



Future of Solar Energy in India

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Threat of Global Competition in the Manufacturing Sector

Current Market

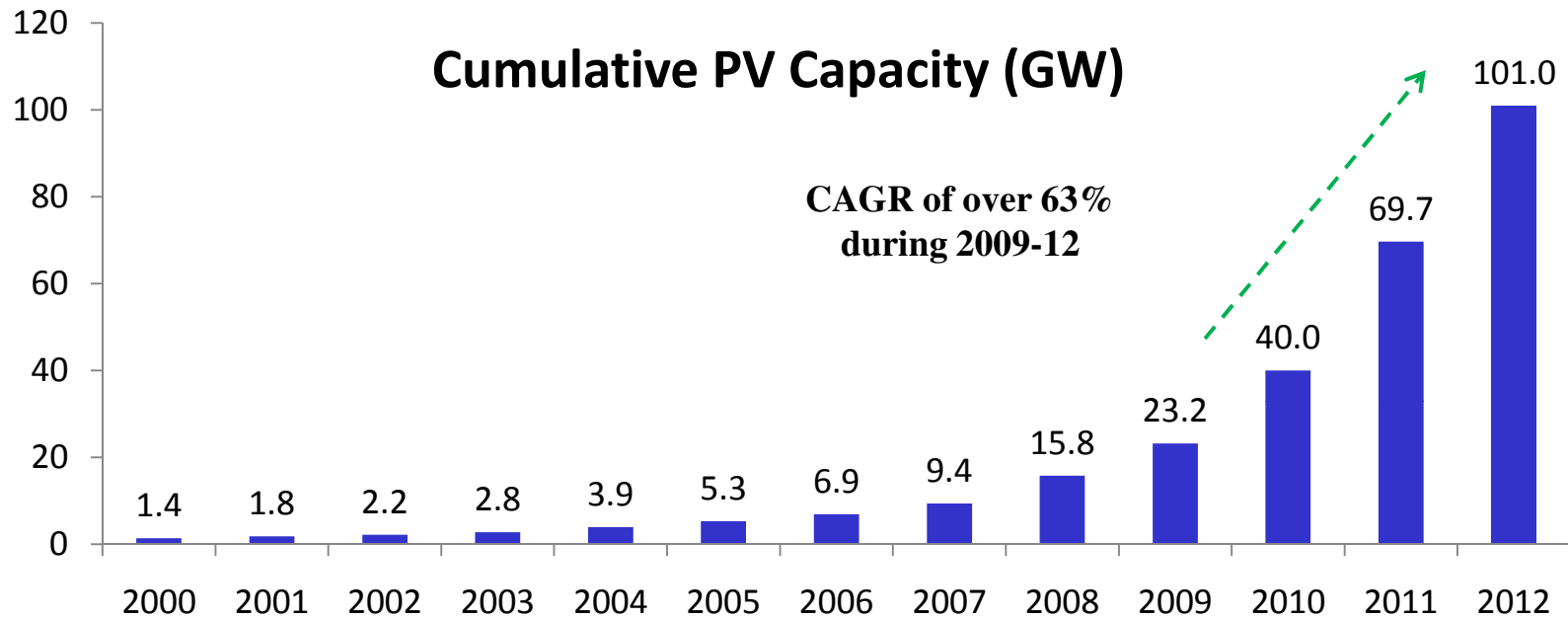
- Solar PV installed capacity has increased from about 40 MW in 2010 to over 1,800 MW as of August 2013
- Gujarat and Rajasthan are the top two states in India with a combined share of over 70% of the Indian market
- Only 18% of the Indian market is catered to by the domestic players; rest 88% of the market is serviced by foreign manufacturers led by First Solar (share of over 21%)
- Moser Baer Solar is the one of the largest EPC player in India
 - Leading player in the 'Third Party' EPC segment with a share of over 18%
 - Third player in the 'Own' EPC segment with a share of 11% of the Indian market

Future Outlook

- Over 700 MW of solar power expected to be installed in India over the next 12 months
- About 2.3GW of solar installations are expected in the commercial parity space in the next 4 years
- Cumulative installed capacity by 2016 forecast at 12.8 GW

Source: Bridge to India

PV installations have grown rapidly over the last 3-4 years



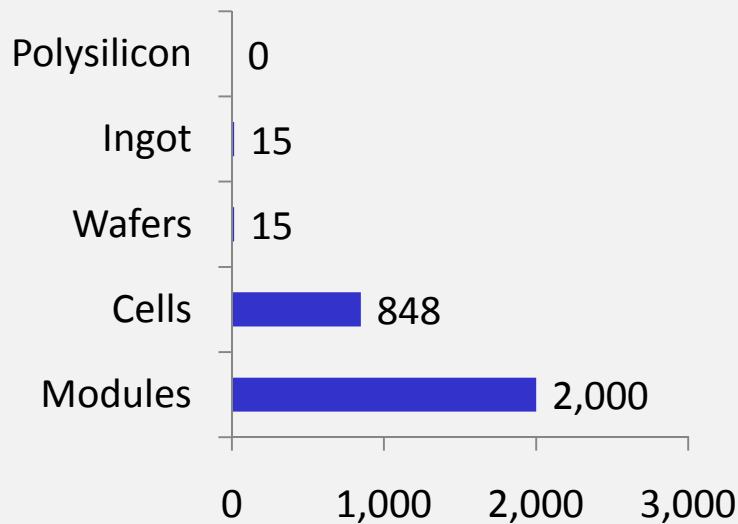
While demand increased strongly during 2009-12, capacity/supply increased even faster thereby putting downward pressures on pricing

Source: EPIA

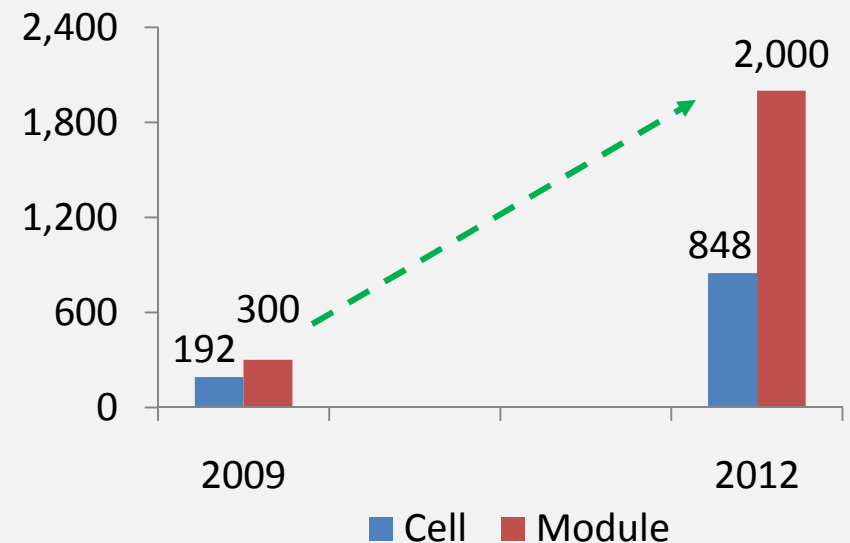
Domestic Solar PV Manufacturing - Overview



Domestic Solar PV Manufacturing Capacity (MW)¹



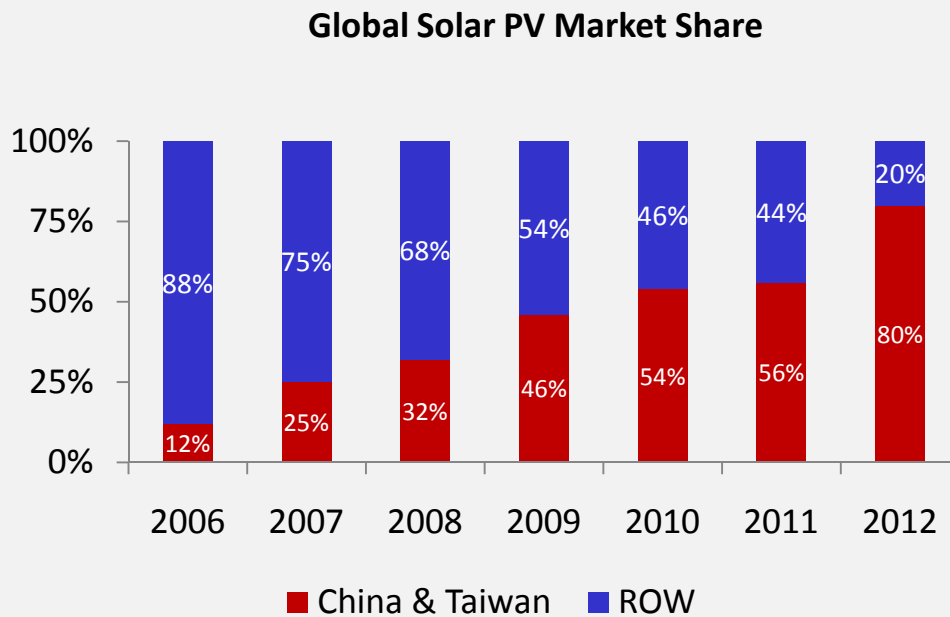
Ramp up of Capacities in India (MW)¹



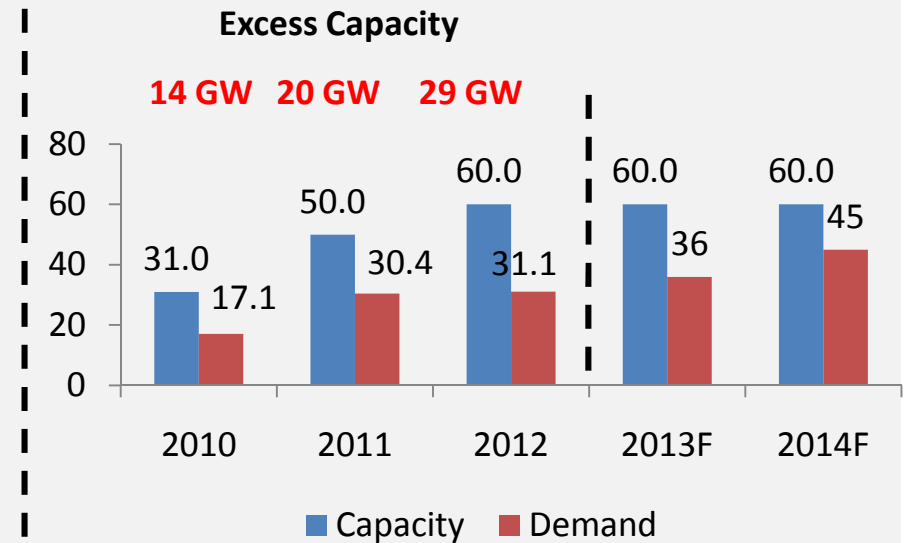
- Indian Solar Manufacturing industry has installed capacity of close to 1GW of Cells & 2GW of Modules with an investment of Rs 10,000 Cr
- MNRE under the JNNSM has targeted a domestic manufacturing capacity of 5,000 MW by 2017
- However, bulk of the PV capacity in India is currently sitting idle on account of predatory pricing and dumping of products from China

1. Capacity figures are at the end of 2012
2. Jawahar Lal Nehru National Solar Mission

Massive Buildup of Capacities in China....



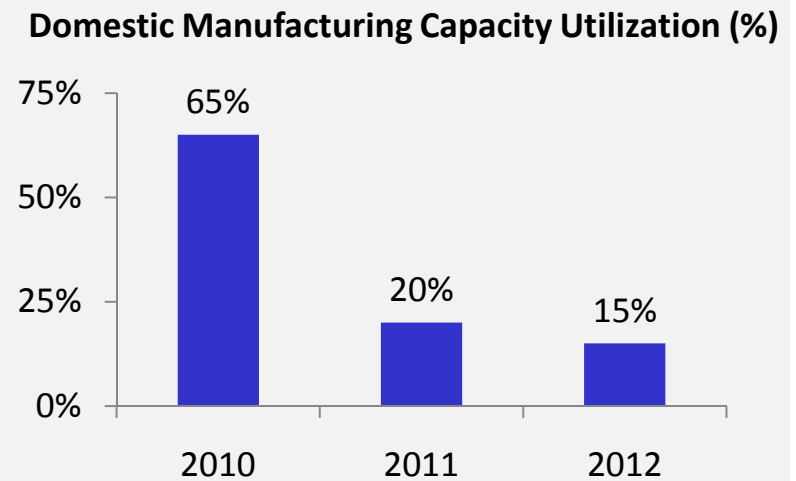
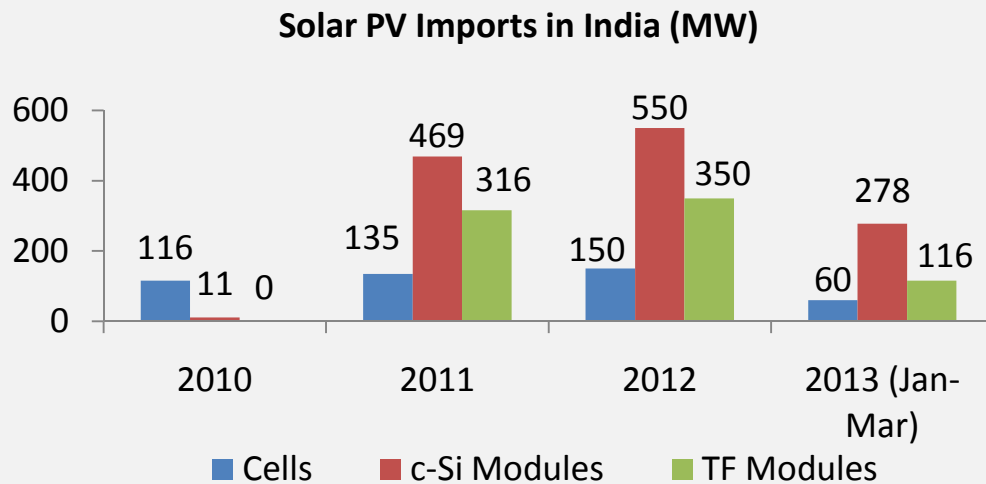
Global Solar Demand Supply Imbalance (GW)



- Chinese Govt provided USD 43 bn in subsidies & soft loans to enable Chinese players to dominate global manufacturing
- Provincial Govts provide free land, low cost power (50% lower than in India) & integrated infrastructure to major Chinese players to ensure low cost production and supply chain efficiencies.

- The huge capacity buildup by Chinese manufacturers resulted in serious demand-supply imbalance in the global PV market
- Over 50 solar PV companies announced bankruptcy/exit globally (key players - Bosch, Siemens, Q Cells, Solyndra, Siemens, Abound Solar, Conergy etc.)
- This impacted Indian manufacturers as well that suffered due to collapse of ASPs on account of the massive oversupply situation

.... Adversely Impacted Domestic Manufacturing Industry



- Solar module prices fell by about 80% (USD 3/watt to USD 0.6 watt) during 2010-2013 Aug
- Solar PV imports into India increased at a CAGR of 188% during 2010-12
- Indian Manufacturing virtually shut down jeopardizing >Rs 10,000 cr. investment
- New manufacturing lines lying unopened
- Over 27,000 jobs at stake with job losses increasing by the day
- All the cell manufacturers in the process of debt restructuring
- Suspension of technology development and R&D initiatives
- Erosion of capital and productive assets

- **Over 50% of India's PV Cell capacity and 100% of the module capacity is already technologically at par with the global standards**
 - **By end of 2010, leading domestic manufacturers such as Tata Solar and Moser Baer Solar were exporting a high proportion of their capacities to attractive markets such as Germany, Italy, Spain etc.**
- **Cells & Modules made in India have all the requisite International Product & Quality accreditations (ISO 9000, ISO 14000, ISO 18000, IEC, UL, JET, JIS, MCS, CSTB etc)**
- **Rest of the Indian PV Cell industry can also achieve technology parity within a short time, provided domestic market development takes place through policy support**

With the right Policy support and Eco-System development, Indian manufacturing has the ability to stay ahead on the Technology curve

Europe

- In August 2013, the European Commission (EC)
 - Limited annual Chinese PV imports to European Union at 7 GW and
 - Imposed a minimum price guarantee of €0.56/watt on Chinese players

USA

- In October 2012, US Department of Commerce announced antidumping duties of 18.3-249.9% and countervailing duties between 14.78-15.97% on Chinese PV imports

Compelling need to develop Domestic Solar Manufacturing base



Need to lower dependence on Energy Imports

- Robust domestic solar manufacturing industry would lower dependence on imported energy that presents a huge geo-political risk
 - Reliance on imported energy also exposes to the risk of severe cost escalation and adverse impact on the current account balance
 - India is targeted to witness ~8 GW of additional PV capacity by 2017 (JNNSM), which if imported would result in a forex outflow of over USD 5 billion

Need for a Robust Domestic Eco-System

- A strong manufacturing base would also lead to long term development of the Solar Industry in India across the value chain and would strengthen the overall eco-system

Employment Generation

- Economic development and high quality employment generation across the solar value chain

Technology Development

- Growth and development of R&D in Solar power

Domestic Content Regulation

- Urgent implementation of Domestic Content Regulation in India on Technology agnostic basis (covering both Crystalline Silicon & Thin Film Technologies)

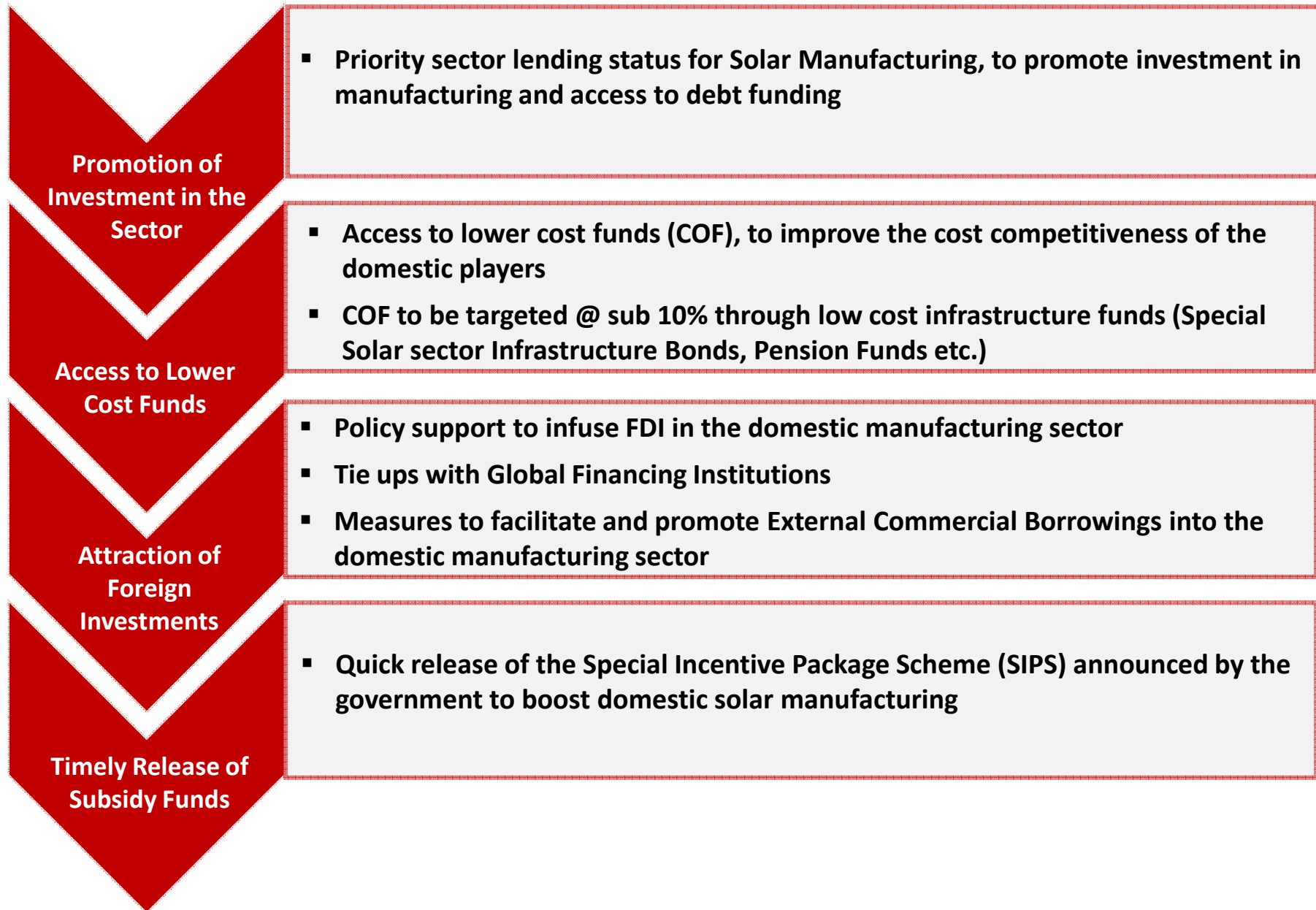
Anti Dumping Duties

- Urgent imposition of Anti Dumping Duties to provide a level playing field against dumping at predatory prices by overseas manufacturers, led by China

Stricter Enforcement of Solar RPOs

- Stricter enforcement of the solar renewable purchase obligations on the obligated entities, especially the discoms
 - This is essential to ensure targeted development of the solar REC Market

Policy Measures to Stimulate Domestic Manufacturing



Support in Upgradation of Manufacturing Facilities

- A one time Technology up-gradation fund facility to be provided to existing manufacturers to achieve quality/cost competitiveness

Investments in R&D

- Promotion of investments in technology development through
 - Solar Research Centers/R&D Labs, Test facilities, Resource assessment facilities, Training Centers, Educational Institutions etc.

Next Generation Technologies

- Access to next generation technologies

Integrated Solar Manufacturing Parks

- Promotion of integrated Solar manufacturing parks as clusters of excellence
 - Provision of land and suitable infrastructure including reliable power supply to house the entire manufacturing eco-system (wafers, cells, modules and Balance of Systems)

Domestic Manufacturing Eco-System

- Policy Support for development of robust and complimentary PV Eco-system – BOM, BOS & Machinery Mfrs

- **Policy support by the Government to revive the domestic Solar PV manufacturing industry**
- **Liberal policies for encouraging foreign investment (FDI) in domestic manufacturing**
- **Timely release of subsidy funds (SIPS etc.) by the Government**
- **Access of reliable power to the domestic players (on payment basis)**
- **Impetus on R&D in solar energy development through institutions such as IITs, CSIR's etc.**
- **Leverage solar as a large manufacturing and services sector employment base**



Thank You