

Solar Manufacturing in India; A KMPG Report

Solar power is a strategic need for India as solar power can potentially save around USD 20 bn. in fossil fuel imports annually by 2030. A sustainable domestic manufacturing industry can save USD 42 bn. in equipment imports by 2030 and create 50,000 direct jobs and at least 125,000 indirect jobs in the next 5 years, besides providing equipment supply security.

Why India needs to build Solar Manufacturing Capacity

India's energy imports have risen sharply from USD 43 bn. in 2005-06 to USD 167 bn. in 2013-14. In comparison India's trade deficit in 2013-14 was USD 139 bn (table 1).

Solar power is a strategic need for the country as solar power can potentially save USD 20 billion in fossil fuel imports annually by 2030 and domestic manufacturing can save USD 42 billion in equipment imports by 2030.

In the absence of manufacturing, India will need to import USD 42 bn. of solar equipment by 2030 corresponding to 100 GW of installed capacity.

Solar manufacturing can also create direct employment of more than 50,000 in the next 5 years assuming local manufacturing captures 50% domestic market share and 10% global market share. Another at least 125,000 indirect jobs will be created in the supply chain

India may not be able to utilize its large solar energy resources, if imports of solar panels get impacted due to

- Major exporters using their production for their domestic use.
- Sudden jump in prices in the future due to supply shortages (e.g.. Polysilicon price jump in 2008)
- Dispute with major suppliers (as evidenced in case of China's rare earth

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supply to Japan or supply of gas by Russia to European nations)

Why it is necessary for India to support a strategic industry [Solar] at early state of the life cycle?

- Economies of scale results in lower cost and brand building
- Skilled manpower gets developed with passage of time
- Overall strategy for innovation and exports are developed at an early stage
- Appreciation of industry and competitive dynamics
- Large domestic market helps in expanding capacity

- Capabilities are built to compete effectively in competitive global markets
- Strong ancillary industry is created
- Clusters for knowledge and infrastructure sharing are developed
- Research institutions develop industry linkages and support innovation

Global Solar Manufacturing Scenario

Globally, there are examples of countries providing strategic support to solar energy also supporting solar manufacturing (table 2).

- China has developed 'solar champions' in a systematic manner through massive subsidies, low interest loans, grants and easy access to land and utilities
- Globally, manufacturing bases are being planned as integrated solar industrial clusters with strong Government support (table 3).

Indian Solar Manufacturing Industry

India's Manufacturing Policy recognizes solar manufacturing as an industry with 'strategic importance'. However, the policy is yet to have the intended effect:

- 40% of the Indian solar cell manufacturers have shut down with industry utilization at only 21%
- The industry has suffered due to sudden and sharp price declines due to

TABLE 1

In billion USD	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Coal	3	4	5	9	8	9	17	16	15
Crude Oil	39	48	68	77	80	100	140	144	143
LNG	1	1	2	3	2	3	7	8	9

TABLE 2

Country	2013 Solar Installations (MW)	Manufacturing Capacity (MW)
China	12,900	45,000
Japan	6,900	3,597
USA	4,800	1,500
World	39,000	65,000

Note-Japanese and US companies have large manufacturing capacities abroad in addition to domestic capacity.

global over-supply and lack of a level playing field

Indian manufacturing costs are higher due to three major reasons:

- Lack of scale -Indian factory sizes are only one-fifth the size of a typical Asian factory
- Insufficient government support -Other countries have provided massive loans, tax holidays, subsidized utility services, easy access to land and technology support
- Underdeveloped supply chain -Indian manufacturers have no access to domestic upstream raw material supplies of polysilicon and wafers

The Indian government would be a net beneficiary by encouraging solar manufacturing as jobs would be created and taxes will increase. The Potential Impact by 2024 on NPV basis will be:

- Potential loss due to higher prices = USD 851 million

- Direct taxes on manufacturing: Domestic capacity of about 10GW by 2024 = USD 870 million
- Direct taxes on Salaries: Employment generation of about 75,000 by 2024 = USD 90 million
- Impact on taxes owing to GDP increase and factoring tax/ GDP ratio = USD 980 million

Following are some global examples and case studies that India needs to look at:

TABLE 4, Average Solar PV Plant Cost in India

	Domestic Panels	Foreign Panels
Rs. Cr/MW	7,5	6,5

1. Case Study: Chinese Export Embargo impact on REE price showing how overdependence on critical fuel sources and materials can prove to be disruptive

- Rare Earth Elements (REE) are critical inputs for Japanese giants like Mitsubishi, Toyota and Sony in hi-tech manufacturing of electric vehicles, wind turbines and defense equipment
- China controlled 97 percent of the global REE supply and Japan imported 80 percent of its REE requirements from China
- In 2010, China cut its REE export quota by 39 percent while banning the export of 41 rare earth-related processed products

- As a result, REE Prices more than tripled in 2011 and Japanese production was severely disrupted

2. Creating Solar “National Champions” has become a strategic imperative for large nations

“Support will be provided to major enterprises to grow stronger so that by 2015, leading polysilicon enterprises will reach 50,000 metric tons per year, and major enterprises will reach 10,000 metric tons per year; leading solar cell enterprises will reach the 5GW level, and major enterprises will reach the 1GW level. By 2015, in China there will be one PV enterprise with annual sales revenue exceeding RMB 100 billion, 3-5 PV enterprises with annual sales revenue exceeding RMB 50 billion, and 3-4 enterprises specializing in PV equipment manufacturing with annual sales revenue exceeding RMB 1 billion” –Chinese 12th Five Year Plan

China already has 7 of the 10 global “solar champions” and it is plans to make them even more dominant as solar energy becomes an increasingly important component of the global energy basket.

3. Case Study: It has become very costly and difficult for India to catch-up in electronics manufacturing

- Despite being one of the world’s largest consumers of electronic, Imports account for more than 60% of domestic demand
- Electronics industry was not given due importance during early stages of evolution
- As a consequence, Electronic imports now are the 4th biggest item in India’s import basket accounting for 23% of trade deficit
- Asian economies such as South Korea, Taiwan and China have be-

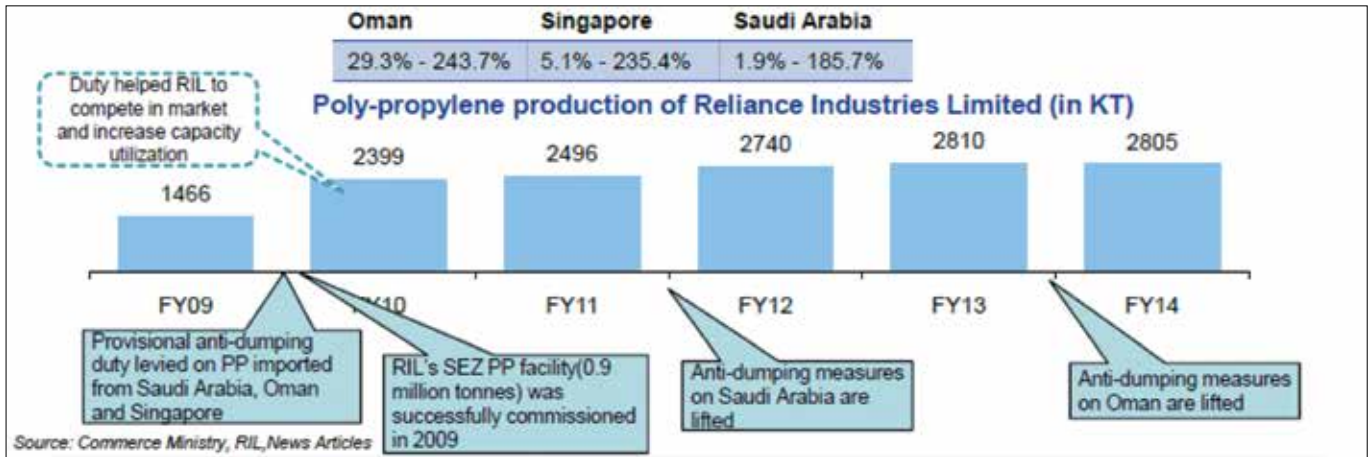
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TABLE 3

Country	Low interest Loans and Guarantees	Capital Subsidies	Support in Acquiring Land	Subsidized Utilities	R&D Support	Tax Breaks	Anti-Dumping Duties	Preferential Domestic Procurement
China	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
USA	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes
Taiwan	Yes	Yes	Yes	Yes	Yes	Yes	-	-
Malaysia	Yes		Yes	Yes		Yes	-	-
India	-	Yes; but not disbursed to any manufacturer till date	-	-	-	-	-	Yes

TABLE 5. TOP 10 GLOBAL SOLAR COMPANIES

	Yingli Green, China	Trina Solar, China	Canadian Solar, (Canada-China)	Sharp Solar, Japan	Jinko Solar, China	ReneSola, China	First Solar, USA	Hanwha Solar, (Korea-China)	Kyocera, Japan	JA Solar, China
Shipments in MW	3300	2600	1894	1865	1800	1750	1600	1300	1200	1200



Source: Commerce Ministry, RIL, News Articles

come significant global players and have succeeded in creating large scale employment

- The Indian government in contrast has inadvertently created hostile conditions for electronics manufacturing which has made foreign manufacturers close even existing facilities
- Government has belatedly tried to promote domestic manufacturing through 20-25% capital subsidy and incentives such as interest free loans and tax breaks.
- But, it has been hard to encourage domestic manufacturing owing to poor scale economics amongst other reasons

India cannot afford to repeat the mistake in case of the solar industry

4. Case Study: Imposition of Anti-Dumping Duty turned India from a Polypropylene Importer to an Exporter

Before Anti-Dumping Duty

- In FY08, India imported around 25,000 tons of Polypropylene (PP) from Saudi Arabia as it was 10% cheaper than locally-manufactured PP

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- Petition for Anti Dumping Duty was filed by Reliance and supported by HaldiaPetrochemicals
- Consequently anti-dumping duties were levied on Oman, Singapore and Saudi Arabia

Post Anti-Dumping Duty

- Domestic production of PP kept pace with domestic demand, increasing from 1844 KT in 2006 to 3692 KT in 2012 (CAGR of 12.3%)
- India exported over 800 KT of PP in 2011 and 2012

5. Case Study: DCR requirements helped establish the entire solar value chain in Canada attracting substantial investments

- Ontario linked subsidies to DCR in 2009 which led a sharp increase in FDI and domestic investments in solar manufacturing
- In 2014, DCR was removed due to a WTO case by Japan. However, growth is continuing due to deep roots that the industry has established in the province
- The development of the solar panels industry was followed by the development of solar inverter industry
- Ancillary industries such as racking systems and wiring also started showing strong growth
- Domestic industry gained technical expertise and became competitive in global markets. Local companies have now become exporters ◀◀

TABLE 6. INSTALLED SOLAR CAPACITY IN ONTARIO

	2006	2007	2008	2009	2010	2011	2012	2013
Installed Solar Capacity in MW	0	26	33	95	281	558	766	814