Market Research Report – India, 2022

Solar PV Manufacturing Business Opportunity & Outlook 2030 in India

Tracking fully integrated solar PV manufacturing covering full scale value chain of polysilicon, ingot/wafer, solar cell and solar PV modules for different regions in India

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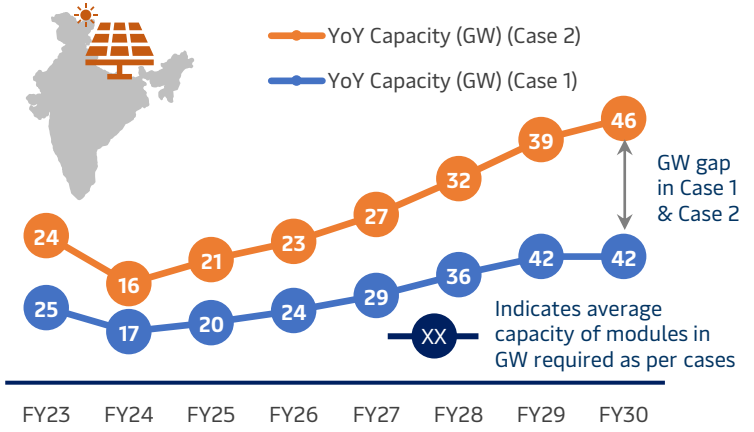
Market Research Report

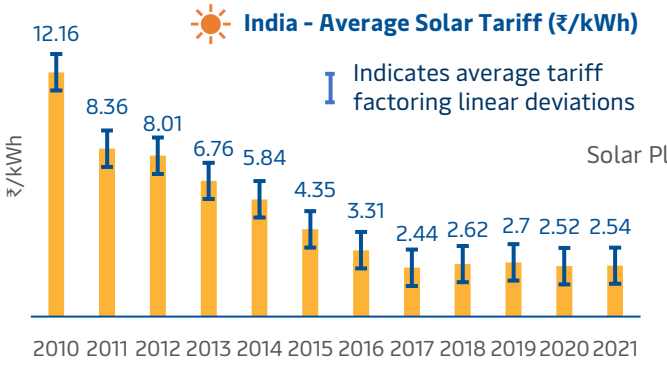
Why eninrac's market research on solar manufacturing in India with especially when impending imports ban from China on solar cells and modules kicks in early FY 22-23?

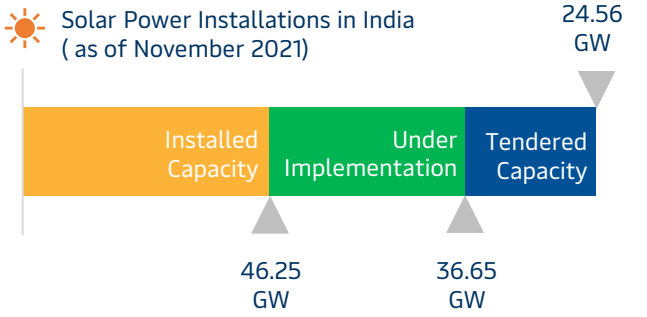
Import restrictions and impetus on adding more solar capacities are certainly going to be boon factors for solar manufacturing in India

With India, all set to impose import restrictions from April 2022 the solar manufacturing in the country is set to get unprecedented push more than ever. Talking numbers only, India would see a need of nearly 20GW+ in beginning half of 2020-30 decade and 35GW+ in the later half on yoy basis. For a country like India wherein the manufacturing base currently stands at **~10.8 GW** on yoy basis for modules[1] it will not be an easy task to scale up the base. Having said so solar manufacturing will certainly attract heavy investments in near future from both domestic and global majors.



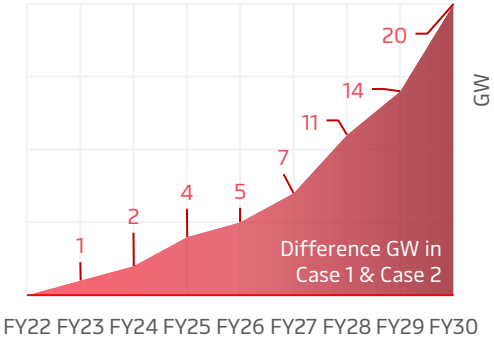
[1]As per List 1 of manufacturers of solar modules as per ALMM, Nov. 2021 (Dated 10th November 2021)



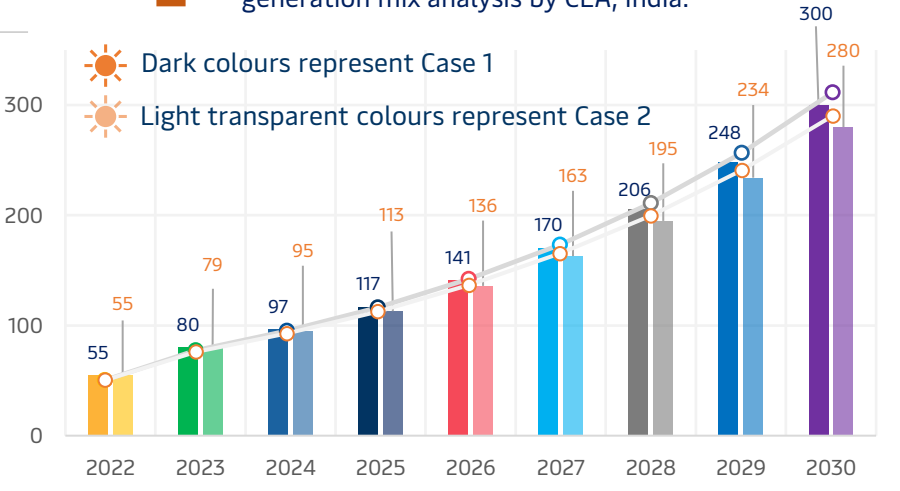


Case 1 – 55 GW of solar installed by FY 22 & 300 GW by FY 30 as per GoI Plan

Case 2 – 55 GW of solar installed by FY 22 & 280 GW by FY 30 as per CEA optimal generation mix report



Yearly solar installed capacity variance in India as per plan of GoI by 2030 and optimal generation mix analysis by CEA, India.

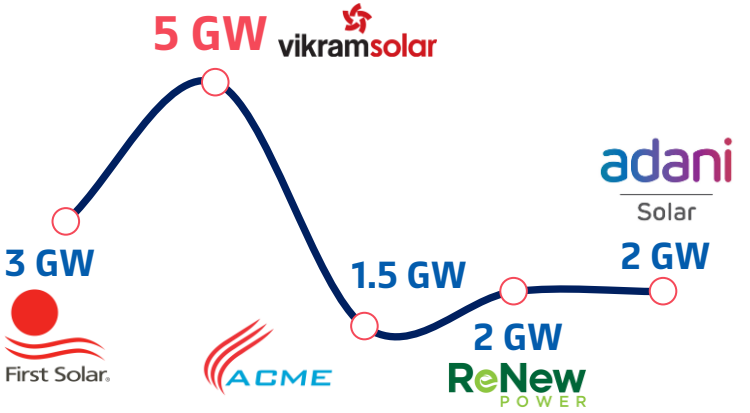


Source: Eninrac research & analysis, CEA, MNRE GoI, SERCs Tariiff Orders & Channel Checks

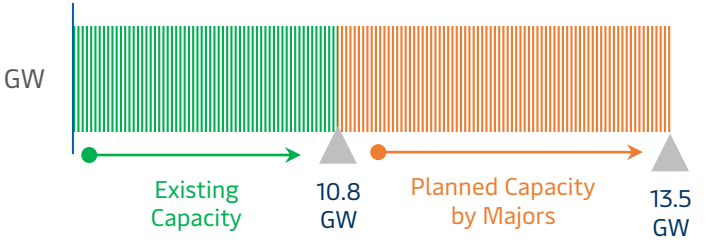
Why solar manufacturing presents $5 Billion investment opportunity by 2025-26?

Since the advent of COVID19 the intent of becoming self-reliant in most of the manufacturing base in India has garnered momentum. Thus, is no different for solar manufacturing either as the country was heavily dependent upon imports to meet the demand which was northbound in past decade or so. Moreover, in India a level playing field in solar manufacturing did not exist and nor were adequate incentive mechanism to provide for necessary fillip to augment the solar manufacturing in the country. Consequently, GoI bought in the PLI scheme to boost manufacturing with many other allied incentives and announced to develop three large bases to support manufacturing of entire spectrum of solar like modules, cells and wafers. To compliment the drive induced from GoI, many leading OEMs have already kicked off the plans to expand their manufacturing capacities. If we combine the leading OEMs only ~ **14GW** of additional capacity in solar module manufacturing capacity is expected to come online by FY 2025-26. This would be driven further with BCD being levied from April 2022.

Fresh solar manufacturing capacities planned to be added in India by leading companies till 2025-26



Solar Module Manufacturing Status in India (Nov.2021)



40% BCD on solar modules

25% BCD on solar cells

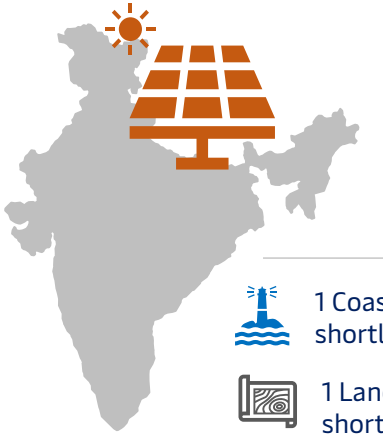
Both to be implemented from April 2022

Expression of Interest (EoI) already received by Government of India for solar manufacturing (Nov. 2021)

20 GW → EoI for Solar Modules

20 GW → EoI for Solar Cells

10 GW → EoI for Wafer



03 Large Solar manufacturing zones in India

- 1 Coastal State shortlisted
- 1 Hill State shortlisted
- 1 Land locked state shortlisted

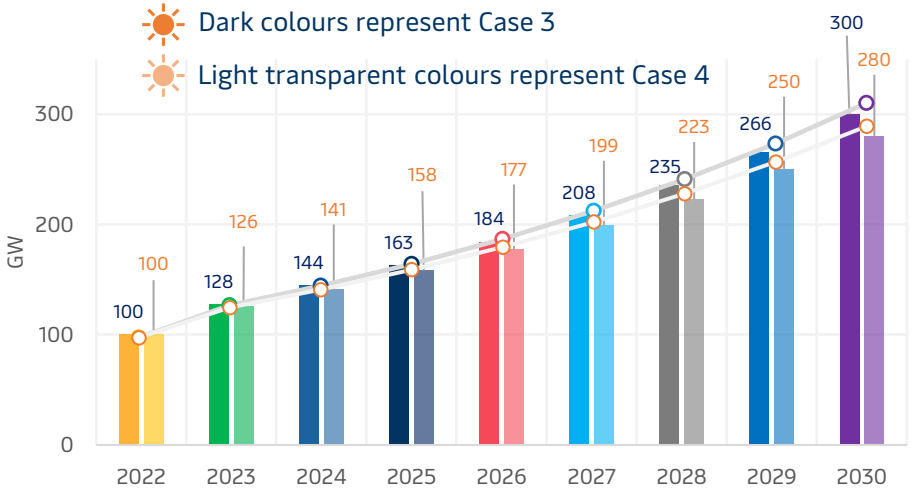
15 + firms already have concrete plans to invest over $3 Billion in India by 2025-26 in solar manufacturing under solar modules, cells & wafer respectively

Source: Eninrac research & analysis, Channel Checks

What shall shape the seamless transition of India as hotspot for solar manufacturing and transform into biggest base for attracting global investments in the segment?

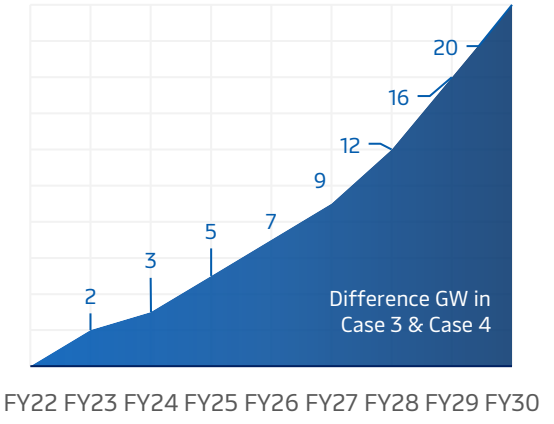
Solar manufacturing case when India witnesses an installed capacity of 100 GW by FY 22 depicted for Case 3 & Case 4

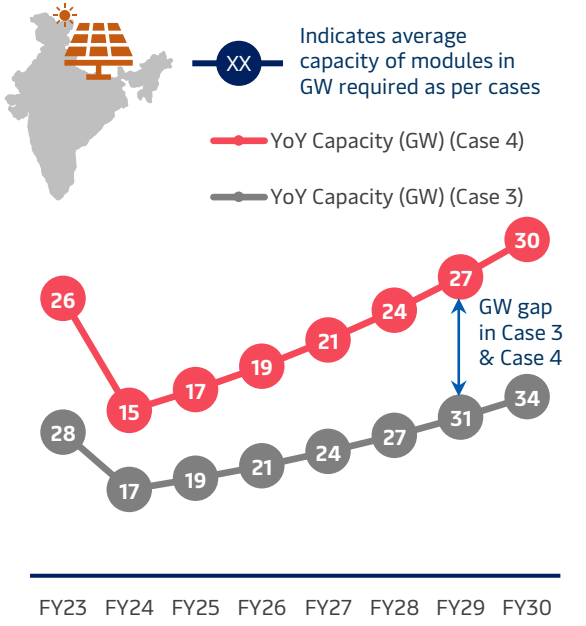
Yearly solar installed capacity variance in India as per plan of GoI by 2030 and optimal generation mix analysis by CEA, India with an assumption of 100 GW solar being installed by FY 2022



Case 3 – 100 GW of solar installed by FY 22 & 300 GW by FY 30 as per GoI Plan

Case 4 – 100 GW of solar installed by FY 22 & 280 GW by FY 30 as per CEA optimal generation mix report





Source: Eninrac research & analysis, CEA, MNRE GoI, SERCs Tariiff Orders & Channel Checks

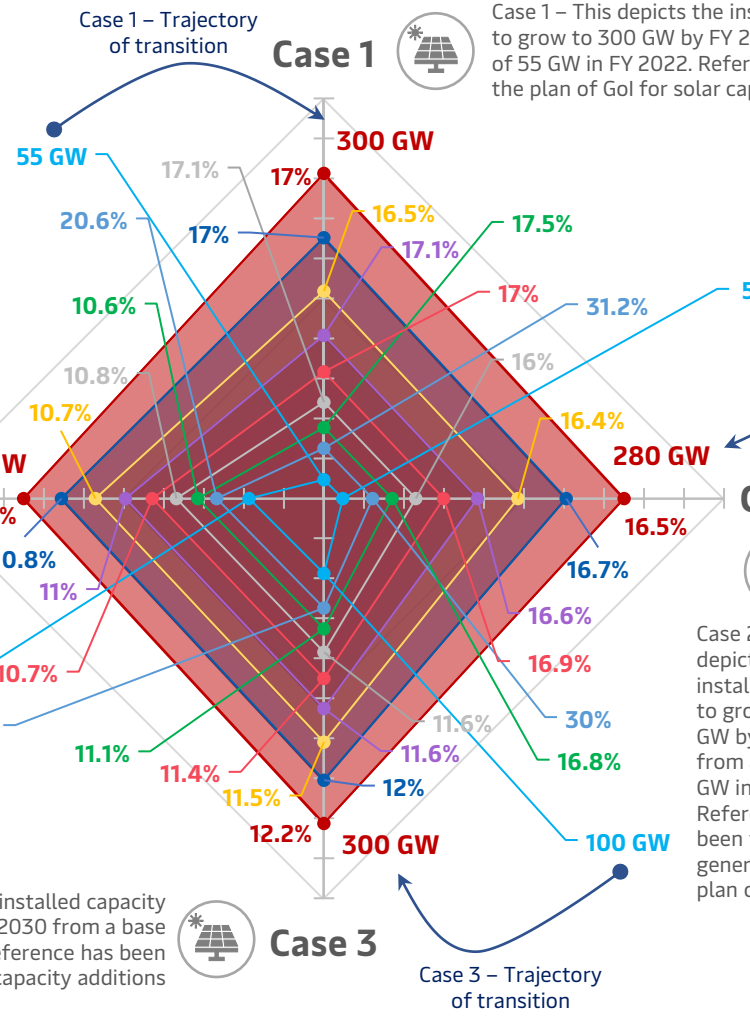
Companies from global hubs are eyeing India as their leading investment destination, especially the one's from US and Europe to counter the Chinese presence from the global markets and be the part of the largest growth market in the world simultaneously. For instance, US silicon wafer manufacturer 1366 Technologies (Cubic PV) and First solar have planned big investments in India till 2025-26. Interestingly, firms like Cubic PV are scouting for local partner firms to gain the necessary momentum in order to support its initial plan of setting up of 2 GW of solar cell & wafer manufacturing capacity in India with an investments of nearly $3.5 Mn. This would be gradually expanded to 10 GW in due course with a massive investment of $ 1.1 billion. This drive of foreign companies & many other domestic majors shall get a decisive push to head north only as GoI has already announced a PLI scheme of ₹4,500 Crore which shall be scaled up to ₹ 24,000 crores in due course. Reliance Industries & Adani Energy are already eyeing the green hydrogen along with solar manufacturing. To support it's larger objective Reliance industries are in advance level talks to acquire Europe's largest solar panel manufacturer REC group from its China helmed company ChemChina. Apart from these companies the established players like Tata Power, Borosil Renewables (first & only solar glass manufacturer in India), Websol Energy & Waree Energy are planning huge investments to cater to rising domestic manufacturing in solar sector of India.

10% yoy minimum growth required for India in solar manufacturing capacity from base year FY 22 to plan year FY 2030

Trajectory of transition – Represents the transformation of solar installed capacity on yoy basis from base year of 2022 to plan year of 2030 for India

Year wise capacity addition trajectory required in solar manufacturing capacity as per Case 1 to Case 4 – Estimates

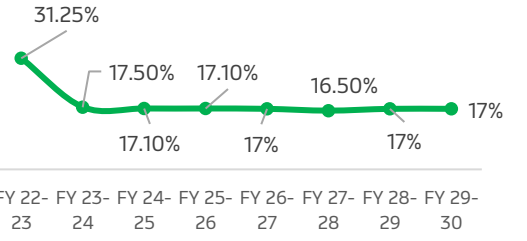
2022 2023 2024 2025 2026 2027 2028 2029 2030



Case 1 – This depicts the installed capacity to grow to 300 GW by FY 2030 from a base of 55 GW in FY 2022. Reference has been the plan of GoI for solar capacity additions

Extent of gradient increase in solar capacity manufacturing required under **Case 1** in India

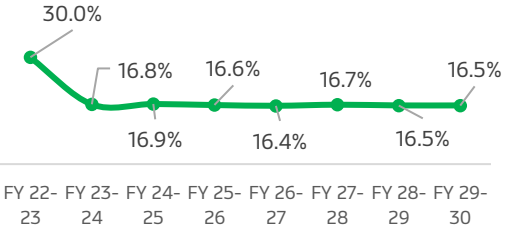
Case 1 - YoY Increase



Case 2 – This depicts the installed capacity to grow to 280 GW by FY 2030 from a base of 55 GW in FY 2022. Reference has been the optimal generation mix plan of CEA

Extent of gradient increase in solar capacity manufacturing required under **Case 2** in India

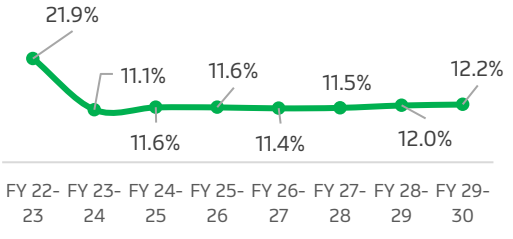
Case 2 - YoY Increase



Case 3 – This depicts the installed capacity to grow to 300 GW by FY 2030 from a base of 100 GW in FY 2022. Reference has been the plan of GoI for solar capacity additions

Extent of gradient increase in solar capacity manufacturing required under **Case 3** in India

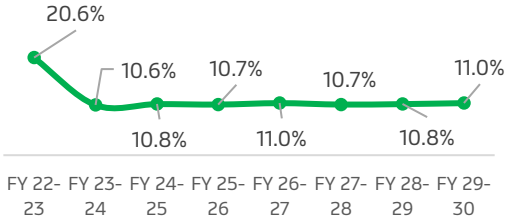
Case 3 - YoY Increase



Case 4 – This depicts the installed capacity to grow to 280 GW by FY 2030 from a base of 100 GW in FY 2022. Reference has been the optimal generation mix plan of CEA

Extent of gradient increase in solar capacity manufacturing required under **Case 4** in India

Case 4 - YoY Increase



Case 4 & Case 3 are in order the most likely cases possible for India provided cumulative solar installed capacity reaches 100 GW. **Case 4** would also need a serious push to attain a capacity delta rise of 10% on yoy basis from FY 22 to FY 30

Source: Eninrac research & analysis, MoEF GoI, OEMs Manufacturing & Channel Checks

Key Signpost – Solar manufacturing will gather momentum in India, no two words onto that but whether the country be able to absorb the planned capacity additions on its remains to be witnessed?

For India which is identified as a country designated for embellished solar installations the business interests of both domestic & foreign OEMs to envisage manufacturing bases under solar PV value chain is inevitable and looks very promising. However, when looked upon with the rationale to have a comprehensive indigenization across the PV value chain the first few connectors seem out of place which involves raw materials availability domestically in the country which essentially may pose significant threat to the planned module manufacturing capacities as approved under the ALMM List – I.

Prima facie lack of availability of high quality poly-silicon in the country would be extremely challenging to indigenize as only handful players across the globe that too in the mature markets have been able to achieve. Therefore, it becomes essential to evaluate these links of the chain in order to have a flourishing solar PV manufacturing market in the country possibly in less then a decade's time now, which needs comprehensive assessment for market development & potential challenges map in order to project a path finding guide for all participants in the solar PV manufacturing market. Thus, eninrac consulting is coming up with a comprehensive dossier addressing all market needs & entailing dimensions involved within for solar PV market.

What's our difference margin for market research?

1 Our Market Research Coverage Range

- Assessing business case of solar PV manufacturing in India
- Raw material sourcing & challenges for solar cells and module manufacturing in India
- Pricing of solar PV modules in India – Scenario based estimation using "Data to Information" (D2I) Model
- Identification of key demand clusters of solar PV modules in India

2 Our Market Research DNA & Team of Domain Specialists

- We boast a highly qualified and experienced team of market research professionals having experience of working in top companies across different domains
- Our focus on nurturing industry connect is paramount which helps us generate high quality robust market feed which is filtered and sourced through from different levels
- Any market research report follows strict turn-around-time procedures with cross-vetting from our Knowledge Grid Experts which adds immense value to our research credentials for the deemed subject

3 Our Satisfied Patrons and Retention rate of over 97.6% on yoy basis

We have been bestowed with a phenomenal client retention rate and many satisfied clientele. Our client's have been from wide variety of industry domains and from different geographic locations across the globe. Eninrac consulting is a trusted market research partner and an objective resource augmenting value for more than 327+ group companies & 852+ market research delivered

Contents & Coverage – Solar PV Manufacturing Business Opportunity & Outlook

01 Assessing business case for solar manufacturing in India

This section shall cover the impact on imports of solar PV modules post introduction of Basi Custom Duty (BCD) and shall talk about PLI program for solar manufacturing in India. Further, a ALMM list shall also be shared along with the FDI status in solar manufacturing

02 Overview of solar manufacturing market in India

This section shall cover current module manufacturing capacity in GW, ingots & wafers manufacturing capacity in GW, polysilicon manufacturing capacity in GW and current module manufacturing capacities as per OEMs

03 Raw material sourcing & challenges for solar cells and module manufacturing in India

This section shall cover raw material sourcing process and challenges for solar cells & module manufacturing in India

04 Location fitment indexation for solar PV module manufacturing in India

Detailed indexation of state as per incentives offered for manufacturing, further business ranking of states shall be done on regional basis i.e. Northern, Eastern, Western & Southern w.r.t. solar manufacturing value chain

05 List of clearances & permits required for setting up solar PV module manufacturing in India

This section shall cover the list of clearances & permits required for setting up solar PV module manufacturing in India

06 Infrastructure set up cost map & key cost drivers for solar manufacturing

This section shall cover module bill of material (BOM) comparison, cell manufacturing cost comparison, wafer manufacturing cost comparison etc. for India w.r.t. countries like China & USA

07 Crystalline silicon PV module manufacturing cost mapping in India

Benchmark analysis for setting up plant with cost reduction map shall be carried out in this section with the backing of a holistic survey-based input for costs currently existing in India along with fixed & variable cost maps

08 Regulation & policy framework for examination of scaling up solar PV module and it's value chain manufacturing

This section shall involve a holistic list of clearances and timeline involved with the same for development of solar PV module manufacturing in India

09 Risks & challenges for solar PV module manufacturing in India

This section shall involve a holistic view of risks and challenges associated with the module manufacturing consisting of investments environment, policy & regulatory environment, infrastructure constraint etc.

10 Pricing of solar PV modules in India – Scenario based estimation

This section shall Pricing of solar PV modules in India – Scenario based estimation using "Data to Information" (D2I) Model under long, medium & short-term range

11 Customer analysis for solar PV manufacturing market

A scenario-based (short term, medium term & long term) estimation shall be done based on a D2I model

12 Scaling up of solar PV module market in India

This section shall involve the type of infrastructure required for scaling up solar PV market in India

13 Identification of key demand centers of solar PV modules in India

Identification of key demand centers shall be done as per region, end use application, logistics & development of supportive infra index

14 Go-to-market (GTM) strategy for market participants

Developing a GTM strategy for technology providers, project developers, end use companies etc.

Key Highlights for Market Research on Solar PV Manufacturing Business Opportunity & Outlook

1. Examining business case for polysilicon suppliers, solar PV module & cell manufacturing companies and other value chain players
2. Understanding raw material sourcing challenges for solar cells & module manufacturing in India
3. Module & cell manufacturing cost comparison with China & USA, outlook for decreasing the cost
4. Benchmark analysis for setting up PV module manufacturing plant with fixed & variable costs
5. Pricing of solar PV modules under short, medium & long-term range as per growth of Indian solar market
6. Identification of key demand clusters for solar PV modules as per project development & pace of capacity addition on regional basis
7. Customer analysis for solar PV manufacturing market in India as per key end use & power developers
8. Value chain indigenization, strategy development as per domestic & international sales strategy spread across both primary components & supply chain ecosystem

Differentiating Insights for Market Research on Solar PV Manufacturing Business Opportunity & Outlook

1. Current solar manufacturing market with split of domestic & foreign OEMs and primary components
2. Pathways to secure high-quality polysilicon production in India addressing cost challenge to tied over Chinese competition
3. Evaluating major drivers such as tariff barriers & PLI for long term as per quantum of manufacturing for modules, cells, ingots & wafers
4. Location fitment analysis for solar manufacturing as per different region and ease of doing business index for state wise split
5. Infrastructure cost set up and benchmark analysis for solar PV manufacturing in India
6. Solar PV module manufacturing market competition analysis
7. Comprehensive benchmark analysis for solar PV module manufacturing companies in India
8. Future outlook comprehensive map for solar PV manufacturing along with value chain
9. Company profiling of all major OEMs (domestic & foreign) involved/planning to enter solar PV manufacturing in India

Must Buy For

- Solar PV Module Manufacturers
- Solar Cell Manufacturers
- Wafers & Ingots Manufacturers
- Polysilicon Suppliers
- Solar Primary Component Developers
- Solar Supply Chain Players
- Solar Project Developers
- Independent Power Producers
- EPC Players
- Investment Banks
- Funding Bodies
- Regulatory Authorities
- Financial Institutions
- Credit Rating Agencies

For Queries

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Please call at +91 7290016953/54 for any other queries

Companies Mentioned

- Mundra Solar PV
- Vikram Solar
- Emmvee PV Power Private Limited
- TATA Power Solar
- Renew Sys India Private Limited
- Premier Energies Ltd.
- Websol Energy Systems Limited
- Sova Solar Limited
- Goldi Solar Private Limited
- Waaree Energies Limited
- PV Power Technologies
- Saatvik Green Energies
- Navitas Green Solutions
- Jakson Engineers Ltd.
- Patanjali Renewable
- Grasim Industries
- Gautam Solar
- Novasys Green Energy
- Pixon Green Energy Private Limited
- Alpex Solar

The life of a man consists not in seeing visions and in dreaming dreams, but in active charity and in willing service

- Henry Wadsworth Longfellow

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