b>	<b>32,037</b>	<b>56,110</b>	<b>55,416</b>	<b>49,874</b>	<b>54,566</b>
<b>Recurring EPS</b>	<b>2</b>	<b>4</b>	<b>22</b>	<b>35</b>	<b>59</b>	<b>111</b>	<b>195</b>	<b>192</b>	<b>173</b>	<b>190</b>
<b>Balance sheet</b>										
<b>Shareholders' funds</b>	<b>3,526</b>	<b>4,276</b>	<b>18,384</b>	<b>40,878</b>	<b>93,065</b>	<b>125,102</b>	<b>181,212</b>	<b>236,628</b>	<b>286,502</b>	<b>341,068</b>
Share capital	1,971	1,971	2,434	2,630	2,879	2,879	2,879	2,879	2,879	2,879
Reserves & surplus	1,554	2,305	15,950	38,249	90,186	122,223	178,333	233,749	283,623	338,189
Debt	3,315	3,634	3,203	5,534	15,534	60,714	50,714	40,714	30,714	20,714
Deferred tax liabilities	88	264	479	371	371	371	371	371	371	371
Minority interest and other liabilities	741	540	4,205	14,556	15,087	15,708	16,395	17,186	18,056	19,013
<b>Total sources of funds</b>	<b>7,670</b>	<b>8,715</b>	<b>26,271</b>	<b>61,339</b>	<b>124,056</b>	<b>201,894</b>	<b>248,692</b>	<b>294,899</b>	<b>335,643</b>	<b>381,166</b>
Net fixed assets	2,813	7,340	16,284	27,777	51,504	88,915	121,580	134,710	141,289	138,966
Net working capital (ex-cash)	1,340	(3,881)	(10,283)	(9,459)	(4,195)	1,089	7,987	13,186	17,129	20,135
Investments	2,415	1,592	3,085	5,230	5,230	5,230	5,230	5,230	5,230	5,230
Cash and bank balances and current investments	1,102	3,664	17,184	37,792	71,518	106,661	113,896	141,773	171,996	216,836
<b>Total application of funds</b>	<b>7,670</b>	<b>8,715</b>	<b>26,271</b>	<b>61,339</b>	<b>124,056</b>	<b>201,894</b>	<b>248,692</b>	<b>294,899</b>	<b>335,643</b>	<b>381,166</b>
<b>Free cash flow</b>										
Operating profit before wcap. changes	1,160	1,924	9,410	20,485	27,276	57,189	92,720	94,485	88,703	96,143
Change in working capital / other adjustments	(229)	5,344	7,196	5,916	(5,264)	(5,284)	(6,898)	(5,199)	(3,943)	(3,006)
Direct tax paid	(215)	(259)	(1,004)	(3,351)	(5,752)	(11,237)	(19,543)	(19,340)	(17,460)	(19,105)
<b>Net cashflow from operating activities</b>	<b>717</b>	<b>7,009</b>	<b>15,602</b>	<b>23,050</b>	<b>16,260</b>	<b>40,668</b>	<b>66,279</b>	<b>69,946</b>	<b>67,299</b>	<b>74,032</b>
Capex	(1,979)	4,965	(8,654)	(13,423)	(26,730)	(43,947)	(43,578)	(27,602)	(23,610)	(16,726)
<b>Free cash flow (CFO + net capex)</b>	<b>(1,262)</b>	<b>11,973</b>	<b>6,948</b>	<b>9,627</b>	<b>(10,470)</b>	<b>(3,279)</b>	<b>22,701</b>	<b>42,344</b>	<b>43,689</b>	<b>57,306</b>
<b>Growth (%)</b>										
Revenue growth		46.1	136.5	68.8	27.8	49.5	30.3	6.3	(0.7)	11.6
EBITDA growth		15.9	652.3	88.6	49.8	86.4	52.5	(4.2)	(11.2)	9.9
Recurring PAT growth		65.8	538.5	156.3	30.8	97.9	75.1	(1.2)	(10.0)	9.4
<b>Key ratios</b>										
EBITDA margin (%)	4.9	3.9	12.4	13.8	16.2	20.2	23.6	21.3	19.1	18.8
Net debt/equity (X)	0.6	(0.0)	(0.8)	(0.8)	(0.6)	(0.4)	(0.3)	(0.4)	(0.5)	(0.6)
Net debt/EBITDA (X)	2.3	(0.0)	(1.7)	(2.0)	(2.4)	(1.0)	(0.9)	(1.6)	(2.5)	(3.1)
Book value per share (Rs)	18	22	82	158	337	435	629	822	995	1,185
RoAE (%)	14	19	43	42	24	29	37	27	19	17
RoACE (%)	9	9	71	53	40	38	36	26	19	20

Source: Company, Kotak Institutional Equities estimates

# 2

## Valuation: Initiate with SELL rating and Fair Value of Rs2,550

We initiate coverage on Waaree Energies with a SELL rating and a DCF-based Fair Value of Rs2,550 (7% downside from current levels), implying 13.1X P/E on March 2027E consolidated earnings. Waaree Energies is India’s largest module manufacturer with plans to vertically integrate into ingots, wafers and cells. The company also undertakes solar EPC projects with future plans to enter into hydrogen electrolyser manufacturing and BESS systems. We forecast Waaree’s PAT to increase at 35% CAGR over FY2024-30E, driven by (1) India capacity expansion and backward integration; (2) expansion into US module manufacturing; and (3) higher capacity utilization. We see Waaree’s margins expanding from 13.8% in FY2024 to 23.6% in FY2027, largely driven by vertical integration. However, heightened competitive intensity should start cutting into margins beyond FY2028.

### Our DCF-based valuation implies 7% downside from CMP

We value Waaree Energies using a DCF model. In our forecast period (FY2024-35E), we build in (1) Waaree Energies’ capacity to grow at 12% CAGR for module, with module/cell capacities reaching 40 GW/32 GW by 2035; (2) 14% volume CAGR for module volumes until FY2035, driven by capacity additions and utilization levels on effective capacity of 70%+ for modules and 80% cells; (3) stable EBITDA margins of ~19% in the long term, with exit FY2035 EBITDA margin of 19.4%; (4) cost of equity of 13% and WACC of 12.6%; and (5) terminal value—2X FY2030 book value (in line with current Chinese peers solar valuation). Our DCF-based FV of Rs2,550 implies 10.0X EV/EBITDA FY2027E and 13.1X March 2027E P/E.

We believe that Waaree will be in a capacity addition phase in the next couple of years, with the impact of 6 GW integrated ingot to module plant, 5.4 GW cell capacity expansion as well as 1.6 GW US expansion impacting earnings only from FY2026. Further, near-term EBITDA margins for the company will be elevated, given the vertical integration plans. We expect EBITDA margins to normalize post FY2027 once large capacities from competitors come on stream. Hence, by FY2030 earnings should reflect the full impact of major capacity expansion announced and a normalized margin level (we do not include the impact of IRA incentives in our EBITDA margin estimates; the same has been included in other income).

### We arrive at a valuation of Rs 2,550/share for Waaree Energies

Exhibit 3: Waaree Energies’ DCF model (Rs mn), March fiscal year-ends, 2021-35E

	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E	2033E	2034E	2035E
<b>Consolidated revenue</b>	<b>19,530</b>	<b>28,543</b>	<b>67,509</b>	<b>113,976</b>	<b>145,667</b>	<b>217,703</b>	<b>283,673</b>	<b>301,640</b>	<b>299,461</b>	<b>334,112</b>	<b>380,603</b>	<b>421,069</b>	<b>454,157</b>	<b>481,266</b>	<b>507,832</b>
YoY (%)		46.1	136.5	68.8	27.8	49.5	30.3	6.3	(0.7)	11.6	13.9	10.6	7.9	6.0	5.5
EBITDA	957	1,109	8,346	15,744	23,581	43,962	67,056	64,246	57,071	62,747	72,258	80,549	87,348	92,952	98,493
EBITDA Margin (%)	4.9	3.9	12.4	13.8	16.2	20.2	23.6	21.3	19.1	18.8	19.0	19.1	19.2	19.3	19.4
Consolidated EBIT	635	677	6,705	12,976	20,578	37,426	56,143	49,775	40,039	43,698	51,413	57,548	62,372	66,432	70,412
<b>NOPAT</b>	<b>422</b>	<b>455</b>	<b>5,005</b>	<b>8,692</b>	<b>15,310</b>	<b>27,845</b>	<b>41,771</b>	<b>37,032</b>	<b>29,789</b>	<b>32,511</b>	<b>38,251</b>	<b>42,816</b>	<b>46,404</b>	<b>49,425</b>	<b>52,387</b>
Depreciation	323	433	1,641	2,768	3,002	6,536	10,912	14,471	17,032	19,049	20,845	23,001	24,976	26,520	28,080
Inc/dec in working capital	(222)	5,416	2,076	(7,147)	(5,264)	(5,284)	(6,898)	(5,199)	(3,943)	(3,006)	(4,033)	(3,511)	(2,870)	(2,352)	(2,305)
Capex	(1,979)	4,965	(8,654)	(13,423)	(26,730)	(43,947)	(43,578)	(27,602)	(23,610)	(16,726)	(19,191)	(23,932)	(15,572)	(15,313)	(15,888)
<b>FCFF</b>	<b>(1,456)</b>	<b>11,269</b>	<b>68</b>	<b>(9,110)</b>	<b>(13,681)</b>	<b>(14,850)</b>	<b>2,208</b>	<b>18,703</b>	<b>19,268</b>	<b>31,828</b>	<b>35,872</b>	<b>38,374</b>	<b>52,938</b>	<b>58,281</b>	<b>62,275</b>
Post tax cost of debt (%)		7.1													
Risk free rate (%)		7.0													
Risk premium (%)		4.9													
Beta		1.3													
Cost of equity		13.5													
FY2025 debt		15,534													
FY2025 equity		93,065													
<b>WACC (%)</b>		<b>12.6</b>													
Price to book multiple (X)		2.0													
Sum of discounted cash flow		173,361													
Terminal value		497,955													
Enterprise value		671,316													
Net debt/(cash) - March 2027		(65,543)													
<b>Equity value</b>		<b>736,858</b>													
<b>Equity value per share (Rs)</b>		<b>2,550</b>													
<b>Fair value (Rs)</b>		<b>2,550</b>													

Source: Company, Kotak Institutional Equities estimates

**We forecast revenues to increase at 20% CAGR over FY2024-30E**

We bake in a revenue CAGR of 20% over FY2024-30E, based on (1) India expansion: we expect doubling of the module capacity to 23 GW by FY2030E, with greater emphasis on backward integration; (2) US expansion: the company is in the final stages of setting up 1.6 GW PV module facility; we estimate a brownfield expansion of the facility to 5 GW by FY2027E; (3) elevated utilization: from 40% for module in FY2024 to ~60%/~65% for modules and cells, respectively, by FY2030E.

**We forecast revenue to increase at 19.6% CAGR over FY2024-30E, driven by capacity expansion across India and US, backward integration and higher utilization**

Exhibit 4: Segmental revenue breakdown of Waaree Energies, March fiscal year-ends, 2021-30E (Rs mn)

	Manufacturing	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E	CAGR 2024-30E (%)
<b>Installed Capacity (GW)</b>												
Module	India	2.0	4.0	9.0	12.0	13.3	16.3	19.3	20.3	21.3	23.0	
Module	US	–	–	–	–	1.6	3.0	5.0	5.0	5.0	5.0	
Cell	India	–	–	–	–	5.4	5.4	11.4	11.4	16.0	20.0	
Ingot Wafer	India	–	–	–	–	–	–	6.0	6.0	10.0	10.0	
<b>Capacity Utilization (%)</b>												
Module	India	40.5	24.0	29.2	39.8	52.7	49.0	49.8	52.7	52.7	60.7	
Module	US	–	–	–	–	4.5	48.3	50.4	63.0	63.0	63.0	
Cell	India	–	–	–	–	–	54.0	51.7	68.1	62.8	65.6	
Ingot Wafer	India	–	–	–	–	–	–	63.0	63.0	50.4	63.0	
<b>Actual Production (GW)</b>												
Module	India	0.8	1.0	2.6	4.8	7.0	8.0	9.6	10.7	11.2	14.0	
Module	US	–	–	–	–	0.1	1.4	2.5	3.2	3.2	3.2	
Cell	India	–	–	–	–	–	2.9	5.9	7.8	10.0	13.1	
Ingot Wafer	India	–	–	–	–	–	–	3.8	3.8	5.0	6.3	
<b>Realization (US\$ /wp)</b>												
Module (Domestic)	India					0.17	0.16	0.16	0.16	0.13	0.13	
Module (Export)	India					0.28	0.25	0.24	0.23	0.21	0.20	
Module	US					0.28	0.25	0.24	0.23	0.21	0.20	
Cell	India					0.13	0.13	0.13	0.11	0.10	0.09	
<b>Revenue (Rs mn)</b>												
Module (India)	India	13,223	19,311	13,189	34,513	120,897	93,980	67,409	47,100	14,049		
Module (Export)	India	4,809	6,578	46,165	65,691							
Module	US	–	–	–	–	1,714	31,253	52,410	63,171	60,912	58,735	
DCR (Module + Cell)	India	–	–	–	–	–	62,894	129,055	151,740	181,298	228,264	
IPP, EPC and Other Business		1,498	2,654	8,154	13,772	22,766	29,256	34,446	39,242	42,777	46,646	
<b>Total Revenue (Rs mn)</b>		<b>19,530</b>	<b>28,543</b>	<b>67,509</b>	<b>113,976</b>	<b>145,376</b>	<b>217,383</b>	<b>283,321</b>	<b>301,253</b>	<b>299,036</b>	<b>333,645</b>	<b>19.6</b>

Source: Company, Kotak Institutional Equities estimates

**DCR, backward integration, US manufacturing and operating leverage to be key margin drivers**

**We build in 500 bps improvement in EBITDA margin by FY2030E, with peak in FY2027E**

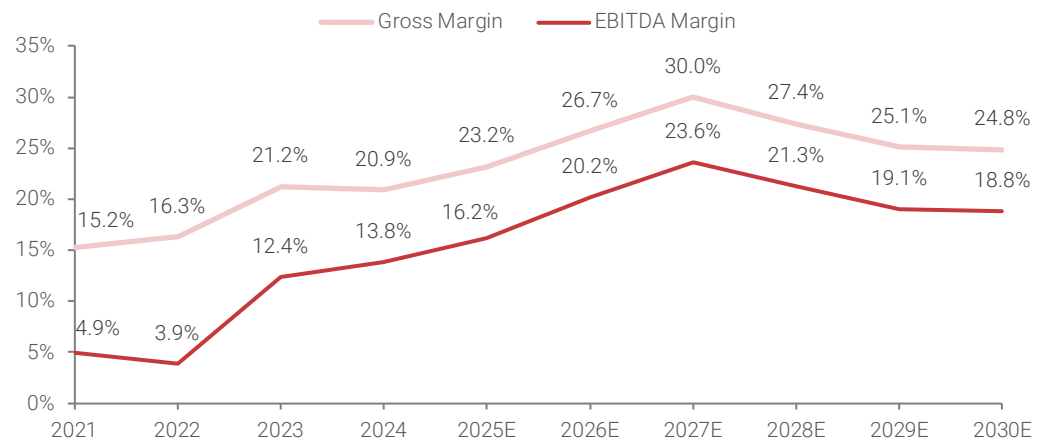
We bake in a margin improvement of 500 bps over FY2024-30E, based on (1) higher contribution from DCR: modules with domestic solar cells generate superior realization and margins; (2) backward integration: investment in ingot, wafer and potentially aluminum frame to support margins; and (3) expansion into US domestic module manufacturing.

- **Higher contribution from DCR:** We estimate Waaree’s cell manufacturing capacity to increase from 5.4 GW in FY2025E to 20 GW in FY2030E. The sharp rise in cell capability will be on account of (1) the implementation of the ALMM list from June 1, 2026; (2) supply-demand mismatch (~8 GW nameplate capacity versus 15 GW India solar capacity addition in FY2024); and (3) elevated realization for DCR modules (US\$25 cents/wp versus US\$17 cents/wp for standard module).

- ▶ **Backward integration:** The company is in the process of adding ingot and wafer manufacturing capacity by setting up a 6 GW fully integrated PV module manufacturing capacity in Odisha, which will commence production in FY2027E. We expect this facility to improve profitability by 150-200 bps. Additionally, in line with recent announcements by several Indian solar module manufacturers, we expect Waaree to also expand into aluminum frame manufacturing that will further support margins by 80-100 bps (we do not bake this into our estimates as of now).
- ▶ **US manufacturing:** Waaree has forayed into US domestic module manufacturing to capitalize on the IRA AMPC rebate on module of US\$7 cents/wp offered by the US government. It is currently setting up a 1.6 GW module manufacturing plant in Houston, Texas, which will be commissioned in FY2025 and has the potential to increase capacity to 5 GW. Provided no major changes in the US policy, we expect this facility to reach 3 GW/5 GW capacity by FY2026/2027.

**We expect gross/EBITDA margins to peak at 30.0%/23.6% in fiscal 2027**

Exhibit 5: Gross and EBITDA margin of Waaree Energies, March fiscal year-ends, 2021-30E (%)



Source: Company Filings, Kotak Institutional Estimates

**Balance sheet: Capex intensity to increase and working capital cycle to remain stable**

**Cash on the balance sheet**

We expect the company to continue generating strong cash flows and maintain balance sheet strength. Operating cash flow and internal accruals will be sufficient to meet requirements of incremental capex and working capital funding, and hence company will be net cash despite aggressive expansion until FY2030E. We expect net debt-to-equity and net debt-to-EBITDA of -0.6X/-3.2X by FY2030E, compared to -0.8X/-2.0X in FY2024.

**Attractive working capital cycle, driven by customer advances**

Waaree had a negative working capital cycle of two days in FY2024, a sharp decline from negative 42 days in FY2023 on account of the reduction in customer advances from 128 days to 69 days. Solar module manufacturers typically receive advances from customers to fix module prices, and this helps players such as Waaree maintain a negative working capital cycle. However, with increasing competitive intensity, we foresee a normalization of customer advances to 35 days, increasing net working capital days to 32 days in the next couple of years, a marginal deterioration from current levels.

**NWC days to rise to 25-30 days from FY2027 compared to -2 days in FY2024, driven by reduction in customer advances****Exhibit 6: Net working capital days of Waaree Energies, March fiscal year-ends, 2021-30E (Rs mn)**

	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
Receivable Days	22	12	17	31	31	31	31	31	31	31
Inventory Days	69	69	146	83	83	83	83	83	83	83
Payable Days	67	68	77	47	47	47	47	47	47	47
OCL (Includes Customer Advances) days	29	85	128	69	55	50	45	40	35	35
<b>NWC days</b>	<b>(5)</b>	<b>(73)</b>	<b>(42)</b>	<b>(2)</b>	<b>12</b>	<b>17</b>	<b>22</b>	<b>27</b>	<b>32</b>	<b>32</b>

Source: Company, Kotak Institutional Equities estimates

**Capex intensity to increase as Waaree is in an investment phase**

Waaree historically has been a PV module player, a low-capex business. Modules typically require capex of ~Rs1.5 bn/GW, with asset turns ranging between 5X and 6X. However, with changing industry dynamics on account of heightened competition and the ALMM list II implementation, the company has shifted focus toward backward integration. Unlike module, backward integration is capex heavy in nature with low asset turns, which will lead to higher capex intensity.

We model a capex of Rs182 bn over FY2025-30E, translating into an FATR of 2.4X by FY2030. This capex will take care of capacity expansion across modules, cells, ingots, wafers in India, modules in the US and maintenance capex in the next five years. We expect FCF improvement from Rs10 bn in FY2024 to Rs58 bn in FY2030, largely driven by an increase in OCF from Rs23 bn to Rs74 bn over FY2024-30E.

The company is currently undertaking massive expansion both in India and the US, with construction in final stages for the 5.4 GW cell facility in Chikli, Gujarat and 1.6 GW module facility in Houston, Texas, US. Both the facilities are expected to commence production in FY2025. In addition, Waaree is setting up a mega 6GW integrated facility in Odisha. The total cost of the project is ~Rs90 bn and will commence production by FY2027. We expect further capacity expansion to 23/20/10 GW in modules, cells and ingot wafers, respectively, with a total capex of Rs146 bn to consolidate the company's leadership position in the domestic market and tap potential export opportunities. We expect Rs18 bn to be invested for brownfield expansion of US module capacity to 5 GW by FY2027.



**We model Waaree to spend Rs182 bn over FY2024-30E to drive capacity expansion and backward integration**

**Exhibit 7: Capital expenditure buildup of Waaree Energies, March fiscal year-ends, 2024-30E (GW, Rs mn)**

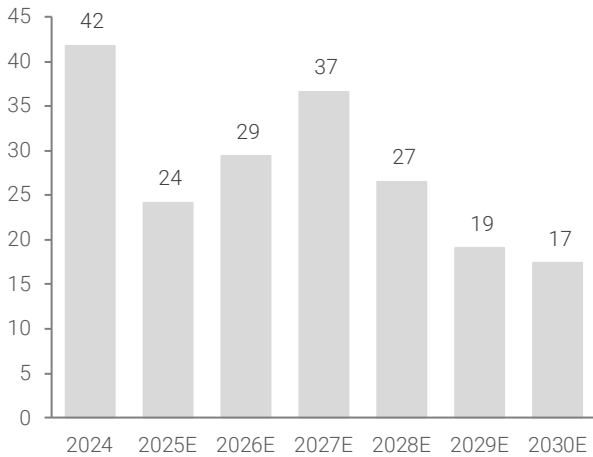
	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Year End Capacity (GW)</b>							
Module (India)	12.0	13.3	16.3	19.3	20.3	21.3	23.0
Module (US)	–	1.6	3.0	5.0	5.0	5.0	5.0
Cell	–	5.4	5.4	11.4	11.4	16.0	20.0
Cell - Upgrade	–	–	–	–	1.4	–	–
Ingot + Wafer	–	–	–	6.0	6.0	10.0	10.0
<b>Capacity Addition (GW)</b>							
Module (India)	3.0	1.3	3.0	3.0	1.0	1.0	1.7
Module (US)	–	1.6	1.4	2.0	–	–	–
Cell	–	5.4	–	6.0	–	4.6	4.0
Cell - Upgrade	–	–	–	–	–	–	–
Ingot + Wafer	–	–	–	6.0	6.0	10.0	10.0
<b>Cost/GW (Rs mn)</b>							
Module (India)	–	1,500	1,500	1,425	1,354	1,286	1,222
Module (US)	–	3,675	3,675	3,491	3,317	3,151	2,993
Cell	–	7,000	7,000	6,300	5,670	5,103	4,593
Cell - Upgrade	–	–	–	–	2,000	–	–
Ingot + Wafer	–	4,000	4,000	3,600	3,240	2,916	2,624
<b>Capex (Rs mn)</b>							
Module (India)	–	1,950	4,500	4,275	1,354	1,286	2,077
Module (US)	–	5,880	5,145	6,983	–	–	–
Cell	–	18,900	21,000	18,900	13,041	11,737	9,185
Cell - Upgrade	–	–	–	–	2,800	–	–
Ingot + Wafer	–	–	12,000	10,800	6,480	5,832	–
Maintenance Capex	–	–	1,302	2,620	3,927	4,755	5,464
<b>Total Capex (Rs mn)</b>		<b>26,730</b>	<b>43,947</b>	<b>43,578</b>	<b>27,602</b>	<b>23,610</b>	<b>16,726</b>

Source: Company, Kotak Institutional Equities estimates

**Return ratios remain healthy despite lower asset turn and margin pressure**

**RoAE to witness decline: 17% by FY2030E, driven by reduction in profit margin (post FY2027E) and lower asset turnover**

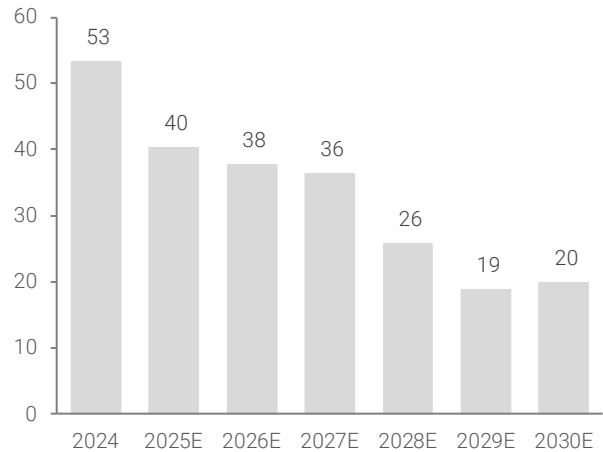
Exhibit 8: RoAE of Waaree, March fiscal year-ends, 2024-30E (%)



Source: Company Filings, Kotak Institutional Equity estimates

**RoACE to see sharp decline over FY2024-28E due to heavy investment in backward integration**

Exhibit 9: RoACE of Waaree, March fiscal year-ends, 2024-30E (%)



Source: Company Filings, Kotak Institutional Equity estimates

**Strong OCF to take care of capital expenditure**

Operating cash flows for Waaree Energies have remained fairly strong over FY2021-24 and were sufficient to meet a significant proportion of capex requirement in the same period. However, we estimate FCF to witness sharp drop over FY2025-26E due to large investment in capex-heavy elements of the solar supply chain.

We expect Waaree to generate operating cash flows of Rs334 bn over FY2025-30E, which will be take care of capex requirements of Rs182 bn in the same period. We expect Waaree to generate free cash flow from FY2027.

**Relative valuation table**

Waaree Energies trades at a substantial discount to its peer Premier Energies on FY2027E earnings. This is due to the large capacity expansion coming on stream for Waaree over the short term, while for Premier, the impact of the majority of the expansion would be seen only beyond FY2027. Furthermore, Premier Energies has an already operational cell manufacturing facility and lower exposure to the US geography, both of which should reduce any uncertainty on near-term earnings. By FY2030E, we see both margins and return ratios converging for the two companies, with only major difference being the scale of operations.

**Exhibit 10: Valuation comparable metric for Indian solar manufacturing companies, March fiscal year-ends, 2025-27E**

Company	Mkt Cap. (US\$ mn)	Price (LC)	Year end	EV (US\$ mn)	EV/EBITDA (X)			P/E (X)			P/B (X)			RoAE (%)		
					2025E	2026E	2027E	2025E	2026E	2027E	2025E	2026E	2027E	2025E	2026E	2027E
<b>India</b>																
Waaree Energies	9,192	2,742	Mar	8,859	31.1	16.9	10.8	46.7	24.6	14.1	8.1	6.3	4.4	24.2	29.4	36.6
Premier Energies	6,707	1,275	Mar	6,618	40.2	25.5	18.2	78.4	47.2	36.1	19.9	14.0	10.1	41.6	34.9	32.5
					<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>
<b>Global</b>																
First Solar	19,959	186	Dec	19,383	10.1	6.6	4.8	14.1	9.0	6.5	2.5	2.0	1.5	18.7	23.4	25.3
LONGI Green Energy	15,688	15	Dec	15,122		14.9	8.7		54.0	16.9	2.1	2.0	1.8	(11.0)	4.1	9.3
Jinko Solar	9,948	7	Dec	12,229	10.7	7.8	6.0	48.1	18.9	14.4	2.1	1.9	1.7	4.3	9.1	12.5
JA Solar	5,899	13	Dec	9,152	14.6	7.9	5.4		22.3	10.4	1.5	1.5	1.4	(3.5)	5.8	11.2
Trina Solar	5,493	18	Dec	10,659	14.4	10.9	7.6	439.8	17.8	11.3	1.3	1.2	1.1	0.3	7.9	9.5
Canadian Solar	788	12	Dec	5,936	10.3	7.3	5.0	23.2	52.1	4.0	0.3	0.2	0.3	1.5	4.7	8.8
<b>Median (China peers)</b>					<b>14.4</b>	<b>9.4</b>	<b>6.8</b>	<b>243.9</b>	<b>20.6</b>	<b>12.8</b>	<b>1.8</b>	<b>1.7</b>	<b>1.6</b>	<b>(1.6)</b>	<b>6.8</b>	<b>10.3</b>

**Note:**

(a) All global companies ending Dec have valuation ratios for CY2024/25/26. All domestic companies ending March have valuation ratios for FY2025/26/27

(b) China peers include LONGI Green Energy, Jinko Solar, JA Solar and Trina Solar

Source: Bloomberg, Kotak Institutional Equities estimates

## 3

**Waaree: Make in India for the world (primarily US)**

The imposition of trade and non-trade barriers by US on Chinese solar imports have a created a favorable demand environment for India and other southeast Asian countries. We expect the next couple of years to be strong for exports of solar modules from India, and Waaree should maintain its dominant export market share. However, with local US module and cell manufacturing capacity being set up with the help of IRA (Inflation Reduction Act) incentive, we see Waaree's exports from India declining after FY2026 and local US module manufacturing being the primary driver of US sales. Potential policy changes for the US solar sector and uncertainty regarding the continuation of current policies remain key near-term monitorable.

**Indian solar exporters thrive as US tariffs on China boost demand**

The imposition of trade and non-trade barriers by the US on Chinese solar imports have a created a favorable demand environment for India and other southeast Asian countries. Indian solar module exports have a seen a sharp uptick in the last two years, with ~US\$2 bn (6.1 GW) worth of solar modules being exported from India in FY2024. Nearly all the exports from India have been to the US, driven by multiple duties and import restriction on China.

US has imposed a 50% import tariff on solar cells and modules from China. Additionally, multiple barriers have been implemented to curb Chinese imports, including (1) antidumping or countervailing duty, (2) section 201 and 301 tariffs and (3) implementation of the Uyghur Forced Labor Prevention Act in June 2022 (UFLP Act). Under the UFLP Act, importers are required to furnish evidence that the goods they have imported were produced without the use of forced labor. As per Crisil, this requirement extends to goods that are entirely or partially manufactured in the Xinjiang Autonomous Region (XAUR) and impacts nearly 45% of global PV grade polysilicon facilities.

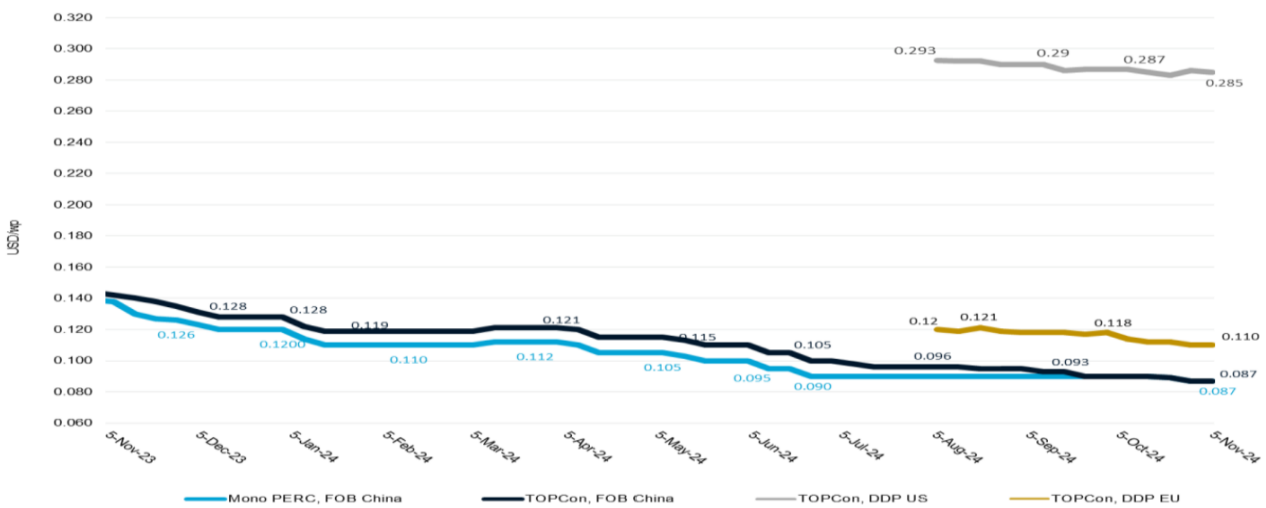
**Timeline of tariffs imposed on China**

- ▶ **2012:** Obama administration imposed 36% duty on China solar import, after receiving complaint from US manufacturer SolarWorld; this triggered a 23-percentage point drop in share of China imports.
- ▶ **2014:** Despite two years of tariffs, China still supplied 38% of imported solar goods. So, US raised duty on the said products and additionally put tariffs on Taiwanese cells after reports of Chinese manufacturers shifting base to Taiwan to avoid US tariffs.
- ▶ **2018:** To promote domestic manufacturing, President Donald Trump announced that imported solar goods and Chinese products would face an additional 25% tariff; this led Chinese import share to fall below 1%.
- ▶ **Since 2021:** The Biden administration continued previous import tariffs imposed by Trump and two years later increased tariff on Chinese good specifically. Select manufacturers in Thailand, Malaysia, Cambodia and Vietnam were slapped with new duties for being used to avoid tariffs on China.

However, by restricting imports and promoting domestic manufacturing, the US has become one of world's most lucrative markets. As per latest report by OPIS, US modules trade at US\$28.5 cents/wp as of November 2024; about 3X of FOB China (US\$9 cents/wp). This has helped Indian manufacturers such as Waaree Energies, Adani, Vikram Solar enjoy superior realization and margins by focusing on US exports.

**US modules trade at ~3X of prevalent global prices as a result of import tariffs on Chinese goods**

Exhibit 11: 1-year monthly module prices (China / EU / US); Nov 2023-24 (US\$/wp)



Source: OPIS, A Dow Jones Company

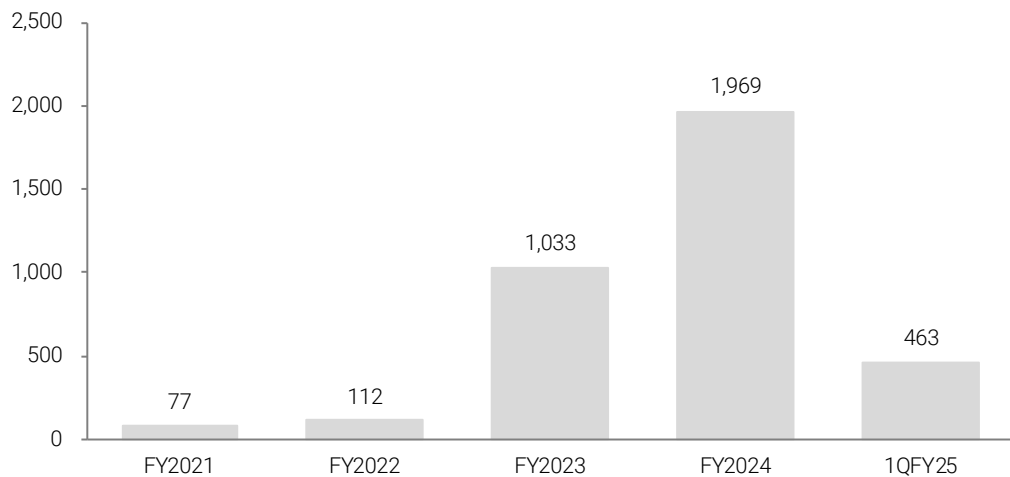
**India exports witness 25X surge over FY2021-24, leveraging supply void and attractive pricing in US**

Indian exports have witnessed explosive growth surging from US\$112 mn in FY2022 to US\$1.97 bn in FY2024, enabled by US import restriction on Chinese goods. We believe Indian solar exporters would continue to enjoy robust demand environment in the next 3-4 years, after which domestic supply will catch up with demand.

We believe Indian manufacturers are not cost-competitive with Chinese suppliers on account of large scale, backward integration, cheaper raw materials and favorable government policies. However, Indian exporters can potentially capture market if countries impose import restrictions on Chinese goods. Hence any new tariffs in the EU, Africa and the Middle East will be advantageous but would disproportionately benefit large-scale manufacturers with a history of export such as Waaree.

**India solar exports have seen 25X surge between FY2021 to FY2024**

Exhibit 12: India solar exports, March fiscal year-ends, 2021-25E (US\$ mn)



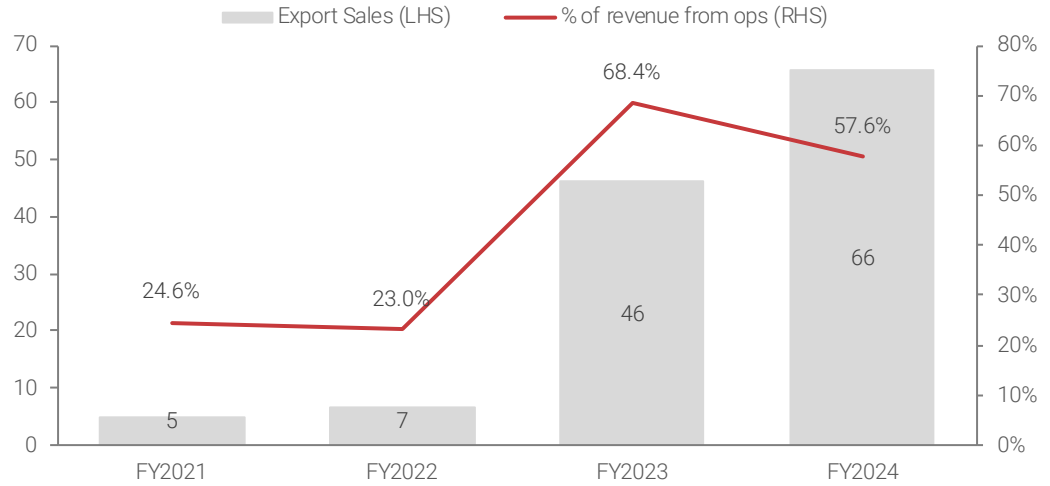
Source: Company Reports, Ministry of Commerce

**Waaree: First Indian manufacturer to tap US market, currently leading Indian exporter**

Waaree was among the first players within Indian solar module manufacturers to foresee the supply void created in the US due to imposition of barriers on Chinese import. FY2022 onward, the company pivoted to an export focused strategy to take advantage of superior unit economics. This resulted in a 14X jump in export sales for Waaree from Rs4.8 bn (24.6% of revenue) in FY2021 to Rs65.7 bn (57.6% of revenue) in FY2024.

**Exports grew at CAGR of ~140% over FY2021-24, predominantly led by US exports**

**Exhibit 13: Export sales for Waaree Energies (consolidated), March fiscal year-ends, 2021-24 (Rs bn, %)**

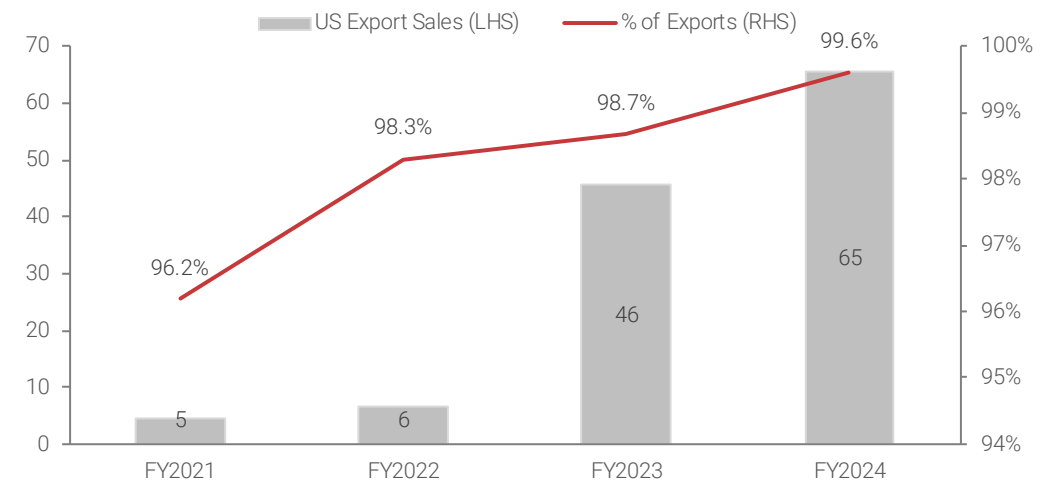


Source: Company

Waaree’s aggressive export strategy have reaped immense benefits. It has enabled the company to (1) become a leading solar module exporter from India and (2) expand module capacity while maintaining high utilization, despite the oversupply in the domestic market. These factors have helped Waaree generate higher margins relative to domestic focused module manufacturers by leveraging superior module realization in the US, which is by far its largest export market (~99.6% contribution to export revenue in FY2024).

**US sales outpaced exports at a CAGR of ~142% versus 140% in FY2021-24; contribution increased by 340 bps**

**Exhibit 14: US export sales for Waaree Energies, March fiscal year-ends, 2021-24 (Rs bn)**



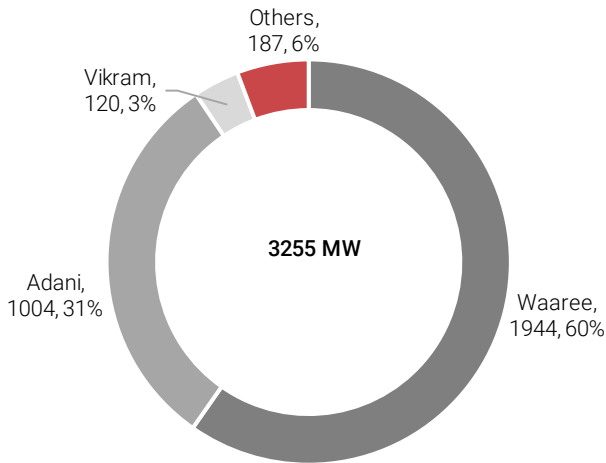
Source: Company Filings

**Established leadership in India solar exports**

Waaree’s large module manufacturing capacity, coupled with its aggressive export strategy, has helped it become largest Indian exporter, supplying 2.7 GW of solar modules in FY2024, up 42% from 1.9 GW in FY2023. Waaree commands about 44% export market share in FY2024, 4 percentage points higher than the nearest competitor Adani. Although the company saw a 16% drop in export share in FY2024, we expect continued dominance in exports on account of (1) large module capacity, (2) overcapacity in the domestic market, (3) attractive unit economics for US exports and (4) deep relationship with US buyers.

**Waaree exported ~1.9GW commanding 60% market share**

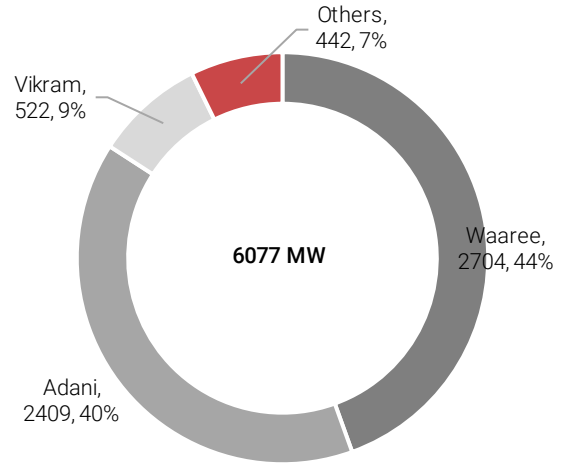
Exhibit 15: India export sales, March fiscal year-end, 2023 (MW)



Source: Company Report, CRISIL

**Exports grew 42% yoy resulting in 44% market share**

Exhibit 16: India export sales, March fiscal year-end, 2024 (MW)



Source: Company Report, CRISIL

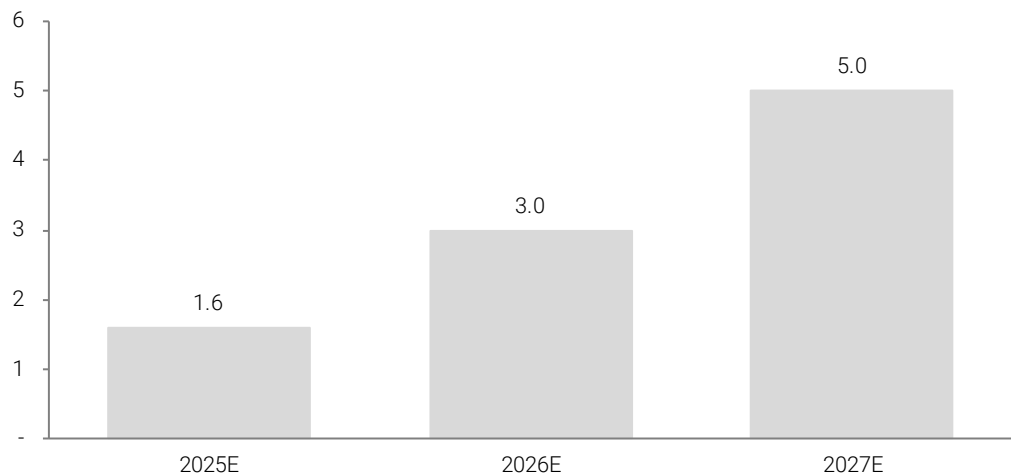
**Evolving to become a global player by establishing significant local US manufacturing presence**

To benefit from subsidies offered by the US government under IRA and tap customers in the US and globally, Waaree is in process of establishing domestic presence by setting up a 1.6 GW solar PV module manufacturing facility in Houston, Texas. This facility will provide revenue visibility over the next three years on account of 3.75GW order received from a leading US IPP player. We expect said facility to come online in FY2025 and further expand to 3 GW by FY2026 and 5 GW by FY2027, subject to favorable market conditions

This facility will act as a hedge for the company if the new US administration moves forward with its plan to increase tariffs on imports, since it will benefit domestic manufacturing while negatively impacting profitability/unit economics of Waaree’s US exports. The Houston facility would also offer an effective solution for customers seeking to rationalize their global sourcing and supply chain costs by providing them options in the form of localized manufacturing and customer service capabilities.

Additionally, the company can potentially set up a 5 GW solar cell manufacturing facility in the US in the future to take advantage of IRA and domestic content bonus credit, although there have been no concrete developments toward the same (we have not baked this in our estimates).

**Exhibit 17: Projected US module manufacturing capacity of Waaree, March fiscal year-ends, 2025-27E (GW)**



Source: Company, Kotak Institutional Equities estimates

### Potential impact of change in US administration

Given the change in US administration post the recently concluded US presidential elections, there is near-term uncertainty on the continuation of the current Inflation Reduction Act and other incentives to the solar sector.

Any measures to selectively reduce IRA benefits or restrict the ability of foreign firms to claim incentives could potentially impact Waaree's capacity expansion plans in the US.

Currently we see three scenarios which could potentially impact Waaree Energies:

#### 1) Reduction in IRA AMPC rebate and increase in solar import tariffs

- ▶ **Impact on industry (Negative):** A reduction in IRA, along with an increase in tariffs, can severely hit the US solar industry, as IRA reduction will negatively impact the financial viability of setting up domestic manufacturing while tariffs would make imports expensive. Together, this will lead to a surge in module prices, impacting the viability of solar power plants, and hit exporters with exposure to the US.
- ▶ **Impact on Waaree (Negative):** Waaree derived ~58% of FY2024 revenue from US exports. An increase in tariffs and a reduction in IRA will likely hit both Waaree's export revenue and US expansion plans.

#### 2) No change in IRA and increase of tariffs on solar imports

- ▶ **Impact on industry (Positive for domestic manufacturing):** This scenario will lead to quicker shift of domestic manufacturing to the US (demand supply parity by 2027 versus 2028), since the tariff increase will lead to a surge in US module prices, thus benefitting domestic module manufacturers while negatively impacting exporter's margin in the short term, reducing revenue visibility.
- ▶ **Impact on Waaree (Partially negative):** The company will benefit from 1.6 GW US manufacturing facility and would likely speed up its plan to expand US domestic manufacturing to reap IRA benefits, but its export business will see a sharp cut in profitability and revenue visibility.

#### 3) No change in IRA and no change in tariffs

- ▶ **Impact on industry (Neutral):** In the case of no policy change, domestic manufacturing will continue to grow aggressively due to the IRA, while manufacturers will continue to export to the US until demand-supply parity is achieved (expected by 2028).



- **Impact on Waaree (Neutral):** We expect the company to continue with its policy of expanding domestic manufacturing presence in the US to 5 GW till fiscal 2027 and continue to export until 2028.

**Reduction in IRA incentive and increase in US tariffs would significantly impact Waaree’s US expansion plans**

**Exhibit 18: Scenario analysis of Waaree Energies, March fiscal year-ends, 2025-30E (Rs mn)**

Waaree Energies scenarios analysis			
in Rs bn	Base case	Scenario 1	Scenario 2
IRA Act	No change in IRA	Reduction in IRA	No change in IRA
US tariffs	No change in tariffs	Increase in US tariffs	Increase in US tariffs
Revenue (FY2030)	334	282	331
EBITDA margin FY2030 (%)	18.8	17.7	18.1
RoCE (FY2030) (%)	20	16	18
<b>Fair Value</b>	<b>2,550</b>	<b>2,000</b>	<b>2,400</b>

Source: Kotak Institutional Equities estimates

# 4

## Metamorphizing from India’s largest module manufacturer to a leading integrated solar manufacturer

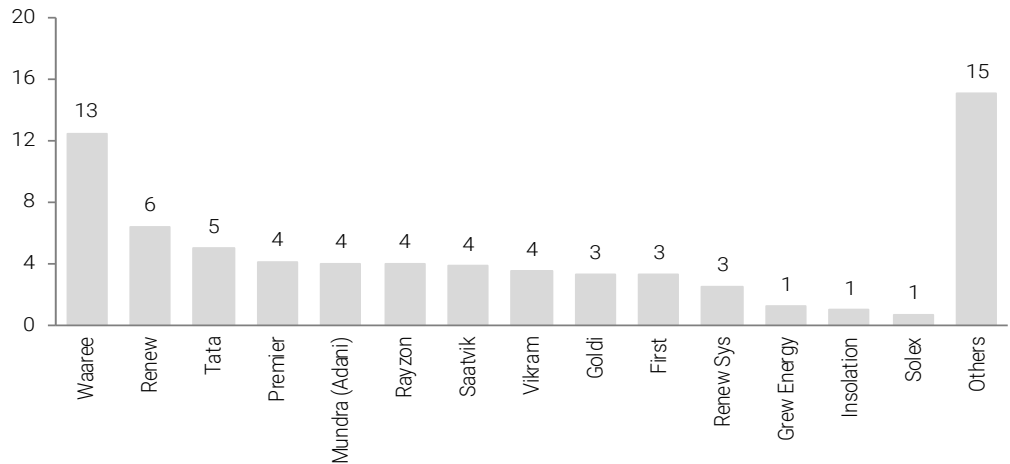
Waaree is the largest domestic solar module manufacturer, commanding an 18% capacity share (~2X the 2<sup>nd</sup> largest player). We expect continued dominance in module in the foreseeable future, based on announced capacity expansion plans. We also believe that the company is looking to capitalize on its dominant industry position by vertically integrate into solar ingots, wafers and cells. We expect backward integration to help Waaree expand from 13.8% in FY2024 to 18.8% in FY2030. However, large capacity announcements by peers could impact profitability and the utilization of module capacity in the medium term.

### Largest solar module manufacturing player in India with 13.3 GW capacity

Waaree Energies commenced operations in 2007 focusing on solar PV module manufacturing, and over the years it has adopted an aggressive expansion strategy to capitalize on the early-mover advantage with installed capacity surging from 2 GW in FY2021 to 13.3 GW in FY2025. Currently, Waaree is the largest domestic solar module manufacturer, commanding 18% share of total India capacity and more than double the 2<sup>nd</sup> largest player Renew Energy.

### Waaree is the largest module manufacturer commanding 18% capacity share, ~2X nearest peer

Exhibit 19: Domestic module manufacturing capacity by leading players, March fiscal year end, 2024 (GW)



Source: Company Filings

### Transitioning into an integrated solar manufacturer

Waaree is looking to capitalize on its dominant solar module capacity market share with plans to vertically integrate into solar ingots, wafers and cells. It has announced significant capacity expansion within critical focus on backward integration. Assuming no delays, we see Waaree reaching 19.3 GW module, 11.4 GW cell and 6 GW wafer domestic capacity by 2027. This expansion would take place in two steps: (1) 5.4 GW cell manufacturing capacity in Chikli, Gujarat; and (2) 6 GW integrated ingot to modules facility in Odisha. Based on announcements made by various companies, Waaree will be the largest module manufacturer at ~20 GW and second largest in cell with 11.4 GW versus 20 GW for Reliance.

**We expect Waaree to reach 19.3 GW, 11.4 GW, 6.0 GW domestic capacity in module, cell and ingot wafer resp. by 2027E**

**Exhibit 20: Forecasted Waaree capacity basis announcement, March fiscal year ends, 2024-27E (GW)**

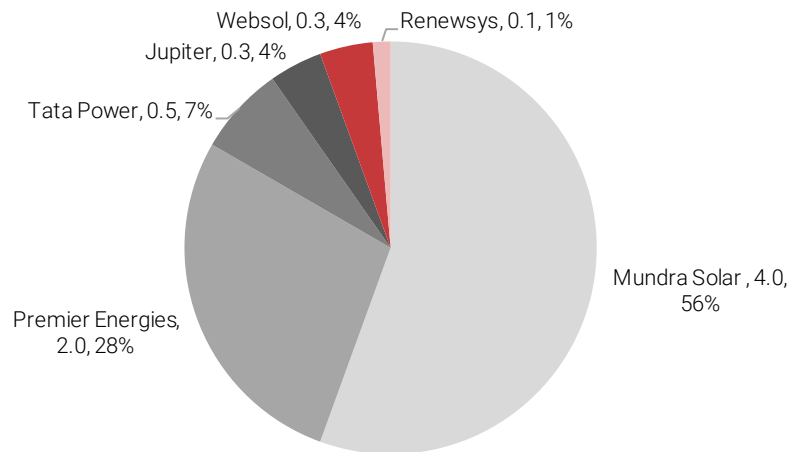


Source: Company filings

**Expansion into solar cell manufacturing by setting up 5.4 GW facility by FY2025**

Despite being a leader in solar module manufacturing, Waaree has historically lagged behind its peers in solar cell capability. As of FY2024, India had ~8 GW solar cell capacity dominated by Adani Group (4 GW), Premier Energies (2 GW) and Tata Power (0.5 GW). However, Waaree is rapidly expanding into solar cell manufacturing by setting up a 5.4 GW plant at their Chikli, Gujarat facility.

**Exhibit 21: India solar cell capacity, March fiscal year end, 2024 (GW)**



Source: Company filings, MNRE, Frost & Sullivan

**Development of 6 GW integrated facility, taking cell/ingot wafer capacities to 11.4 GW/6 GW**

Waaree has proposed to set up a full integrated 6 GW facility in Dhenkanal, Odisha. This facility will have end-to-end manufacturing capability starting from ingots, wafers, cells to solar modules. The aim of the project is to increase backward integration, improve profitability and de-risk supply chain. We expect the project to receive PLI incentives worth Rs19,230 mn, provided the project is operational on-time.

► **Estimated project cost**

As per company estimates, the total cost of the 6 GW facility stands at Rs90.5 bn, with Rs1.5 bn already deployed for land acquisition by Aug 2024. Additionally, the company has given a guarantee of Rs540 mn to SECI in order to secure PLI incentives for setting up and manufacturing integrated modules from the facility.

**Exhibit 22: Detailed break-down of estimated project cost (Rs mn)**

	Total estimated cost	Amount Deployed as of Aug 24	Balance
Land	1,386	1,386	
Consultancy	869	81	788
Civil works	10,856		10,856
Purchase of machinery including	44,228		44,228
Utilities	29,319		29,319
IT Infrastructure	930		930
Freight	1,286		1,286
Miscellaneous	875		875
Contingencies	751		751
<b>Total Project Cost</b>	<b>90,500</b>	<b>1,467</b>	<b>89,033</b>

Note:

(a) Estimated cost as per the project report dated October 7, 2024

Source: Company filings

► **Implementation schedule**

Waaree is aiming to commence production by fiscal 2027, starting with commissioning of solar module plant by July 2025, followed by solar cells by April 2026 and finally ingot wafer facility by October 2026.

**Exhibit 23: Project implementation schedule**

	Estimated schedule of commencement	Estimated schedule of completion
Acquisition of land (by way of lease)	Dec-23	Jun-24
Engineering consultancy	Aug-24	Oct-26
Building construction & civil work	Dec-24	Dec-25
Plant & machineries	Feb-25	Oct-26
Utilities	Dec-24	Sep-25
Production - Solar Ingot and Wafer Plant		Oct-26
Production - Solar Cell Plant		Apr-26
Production - Solar Module Plant		Jul-25

Source: Company filings

► **Project financing**

The company will fund Rs34 bn (~38% of the project cost) through net proceeds of IPO and internal accruals, rest Rs55 bn will be funded through debt that has been secured from SBI.

The company’s wholly owned subsidiary Sangam Solar One, in which the project will be housed, has entered into borrowing arrangement with SBI to avail a loan of Rs55,180 mn. The loan has been divided into three term loans, one each for ingot wafers, cells and modules. The tenor for each range between 61 and 100 months and is repayable in equal quarterly instalments after a moratorium period post the date of scheduled commercial operations, ranging between 12 and 20 equal quarterly instalments.

**Exhibit 24: Project financing (Rs mn)**

	Amount
From the Net Proceeds	27,750
From existing identifiable internal accruals	6,103
From Project Loan	55,180
<b>Total</b>	<b>89,033</b>

Source: Company filings

**Waaree will remain relatively immune to overcapacity in domestic module market**

Since FY2017, India’s solar module manufacturing capacity witnessed a phenomenal increase from 4.2 GW to 39.5 GW by FY2023 at a CAGR of 45%. The capacity has further expanded to 70 GW in FY2024 and ALMM approved capacity as of October 2024 is ~60 GW. Taking into account all announcements made by various companies on capacity expansion plans, India can potentially reach up to 162 GW of nameplate solar module capacity by end-FY2027 (32% CAGR FY2024-27E).

With India demand expected to be closer to 40 GWdc in the best-case scenario, this implies only ~35% utilization at an aggregate industry basis (including ~15 GW of module exports), which could potentially make operations less viable for some of the smaller players in the module manufacturing industry. However, we believe that Waaree will be relatively immune and have high-capacity utilization on account of (1) the implementation of ALMM list II from June 1, 2026, (2) backward integration into cells, wafers and ingots; and (3) low cost of production, driven by economics of scale.

**Solar module capacity worth ~92 GW to be added over next three years based on announcements (however, given the potential overcapacity, commissioned capacity is likely be significantly lower)**

**Exhibit 25: Announced module capacity expansion by various Indian companies, March fiscal year-ends, 2024-27E (GW)**

Solar Module capacity (in GW)				
Company Name	2024	2025E	2026E	2027E
Reliance Industries		10	20	20
Waaree Energies	13	13	20	20
Vikram Solar	4	5	11	15
Renew Power	6	6	6	12
Premier Energies	4	4	8	10
Mundra Solar (Adani Enterprises)	4	6	8	10
Saatvik Green Energy Pvt. Ltd	4	6	6	8
Renew Sys India	3	5	5	7
Grew Energy Private Limited	1	3	3	6
Goldi Solar	3	6	6	6
Shirdi Sai	0	1	3	5
Tata Power Solar	5	5	5	5
Insolation Energy	1	1	2	4
Solex energy	1	2	3	4
Rayzon Solar	4	4	4	4
First Solar	3	3	4	4
Others	15	19	23	23
<b>Total India Capacity</b>	<b>70</b>	<b>97</b>	<b>135</b>	<b>162</b>

Source: Company announcements

**Impact of implementation of ALMM list II**

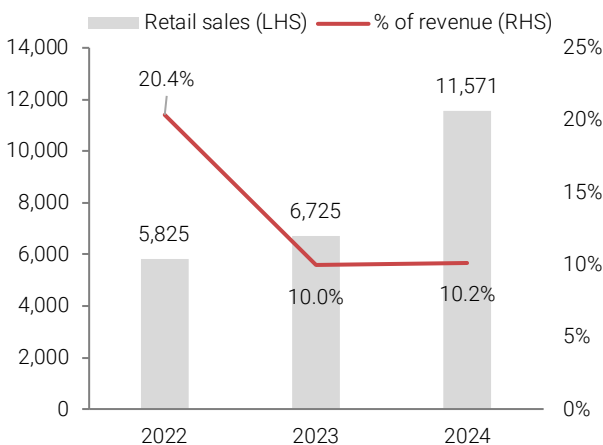
The Ministry of New and Renewable Energy (MNRE) has issued the amendment ([link](#)) for the implementation of ALMM (approved list of models and manufacturers) for solar PV cells, which shall be effective from June 1, 2026. The ALMM framework, which acts as a non-tariff barrier to aid domestic manufacturing, was introduced in 2019 (kept in abeyance until March 31, 2024), and was focused on regulating the quality of solar modules. The ALMM list I specifies the list of approved models and manufacturers of solar modules (module capacity under ALMM now stands at ~60 GW as of October 2024). While ALMM had a provision for list for solar cells (list II), it was kept in abeyance due to low solar cell capacity. Once the list II becomes effective from June 1, 2026, all solar projects under the ALMM’s purview and that are mandated to use solar modules listed ALMM list I, must use cells listed in ALMM list II.

Currently, Indian solar cells are primarily used in schemes where DCR (domestic content requirement) policy is mandated (PM Suryaghar Yojana-Rooftop solar program, PM KUSUM scheme- Solar pumps, and CPSU Scheme), which potentially accounts for 20-30% of the overall market. However, after the implementation of the ALMM policy for solar cells, domestic cells would have to be used in 90-95% of projects. This would greatly benefit solar cell manufacturers, and especially Waaree considering that the company will be the second-largest cell manufacturer, with a capacity of 11.4 GW by FY2027.

**Growth in rooftop solar an additional growth lever given Waaree’s deep focus on India retail segment**

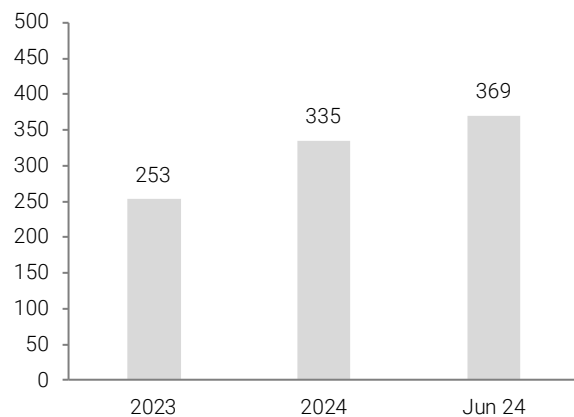
Waaree is one of the largest players in the retail segment operating through a pan-India network of 350+ franchisees focused on the rooftop and MSME business verticals. Waaree grants its franchisee exclusive right to open, maintain and operate a store offering products and services under its trademarks. Typically, the agreements are for a term of three years with an option for renewal, with a 2 year non-compete. The franchise strategy has worked very well, with the retail business growing from Rs5.8 bn in FY2022 to Rs11.6 bn in FY2024.

**Exhibit 26: Retail segment revenue, March fiscal year-ends, 2022-24 (Rs mn)**



Source: India RE, company reports, Crisil

**Exhibit 27: Franchise network, March fiscal year-ends, 2023-25 (#)**



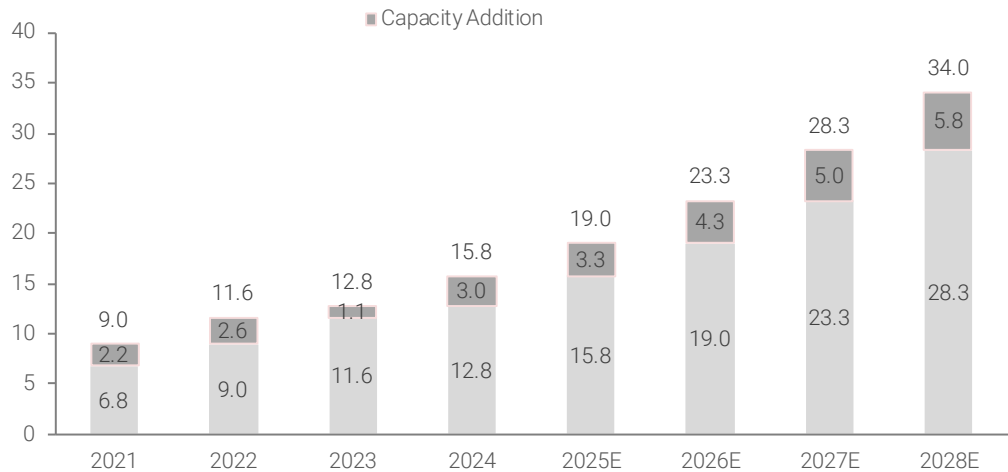
Source: Company

**Rising adoption of rooftop solar**

The government aims to expand India’s rooftop capacity to 40 GW. To hasten rooftop adoption, the Grid Connected Solar Rooftop Program was approved, offering financial assistance for residential rooftop solar installations, at Rs18,000/KW for the first 3KW capacity and Rs 9,000/KW for those with a capacity beyond 3 KW and up to 10 KW. We expect rooftop capacity to reach 34 GW by 2028, growing at 3-6 GW annually during FY2025-28.

**India rooftop capacity to hit 34GW by FY2028, with annual capacity addition reaching ~6 GW**

**Exhibit 28: India rooftop capacity addition, March fiscal year-ends, 2021-28E (GW)**



Source: India RE, company reports, Crisil

**Other business verticals: EPC to be key near-term driver with hydrogen electrolyser and BESS potential future growth areas**

Waaree Energies, via its subsidiary Waaree Renewable Technology (WRTL), is one of the leading solar EPC players in the Indian market. WRTL has registered a robust ~130% growth over the last two years (FY2022-24). We expect WRTL to continue to see robust growth in the medium term (~29% revenue CAGR FY2024-30E). However, we forecast margins to normalize at ~12%, in line with the industry average. Beyond EPC, Waaree is one of the winners of the hydrogen electrolyser PLI scheme, with plans to enter into BESS manufacturing.

**EPC and O&M Business**

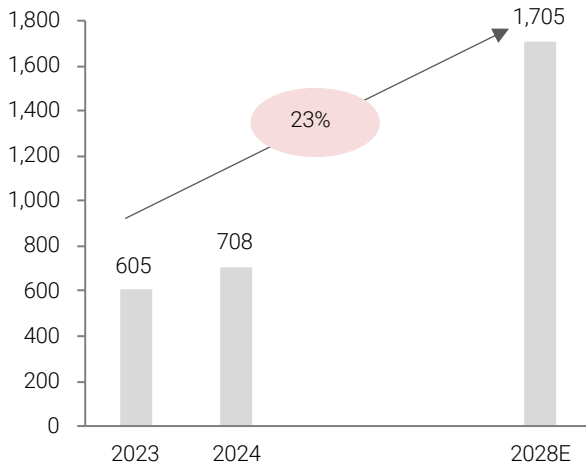
Waaree Energies' 74.46% subsidiary Waaree Renewable Technology (WRTL) is one of the fastest growing solar EPC contractors in the country. Solutions include setting up of ground mount, rooftop and floating solar projects across the country in association with other Indian and international partners. WRTL has more than 10 years of experience as an EPC contractor, with a track record of executing 1.8 GW+ of projects, including over 180 rooftop projects commissioned so far, ~1.7 GW of projects are under execution, as of September 30, 2024.

**▶ Indian solar EPC and O&M market to witness 23% CAGR in the next few years**

Fueled by the government's push toward the adoption of solar energy and supportive policies, we expect Indian solar EPC services to witness robust growth of ~23% over FY2023-28E, reaching Rs1.7 tn from Rs708 bn in FY2024. Similarly, O&M market for third party is estimated to grow from 16.8 GW to 73.0 GW over FY2023-30E, translating to ~23% growth over the period.

**Robust growth: CAGR of ~23% over FY2023-28E**

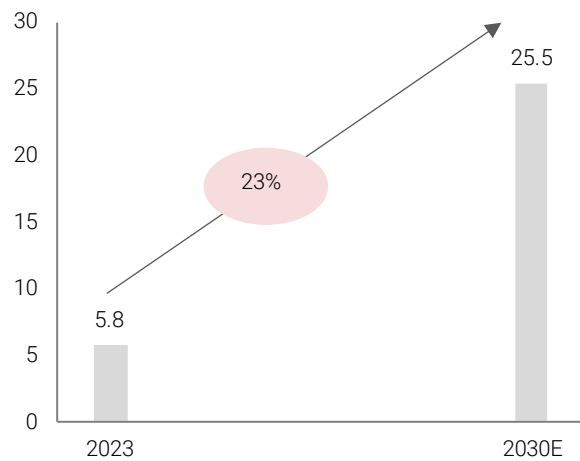
Exhibit 29: India solar EPC market size, March fiscal year-ends, 2023-28E (Rs bn)



Source: Company, Crisil

**O&M in India has strong market potential**

Exhibit 30: India O&M market size, March fiscal year-ends, 2023-30E (Rs bn)



Source: Company, Crisil

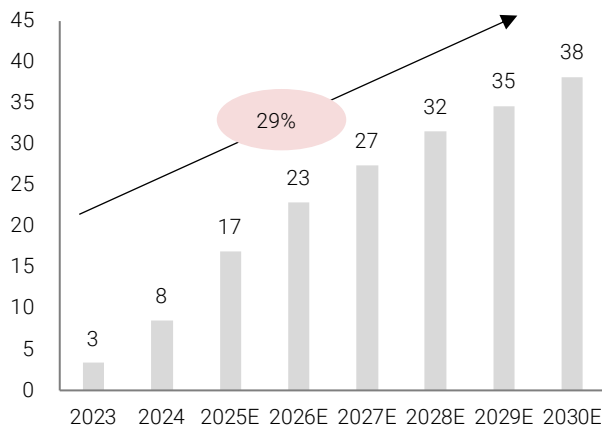
**► Waaree set to outpace industry growth**

WRTL’s primary business is solar EPC, which has gone from strength to strength in the last two years, registering ~130% CAGR over FY2022-24. We expect the company to continue growing at a brisk pace in the medium term on account of (1) strong industry growth of 23%, (2) robust order book, (3) cross-selling, (4) end-to-end capabilities and (5) deep relationships with IPPs. The O&M portfolio, which stands at 587 MW, is also expected to grow meaningfully, adding another leg to growth.

We bake in 29% growth over FY2024-30E, reaching Rs38 bn. EBITDA margins are expected to normalize at 12% from 21% registered in FY2024.

**We expect WRTL’s revenue to reach Rs38 bn, growing at 29% CAGR over FY2024-30E**

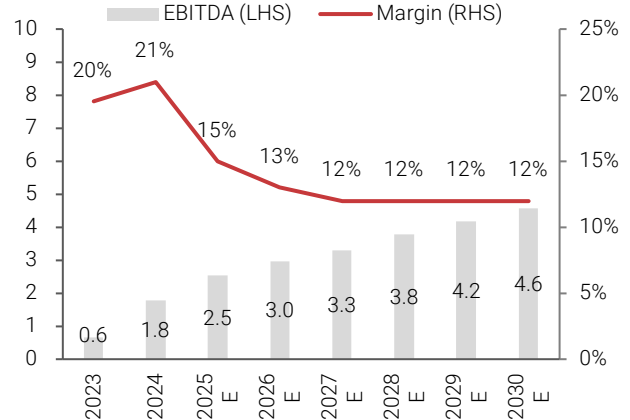
Exhibit 31: Revenue projection for WRTL, March fiscal year-ends, 2023-30E (Rs bn)



Source: Company filings, Kotak Institutional Equities estimates

**WRTL EBITDA to lag revenue growth on account of normalization of margins from 21% to 12% over FY2024-30E**

Exhibit 32: EBITDA projection for WRTL, March fiscal year-ends, 2023-30E (Rs bn)



Source: Company filings, Kotak Institutional Equities estimates



### **Green hydrogen electrolyzers**

Waaree is looking to further expand its presence across the green energy space by venturing into the manufacturing of green hydrogen electrolyzers. As of date, it is in discussions with various foreign electrolyser manufacturers for a technology tie-up for local manufacturing and expect the finalization of the arrangement by end-FY2025. Having won the PLI tender for setting up electrolyser manufacturing capacity of up to 300 MW, the aim is to commence production by FY2026. If Waaree is able to successfully set up the electrolyser plant, we believe that this can be a significant growth driver in the next decade as the industry expands.

# 5

## Deep-dive into key drivers of Waaree’s profitability

Waaree has consistently delivered superior margins relative to peers, driven by (1) significant contribution from exports and (2) economics of scale. We expect the outperformance to continue, led by (1) backward integration, (2) higher capacity utilization, (3) scale benefits, (4) exports, and (5) US manufacturing business. Margins are likely to peak out in 2027, led by (1) increased competitive intensity (2) drop in US exports (3) lower realization in the domestic market.

### Superior margin profile relative to India solar module-only manufacturers

Waaree has seen a marked improvement in profitability, with EBITDA margins surging from 4% in FY2022 to 15% in 1HFY2025, similar to the peer median of 3% and 14% in FY2022 and 1HFY2025, respectively. The company has generated superior margins relative to module only peers to the tune of 1-5% in the past three years; this can be attributed to (1) exports, which offer better realizations and profitability; and (2) lower cost of manufacturing, driven by economics of scale.

### Waaree consistently outperformed module only mfg. in profitability led by exports and economics of scale

Exhibit 33: EBITDA margin of module only India solar manufacturers, March fiscal year-ends, 2022-25E

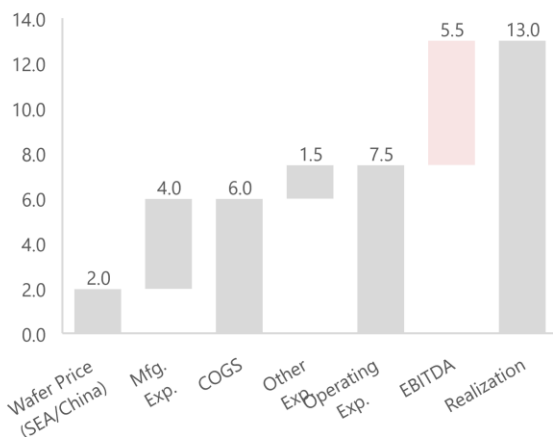
	2022	2023	2024	1HFY2025
Waaree Energies	4%	12%	14%	15%
Vikram Solar	3%	9%	16%	—
Insolation Energy	6%	7%	11%	13%
Solex Energy	3%	7%	8%	9%
Alpex Solar	2%	6%	9%	14%
<b>Median</b>	<b>3%</b>	<b>7%</b>	<b>11%</b>	<b>13%</b>

Source: Company filings

Players with cell and module manufacturing capacities such as Mundra Solar (Adani), Premier and Websol have outperformed Waaree in 1HFY25, on account of attractive unit economics of domestic cells due to DCR implementation. We estimate cell manufacturers to continue benefitting from elevated pricing until normalization in FY2028. Since Waaree’s 5.4 GW cell capacity will come on stream by end-FY2025, margins are expected to expand, peaking in FY2027.

### Supernormal profitability at US\$5.5 cents/wp (42% margin)

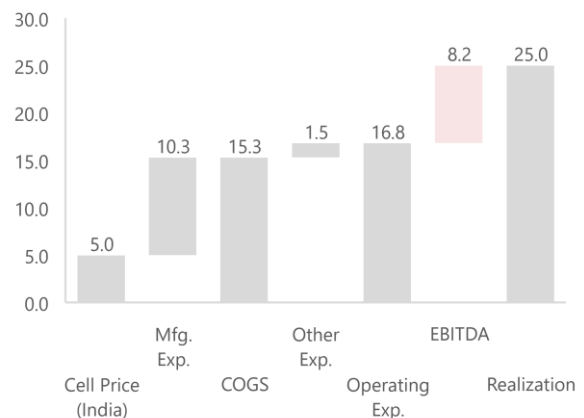
Exhibit 34: Unit economics domestic cell; Dec 24 (US\$/wp)



Source: OPIS, Bloomberg, Company, Kotak Institutional Equity estimates

### ~5X profitability w.r.t standard module (8.2 versus 1.7 cents/wp)

Exhibit 35: Unit economics DCR module; Dec 24 (US\$/wp)



Source: OPIS, Bloomberg, Company, Kotak Institutional Equity estimates

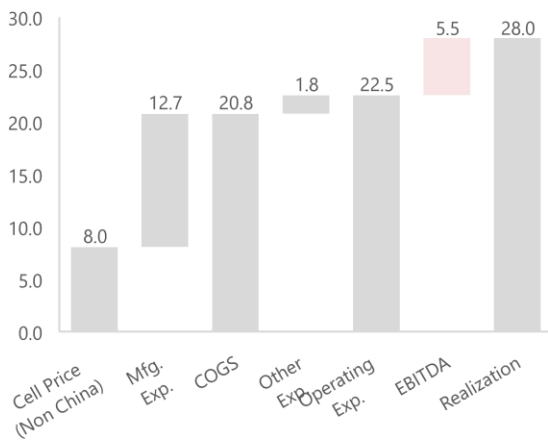
**Unit economics: US exports versus domestic sales**

Import tariffs on Chinese imports in addition to anti-dumping (AD) and countervailing duties (CVD) on solar modules from SEA have led to higher solar module prices in the US. With the government’s focus on onshoring of solar supply chain, we believe US module prices will remain elevated, driven by higher cost of manufacturing for US domestic manufacturers.

At current module prices of US\$28 cents/wp, export offers superior realization and profitability (US\$5.5 cents/wp), translating into ~20% EBITDA margin relative to India domestic sales (US\$1.7 cents/wp, ~10% EBITDA margin). We expect Waaree to maximize US exports, benefiting from higher realization and profitability until the complete erosion of US module demand-supply mismatch, which we estimate will occur in FY2028.

**Exports to deliver EBITDA at US\$5.5 cents/wp (~20% margin)**

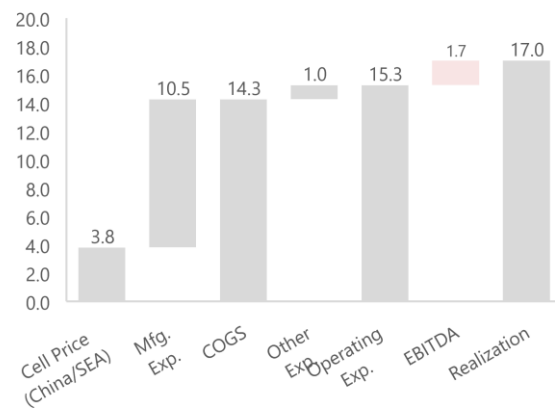
Exhibit 36: Unit economics US module export; Dec 24 (US\$ cents/wp)



Source: OPIS, Bloomberg, Kotak Institutional Equity estimates

**India market offers lower realization and profitability w.r.t exports**

Exhibit 37: Unit economics India module sales; Dec 24 (US\$ cents/wp)



Source: OPIS, Bloomberg, Kotak Institutional Equity estimates

**Backward integration to be a key lever in long-term margin sustainability**

Backward integration is a key element of the company’s six-pronged business strategy. We believe that the company’s foray into cell, ingot and wafer manufacturing will further enhance its operations, and aid profitability by integrating each stage of the production process to achieve significant cost savings, in addition to benefitting from govt policies such as implementation of ALMM list II.

By increasing backward integration measures, Waaree will have a greater control over quality and availability of materials, which in turn will reduce dependence on Chinese/ASEAN suppliers. This also shields the company from any potential price increase by the suppliers while enhancing the ability to negotiate more favorable pricing from customers. Furthermore, vertical integration will reduce lead time in production.

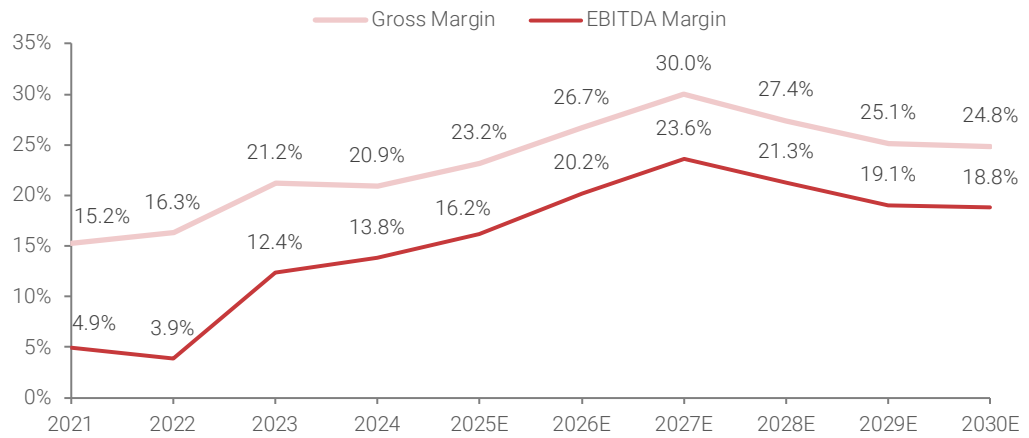
All aforementioned factors will significantly reduce Waaree’s cost of production relative to peers, which will allow them to generate superior operating margins and improve market share by ensuring higher capacity utilization despite potential overcapacity of module and cell in India, which we estimate will happen by FY2028.

**Profitability to peak in FY2027, margins erode post amid rising competitive intensity**

We estimate a ~500 bps improvement in EBITDA margins, rising from 13.8% to 18.8% over FY2024-30E. After 2027, we anticipate a gradual reduction, with EBITDA margins settling at 18.8% in FY2030E, driven by (1) higher competitive intensity, (2) reduction in US exports and (3) lower realization in the domestic market.

**Gross and EBITDA margins to peak at 30.0% and 23.6% in FY2027**

**Exhibit 38: Gross & EBITDA Margin of Waaree Energies, March fiscal year-ends, 2021-30E (%)**



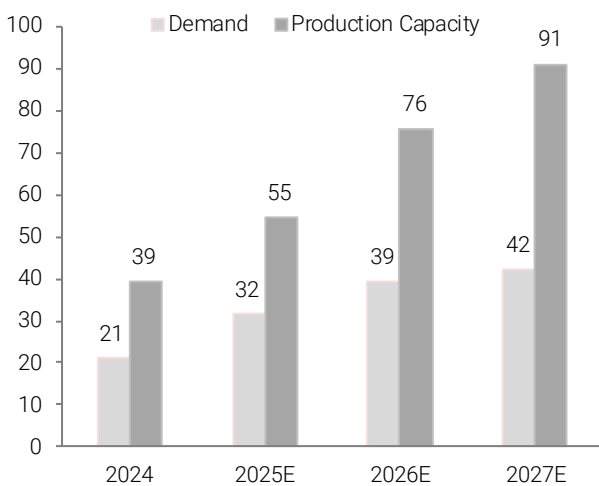
Source: Company Filings, Kotak Institutional Estimates

**Higher competitive intensity**

India’s solar manufacturing sector has seen a surge of investments by a multitude of players in the last five years. This has been driven by rising domestic solar demand, attractive export economics and favorable government policies such as the imposition of trade (BCD) and non-trade barriers (ALMM, DCR, PLI). With the announcement of about 90 GW capacity addition in modules in the next three years, we expect module heading into an oversupply zone, potentially making the business unviable for smaller/non-integrated players. Despite cells being the most complex and capex heavy element of solar value chain, with 84 GW of announced capacity addition, we believe it too will be in oversupply by FY2027/28. Assuming only 80% and 70% of the announced module and cell capacity will come on stream and industry standard of 70% utilization of module and 80% of cell, domestic demand will only constitute about 45% and 80% production capacity utilization for module and cell, respectively.

**Module demand to account for only ~45% of production capacity**

**Exhibit 39: Demand versus production capacity of Indian modules, March fiscal year-ends, 2024-27E (GW)**



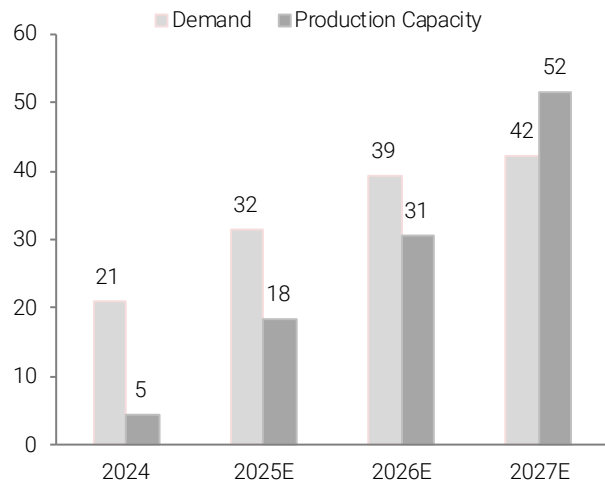
Note:

(a) Production capacity = ~60% of nameplate capacity

Source: Company, Kotak Institutional Equity estimates

**Cells to head into oversupply zone in FY2027/28**

**Exhibit 40: Demand versus production capacity of Indian cells, March fiscal year-ends, 2024-27E (GW)**



Note:

(a) Production capacity = ~60% of nameplate capacity

Source: Company, Kotak Institutional Equity estimates

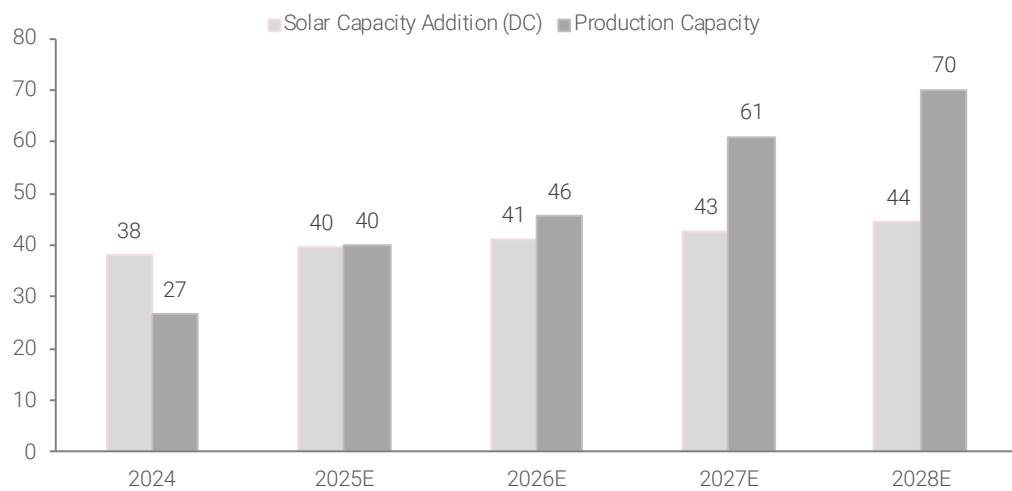
**Drop in US exports**

Exports have been an integral part of Waaree’s business strategy, constituting ~57% of FY2024 revenue. About 99% of Waaree’s exports have been to the US. This can be attributed to strong module demand, driven by tariffs on Chinese and ASEAN manufacturers, solar capacity addition and high cost of domestic manufacturing, which have led to elevated module prices in the US, enabling Indian module exporters such as Waaree to make supernormal profits.

We expect US exports to continue generating a significant part of the revenue until FY2028E, after which US export contribution will likely be insignificant, on account of the oversupply of domestic modules in the US market, which might potentially lead to tariff hikes, making imports unviable.

**US domestic production to outstrip demand by CY2026; we estimate export restriction by CY2027**

**Exhibit 41: Demand vs production capacity of US modules, December fiscal year-end, 2024-27E (GW)**



Note:

(a) Production capacity = 70% of nameplate capacity

Source: Reuters, SEIA, Kotak Institutional Equity estimates

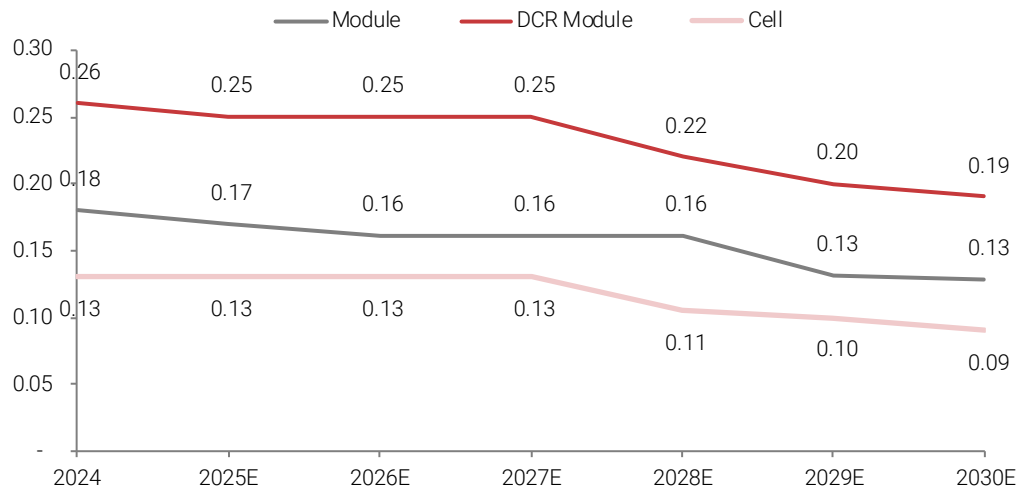
**Reduction in domestic modules and cell prices**

We bake in a gradual reduction of module and cell prices over FY2025-30E on account of (1) oversupply of modules and (2) cell supply catching up with demand by FY2028.

- ▶ **Module:** Although the ALMM list II will be effective from June 1, 2026, we believe that cell supply will not be able to meet domestic demand by then. We expect cell supply catching up with demand in later part of FY2027 or early FY2028. Taking this into account, we forecast a gradual reduction in module prices from US\$18 cents/wp in FY2024 to US\$16 cents/wp in FY2028, post which there will likely be a sharp drop in module prices reaching US\$13 cents/wp by FY2030, significantly impacting module only players.
- ▶ **DCR module:** DCR modules currently constitute 20-30% of total domestic demand. After the implementation of ALMM list II close to 90% of all projects will be required to use DCR modules, creating strong demand environment, in turn, ensuring high price realization for DCR modules. Hence, we expect the existing elevated price of US\$25 cents/wp to sustain until FY2027, after which there will potentially be a sharp correction as cell supply catches up with domestic demand. We forecast DCR module prices to drop from US\$25 cents/wp to US\$19 cents/wp on account of (1) the erosion of cell supply-demand mismatch (2) heightened competitive intensity and (3) lower cost of manufacturing.
- ▶ **Cell:** Similar to DCR modules, cells will see a surge in demand post implementation of ALMM list II on June 1, 2026, we expect cell supply to catch up with domestic demand only in the later part of FY2027 or early FY2028. This will ensure elevated prices of US\$13 cents/wp until FY2027, after which we forecast a sharp decline, with prices reaching US\$9 cents/wp by FY2030.

**We estimate 28%/27%/31% drop in module/DCR module/cell prices over FY2024-30E**

**Exhibit 42: India mfg. module, DCR module, cell pricing, March fiscal year-ends, 2024-30E (US\$ cents/wp)**



Source: Company filings, Kotak Institutional Equity estimates

## 6

## Key Risks: Significant exposure to solar PV modules and vulnerability to India and US solar policy

The key risks to Waaree's long-term growth story, in our view, are: (1) change in India solar policy, (2) change in US import policy, (3) reduction in IRA AMPC rebate for foreign entities, (4) delay in getting cell capacity on stream, (5) slower-than-expected growth in India and US renewable capacity addition and (6) risk from heightened competitive intensity

### Change in India solar policy

Waaree derived 43% revenue in FY2024 from domestic solar market, with contribution expected to increase in the medium term, reaching ~60% by FY2027 as per KIE estimates. This makes Indian solar policy very critical for long-term growth of the business.

Current government policies such as 1) basic custom duty of 25% on solar cells and 40% on modules, 2) ALMM (approved list of models and manufacturers) and 3) DCR (domestic content requirement) have created a favorable demand environment for module manufacturers; hence, any rollback of these policies can significantly impact both revenue visibility and margin profile of the business.

### Change in US import policy

Waaree generated 57% revenue in FY2024 from US exports, enabled by higher US domestic prices of US\$28 cents/wp: ~3X of global and ~1.5X of India module prices due to five import tariffs and anti-dumping/countervailing duties on China, Cambodia, Malaysia, Thailand and Vietnam. Any unfavorable change in import policy such as a reduction in import tariff on China or higher duty on India import, etc. can severely impact US exports' revenue visibility and profitability.

### Reduction in IRA AMPC rebate on foreign entities

The company is setting up a 1.6 GW PV module facility in Houston, Texas. The facility has potential to expand to 5 GW by FY2027. A reduction in IRA rebate from US\$7 cents/wp will impact both profitability as well as future expansion plans. As per KIE estimates, without the IRA rebate, Waaree's US facility's operating margin will reduce from US\$12.5 cents/wp (44% margin) to US\$5.5 cents/wp (20% margin).

### Delay in getting cell capacity on stream

India's current module capacity stands at 70+ GW versus solar capacity addition of 15 GW (FY2024). This has led to module manufacturers operating at low utilizations, leading to weaker profitability (10% EBITDA margin). On the other hand, India's cell capacity stands at ~8 GW as of FY2024, significantly lower than the domestic demand. This has allowed cell manufacturers to generate supernormal margins to the tune of 40%+, as per KIE estimates. With the ALMM list II or ALCM expected to be effective from June 1, 2026, it is imperative for Waaree to avoid delays in getting cell capacity on stream to avoid the impact on near-term profitability.

### Slower-than-expected growth in Indian and US renewable capacity addition

Waaree generated ~100% of revenue from India and the US, making these markets very critical. The company's future expansion plans take into account India and US witnessing strong solar capacity addition in the next decade. Any reduction in capacity addition in either of the markets will have a detrimental impact on the expansion plans, hindering future growth and margin.

### Risk from heightened competitive intensity

EBITDA margins for Waaree Energies have seen a sharp upturn in the last couple of years, rising from 3.9% in FY2022 to 15.4% in 1HFY25. We estimate EBITDA margins to expand to 23.6% by FY2027 on account of higher margin on cells, benefit from backward integration into ingot wafer and superior margins on the US business.

These assumptions can be a major risk to earnings prediction. If supply dynamics deteriorate, i.e., new competition emerges in cells, ingots and wafers, then margins would likely come under pressure. Margins can also be negatively impacted by non-availability and pricing of polysilicon/wafer that Waaree imports from China/North Asia.

## 7

**Financial Outlook: We expect 35% PAT CAGR over FY2024-30E**

We forecast Waaree's growth to be driven by three key factors: (1) India capacity expansion and backward integration, (2) expansion into US module manufacturing and (3) higher capacity utilization. We estimate a marked increase in margins on account of reduced cost of operations, led by backward integration and operating leverage. Operating cash flows and internal accruals will be sufficient to fund incremental capex required for growth.

**Domestic and international expansion, backward integration, higher utilization to be key revenue drivers****We expect revenues to increase at 20% CAGR in FY2024-30E**

We bake in revenue CAGR of 20% over FY2024-30E, based on (1) **India expansion**: We expect doubling of module capacity to 23 GW by FY2030E with greater emphasis on backward integration; (2) **US expansion**: the company is in the final stages of setting up 1.6 GW PV module facility; we estimate a brownfield expansion of the facility to 5 GW by FY2027E; and (3) **capacity utilization**: from 43% for module to 65%/80% of effective capacity for modules and cells, respectively, by FY2030E.

- **India expansion**: Waaree has continued to build on its leading position in India PV module, with the commissioning of 1.3GW module capacity and plans to commission 5.4 GW cell facility in FY2025. The company's 6 GW fully integrated facility in Odisha is expected to come on stream by FY2027, this will take its India capacity to 19.3 GW module, 11.4 GW cell and 6 GW ingot wafer. We expect Waaree to reduce the pace of module capacity addition, with a greater emphasis on backward integration post commencement of Odisha facility and build in module, cell, ingot wafer capacity reaching 23 GW, 20 GW and 10 GW, respectively, by FY2030. With the ALMM list II being implemented from June 1, 2026, we expect significant benefit for cell manufacturers and reduced market for module only players. We have baked in a rise in DCR contribution within domestic business from 0% in fiscal 2025 to 100% in fiscal 2030.

**DCR modules' contribution to reach ~100% of Waaree's India module business by FY2030E**

Exhibit 43: India solar segmental revenue breakup of Waaree Energies, March fiscal year-ends, 2022-30E (Rs mn)

	Manufacturing	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Revenue Contribution - India Solar Business</b>										
Non DCR Module (Chinese Cell)	India	19,311	13,189	34,513	120,897	93,980	67,409	47,100	14,049	–
% of domestic solar revenue		100	100	100	100	60	34	24	7	–
DCR Module (Indian Cell)	India	–	–	–	–	62,894	129,055	151,740	181,298	228,264
% of domestic solar revenue		–	–	–	–	40	66	76	93	100

Source: Company, Kotak Institutional Equities estimates

- **US expansion**: Waaree is expanding its geographical footprint by establishing a 1.6 GW PV module facility in Houston, Texas. We believe that this facility will be further expanded to 3 GW and 5 GW by FY2026 and FY2027, respectively, subject to no material change in IRA AMPC policy.
- **Capacity Utilization**: We expect Waaree's utilization on effective capacity to reach 65%/80% for PV modules and cells, respectively. This will be on account of (1) the rise in India's solar capacity addition from 15 GW in FY2024 to 42 GW in FY2030, as well as in the US from 24 GW in FY2024 to 40 GW by CY2030; (2) higher backward integration resulting in lower cost of production; and (3) strong presence in rooftop and solar EPC.

This results in a 20% CAGR over FY2024-30E for the solar business. Domestic revenue is expected to grow seven-fold from Rs34 bn in FY2024 to Rs228 bn in FY2030. Exports are likely to see a sharp drop on account of erosion of demand supply mismatch in the US by FY2028. We estimate US manufacturing business to reach Rs59 bn in FY2030, driven by higher capacity and utilization.



**We expect revenue to increase at 19.6% CAGR over FY2024-30E, driven by capacity expansion across India and US, backward integration and higher utilization**

Exhibit 44: Segmental revenue breakdown of Waaree Energies, March fiscal year-ends, 2021-30E (Rs mn)

	Manufacturing	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E	CAGR 2024-30E (%)
<b>Installed Capacity (GW)</b>												
Module	India	2.0	4.0	9.0	12.0	13.3	16.3	19.3	20.3	21.3	23.0	
Module	US	–	–	–	–	1.6	3.0	5.0	5.0	5.0	5.0	
Cell	India	–	–	–	–	5.4	5.4	11.4	11.4	16.0	20.0	
Ingot Wafer	India	–	–	–	–	–	–	6.0	6.0	10.0	10.0	
<b>Capacity Utilization (%)</b>												
Module	India	40.5	24.0	29.2	39.8	52.7	49.0	49.8	52.7	52.7	60.7	
Module	US	–	–	–	–	4.5	48.3	50.4	63.0	63.0	63.0	
Cell	India	–	–	–	–	–	54.0	51.7	68.1	62.8	65.6	
Ingot Wafer	India	–	–	–	–	–	–	63.0	63.0	50.4	63.0	
<b>Actual Production (GW)</b>												
Module	India	0.8	1.0	2.6	4.8	7.0	8.0	9.6	10.7	11.2	14.0	
Module	US	–	–	–	–	0.1	1.4	2.5	3.2	3.2	3.2	
Cell	India	–	–	–	–	–	2.9	5.9	7.8	10.0	13.1	
Ingot Wafer	India	–	–	–	–	–	–	3.8	3.8	5.0	6.3	
<b>Realization (US\$ /wp)</b>												
Module (Domestic)	India					0.17	0.16	0.16	0.16	0.13	0.13	
Module (Export)	India					0.28	0.25	0.24	0.23	0.21	0.20	
Module	US					0.28	0.25	0.24	0.23	0.21	0.20	
Cell	India					0.13	0.13	0.13	0.11	0.10	0.09	
<b>Revenue (Rs mn)</b>												
Module (India)	India	13,223	19,311	13,189	34,513	120,897	93,980	67,409	47,100	14,049		
Module (Export)	India	4,809	6,578	46,165	65,691							
Module	US	–	–	–	–	1,714	31,253	52,410	63,171	60,912	58,735	
DCR (Module + Cell)	India	–	–	–	–	–	62,894	129,055	151,740	181,298	228,264	
IPP, EPC and Other Business		1,498	2,654	8,154	13,772	22,766	29,256	34,446	39,242	42,777	46,646	
<b>Total Revenue (Rs mn)</b>		<b>19,530</b>	<b>28,543</b>	<b>67,509</b>	<b>113,976</b>	<b>145,376</b>	<b>217,383</b>	<b>283,321</b>	<b>301,253</b>	<b>299,036</b>	<b>333,645</b>	<b>19.6</b>

Source: Company, Kotak Institutional Equities estimates

**DCR, backward integration, US manufacturing and operating leverage to be key margin drivers**

**We build in 500 bps improvement in EBITDA margin by FY2030E, with peak in FY2027E**

We bake in margin improvement of 500 bps over FY2024-30E, based on (1) higher contribution from DCR: modules with domestic solar cells generate superior realization and margins; (2) backward integration: investment into ingot, wafer and potentially aluminum frame to support margins; and (3) expansion into US domestic module manufacturing.

- ▶ **Higher contribution from DCR:** Waaree’s cell manufacturing capacity is estimated to increase from 5.4 GW in FY2025 to 20 GW in FY2030. The sharp rise in cell capability will be on account of (1) ALMM list II effective from June 1, 2026, (2) supply-demand mismatch (~8 GW nameplate capacity versus 15 GW India solar capacity addition in FY2024) and (3) higher realization for DCR modules (US\$25 cents/wp versus US\$17 cents/wp for standard module).

**DCR modules to grow at 38% over FY2026-30E, generating 34% EBITDA margin in 2026E, eventually tapering to 19% by 2030E due to higher competitive intensity and potential overcapacity**

Exhibit 45: DCR module segmental financials of Waaree Energies, March fiscal year-ends, 2025-30E (Rs mn)

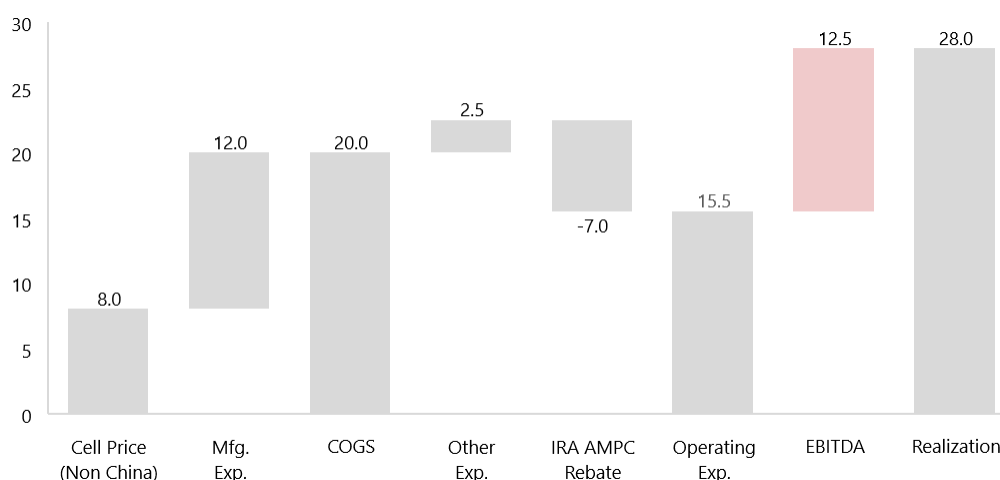
	Unit	2025E	2026E	2027E	2028E	2029E	2030E
Net sales	INR mn	–	62,894	129,055	151,740	181,298	228,264
% contribution	%		29	45	50	61	68
Realization	USD / w	0.25	0.25	0.25	0.22	0.20	0.19
Gross margin	%		40	41	35	29	27
EBITDA margin	%		34	35	28	22	19

Source: Kotak Institutional Equities estimates

- ▶ **Backward integration:** The company is in the process of adding ingot and wafer manufacturing capacity by setting up a 6 GW fully integrated PV module manufacturing capacity in Odisha. The plant is expected to commence production in FY2027E. We expect this facility to improve profitability by 150-200 bps. In addition, based on recent announcement by many India solar module manufacturers, Waaree could also potentially looking at expanding into aluminum frame manufacturing, which can potentially support margins by 80-100 bps (we do not bake this into our estimates currently).
- ▶ **US manufacturing:** US administration’s push toward clean energy and domestic manufacturing through the Inflation Reduction Act has led to sharp rise in domestic module manufacturing. IRA AMPC offers domestic manufacturers US\$7 cents/wp rebate, making unit economics extremely attractive.

**We estimate ~44% operating margin for US module manufacturers at current prices: US\$28 cents/wp**

Exhibit 46: Unit economics for US module manufacturing; Dec 24 (US\$ cents/wp)



Source: Bloomberg, Industry Reports, Kotak Institutional Equity estimates

Waaree has forayed into US manufacturing with a 1.6 GW module manufacturing plant in Houston, Texas. The plant is expected to commission in FY2025E with potential to increase capacity to 5 GW. Provided no major change in the US policy, we estimate the facility to reach 3 GW/5 GW capacity by FY2026/27.

**We expect US business to grow rapidly over FY2025-30E, generating 44% EBITDA margin in FY2025 driven by IRA AMPC rebate**

Exhibit 47: US business segmental financials of Waaree Energies, March fiscal year-ends, 2025-30E (Rs mn)

	Unit	2025E	2026E	2027E	2028E	2029E	2030E
Net sales	INR mn	1,714	31,253	52,410	63,171	60,912	58,735
Realization	USD / w	0.28	0.25	0.24	0.23	0.21	0.20
Gross margin	%	28%	21%	19%	16%	14%	11%
IRA AMPC	USD / w	0.07	0.07	0.07	0.07	0.07	0.07
EBITDA margin	%	44%	39%	38%	36%	35%	33%

Source: Kotak Institutional Equities estimates

**We expect revenues and EBITDA to grow at a CAGR of 19.6%/25.9% over FY2024-30E**

Exhibit 48: Consolidated income statement of Waaree Energies, March fiscal year-ends, 2021-30E (Rs mn)

	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E	CAGR 2024-30E (%)
<b>Net sales</b>	<b>19,530</b>	<b>28,543</b>	<b>67,509</b>	<b>113,976</b>	<b>145,667</b>	<b>217,703</b>	<b>283,673</b>	<b>301,640</b>	<b>299,461</b>	<b>334,112</b>	<b>19.6</b>
Cost of material	(16,553)	(23,884)	(53,163)	(90,139)	(111,859)	(159,666)	(198,666)	(218,959)	(224,245)	(251,093)	
Employee expense	(481)	(569)	(1,238)	(1,772)	(2,566)	(3,455)	(4,506)	(4,789)	(4,751)	(5,302)	
Other expenses	(1,539)	(2,980)	(4,761)	(6,322)	(7,662)	(10,619)	(13,445)			(14,970)	
<b>Total expenses</b>	<b>(18,573)</b>	<b>(27,433)</b>	<b>(59,162)</b>	<b>(98,232)</b>	<b>(122,087)</b>	<b>(173,740)</b>	<b>(216,617)</b>	<b>(237,394)</b>	<b>(242,390)</b>	<b>(271,365)</b>	
<b>EBITDA</b>	<b>957</b>	<b>1,109</b>	<b>8,346</b>	<b>15,744</b>	<b>23,581</b>	<b>43,962</b>	<b>67,056</b>	<b>64,246</b>	<b>57,071</b>	<b>62,747</b>	<b>25.9</b>
<b>EBITDA (incl. other income)</b>	<b>1,257</b>	<b>2,025</b>	<b>9,441</b>	<b>18,096</b>	<b>27,276</b>	<b>57,189</b>	<b>92,720</b>	<b>94,485</b>	<b>88,703</b>	<b>96,143</b>	
Depreciation	(323)	(433)	(1,641)	(2,768)	(3,002)	(6,536)	(10,912)	(14,471)	(17,032)	(19,049)	<b>37.9</b>
<b>EBIT</b>	<b>635</b>	<b>677</b>	<b>6,705</b>	<b>12,976</b>	<b>20,578</b>	<b>37,426</b>	<b>56,143</b>	<b>49,775</b>	<b>40,039</b>	<b>43,698</b>	
Other income	300	916	1,095	2,352	3,695	13,227	25,664	30,239	31,632	33,396	
Interest	(309)	(409)	(823)	(1,399)	(1,804)	(6,758)	(5,466)	(4,466)	(3,466)	(2,466)	<b>9.9</b>
<b>Profit before tax</b>	<b>625</b>	<b>1,184</b>	<b>6,977</b>	<b>13,929</b>	<b>22,470</b>	<b>43,895</b>	<b>76,341</b>	<b>75,547</b>	<b>68,205</b>	<b>74,628</b>	<b>32.3</b>
Tax expense	209	387	1,769	4,598	5,752	11,237	19,543	19,340	17,460	19,105	
<b>Adjusted PAT</b>	<b>415</b>	<b>756</b>	<b>5,033</b>	<b>8,959</b>	<b>16,187</b>	<b>32,037</b>	<b>56,110</b>	<b>55,416</b>	<b>49,874</b>	<b>54,566</b>	<b>35.1</b>
<b>Reported PAT</b>	<b>456</b>	<b>756</b>	<b>4,828</b>	<b>12,372</b>	<b>16,187</b>	<b>32,037</b>	<b>56,110</b>	<b>55,416</b>	<b>49,874</b>	<b>54,566</b>	
<b>Adjusted EPS (Rs)</b>	<b>2.1</b>	<b>3.8</b>	<b>22.5</b>	<b>34.7</b>	<b>58.7</b>	<b>111.3</b>	<b>194.9</b>	<b>192.5</b>	<b>173.2</b>	<b>189.5</b>	<b>32.7</b>

Notes:

(a) Other Income includes government support comprising of IRA AMPC rebate and PLI incentive

(b) Adjusted PAT excludes extraordinary items

Source: Company, Kotak Institutional Equities estimates

**Balance sheet: Capex intensity to increase and working capital cycle to remain stable**

**Cash on the balance sheet**

We expect the company to continue generating strong cash flows and maintain balance sheet strength. Operating cash flow and internal accruals will be sufficient to meet requirements of incremental capex and working capital funding; hence, the company will be net cash despite aggressive expansion till FY2030E. We expect net debt/equity and net debt/EBITDA of -0.6X/-3.2X by FY2030E compared to -0.8X /-2.0X in FY2024.

**Attractive working capital cycle, driven by customer advances**

Waaree had a negative working capital cycle of 2 days in FY2024, a sharp decline from negative 42 days in FY2023 on account of a reduction in customer advances from 128 days to 69 days. Solar module manufacturers typically receive advances from customers to fix module prices and this helps players like Waaree maintain a negative working capital cycle. But with increasing competitive intensity, we foresee a normalization of customer advances to 35 days, as a result net working capital day will increase to 32 days in the next couple of years, a marginal deterioration from current levels.

**Normalization of net working capital expected from current levels, driven by reduction in customer advances**

**Exhibit 49: Net working capital days of Waaree Energies, March fiscal year-ends, 2021-30E (#)**

	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
Receivable Days	22	12	17	31	31	31	31	31	31	31
Inventory Days	69	69	146	83	83	83	83	83	83	83
Payable Days	67	68	77	47	47	47	47	47	47	47
OCL (Includes Customer Advances) days	29	85	128	69	55	50	45	40	35	35
<b>NWC days</b>	<b>(5)</b>	<b>(73)</b>	<b>(42)</b>	<b>(2)</b>	<b>12</b>	<b>17</b>	<b>22</b>	<b>27</b>	<b>32</b>	<b>32</b>

Source: Company, Kotak Institutional Equities estimates

**Capex intensity to increase as Waaree is in an investment phase**

Waaree historically has been a PV module player, a low-capex business. Modules typically require capex of ~Rs1.5 bn/GW with asset turns ranging between 5-6X. However, with changing industry dynamics on account of heightened competition and ALMM list II implementation, the company has shifted its focus toward backward integration. Unlike module, backward integration is capex-heavy in nature with low asset turns, which will lead to higher capex intensity.

We model capex of Rs182 bn over FY2025-30E, translating into FATR of 2.4X by FY2030. This capex will take care of capacity expansion across modules, cells, ingots, wafers in India, modules in US and maintenance capex over the next five years. We expect FCF improvement from Rs10 bn in FY2024 to Rs58 bn in FY2030, largely driven by an increase in OCF from Rs23 bn to Rs74 bn over FY2024-30E.

The company is currently undertaking massive expansion both in India and the US, with construction in final stages for the 5.4 GW cell facility in Chikli, Gujarat and 1.6 GW module facility in Houston, Texas, US. Both the facilities are expected to commence production in FY2025. Additionally, Waaree is setting up a mega 6 GW integrated facility in Odisha with a total cost of ~Rs90 bn; it will commence production by FY2027. We expect further capacity expansion to 23 GW/20 GW/10 GW in modules/cells/ingot wafers with a total capex of Rs146 bn to consolidate the company’s leadership position in the domestic market and tap potential export opportunities. We expect Rs18 bn to be invested for brownfield expansion of US module capacity to 5 GW by FY2027.

**We model Waaree to spend Rs182 bn over FY2024-30E to drive capacity expansion and backward integration**

**Exhibit 50: Capital expenditure buildup of Waaree Energies, March fiscal year-ends, 2024-30E (Rs mn)**

	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Year End Capacity (GW)</b>							
Module (India)	12.0	13.3	16.3	19.3	20.3	21.3	23.0
Module (US)	–	1.6	3.0	5.0	5.0	5.0	5.0
Cell	–	5.4	5.4	11.4	11.4	16.0	20.0
Cell - Upgrade	–	–	–	–	1.4	–	–
Ingot + Wafer	–	–	–	6.0	6.0	10.0	10.0
<b>Capacity Addition (GW)</b>							
Module (India)	3.0	1.3	3.0	3.0	1.0	1.0	1.7
Module (US)	–	1.6	1.4	2.0	–	–	–
Cell	–	5.4	–	6.0	–	4.6	4.0
Cell - Upgrade	–	–	–	–	–	–	–
Ingot + Wafer	–	–	–	6.0	6.0	10.0	10.0
<b>Cost/GW (Rs mn)</b>							
Module (India)	–	1,500	1,500	1,425	1,354	1,286	1,222
Module (US)	–	3,675	3,675	3,491	3,317	3,151	2,993
Cell	–	7,000	7,000	6,300	5,670	5,103	4,593
Cell - Upgrade	–	–	–	–	2,000	–	–
Ingot + Wafer	–	4,000	4,000	3,600	3,240	2,916	2,624
<b>Capex (Rs mn)</b>							
Module (India)	–	1,950	4,500	4,275	1,354	1,286	2,077
Module (US)	–	5,880	5,145	6,983	–	–	–
Cell	–	18,900	21,000	18,900	13,041	11,737	9,185
Cell - Upgrade	–	–	–	–	2,800	–	–
Ingot + Wafer	–	–	12,000	10,800	6,480	5,832	–
Maintenance Capex	–	–	1,302	2,620	3,927	4,755	5,464
<b>Total Capex (Rs mn)</b>		<b>26,730</b>	<b>43,947</b>	<b>43,578</b>	<b>27,602</b>	<b>23,610</b>	<b>16,726</b>

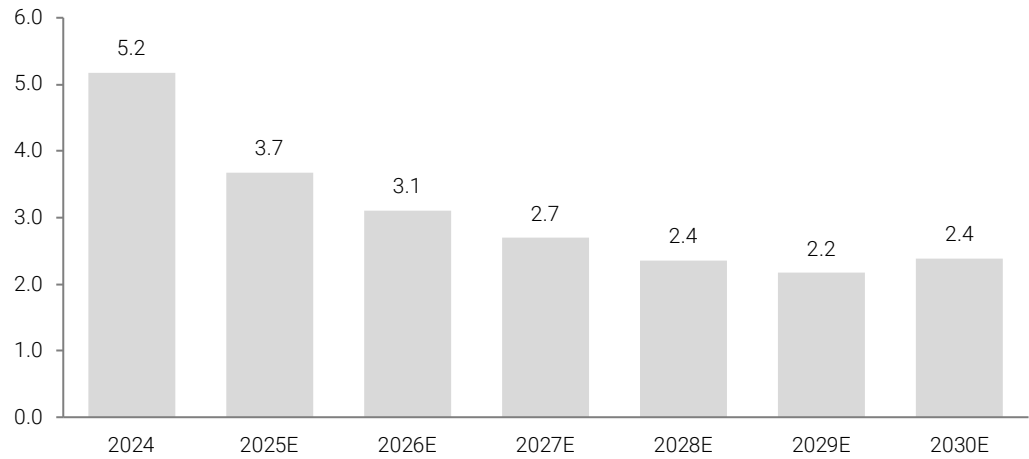
Source: Company, Kotak Institutional Equities estimates

**Asset turnover ratio to deteriorate from current levels, driven by backward integration**

Waaree has witnessed a consistent decline in net fixed asset turnover from 8.5X in FY2021 to 5.2X in FY2024, led by high capex for capacity expansion and low utilization. Going forward, the focus on increasing backward integration by adding cell, wafer and ingot capacities will further deteriorate asset turnover, since these elements of value chain are more capital intensive in nature with significantly lower asset turnover. We expect asset turnover ratios to stabilize from FY2028, as incremental capex reduces and realization rate level out for solar products In India.

**Fixed asset turns to reduce from 5.2X to 2.4X over FY2024-30E; on account of backward integration**

**Exhibit 51: Net fixed asset turnover ratio of Waaree Energies, March fiscal year-ends, 2021-30E (X)**

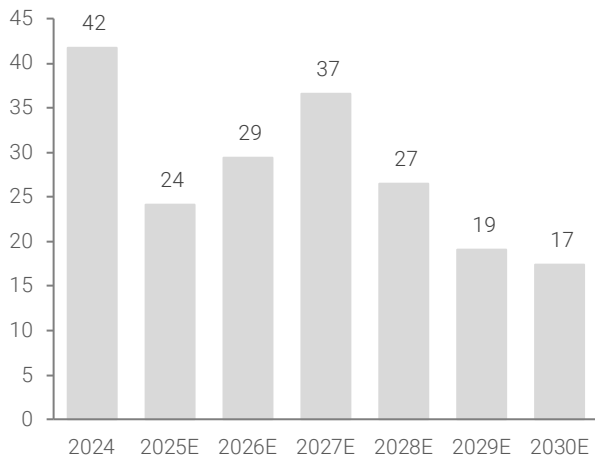


Source: Company filings, Kotak Institutional Equity estimates

**Return ratios remain healthy despite lower asset turn and margin pressure**

**RoAE to witness decline: 17% by FY2030E driven by reduction in profit margin (post FY2027E) and lower asset turnover**

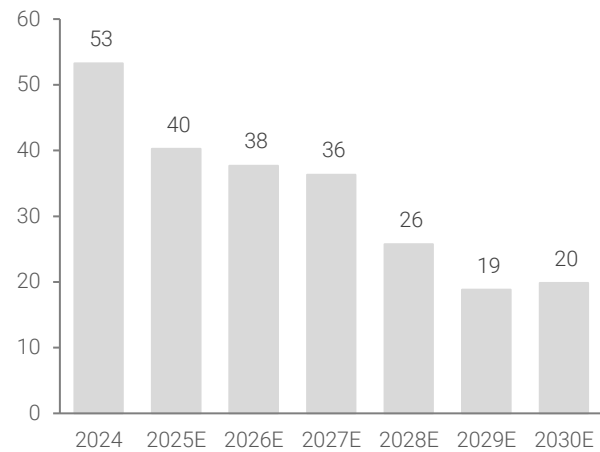
**Exhibit 52: RoAE of Waaree, March fiscal year-ends, 2021-30E (%)**



Source: Company filings, Kotak Institutional Equity estimates

**RoACE to see sharp decline over FY2024-28E due to heavy investment in backward integration**

**Exhibit 53: RoACE of Waaree, March fiscal year-ends, 2021-30E (%)**



Source: Company filings, Kotak Institutional Equity estimates

**We expect Waaree Energies to remain in an investment phase expanding capacity in India and US**

**Exhibit 54: Consolidated balance sheet of Waaree Energies, March fiscal year-ends, 2021-30E (Rs mn)**

	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Shareholders funds</b>	<b>3,526</b>	<b>4,276</b>	<b>18,384</b>	<b>40,878</b>	<b>93,065</b>	<b>125,102</b>	<b>181,212</b>	<b>236,628</b>	<b>286,502</b>	<b>341,068</b>
Equity share capital	1,971	1,971	2,434	2,630	2,879	2,879	2,879	2,879	2,879	2,879
Reserves and surplus	1,554	2,305	15,950	38,249	90,186	122,223	178,333	233,749	283,623	338,189
Loan funds	3,315	3,634	3,203	5,534	15,534	60,714	50,714	40,714	30,714	20,714
Deferred tax liabilities	88	264	479	371	371	371	371	371	371	371
Minority Interest and other liabilities	741	540	4,205	14,556	15,087	15,708	16,395	17,186	18,056	19,013
<b>Total sources of funds</b>	<b>7,670</b>	<b>8,715</b>	<b>26,271</b>	<b>61,339</b>	<b>124,056</b>	<b>201,894</b>	<b>248,692</b>	<b>294,899</b>	<b>335,643</b>	<b>381,166</b>
Net block	2,321	5,648	9,912	11,494	35,221	72,631	105,297	118,427	125,006	122,683
CWIP	493	1,692	6,372	16,283	16,283	16,283	16,283	16,283	16,283	16,283
<b>Net fixed assets</b>	<b>2,813</b>	<b>7,340</b>	<b>16,284</b>	<b>27,777</b>	<b>51,504</b>	<b>88,915</b>	<b>121,580</b>	<b>134,710</b>	<b>141,289</b>	<b>138,966</b>
Investments + Goodwill	2,415	1,592	3,085	5,230	5,230	5,230	5,230	5,230	5,230	5,230
Cash and bank balances	1,102	3,664	17,184	37,792	71,518	106,661	113,896	141,773	171,996	216,836
<b>Current assets</b>	<b>6,601</b>	<b>9,778</b>	<b>37,645</b>	<b>42,339</b>	<b>52,229</b>	<b>74,710</b>	<b>95,297</b>	<b>100,904</b>	<b>100,225</b>	<b>111,038</b>
Inventories	3,680	5,382	27,089	25,855	33,044	49,385	64,351	68,427	67,932	75,793
Sundry debtors	1,182	925	3,126	9,714	12,415	18,554	24,177	25,708	25,522	28,475
Loans and advances	728	617	672	1,010	1,010	1,010	1,010	1,010	1,010	1,010
Other current assets	1,011	2,854	6,759	5,760	5,760	5,760	5,760	5,760	5,760	5,760
<b>Current liabilities</b>	<b>5,262</b>	<b>13,659</b>	<b>47,928</b>	<b>51,798</b>	<b>56,424</b>	<b>73,620</b>	<b>87,310</b>	<b>87,719</b>	<b>83,096</b>	<b>90,904</b>
Trade payables	3,572	5,348	14,316	14,752	18,854	28,178	36,717	39,042	38,760	43,245
Other current liabilities	1,688	8,295	33,333	34,801	35,325	43,197	48,349	46,432	42,091	45,413
Provisions	2	16	279	2,245	2,245	2,245	2,245	2,245	2,245	2,245
<b>Net current assets (excl. cash)</b>	<b>1,340</b>	<b>(3,881)</b>	<b>(10,283)</b>	<b>(9,459)</b>	<b>(4,195)</b>	<b>1,089</b>	<b>7,987</b>	<b>13,186</b>	<b>17,129</b>	<b>20,135</b>
<b>Total application of funds</b>	<b>7,670</b>	<b>8,715</b>	<b>26,271</b>	<b>61,339</b>	<b>124,056</b>	<b>201,894</b>	<b>248,692</b>	<b>294,899</b>	<b>335,643</b>	<b>381,166</b>

<b>Key ratios</b>										
Debt / equity (X)	0.9	0.8	0.2	0.1	0.2	0.5	0.3	0.2	0.1	0.1
Net debt / equity (incl. acceptances) (X)	0.6	(0.0)	(0.8)	(0.8)	(0.6)	(0.4)	(0.3)	(0.4)	(0.5)	(0.6)
Net debt / EBITDA (x)	2.3	(0.0)	(1.7)	(2.0)	(2.4)	(1.0)	(0.9)	(1.6)	(2.5)	(3.1)
Net FATR (X)	8.5	5.6	5.7	5.2	3.7	3.1	2.7	2.4	2.2	2.4
BVPS (Rs)	18	22	82	158	337	435	629	822	995	1,185
RoAE (%)	14	19	43	42	24	29	37	27	19	17
RoACE (%)	9	9	71	53	40	38	36	26	19	20

<b>Working capital as days of sales</b>										
<b>Current assets</b>	<b>123</b>	<b>125</b>	<b>204</b>	<b>136</b>	<b>131</b>	<b>125</b>	<b>123</b>	<b>122</b>	<b>122</b>	<b>121</b>
Inventories	69	69	146	83	83	83	83	83	83	83
Sundry debtors	22	12	17	31	31	31	31	31	31	31
Loans and advances	14	8	4	3	3	2	1	1	1	1
Other current assets	19	37	37	18	14	10	7	7	7	6
<b>Current liabilities</b>	<b>98</b>	<b>175</b>	<b>259</b>	<b>166</b>	<b>141</b>	<b>123</b>	<b>112</b>	<b>106</b>	<b>101</b>	<b>99</b>
Trade payables	67	68	77	47	47	47	47	47	47	47
Other current liabilities	32	106	180	111	89	72	62	56	51	50
Provisions	0	0	2	7	6	4	3	3	3	2
<b>Net current assets (excl. cash) as days</b>	<b>25</b>	<b>(50)</b>	<b>(56)</b>	<b>(30)</b>	<b>(11)</b>	<b>2</b>	<b>10</b>	<b>16</b>	<b>21</b>	<b>22</b>

Source: Company, Kotak Institutional Equities estimates

**Strong OCF to take care of capital expenditure**

Operating cash flows for Waaree Energies have remained fairly strong over FY2021-24 and were sufficient to meet a significant proportion of capex requirement during the same period. However, we estimate FCF to witness sharp drop over FY2025-26E due to large investment in capex heavy elements of the solar supply chain.

We expect Waaree to generate operating cash flows of Rs334 bn over FY2025-30E, which will be take care of capex requirements of Rs182 bn over the same period. We expect Waaree to generate free cash flow from FY2027.

**We expect FCF to witness significant surge from FY2027 onward for Waaree Energies**

**Exhibit 55: Consolidated cash flow statement of Waaree, March fiscal year-ends, 2021-30E (Rs mn)**

	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
<b>Cash flow from operating activities</b>										
Net profit before tax	665	1,184	6,772	17,342	22,470	43,895	76,341	75,547	68,205	74,628
Add: Depreciation	323	433	1,641	2,768	3,002	6,536	10,912	14,471	17,032	19,049
Add: Net interest	73	243	71	(567)	1,804	6,758	5,466	4,466	3,466	2,466
Others	98	64	926	943	—	—	—	—	—	—
<b>Op. Profit before Working Capital Changes</b>	<b>1,160</b>	<b>1,924</b>	<b>9,410</b>	<b>20,485</b>	<b>27,276</b>	<b>57,189</b>	<b>92,720</b>	<b>94,485</b>	<b>88,703</b>	<b>96,143</b>
Changes in Working capital	(229)	5,344	7,196	5,916	(5,264)	(5,284)	(6,898)	(5,199)	(3,943)	(3,006)
Taxes	(215)	(259)	(1,004)	(3,351)	(5,752)	(11,237)	(19,543)	(19,340)	(17,460)	(19,105)
<b>Cash flow from operating activities</b>	<b>717</b>	<b>7,009</b>	<b>15,602</b>	<b>23,050</b>	<b>16,260</b>	<b>40,668</b>	<b>66,279</b>	<b>69,946</b>	<b>67,299</b>	<b>74,032</b>
<b>Cash flow from investing activities</b>										
Capex	(1,979)	4,965	(8,654)	(13,423)	(26,730)	(43,947)	(43,578)	(27,602)	(23,610)	(16,726)
Investments	(294)	(883)	1,092	(77)	—	—	—	—	—	—
Others	(229)	(10,830)	(13,376)	(19,902)	—	—	—	—	—	—
<b>Cash flow from investing activities</b>	<b>(2,502)</b>	<b>(6,749)</b>	<b>(20,938)</b>	<b>(33,403)</b>	<b>(26,730)</b>	<b>(43,947)</b>	<b>(43,578)</b>	<b>(27,602)</b>	<b>(23,610)</b>	<b>(16,726)</b>
<b>Cash flow from financing activities</b>										
Debt	1,651	1,407	(1,508)	416	10,000	45,180	(10,000)	(10,000)	(10,000)	(10,000)
Equity	—	—	10,194	10,035	36,000	—	—	—	—	—
Interest	(222)	(279)	(655)	(1,171)	(1,804)	(6,758)	(5,466)	(4,466)	(3,466)	(2,466)
Dividend	—	(5)	(3)	(5)	—	—	—	—	—	—
Others	145	(138)	(1,603)	(182)	—	—	—	—	—	—
<b>Cash flow from financing activities</b>	<b>1,573</b>	<b>985</b>	<b>6,425</b>	<b>9,092</b>	<b>44,196</b>	<b>38,422</b>	<b>(15,466)</b>	<b>(14,466)</b>	<b>(13,466)</b>	<b>(12,466)</b>
<b>FCF</b>	<b>(1,262)</b>	<b>11,973</b>	<b>6,948</b>	<b>9,627</b>	<b>(10,470)</b>	<b>(3,279)</b>	<b>22,701</b>	<b>42,344</b>	<b>43,689</b>	<b>57,306</b>
<b>Total cash flow</b>	<b>(212)</b>	<b>1,245</b>	<b>1,089</b>	<b>(1,260)</b>	<b>33,726</b>	<b>35,143</b>	<b>7,235</b>	<b>27,878</b>	<b>30,223</b>	<b>44,840</b>
Opening cash	339	127	1,392	2,357	1,098	34,823	69,967	77,202	105,079	135,302
Other bank balances	—	20	(124)	1	—	—	—	—	—	—
Closing cash	127	1,392	2,357	1,098	34,823	69,967	77,202	105,079	135,302	180,142

Source: Company, Kotak Institutional Equities estimates



# A1

## Appendix 1: Company profile

Waaree Energies was founded in 1990, with headquarters in Mumbai, India. The company has 17+ years of experience in solar PV module manufacturing (commenced operations in 2007). During this time company has witnessed exponential growth to become India’s largest manufacturer of solar PV modules, with aggregate installed capacity of 13.3 GW as of September 30, 2024. The business operations comprise (1) manufacturing of solar photovoltaic (PV) cells (expected to commence in FY2025), (2) manufacturing of solar modules including custom made panels for specific applications, (3) solar EPC & O&M through subsidiary WRTL (Waaree Renewable Technologies Limited), (4) independent power production and (5) the sale of other solar-related products.

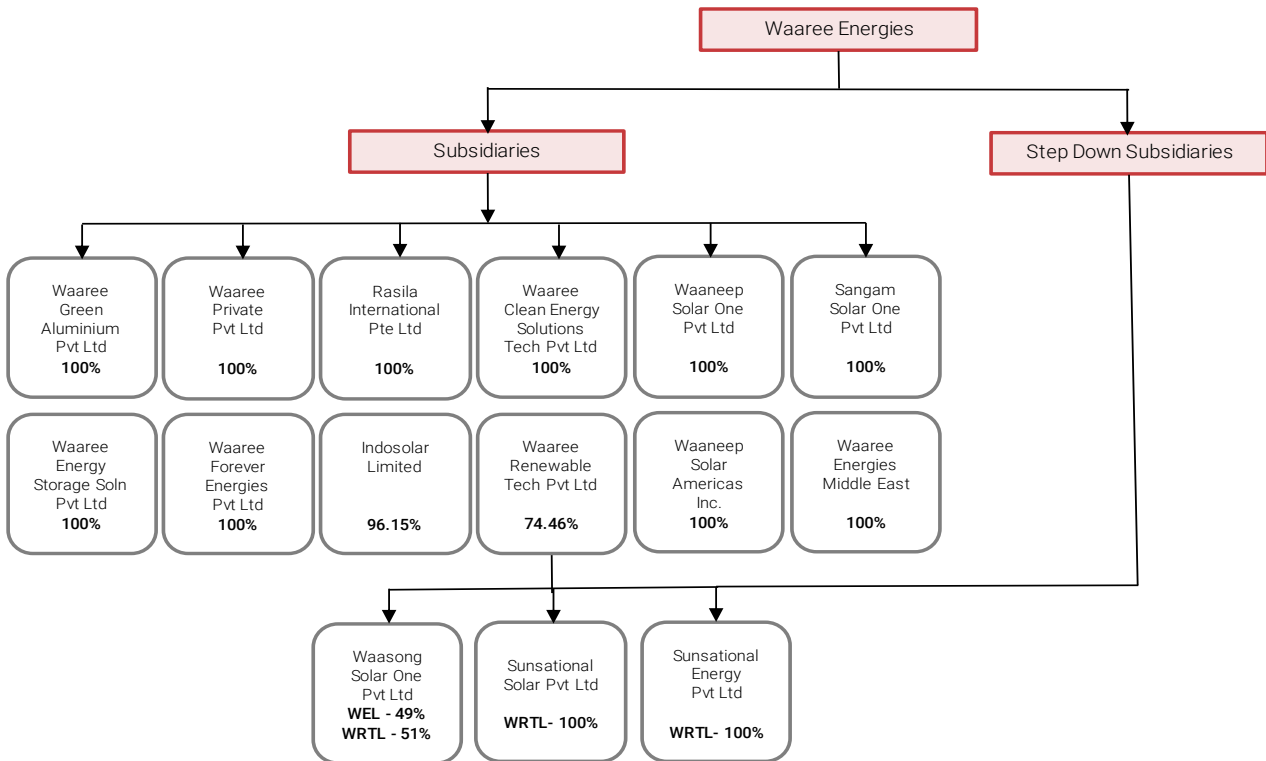
### Manufacturing capacity

Waaree operates five manufacturing facilities in India, spread over an area of 143.01 acres. It operates one factory each located at Surat, Tumb, Nandigram, Chikhli in Gujarat, India and the IndoSolar Facility, in Noida, Uttar Pradesh.

### Group structure

As of June 30, 2024, Waaree Energies had 12 direct subsidiaries and 3 step-down subsidiaries.

Exhibit 56: Waaree Energies group structure as of June 30, 2024



Source: Company

**Capacity expansion**

Waaree Energies intends to follow an expansion strategy of executing regular capacity additions in India and abroad (primarily the US), as well as continuous upgradation of manufacturing technology.

▶ **Near completion**

- Waaree Energies is in the final stages of constructing a 5.4 GW cell plant in Chikli, Gujarat.
- Waaree Energies is in the process of expanding its solar PV module manufacturing capabilities outside India with the establishment of up to 1.6 GW facility in Houston, Texas.

▶ **Ongoing**

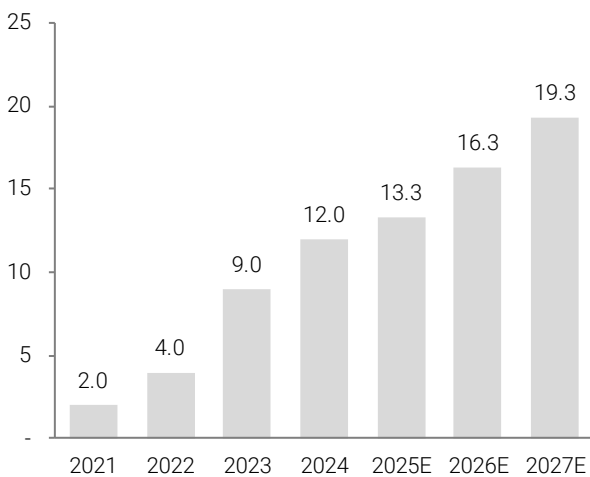
- Waaree Energies is one of the successful full bidders under the PLI scheme for manufacturing high efficiency solar panels (tranche II), and can potentially receive incentive worth Rs19.23 bn.
- As part of the PLI scheme, Waaree intends to set up a fully integrated 6GW facility in Odisha, which will manufacture ingots, wafers, solar cells and PV modules.
- The project is expected to commence commercial operations in fiscal 2027.

▶ **Potential projects**

- 1.6 GW PV module manufacturing facility in Houston, Texas with plans to further expanded to 3 GW of solar module manufacturing facility by FY2026 and to 5 GW by FY2027.
- Waaree may potentially look at establishing a 5 GW solar cell manufacturing facility by FY2027 in the US.

**Waaree Energies aims to expand its module manufacturing capacity to 19.3GW by FY2027**

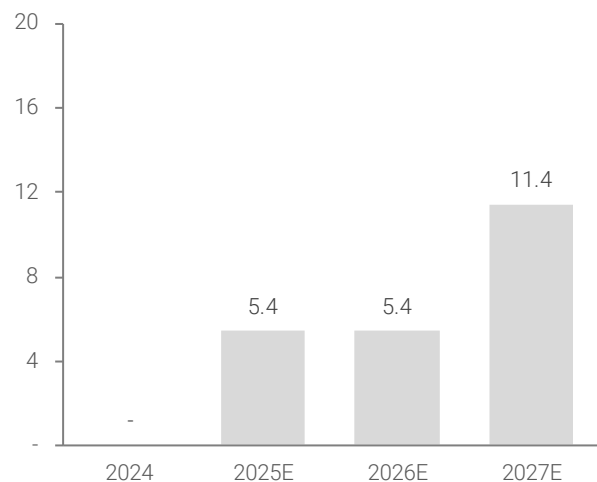
Exhibit 57: Current & projected module capacity, March fiscal year ends, 2021-27E (GW)



Source: Company

**Waaree Energies aims to expand its cell manufacturing capacity to 11.4GW by FY2027**

Exhibit 58: Current & projected cell capacity, March fiscal year ends, 2021-27E (GW)



Source: Company

**Offerings**

▶ **Solar cell**

Waaree is expected to commence 5.4GW solar cell capacity by FY2025. It encompasses 1.4 GW of Mono PERC Cell and 4GW of latest TOPCon Cell. Going ahead, it plans to continue adding TOPCon cell, which builds upon the existing PERC technology and has the capability of achieving efficiencies of between 24.5% and 25.2%.

► **Solar module**

Waaree Energies currently derives ~95% of its revenues from the sale of Solar modules (as of FY2024). Waaree currently manufactures modules using monocrystalline PERC solar cells as well as TOPCon solar cells, which they procure from third-parties. Waaree Energies’ products are differentiated on the basis of module technology, cell size and quantity, and are sold across different power output ranges. The company produces both monofacial and bifacial modules.

► **EPC solutions**

Waaree is a leading solar EPC player, providing solutions through its listed subsidiary Waaree Renewable Technologies Ltd. (WRTL). It is one of the fastest growing players in the Solar EPC space, registering a CAGR of 100%+ over FY2022-24. The company’s solutions include setting up of ground mount, rooftop and floating solar projects across the country, for both government and private power producers.

Key EPC achievements include: (1) 1.82 GW project commissioned, (2) 1.7 GW under construction, (3) 50+ MW rooftop projects executed.

► **O&M solutions**

Apart from EPC WRTL also offers O&M services for solar ground mount and rooftop solar solutions as well as for the solar water pumps it has installed. The company boasts 587 MW of O&M portfolio.

► **Independent power production**

Waaree Energies has a 96 MWp IPP portfolio.

**Sales channel**

Waaree has a well-diversified sales and revenue channel which includes (1) direct sales to utilities and enterprises; (2) export of solar PV modules to international customers and international EPC revenue; (3) retail sales (comprising franchisee sales), which include solar PV module sales through extensive franchisee network focused on rooftop and MSME customer business vertical as well as franchisee EPC revenue; and 4) other revenue from operations, which includes EPC services for domestic utilities and enterprise customers, O&M services, trading in ancillary products, export incentives, generation of electricity from renewable resources and scrap sale.

**Utilities, enterprises, residential and exports are the key end markets for Waaree Energies**

Exhibit 59: Breakdown of revenue exposure by geography and sales/revenue channel; March fiscal year-ends, 2022-24 (Rs mn, %)

Particulars	2022		2023		2024	
	Rs mn	as % of revenue from operations	Rs mn	as % of revenue from operations	Rs mn	as % of revenue from operations
Direct sales	15,963	56	13,168	20%	35,814	31%
Exports	6,578	23	46,165	68%	65,691	58%
Retail sales	5,825	20	6,725	10%	11,571	10%
Others	176	1	1,450	2%	900	1%
<b>Total</b>	<b>28,542</b>	<b>100</b>	<b>67,509</b>	<b>100%</b>	<b>113,976</b>	<b>100%</b>

Source: Company

**Exports**

Waaree has successfully developed a large international customer base and its products are sold globally, including to customers in the US, Canada, Italy, Hong Kong, Turkey and Vietnam. Over the years, the company has focused on increasing export sales and for FY2022, FY2023 and FY2024 represented 23%, 68%, 58%, respectively, of revenue from operations. It also manufactures semi-flexible solar panels for sale to domestic and global customers.

To tap US customers, Waaree is in process of establishing up to 1.6 GW solar PV module manufacturing facility in Houston, Texas, which is expected to be operational by end-FY2025. Waaree further has plans to expand this facility to a total of 3 GW installed capacity by FY2026 and 5 GW of solar module manufacturing facility by FY2027.

### Key events & milestones

#### Waaree Energies has grown to become India's largest solar PV module manufacturer

Exhibit 60: Key events and expansion projects undertaken by Waaree Energies for increasing solar module manufacturing capabilities, March fiscal year-ends, 2007-24

Year	Milestone
2007	Entered the solar energy sector with a 30 MW module manufacturing line
2014	installation of an additional 250MW of annual manufacturing capacity in PV modules at Surat facility
2017	Acquired 40% shares in Waaneep Solar Private Limited from NEEPCO pursuant to which Waaneep Solar became wholly owned subsidiary
2018	1) Commissioned solar photovoltaic modules plant having capacity of 1,000 MW 2) Divested Waaneep Solar Private Limited to Hero Solar Energy Private Limited in tranches
2019	Commissioned international EPC project of 49.5 MWp ground mounted Song Giang solar power project in Vietnam
2021	1) Acquired 500 MW Solar Module manufacturing facility to take total installed capacity to 2GW 2) Initiated construction activities for a solar cell manufacturing unit
2023	1) Increased capacity to 12GW 2) Selected as a manufacturer under the PLI Scheme for setting up a manufacturing facility of 6GW as a greenfield project
2024	Increased capacity to 13.3 GW with commissioning of 1.3 GW of module manufacturing facility at Indosolar Limited's Noida facility

Source: Company, Kotak Institutional Equities

# A2

## Appendix 2: Brief background of board & management team

### Exhibit 61: Brief background of Waaree's Board of Directors

Name	Position	Remark
Hitesh Chimanlal Doshi	Chairman and Managing Director	Hitesh Chimanlal Doshi is the Chairman and Managing Director and promoter of the company. He has been associated with the company since 1999 and is currently responsible for, inter alia, overseeing financial performance, investments and other business ventures, providing strategic advice to the board, developing and executing company's business strategies and establishing policies and legal guidelines. He has over 22 years of experience in the engineering industry
Hitesh Pranjivan Mehta	Whole Time Director	Hitesh Pranjivan Mehta is the Whole Time Director of the company. He has been associated with the Company since April 1, 2011 as the director in Waaree Group. He is currently responsible for, inter alia, leading the company's short and long-term strategy and setting strategic goals. He has over 23 years of experience in the field of engineering, solar and oil industries and was previously associated with Waaree Instruments Limited as director.
Viren Chimanlal Doshi	Whole Time Director	Viren Chimanlal Doshi is the Whole Time Director of the company. He has been associated with the Company since November 26, 2007 and is currently responsible for overseeing the engineering, procurement and construction of the solar projects of the Company, its subsidiaries and other companies within the group. He has over 15 years of experience in the engineering industry
Dr. Arvind Ananthanarayanan	Non-Executive Director	Dr. Arvind Ananthanarayanan is the Non-Executive Director of the company. He joined the Board in May 2023. He is a doctorate in philosophy (science). He was previously associated with the Process Development Division, Bhabha Atomic Research Centre as a scientist. He has over 18 years of experience in applied physics
Richa Manoj Goyal	Independent Director	Richa Manoj Goyal has been associated with our Company since 2021. She is certified trademarks agent and she is currently the managing partner of the law firm 'Richa Goyal and Associates'
Jayesh Dhirajlal Shah	Independent Director	Jayesh Dhirajlal Shah has been associated with the Company since 2015. He is the founding partner of J.D. Shah Associates, Chartered Accountants in 1988. He has over 34 years of experience in the field of taxation, audit, project finance and compliance services
Rajender Mohan Malla	Independent Director	Rajender Mohan Malla has been associated with the Company since 2019. He has previously held the position of a director in various companies, such as SIDBI Venture Capital Limited, IDBI Capital Markets and Securities Limited and IDBI Asset Management Limited
Sujit Kumar Varma	Independent Director	Sujit Kumar Varma has been associated with the Company since 2021. He has been associated with the State Bank of India in various capacities since 1987. He has over 35 years of experience in the banking industry and has held board positions in several banks, such as State Bank of India as the deputy managing director, SBI, New York branch as the chief executive officer, SBI Mauritius Limited and SBI UK Limited as director

Source: Company

**Exhibit 62: Brief background of Waaree’s Key Managerial Personnel**

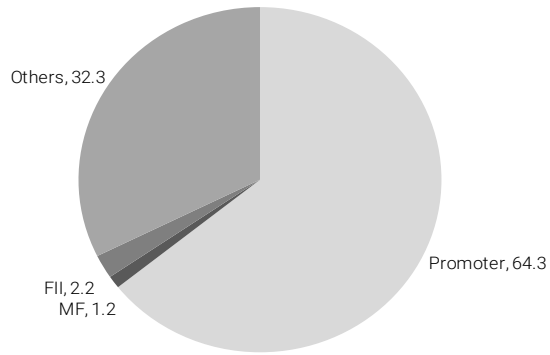
Name	Position	Remark
Amit Paithankar	Chief Executive Officer	Amit Paithankar has been associated with the Company since March 1, 2024 and is responsible for the executive day to day functions of our Company. He holds a bachelor’s degree of engineering (electrical branch) from V. J. Technical Institute and a master’s degree in business administration (Global) from London School of Business and Finance. He also holds a doctor of philosophy (technology) in electrical engineering from Veermata Jijabai Technological Institute. He was previously associated with Emerson Electric Company (India) Private Limited as the managing director South Asia and vice president advanced design center. He is responsible for overseeing day to day business affairs of the Company
Sonal Shrivastava	Chief Financial Officer	Sonal Shrivastava has been associated with the Company since September 3, 2024. She holds a bachelor’s degree of science engineering (chemical) from Vinoba Bhave University and a master’s degree of management studies from the Jamnalal Bajaj Institute of Management Studies University of Mumbai. She was previously associated with Sugati Holdings Private Limited, Duet Capital SA, Vedanta Limited, Lafarge India Limited, Suzlon Energy Limited and Holcim Services (South Asia) Limited in various capacities. She is responsible for accounts and finance functions of our Company
Nilesh Malani	Chief Marketing Officer	Nilesh Malani has been associated with the Company since February 14, 2024 and is responsible for marketing and communication functions in corporate division of our Company. He holds a bachelor’s degree of science (chemistry) from the University of Mumbai and master’s degree of business administration from the School of Business Management of SVKM’s NMIMS University. He was previously associated with Polycab India Limited
Sanjeev Pushkarna	Chief Procurement Officer	Sanjeev Pushkarna has been associated with the Company since June 1, 2024 and is responsible for supply chain management functions of the Company. He holds a bachelor’s degree of engineering (mechanical) from Maharashtra Institute of Technology, Pune. He was previously associated with Sterling and Wilson Renewable Energy Limited
Jignesh Rathod	Director Operations	Jignesh Rathod has been associated with the Company since November 28, 2007. He is currently responsible for overseeing the operational functions at the factories of the Company. He holds a bachelor’s degree of engineering from the Gujarat University and a post graduate diploma in business management from SVKM’s NMIMS. He also holds a master’s degree business administration for working executives from SVKM’s NMIMS
Sunil Rathi	Director- Sales	Sunil Rathi has been associated with the company since September 1, 2015 and is currently responsible for overseeing the sales functions of the Co. and its subsidiaries as well as other companies within the group. He was previously associated with Vikram Solar limited. He holds a bachelor’s degree in electronics engineering from the Amravati University. He also holds a master’s degree in business administration from the Institute for Technology and Management
Pankaj Vassal	President- Sales	Pankaj Vassal has been associated with the company since Aug 2023 and is currently responsible for overseeing the retail sales of the franchise business. He holds a bachelor’s degree of commerce and a master’s degree in management studies from the University of Mumbai. He was previously associated with Havells India Limited, Amway India Enterprises Private Limited, Reliance Broadcast Network Limited, Pidilite Industries Limited, Motorola India Private Limited, Asian Paints Limited and Essel Packaging Limited in various capacities

Source: Company

# A3

## Appendix 3: Shareholding pattern

Exhibit 63: Shareholding pattern of Waaree Energies Ltd for the period ending October 2024 (%)



Source: BSE

## Ratings and other definitions/identifiers

### Definitions of ratings

**BUY.** We expect this stock to deliver more than 15% returns over the next 12 months.

**ADD.** We expect this stock to deliver 5-15% returns over the next 12 months.

**REDUCE.** We expect this stock to deliver -5+5% returns over the next 12 months.

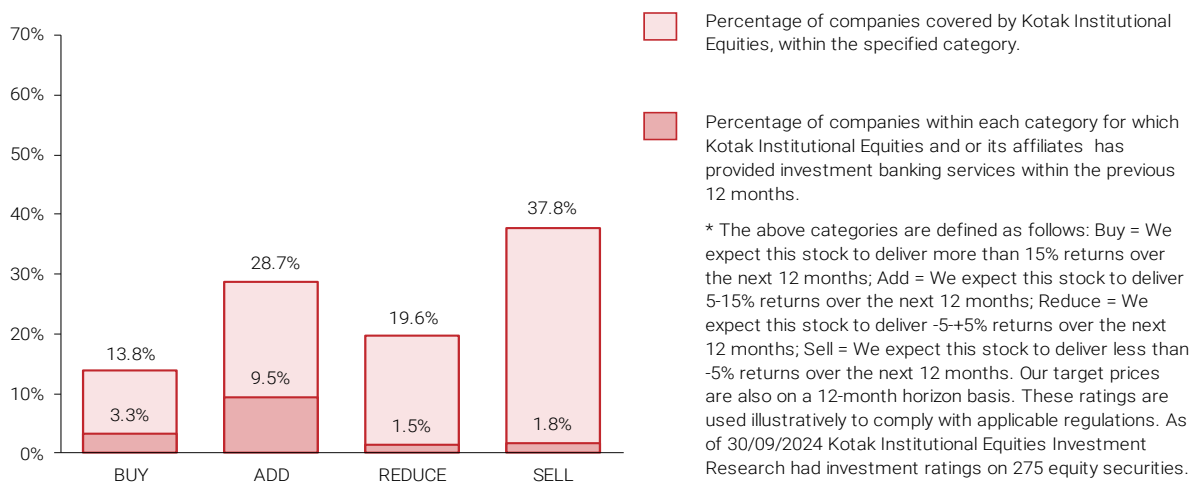
**SELL.** We expect this stock to deliver <-5% returns over the next 12 months.

Our Fair Value estimates are also on a 12-month horizon basis.

Our Ratings System does not take into account short-term volatility in stock prices related to movements in the market. Hence, a particular Rating may not strictly be in accordance with the Rating System at all times.

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Kotak Institutional Equities Research coverage universe



Source: Kotak Institutional Equities

As of September 30, 2024

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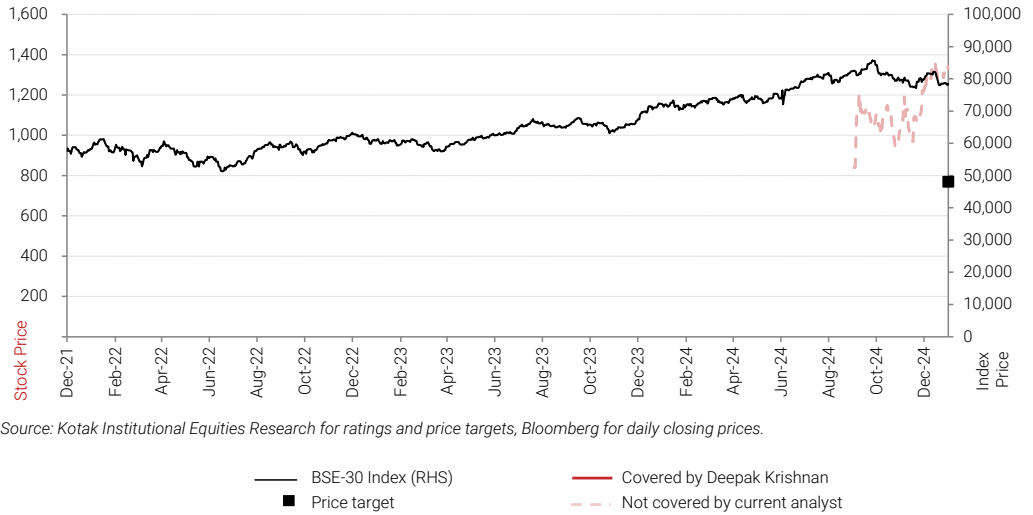
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Renewable Energy



**Premier Energies (PREMIERE)**

Kotak Institutional Equities rating and stock price target history

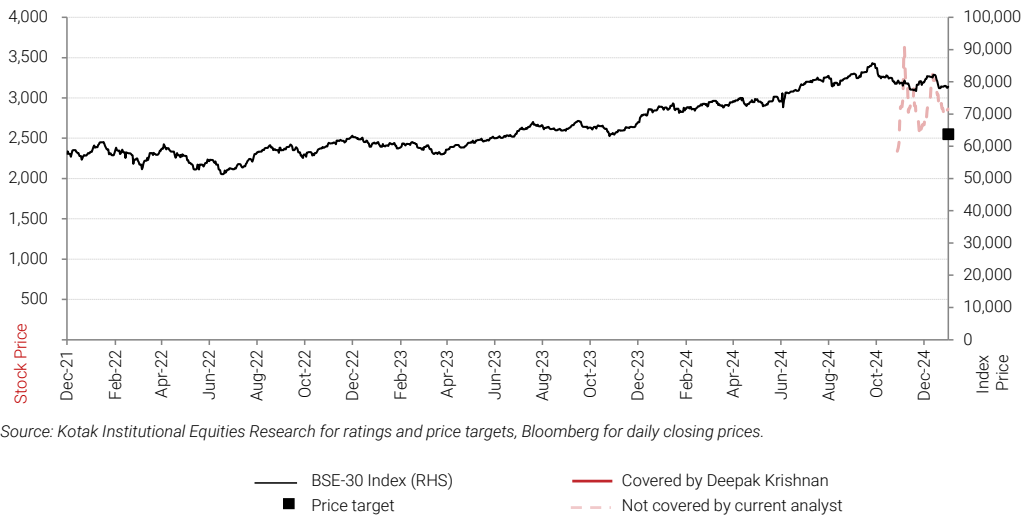


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**Waaree Energies (WAAREEN)**

Kotak Institutional Equities rating and stock price target history



Source: Kotak Institutional Equities Research for ratings and price targets, Bloomberg for daily closing prices.

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KEC International	KECI IN
Premier Energies	PREMIERE IN
Syrma SGS Technology	SYRMA IN
Waaree Energies	WAAREEEN IN

Source: Kotak Institutional Equities research

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