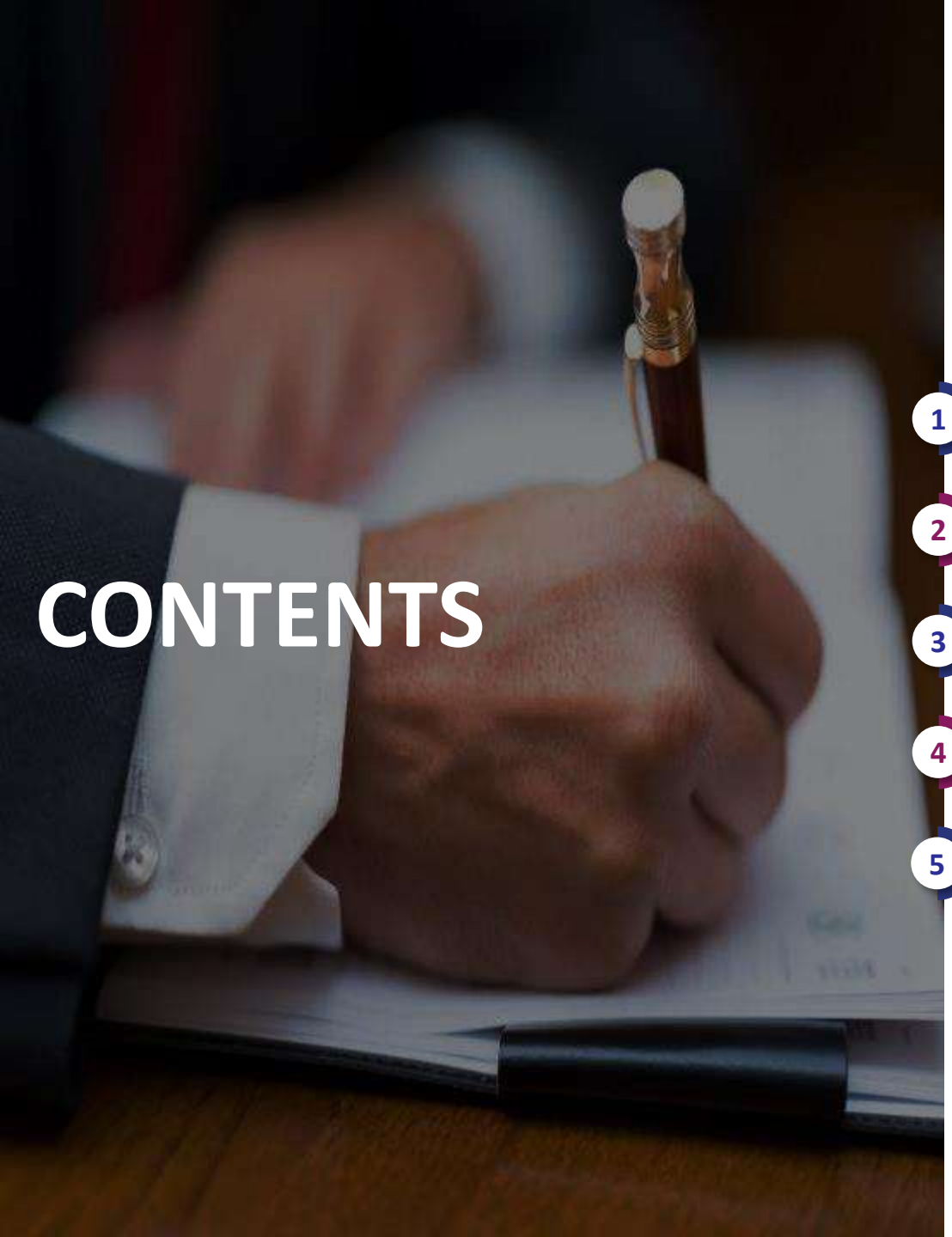
SBI CAPS
Complete Investment Banking Solutions

REPORT ON POWER SECTOR

Integrating to Differentiate: A Solar Module Equation

August 2025



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EXECUTIVE SUMMARY

India's mature module ecosystem now sufficient to meet domestic needs, but will evaporating export opportunities cause oversupply in the medium term?

Owing to a concerted governmental push through PLI and ALMM schemes and a favourable global environment, module makers have greatly expanded their capacities in the past 2 years to the ~100 GW mark. This addition has been absorbed with alacrity as solar additions rose 60% y/y in FY25 to ~24 GW, necessitating a demand for ~50 GW_{dc} of modules. Additions are set to hover ~40-50 GW in the coming years to achieve targets, needing a steady state capacity of 100 GW of modules. Hence, the ~190 GW expected to be installed by 2027 could contribute to an oversupply considering reduced scope for exports due to actions by the US in removing incentives for solar projects. Players who want to take advantage of the lucrative market would look to set up onshore facilities, with a distinct advantage for early movers as the US market is also building up indigenous upstream capacity.

Cell capacities to exponentially rise in the medium term as launch of ALMM-II provides a shot in the arm

Contrasting the maturity in modules, cell capacity in India at under 30 GW remains insufficient. This is where the introduction of ALMM-II for cells is a boon. The order mandates use of only cells from enlisted makers for projects for which bid submission is after 31 Aug'25. Additionally, only ALMM cells and modules may be used for projects benefitting from net metering or open access rules, a move which will open up the significant C&I market to domestic players. Planned capacity additions promise to take up cell capacity to close to self sufficiency in the medium term. In the interim, the higher price for DCR cells this could push up the cost of projects till the supply-demand dynamics re-adjust, potentially reducing bid enthusiasm. The clarity provided on the timelines which exempts ~100 GW of projects bid out from Dec'24 onwards will give time for this readjustment to occur, preventing undue price spikes.

Wafer and polysilicon capacities are some years away; careful evaluation needed on degree of integration desired

Further up the value chain, presence of domestic players remains negligible, with China ruling the roost. The target to achieve nearly 40 GW wafer capacity by Mar'27 is admirable, but on ground movements to meet the lofty target seems moderate. The order clarifying that the use of only blue wafers will qualify cells to be classified as domestic provides a fillip, but more needs to be done. The Chinese action to shutdown nearly a third of its polysilicon capacity makes the case stronger for more domestic facilities, though no capacity exists presently.

Spiking polysilicon prices squeeze the margins of global players as most are only integrated from wafer-module

In recent weeks, polysilicon prices have spiked by 35-40%, with only a portion trickling down to wafers and cells. Module prices remain unmoved. This indicates that the margins of mid- and down-stream players is getting eaten up. This trend means that most global players (with Tongwei being a notable exception) have seem EBITDA margins plummet due to their integration only from wafer-module stage. In this context, India's PLI which provides incentive for integration from polysilicon to module is unique since most global players are integrated from wafer-module only, leaving them exposed to fluctuations in polysilicon prices.

Indian players have outperformed global players on returns due to favourable domestic and global regulations

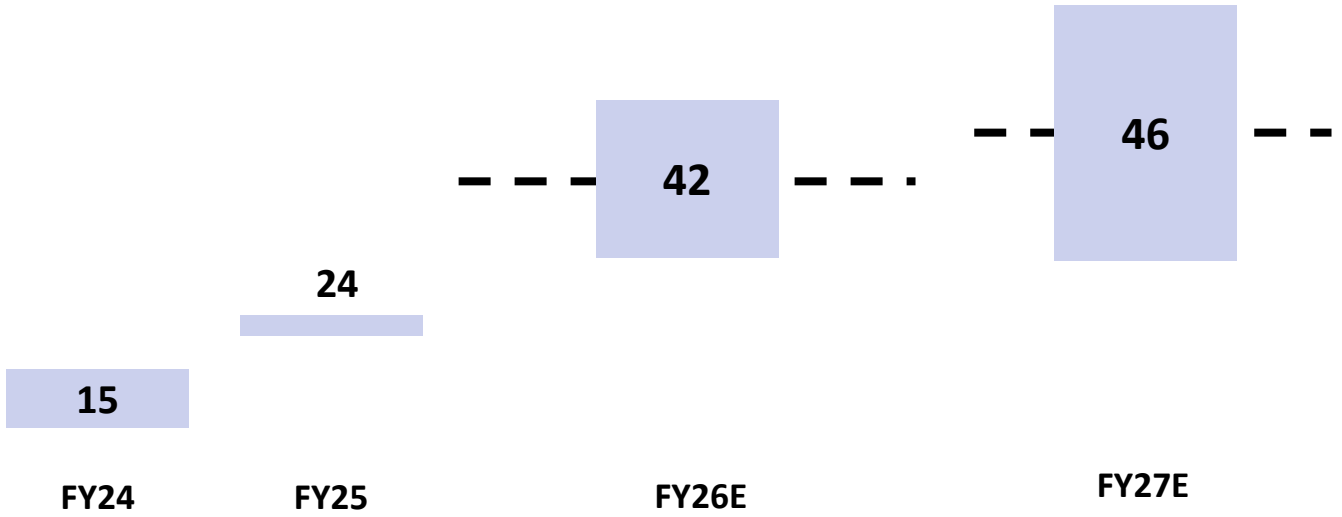
The margin and growth profile of Indian companies remains meaningfully superior to that of international counterparts. Domestic Integrated manufacturers are likely to remain better placed over the medium term, given their ability to manage input costs and benefit from tight cell supply–demand conditions. In contrast, standalone module makers may see more variability in returns, prompting many players to diversify into adjacencies such as inverters, IPPs, and battery storage. While current policy support and surging renewable demand provide a 'golden period,' the longer-term question is whether industry dynamics eventually resemble those of the steel sector—where returns are cyclical and heavily policy-influenced

01

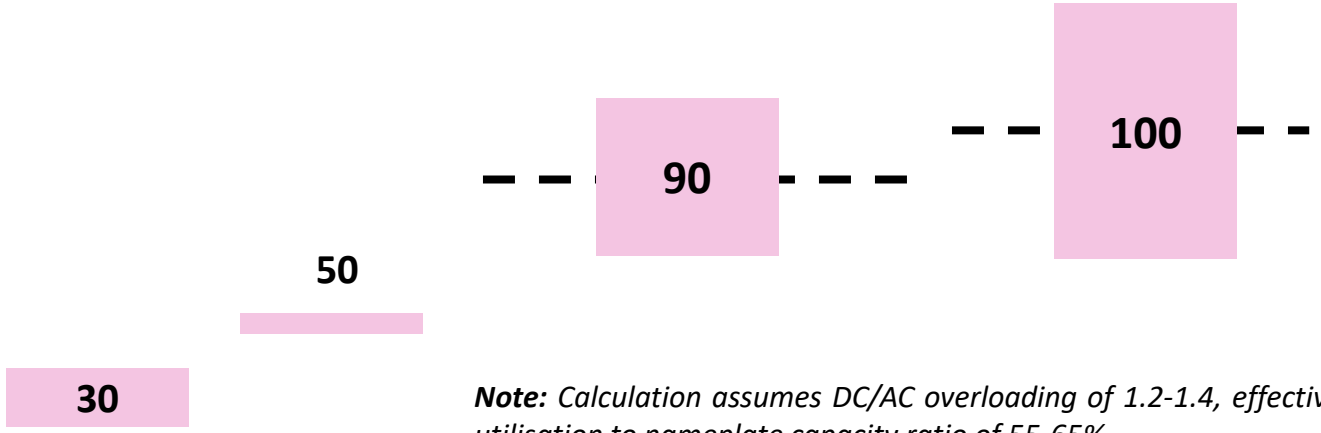
MATURE MODULE ECOSYSTEM TOUCHES 100 GW MARK

SOLAR ADDITION PACE TO STAY NEAR FY26 RECORD IN COMING YEARS

SOLAR GROSS ADDITIONS (GW)



DOMESTIC MODULE DEMAND PROJECTIONS (GW_{dc})



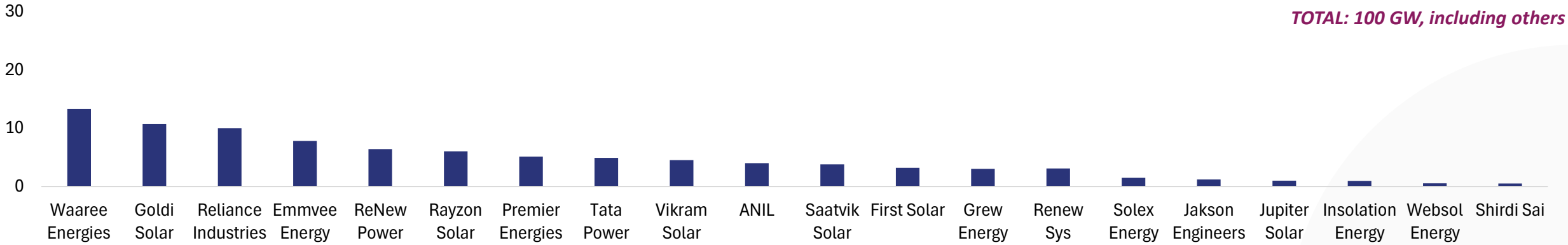
Note: *Calculation assumes DC/AC overloading of 1.2-1.4, effective utilisation to nameplate capacity ratio of 55-65%*

- Solar additions in Q1FY26 were ~11 GW, which is the highest ever, and almost half the additions seen in FY25
- Addition pace of ~40 GW/year is well on track to meet the estimated solar capacity by FY30, in line of healthy pipeline present
- Only ~4 GW of modules were exported by India in FY25, down on year due to changes in regulations in the US

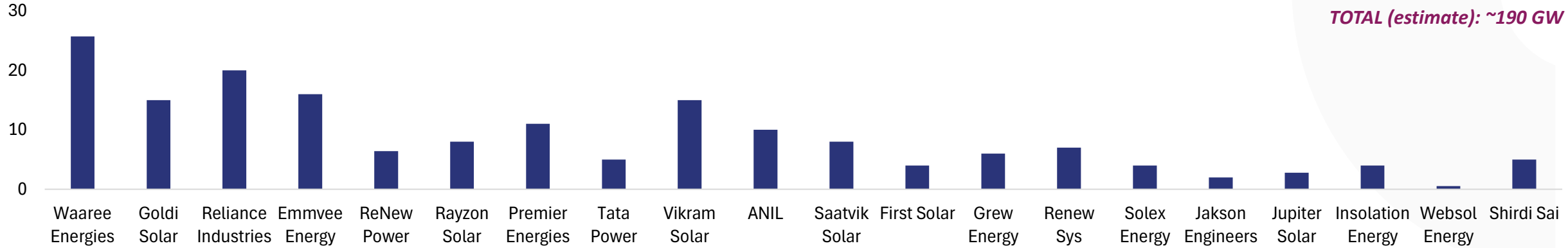
Source: CEA, SBICAPS

MODULE CAPACITY HEADING TOWARDS OVERCAPACITY BY 2027?

CURRENT DOMESTIC MFG. CAPACITY (GW_{dc})



EXPECTED DOMESTIC MFG. CAPACITY BY Mar'27 (GW_{dc})

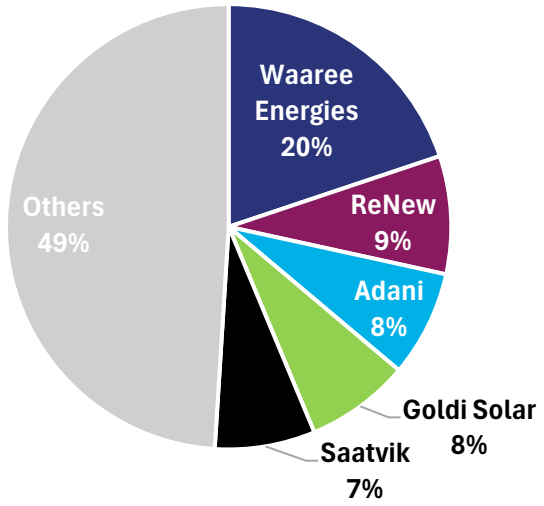


- Major module makers have announced significant capacity increases, which will double their nameplate capacity over the next 18 months. Given the steady state requirement of solar modules over the next 5 years corresponds to ~100 GW nameplate capacity, this might lead to over-capacity

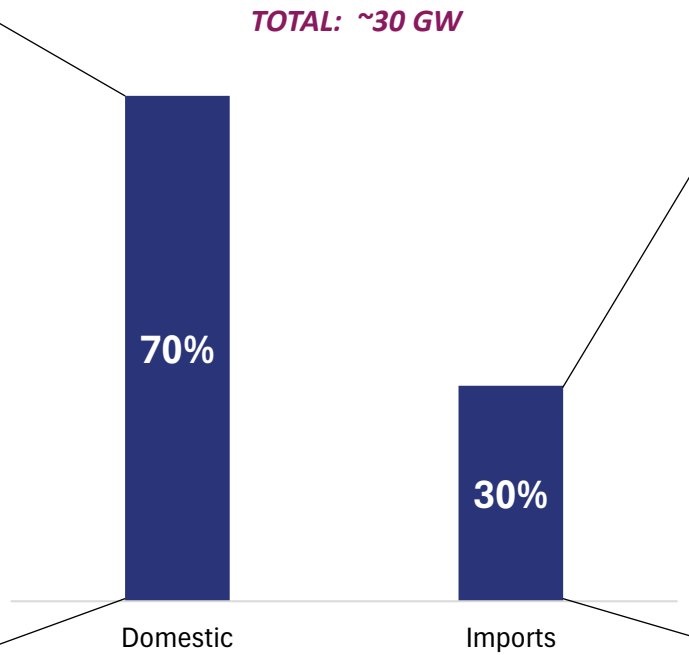
Source: Company Disclosures, MNRE, News Sources, SBICAPS

IMPORTS HAVE REDUCED BUT CONTINUE FOR CERTAIN PROJECTS

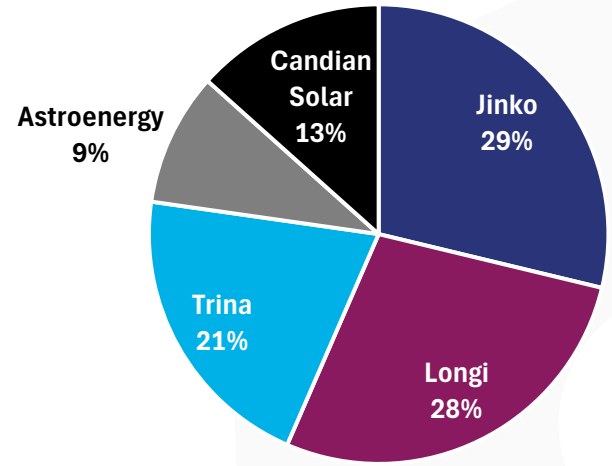
INDIAN PLAYERS



DOMESTIC MODULE CONSUMPTION (FY25)



FOREIGN PLAYERS

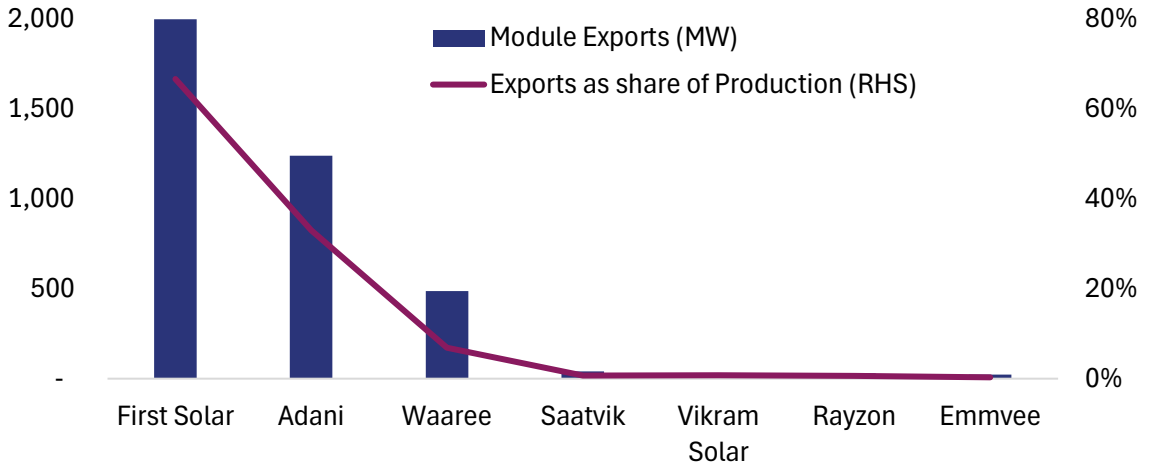


- Domestic consumption of modules rose by ~50% y/y in FY25. While utility scale additions rose handsomely, there was stark rise in non-utility setups which has helped drive demand to the next level. Demand for modules is expected to remain strong in the medium term
- The reimposition of ALMM from Apr'24, led to reduction in imports to Rs.322 bn in FY25, a 38% y/y decline. However, given sharp rise in non-utility segment, much of which does not require ALMM modules, imports also retained a fair share. Almost all imports are from Chinese companies

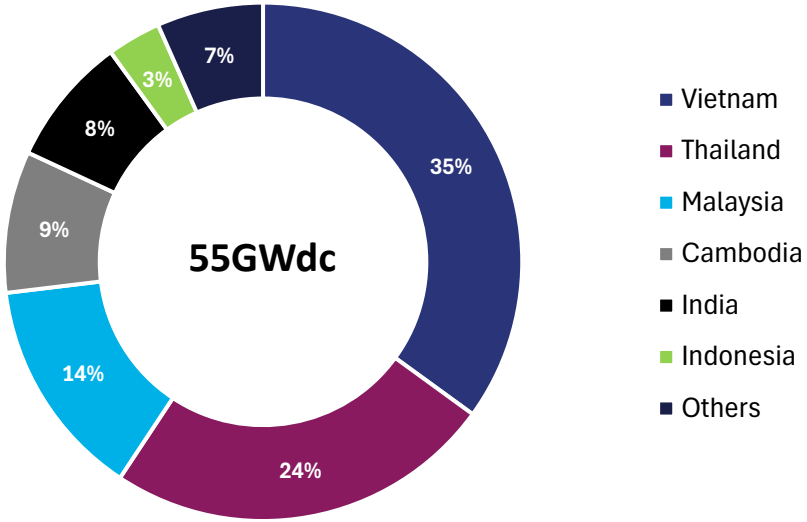
Source: JMK, Company Reports, SBICAPS

EXPORTS CURTAILED AS US GOES COLD ON SOLAR ENERGY

KEY MODULE EXPORTERS FROM INDIA



US MODULE IMPORTS BY SOURCE COUNTRY (CY24)



OVERSEAS CAPEX ANNOUNCEMENTS

COMPANY	TYPE	CAPACITY	STATUS
Vikram Solar	Module	3 GW	Plan is on but no investment made
Navitas Solar	Module	1.2 GW	On Hold
Saatvik Solar	Module	1.5 GW	On Hold
Waaree Energies	Module	1.6 GW	Operational
Premier Energies	Cell	1 GW	On Hold

- US administration issued a directive to halt funding from the IRA. The subsequent enactment of the 'One Big Beautiful Bill' is expected to phase out investment tax credits (ITCs) and production tax credits (PTCs) for solar and wind projects
- This has reduced exports of modules from India to the US (US was the major export destination for Indian modules). Instead, some players are setting up factories there, to adjust to the new FEOC rules

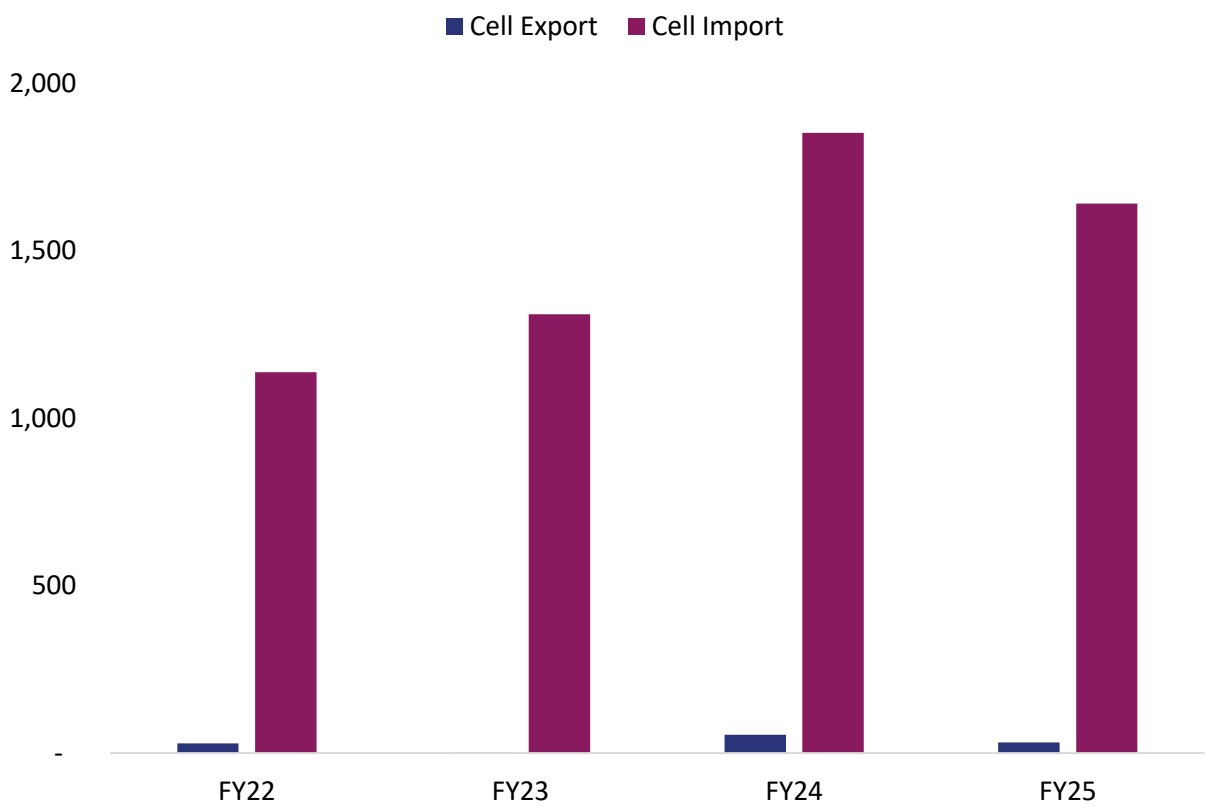
Source: Bloomberg, News Sources, SBICAPS

02

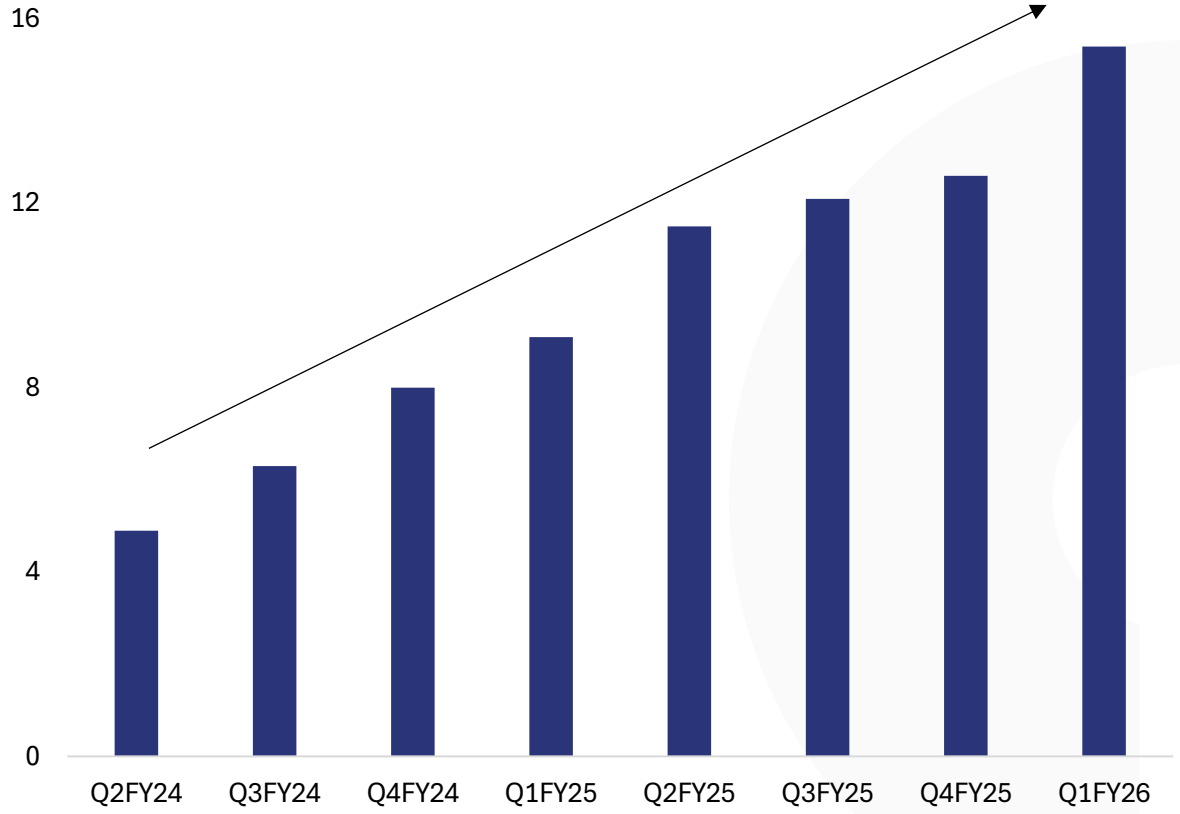
CELLS MAKERS RAMP UP QUICKLY TO TAKE ADVANTAGE OF ALMM-II

CELL IMPORTS TO REMAIN HIGH IN THE SHORT TERM

IMPORT AND EXPORT OF SOLAR PV CELLS (USD mn)



IMPORT OF SOLAR PV CELLS (GW)

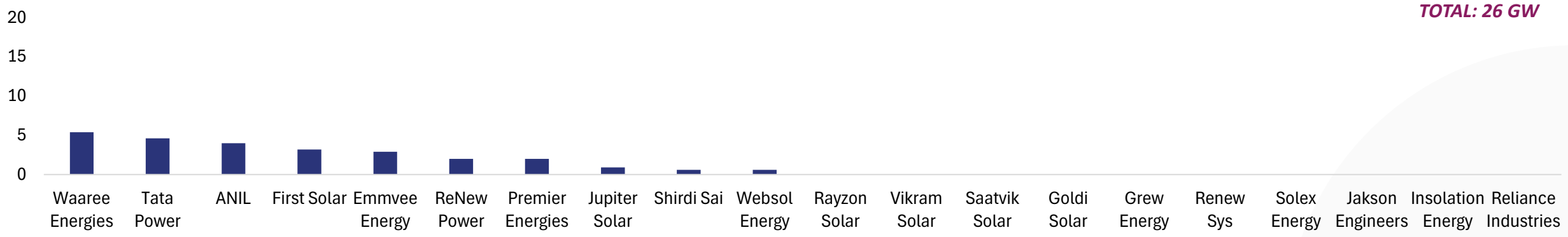


- Due to reduction in price of cells in FY25 vs. FY24, the value of imports of solar cells has reduced even though the volume has continued to surge
- With cell capacities less than one-third of module capacities in India, there will continued import dependence in the near term

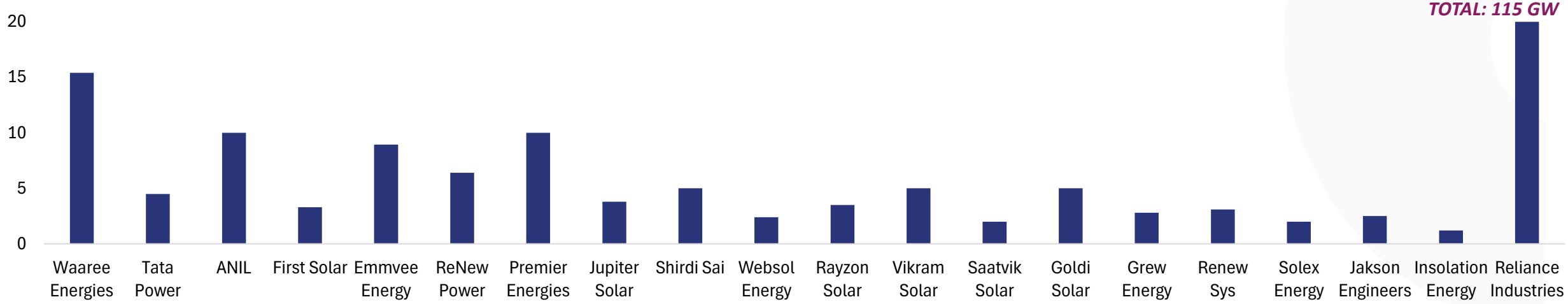
Source: Bloomberg, SBICAPS

INDIA TO BECOME SELF SUFFICIENT IN CELLS IN THE MEDIUM TERM

CURRENT DOMESTIC MFG. CAPACITY (GW_{dc})



EXPECTED DOMESTIC MFG. CAPACITY BY Mar'27 (GW_{dc})



- All major module players have announced plans to add significant cell capacities. By Mar'27, India should largely be self sufficient in cells, though given the considerable ramp up time for cell lines, effective production could be lower in the initial quarters

Source: Company Disclosures, News Sources, SBICAPS

ALMM-II IMPLEMENTATION TIMELINE COULD BE TOUCH AND GO FOR PLAYERS

ALMM LIST-II (SOLAR PV CELLS) – SALIENT FEATURES

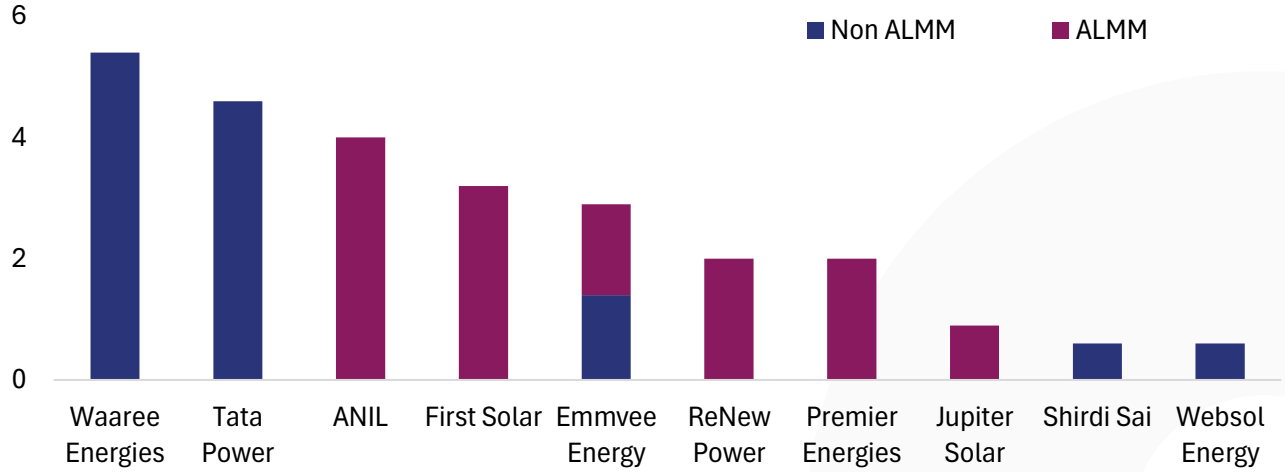
Implementation: from 1 Jun'26 (2-month delay from April)

Applicability: Besides utility, applies to cases where net metering/open access is used

Validity: Till July 30, 2029 (except FS India Solar)

Exemption: Projects with bid submission before 31 Aug'25 are exempt, regardless of commissioning date

PLAYERWISE CAPACITY UNDER ALMM LIST II (GW)



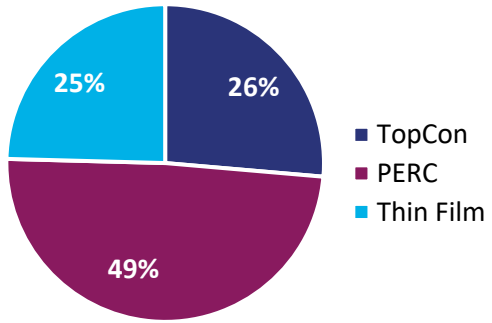
IMPACT OF ALMM-II ON SOLAR MODULES

From June 1, 2026, **only modules using List-II cells** remain in ALMM List-I

Non-compliant manufacturers **delisted** from List-I

ALMM List-I(a) to be introduced for modules not using List-II cells

SHARE OF TECHNOLOGY



- Implementation of ALMM-II will largely fold in the current DCR requirements. It may be noted that DCR modules sell at significant premium to non-DCR ones currently
- From 1 Jun'26, for all projects using net metering and open access RE, ALMM List I and ALMM List II will apply. This means that the significant chunk of C&I projects using imports will come down

Source: MNRE, SBICAPS