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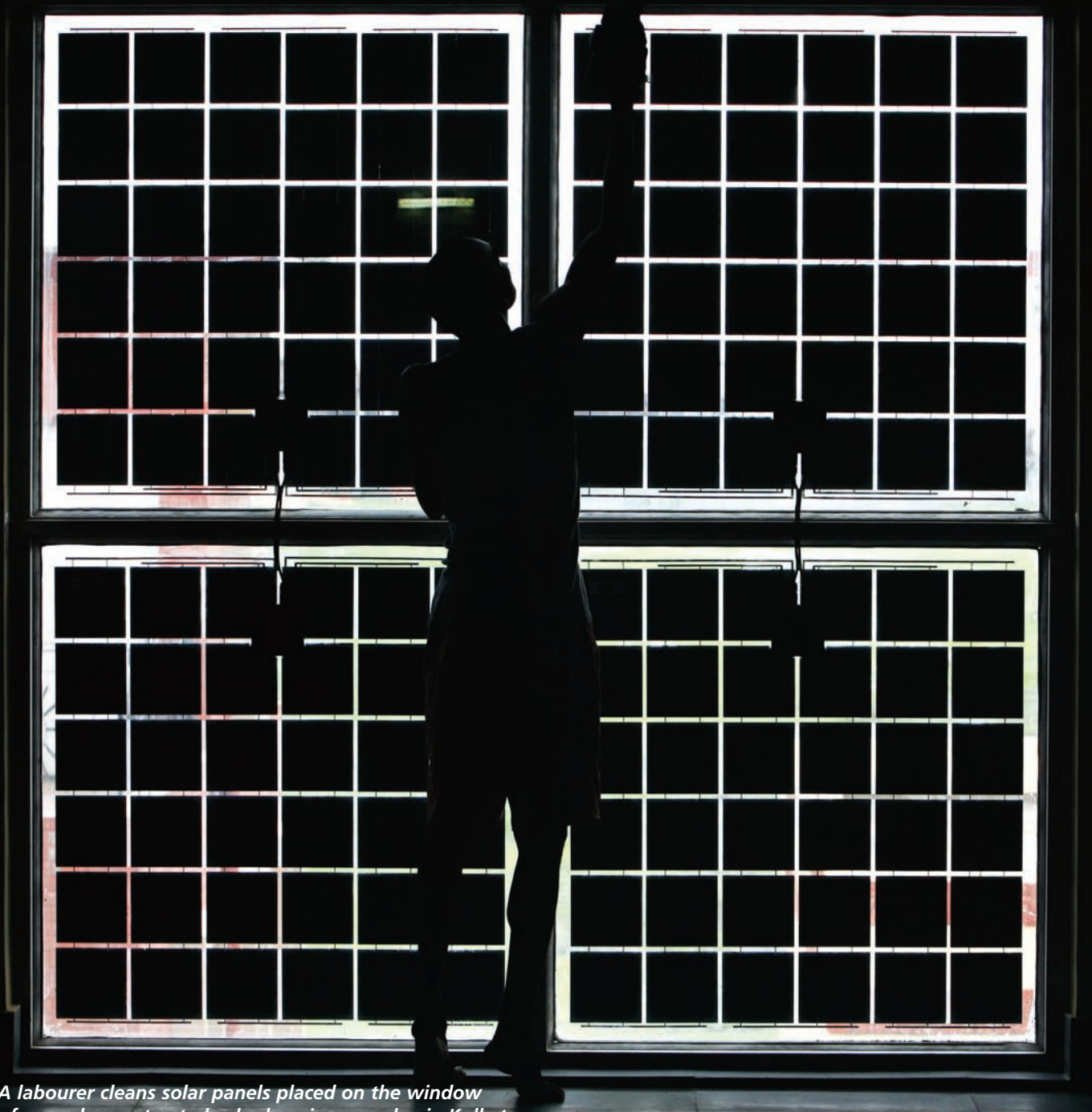
OVERSHADOWED

A glut of solar equipment from China and the US pushes Indian manufacturing sector to the verge of collapse



A labourer cleans solar panels placed on the window of a newly-constructed solar housing complex in Kolkata

About 40 kilometres from Delhi, in the bustling real estate market of Noida-Greater Noida, lies the biggest irony that the renewable energy industry faces. Indosolar, the country's largest manufacturer of solar photovoltaic cells, has set up a 400 megawatt unit. Its entrance is slick and ultra-modern, typifying the product it manufactures. Stepping into the 28,000 square metre production unit, one is struck by the shimmering clean, futuristic and sleek production line, symbolic of the clean future that solar power promises.

Polysilicon wafers, the raw material, can be fed at the starting point. Solar cells, efficiently packed in boxes, can be collected at the end point. But none of this is happening. The production line stands still. One production line of Indosolar stopped making cells in January last year. The other was shut down a few months later in September. In fact, at present, 80 per cent of the country's manufacturing capacity is shut.

Herein lies the irony. Why is India's largest solar cell maker not producing at a time when the country is in the midst of implementing its most ambitious and arguably the world's quickest solar energy mission?

The answer is simple, yet perplexing. "We have no orders," says Rahul Gupta, who set up Indosolar in 2009. "We took the pains to get the most modern manufacturing units designed in Austria. Our in-house research and development increased the efficiency of our cells remarkably. As Rajasthan and Gujarat have gone into an overdrive and are installing hundreds of megawatts of solar energy, it should have been heydays for Indian manufacturers. Instead, there is bankruptcy, loan restructuring and pleas to the government for support against international competition," he rues.

The sunshine industry, literally and figuratively, has been allowed to fade away. There are loopholes in the existing policies. While foreign manufacturers dump their products at dirt cheap prices in the country, domestic manufacturers are finding it hard to compete.

KUSHAL PAL SINGH YADAV and **JONAS HAMBERG** analyse what ails the country's solar manufacturing industry and how it can be revived

The state-of-the-art manufacturing unit of Indosolar under forced closure

SUNSHINE SECTOR LOSES SHEEN

COURTESY: INDOSOLAR

Going solar is no longer a bright idea for the four-decade-old photovoltaic manufacturing industry. This high-potential renewable energy sector has suffered a serious setback in India as much as across the globe. And the alarm bells are ringing loud.

In the 1970s, public sector companies Bharat Heavy Electrical Limited and the Central Electronics Limited were the first to make solar equipment in India. But these were primarily for research and development. In the 1990s, some more companies started small-scale manufacture of solar equipment. These were restricted to manufacturing for household applications. It was in 2006-07 that Moser Baer, an optical storage media manufacturer, set up the first commercial-scale manufacturing plant of 40 megawatt (MW) capacity. This was to make solar cells, an electrical device that converts light energy into electricity (see 'Photovoltaic technology', *p*27).

The industry got the much-needed push from the ambitious Jawaharlal Nehru National Solar Mission (JNNSM), which aims to achieve 22,000 MW solar energy generation by 2022. The growing global demand led to mushrooming of domestic players. The cell manufacturing industry, that was mostly export-oriented and catered to the European market, started aggressive manufacturing anticipating a huge domestic demand coupled with the biggest ever increase in global demand for solar photovoltaic. India now has an installed manufacturing capacity of 2,000 MW for solar modules and 900 MW for solar cells (see 'Manufacturing capacity in India', *p*26). Nineteen cell makers are registered with the Ministry of New and Renewable Energy (MNRE). The country has more than 50 module makers.

But despite the good start, the entire solar manufacturing sector is in a state of collapse. More than 80 per cent of the units in India are closed. What went wrong?

The solar manufacturing sector, say analysts, followed the most optimistic projections for future orders and created a huge overcapacity build-up. Post-

2004, after the feed-in-tariffs were announced in Germany, the industry went into an overdrive. Feed-in-tariff is the high rate that the government gives developers to promote clean but expensive energy.

In the global solar photovoltaic demand, the biggest jump happened in 2010. From a little over 7,000 MW in 2009, the demand shot up to close to 20,000 MW in 2010. This is when the cell manufacturing capacity increased extensively. According to estimates by Bloomberg New Energy Finance, world's leading provider of industry information, the current global demand is about 30,000 MW. But the manufacturing capacity is double that.

European crisis

European countries, which drove the initial investments and supported the sector with attractive policies, were the ones responsible for the industry's downfall. The countries initially gave significantly high feed-in-tariffs for generating power from solar technology.

Germany has been the leader in solar installations ever since it started giving high feed-in-tariff in 2004. By 2010, Germany accounted for 43 per cent of cumulative installed solar photovoltaic capacity, followed by Spain (10 per cent), Japan (9 per cent) and Italy (9 per cent). Till 2008, Germany had accounted for almost 50 per cent of the global demand for solar photovoltaic. Spain, which started giving feed-in-tariffs in 2006, has also been a big mar-

Manufacturing capacity in India

Despite a huge capacity, firms have few clients

	Cells (in MW)	Module (in MW)	Projects on hold or abandoned
Access Solar		18	
Ajit Solar		20	
Alpex		35	
BHEL	8	8	
CEL		10	
EMVEE Solar		120	
Euro Multivision	40		
Evergreen		20	
Green Brilliance		45	
Goldstone			100
HHV		50	10
Indosolar	190		
Jupiter Solar	45		
KL Solar	7	6	
Kotak Urja		15	
KSK Energy			150
Lanco		70	
Maharishi Solar	2.5	17	
Microsol		14	
Moser Baer	250	280	565
Photon Energy Systems		50	
Photonix		15	
PLG Power		100	
Premier Solar Systems		30	
REIL	2	2	
Reliance Industries		30	
Shurjo		5	
Solar Semiconductor	30	195	
Surana Ventures		40	
Tata BP Solar	96	125	
Titan Energy		100	
TopSun Energy		5	
UPV Solar	12	7	
USL Photovoltaics	6	10	
Vikram Solar		100	
Waaree Energy		60	
Webel SL Energy Systems	100	120	
XL Energy	60	210	
Total	**848.5**	**1,932**	**825**

Sources: Solar industry

Rajasthan imports modules from the US for a project under JNNSM

PHOTOGRAPHS: JONAS HAMBERG / CSE

Photovoltaic technology

STAGE1: SUNLIGHT
Materials like silicon absorb the energy emitted by the sun and turn it into electrical current. This is known as the photovoltaic effect, that causes them to absorb photons of light and release electrons

STAGE2: SOLAR CELLS
A solar cell is a thin semi-conductor wafer, specially treated to form an electric field. Electrical conductors are attached to either side of it to form a circuit which captures the released electrons in the form of electric current

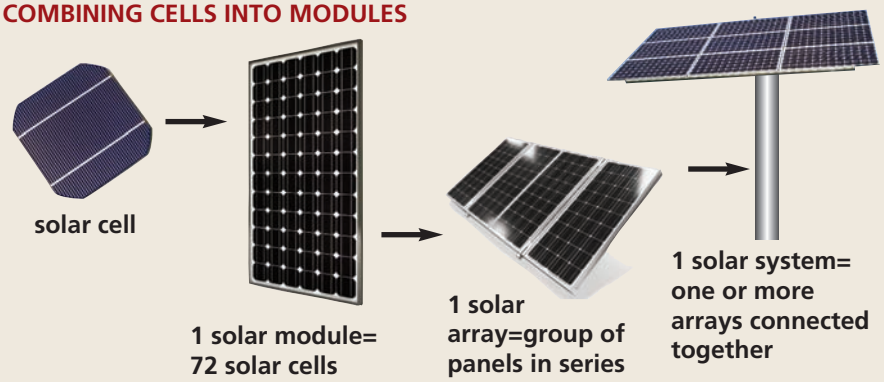
STAGE3: SOLAR PANEL
A solar panel or module is a collection of cells that are electrically connected to one another. These modules are designed to supply electricity at a certain voltage, such as a common 12 volt system

STAGE4: SOLAR POWER
Photovoltaic panels produce direct current (DC) electricity. An inverter is, therefore, required to convert DC to AC (alternating current), because we need AC to power our everyday gadgets and lights

TYPES OF SOLAR CELLS

There are two kinds of commercial solar cells in the market: crystalline and thin-film. Crystalline silicon is of two types: monocrystalline, made by slicing wafers from high-purity crystal block, and polycrystalline, made by sawing a casted block of silicon into bars and then into wafers. Polycrystalline is the most common technology. Thin-film cells are made by depositing layers of strong, light-absorbing materials on coated glass or stainless steel.

COMBINING CELLS INTO MODULES



ket. So has been Italy.

With overproduction and bulging solar power purchase bills, European governments started backtracking on their supportive policies for their manufacturers. Spain was the worst hit. Its government announced complete moratorium on support to solar projects. "Initially, when Spain had announced high feed-in-tariff for solar power, it had budgeted for 600 MW capacity. However, plants for 2,600 MW were set up. The country simply did not have the cash to support such a mega scheme," says a manufacturer who did not want to be named.

No wonder, the prices of solar equipment plunged between 2008 and 2011. Photovoltaic modules cost 60 per cent less, estimates Bloomberg. Other estimates point to a greater decline. The price of polysilicon, the basic building block for polycrystalline solar cells and modules, has fallen from US $500 per kg in 2008 to US $25 per kg now.

This sharp fall in prices made governments wary of paying high feed-in-tariffs. "Moves by Spain and the Czech Republic to make retroactive cuts in feed-in-tariffs for the already operating photovoltaic projects damaged investors' confidence," states the report *Global Trends in Renewable Energy Investment 2011* prepared by Bloomberg and the United Nations Environment Programme. "Other governments, like those of Germany and Italy, announced reduction in tariff for new projects—the logical step after a fall in technology cost. What caused concern was the fear that governments facing economic hardship may go back on the previously promised deals for the existing projects, damaging returns for equity investors and banks," it adds.

No demand in India

The JNNSM provided the policy backing for domestic content for projects under the mission. In the first batch of the mission's first phase, solar photovoltaic modules based on crystalline technology had to be sourced locally. In the second batch, both crystalline cells and modules manufactured in India had to be used.

The domestic demand did not cover the more contemporary and low-cost thin-film solar modules. MNRE allowed free import of thin-film modules on the ground that India had only one thin-film module producer—Moser Baer. The competition in JNNSM has, therefore, been between imported thin-film technology and domestically assembled crystalline silicon modules. But the competition has been far from fair.

Technology choice for projects under JNNSM has been heavily skewed in favour of thin-film modules which were cheaper. But the cost-benefit is neutralised because thin-film modules are less efficient. More thin-film modules are required to generate the same amount of electricity. This increases the demand for land. Almost 60 per cent of the projects under JNNSM's first phase have opted for imported thin-film modules. Only 14 per cent of the modules produced globally are thin-film.

Also, in state programmes like the Gujarat solar policy, that aimed to achieve 500 MW by 2014 but has already achieved its objective, it is not mandatory for project developers to buy

equipment made in India. The developers prefer to import equipment from China and the US as they are cheap. Charanka Solar Park in Gujarat, Asia's biggest with 214 MW operational capacity, has equipment mostly from the US and Chinese manufacturers like MEMC, Suntech Power and CSun. Moser Baer plants in Kamalpur and Zenabad in Gujarat have equipment from LDK, Trina and other Chinese companies, not from the company's Indian manufacturing plant. Reliance Power's 40 MW photovoltaic project in Rajasthan uses modules from First Solar, a US company. "Given the present state, how can domestic content requirement hold? Developers take solace in importing," says Krishnappa Subramanya, former CEO of Tata BP Solar and now an independent consultant.

Only those Indian project developers who also make solar equipment buy equipment from their own plants. Tata Power's 25-MW plant in Gujarat installs in-house Tata BP modules. Lanco Solar's 35-MW plant in Rajasthan also installs self-manufactured modules.

Dormant industry

Despite efficient solar manufacturing, "only about 20 per cent of the manufacturing capacity in the country is operational," says Rahul Gupta, managing director of Indosolar. The rest is dormant as there is not enough demand for Indian cells and modules, he adds. His own state-of-the-art plant in Greater Noida, which has two manufacturing lines of 90 MW capacity each, and another line of 200 MW that was still being set up, closed in September 2011.

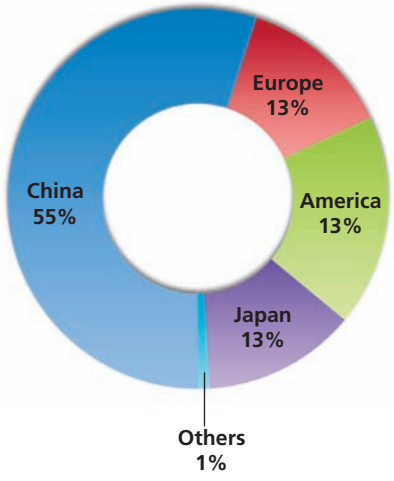
The company retrenched 170 staff, mostly engineers. Indosolar had made a combined investment of ₹1,200-1,300 crore. The company's last year's balance sheet shows it lost about ₹200 crore due to forced closure. "In 2010, what we produced in the morning was off to airport by the afternoon. Today, we don't have clients," says Gupta. The company lost clients in France, Lithuania, Italy, Hungary, Spain and Greece.

This is no isolated case. Maharishi Solar and Tata BP have similar stories to tell. Of the three Tata BP production lines, only one is working. The company had to remove more than 200 workers because of lack of demand. "India has lost the manufacturing plot. Very little of manufacturing capacity established in the country is operational," says Subramanya. Eighty per cent of the Indian manufacturers are now negotiating loan repayment plans with banks because they do not have the money to clear the dues. Debt restructuring is often seen as a precursor to bankruptcy.

Industry is on the verge of collapse. The solar power sector has turned into a purely import business.

Charanka Solar Park in Gujarat has equipment from the US and China

Global share of solar modules produced



Dumping ground

There is enough evidence that China, Taiwan, Malaysia and the US sell solar modules in India at rates much cheaper than in their own countries. The rates are lower than even the production cost. Anywhere in the world, the production cost of solar cells and modules stands between US 95 cents and US $1 per watt-peak. But foreign firms, mostly from the US and China, sell the cells and modules in India between US 65 cents and US 80 cents per watt-peak.

Obviously, these foreign companies are also suffering huge losses. Chinese manufacturer LDK lost US $600 million last year. First Solar, a US company, wiped out a billion dollars in losses in the last two quarters.

According to Bloomberg, China produces over half of the photovoltaic modules used globally and is home to many of the biggest brands. In 2001, China held only one per cent of the global market. In 2010, 55 per cent of the modules worldwide were produced by Chinese companies, 13 per cent by companies based in Europe, 18 per cent by the US companies and 13 per cent by Japanese firms. At present, four of the world's top five cell manufacturers are Chinese, so are three of the world's five largest module manufacturers.

The US share has fallen from 27 per cent in 2001 to just five per cent now. More than 20 companies globally have either shut down or filed for bankruptcy. In 2011, at least six US companies filed for bankruptcy. Abound Solar, a US firm that has been the supplier for many projects under JNNSM, is the latest to file for bankruptcy. The companies operating at present, including the Chinese ones, have seen a sharp drop in their share prices. In some cases, it is as much as 97 per cent. Business is tough. But what makes the Chinese survive?

"They get strong government support. Among other benefits, the manufacturers get huge export credits, cheap loans and cheap land from the government. The country does not even use its own modules. China produces 32 times more modules than the Chinese market needs," adds Gupta. This has led to a global trade war.

Import *v* domestic: A perennial debate

Solar power sector in India is clearly divided into two camps over the government policy on manufacturing. While manufacturers rue they are running out of business because of dumping by foreign manufacturers, project developers criticise the domestic content requirement policy. Developers want to import at zero duty which they say will lead to large solar installations which, in turn, will lead to quick development of the sector, while manufacturers demand a level-playing field with global industry.

RAHUL GUPTA, managing director of Indosolar, and T R KISHOR NAIR, president of Welspun Energy Limited, a project developer, came face to face at a recent meeting organised by Delhi-based non-profit Centre for Science and Environment. Edited excerpts from the conversation

T R KISHORE NAIR: There is a mismatch between thin-film modules demand and supply as the existing manufacturing capacity is very limited and we have to import. Of course, most of the production lines are currently shut down, but the fact remains that even those who have manufacturing lines are using imported modules for their projects.

RAHUL GUPTA: When the global average penetration of thin-film is about 14 per cent of the total solar photovoltaic installations and in India it is about 56 per cent of the total modules, then definitely there is something wrong in India.

NAIR: With cheap imported modules we are able to bring down the tariff to current levels, and this is driving demand. Domestic industry cannot match these low prices. High price of modules will drive away the demand. I am not saying do not support domestic manufacturing, but not in the current form of mandatory domestic content requirement. Rather, give subsidy to the industry to make them globally competitive and reduce module price. The tariffs will be ₹2 higher than the current rates of around ₹8 per kilowatt hour (kWh), which is what we quoted for our project under the national solar mission, if we buy domestic modules.

GUPTA: It has actually not been possible at that particular tariff (₹8). Looking at financial closure of projects under the same phase of JNNSM like that of Mahindra Solar or Azure Power, the cost of the project is ₹11-13 crore/MW thereby coming to a tariff of ₹11 to ₹13 per kWH while Welpsun bid at closer to ₹8/ kWH because they could get cheaper modules in a distressed market. We say it cannot be done below ₹10 crore/ MW or nine-and-a-half. I think Welspun did a fantastic job, because at the time they bid, nobody expected a 23 per cent depreciation in rupee (against the dollar). But, the situation is whether procurement is sustainable even after 23 per cent erosion in the rupee and also the fact that most of the foreign manufacturers have lost hundreds of millions of dollars including one of their (Welspun's) suppliers.

NAIR: When you are in the business, you take some risks. No developer is going to set up the project at ₹9-10 tariff. We are ready to take up more projects worth 300 MW at ₹8 even at today's rate but with imported modules. So, rather than insisting on buying higher priced domestic modules, let the government come up with some more subsidies so that the domestic industry is also able to provide cheaper modules.

GUPTA: There is one more distinction here. The imported modules are being dumped below production costs. Solar Manufacturer Association of India has already filed a petition with the Director General, Anti-Dumping, for level-playing field and if our case will validate the fact, then there will be additional anti-dumping duties on imported modules. This has got nothing to do with the domestic content, but with the WTO norms of level-playing field worldwide.

NAIR: Let's suppose imports are completely blocked and we have to use only domestic modules. What will be the tariff for solar power then? It will go back to ₹15. Are you ready to pay this? I think not, meaning no new projects will be developed thereby killing the entire solar industry.

GUPTA: No. I am saying that even if you quote a tariff of ₹9, you can make double digit profit. You are able to quote tariffs as low as ₹8 because you are able to import cheap modules due to the global distress scale. There is not much difference in manufacturing costs in India, China or Taiwan. But depending on desperation to sell and how much loss they can take, companies today are selling below production costs.

Industry is making losses in billions of dollars. Indian companies are able to quote the lowest tariff globally for solar photovoltaic precisely due to this reason. Today, there is a global problem of oversupply. Developers can demand a price and get it. But a correction in terms of demand and supply is going to take place in the next six to nine months. India has a focus on domestic manufacturing. If you consider the Indian conditions 95 cents per watt peak is our current manufacturing costs domestically. This means that at a tariff of ₹9.50 per kWH, the Indian produced modules can be competitive.

NAIR: If ₹9.50 is a manageable tariff for manufacturers, and if the developers are forced to buy only domestically produced modules then tariff will obviously go up to ₹9.50 and at this rate all the developers will pack up.

TRADE WAR

The dirty picture of global solar manufacturing industry

An intense but covert trade war clouds the solar energy business. Bilateral free trade agreements within the World Trade Organization (WTO) make it difficult to subsidise the domestic industry without other nations countering it with high duties. This has been the case with US investigations into allegations of dumping by Chinese manufacturers and subsequent levy of countervailing (anti-subsidy) and anti-dumping duties on most Chinese manufacturers.

On October 19, 2011, seven US solar manufacturers, grouped as Coalition for American Solar Manufacturing (CASM), filed petitions with the US International Trade Commission and the International Trade Administration of the US Department of Commerce seeking relief against Chinese manufacturers. In August 2009, a similar complaint was filed by German manufacturer SolarWorld AG with the German government and the European Union. But the EU did not initiate an investigation.

"Countervailing duty petition alleges that China illegally subsidises its solar industry by providing cash grants; discounted polysilicon and aluminium necessary for production of solar panels; heavily discounted land, power and water; multi-billion dollar preferential loans and direct credit; tax exemptions, incentives and rebates; export grants and insurance; and by holding its currency under value," states a report prepared by US-based non-profit The Kearny Alliance.

"China's solar manufacturers benefitted from a series of huge government debt financing deals. Loan guarantees worth US $32.5 billion were extended to 10 manufacturers creating an intimidating backdrop for foreign competitors," states a report prepared by Bloomberg

MEETA AHLAWAT / CSE

A solar module being made at Maharishi Solar Technology Limited in Noida

Pushing for their own

Many countries mandate developers to buy domestic equipment

Country (or province)	Domestic content requirement
Ontario (Canada)	60 per cent of the goods and labour has to come from Ontario to qualify for solar tariff
Italy	60 per cent of the components sourced from European facilities get 10 per cent extra on solar tariff
Greece (proposed)	80 per cent of the components sourced from European facilities get 10 per cent extra on solar tariff
France (proposed)	60 per cent of the components sourced from European facilities get 10 per cent extra on solar tariff
Ukraine	15 per cent (commissioned before 2013), 30 per cent (between 2013 and 2014) or 50 per cent (after 2014) of total construction volume from Ukraine
Malaysia	Bonus to tariff if local modules (US $0.01/kWh) and inverters (US $0.003/kWh) are used
Turkey	Up to 50 per cent bonus on tariff of solar components are made in Turkey

Compiled from multiple sources

Indian solar projects that get loan from OPIC/Exim Bank

The US gives loan on condition that all equipment are purchased from American manufacturers

Project	Financer	Amount (million US$)	Year	US company providing panels
Azure Power 10-MW Gujarat photovoltaic plant	OPIC	26.8	2010	Significant initial US procurement associated with the project, supporting US jobs
Azure 3-MW photovoltaic plant in Punjab	OPIC	7.7	2010	Unknown
Reliance Dhanu 40-MW photovoltaic plant in Dhursar, Rajasthan	Exim Bank	84.3	2011	First Solar
Dalmia Solar Thermal 10-MW plant in Bap, Rajasthan	Exim Bank	30	2011	Infinia
Tatith Solar Plant in Gujarat	Exim Bank	18.9	2011	Solarworld Industries
ACME Solar 15-MW photovoltaic plant in Gujarat	Exim Bank	18	2011	First Solar
Azure 5-MW solar photovoltaic plant in Rajasthan	Exim Bank	15.8	2011	First Solar
Punj Lloyd 5-MW solar photovoltaic plant in Rajasthan	Exim Bank	9.2	2011	Abound Solar
5-MW photovoltaic plant in Surendarnagar, Gujarat	OPIC	19.1	2011	Unknown
Universal Solar System 2-MW photovoltaic plant in Ahmedabad, Gujarat	Exim Bank	3.7	2011	Abound Solar (modules) and SMA America (inverters)
5-MW photovoltaic plant in Surendarnagar, Gujarat	OPIC	14.8	2011	That will use advanced US power generation technology

Sources: 1. Fast Start Financing—US Climate Funding in 2010 (India), US Department of State
2. Meeting the Fast Start Commitment—US Climate Finance in 2011, US Department of State

New Energy Finance and the United Nations Environment Programme.

On March 20, 2012, the US Department of Commerce announced preliminary countervailing duties of 2.9 per cent on Suntech Power and 4.73 per cent on Trina Solar, both Chinese companies. All other Chinese manufacturers were levied duty of 3.61 per cent. On May 17, the department announced preliminary anti-dumping duties of 31.22 per cent and 31.14 per cent on Suntech Power and Trina Solar respectively. Fifty other Chinese manufacturers were levied tariff of 31.18 per cent. Rest of the Chinese manufacturers were slapped with a duty of 249.96 per cent. Final orders are yet to be passed in both cases, but sources say the duties will be confirmed. The announcement had the desired impact. US import from China dropped by 64 per cent in two months. This came as a relief for the manufacturers in the Philippines, Malaysia and Taiwan, who are now trying to replace the Chinese in the US market.

But the Chinese cannot afford to lose the US market, says an Indian developer not wanting to be named. They might shift off-shore manufacturing base to Korea, the US or even India to circumvent duties, he conjectures.

India follows

In India, Solar Manufacturers Association recently filed a case with the Director General Anti-dumping (DGAD) in the Union Ministry of Commerce alleging that China, Taiwan, Malaysia and the US dump solar equipment in the country. They have sought imposition of anti-dumping duties on imports. DGAD is expected to admit the petition by July-end after an initial internal investigation.

The US, on the other hand, has criticised India for its domestic content requirement under the Jawaharlal Nehru National Solar Mission (JNNSM) reasoning that it is an illegal support to Indian manufacturers. India contends that JNNSM comes under government procurement agreement in WTO, to which India is not a party. The US wants India to join the government procurement agreement. So far, it has not gone to court. But India is not alone in having a domestic content requirement policy for its national mission (see 'Pushing for their own', *p*30).

The Canadian province of Ontario stipulates that 60 per cent content for its solar projects must be sourced locally. European and Japanese manufacturers have opposed this in WTO. A resolution is unlikely before October this year. Its outcome would be important for India as Ontario also describes it as government procurement.

The province and its implementing agency, the Ontario Power Authority, are also not required to observe WTO's government procurement agreement. Given the covert measures the US has adopted to support its own industry, its criticism of JNNSM smacks of double standards.

US foul play

In December 2009, the Copenhagen Accord was adopted at the Conference of Parties under the United Nations Framework Convention on Climate Change. According to this, developed countries were to contribute US $30 billion as Fast Start Financing fund to support programmes that limit greenhouse gas emissions between 2010 and 2012.

India, say UN sources, has been given US $116.597 million from the fund. Most of this is from two loans by US Exim Bank and Overseas Private Investment Corporation (OPIC) for two solar power plants—Azure Power's 10 MW unit in Gujarat (US $26.8 million) and Reliance's 40 MW unit in Dhanu, Rajasthan (US $84.3 million).

However, in the US Department of State's report on Fast Start Financing (2010 and 2011), all Exim and OPIC funding for grid-connected solar plants to Indian solar sector, totalling US$248.3 million, is included in and counted as fast start financing (see 'Solar plant projects that get loan from OPIC/Exim Bank'). The loans come with the rider that Indian developers must buy equipment from US manufacturers. The major beneficiaries in this case have been US producers First Solar and the now bankrupt Abound Solar.

CHINA'S GAIN INDIA'S PAIN

The country needs a quick revival policy for solar manufacturing

As recently as July 19, US Exim Bank gave two more loans of US $57.3 million to Solar Field Energy Two Private Limited and Mahindra Surya Prakash Private Limited to finance export of US solar modules and ancillary services to India. Solar modules manufactured by First Solar will be used in the construction of photovoltaic plants in Rajasthan. According to a US government release, these "transactions will support 200 US jobs at First Solar's manufacturing facility in Perrysburg, Ohio".

US Exim Bank has approved a loan of US $23 million to Solar Field Energy Two, a Mumbai-based company, for the construction of a 20-MW solar facility in Rajasthan, the release states. Mahindra Surya Prakash, also of Mumbai, has been given approval for a loan of US $34.3 million to build two solar facilities, of 20 MW and 10 MW, in Rajasthan, the release adds.

When giving loans as aid, only the difference between the rate of interest between the 'soft' loan and a commercial loan is counted as aid. In this case, however, the US has counted the entire sum as loan although commercial loans are available at a much higher rate. Had the counting been fair, the US commitment to Fast Start Financing fund would have been reduced to a fraction of this.

US manufacturers are supported by cheap loans from the US Exim Bank. "Indian developers have bent backwards to import from the US given the US Exim Bank support and our government has been silent," rues Subramanya. According to the US Exim Bank, as of October 14, 2001, the interest rate for an 18-year direct loan was 3.18 per cent. Loans from Indian banks come with an interest rate of 14 per cent or more.

Indian banks are wary of funding solar project developers. "First they bid such low prices and then run to us for loans," says an official at an Indian nationalised bank.

The US misuse of Fast Start Financing fund is unethical. The fund that was supposed to benefit the developing countries now works to knock out Indian manufacturers from the competition. It's time the Indian government takes the US to WTO for this pervert triple accounting.

China's emergence as the leader in solar manufacturing industry has completely changed the geopolitical equations in the global renewable energy industry. In the last decade, the country has captured more than half the global solar production capacity, all at the expense of Japanese, the US and European companies. And China is manufacturing at a massive scale.

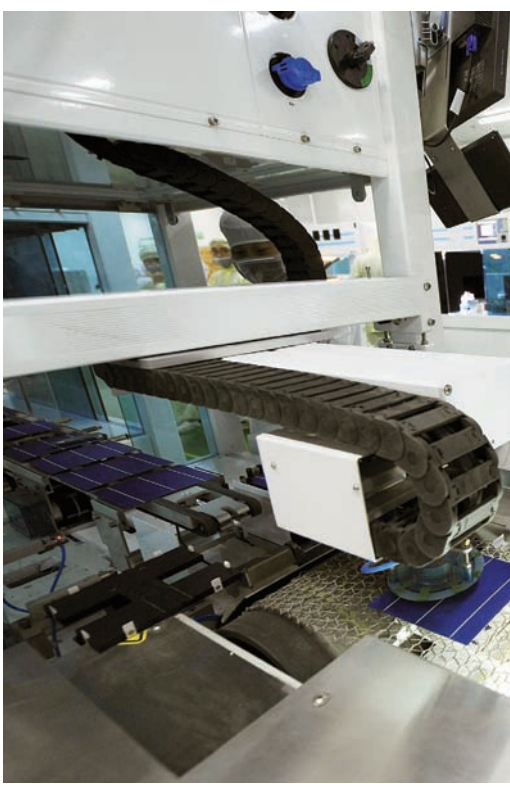
While the largest Indian manufacturer has the cell production capacity of less than half gigawatt (500 MW), the average being less than 100 MW, Chinese manufacturers have the average capacity of more than 1 GW. This is the combined cell manufacturing capacity of all Indian producers. Even the US has an average manufacturing capacity of about half a GW. China's total annual production is 20 GW.

Chinese manufacturers, like Trina Solar and Yingli Green Energy, control the manufacturing process right from production of polysilicon to assembling module. Vertical integration in the manufacturing process, meaning a company controls entire manufacturing chain from sand to module, lowers their production cost. India does not have this advantage because it does not have the capacity to manufacture polysilicon and wafers. The country imports most of the raw material from China.

Now, despite lack of demand, China has announced it will increase manufacture of solar modules. This will lead to more oversupply and a further slump in prices. The announcement is seen as the final blow to push rivals outside China to bankruptcy.

China has been able to script a success story because of huge government support. The Chinese government has identified the industry among its seven new strategic emerging industries. It can, therefore, take aggressive steps for solar power manufacturing. "China's 12th Five Year Plan clearly articulates its goals for these industries," states a report by US-based non-profit The Kearny Alliance. "The country's five-year plans have proved successful. The 11th plan, for instance, designated clean energy technology (solar, wind, bio-

Italian projects get extra 10 per cent tariff if they use domestic equipment



mass and nuclear energy) for government support. China spent about US $309 billion on energy efficiency and environmental protection measures. Today, four of the world's largest photovoltaic cell manufacturers are Chinese," it states.

In addition, China has mandated that 80 per cent of the solar equipment and auxiliary materials for its own use to be produced domestically. Industry sources claim the Chinese government has dedicated a combined fund of US $1.5 trillion for its seven strategic emerging industries. Small wonder, Chinese companies can survive despite selling below production cost and suffering huge losses (see 'Chinese support programmes').

Chinese support programmes

- **Golden Sun Demonstration Programme:** A programme for financial assistance and technological support
- **Preferential Policy Lending:** Subsidised loans and financial assistance to production of crystalline silicon solar cells
- **Provision of Polysilicon for LTAR (less than adequate renumeration):** Polysilicon is provided to producers of solar cells at a lower cost than an adequate market-price
- **Provision of Land for LTAR:** Solar manufacturers were given subsidised land
- **"Two Free, Three Half" Programme for Foreign-Invested Enterprises:** This programme allows full exemption of income tax for two years besides 50 per cent rebate for three years
- **Preferential Tax Programs for High or New Technology Enterprises:** Income tax reduction from 25 per cent to 15 per cent
- **Import Tariff and Value Added Tax (VAT) Exemptions for Use of Imported Equipment**
- **VAT Rebates on FIE Purchases of Chinese-Made Equipment:** Value Added Tax exemption for Chinese Equipment bought by foreign-invested enterprises
- **Sub-Central Government Subsidies for Development of "Famous Brands" and "China World Top Brands":** Lumpsum awards to companies that become famous internationally

India lags

While the Chinese industry, buoyed by its government's support, marches forward, the Indian industry seems to be on its death bed. Urgent and drastic steps are needed for the industry to recover. Multiple options are available.

The government had mandated domestic content requirement for crystalline modules. This, however, was not done for thin-film modules, a loophole project developers exploited, skewing the entire market in favour of thin-film. It is about time the Ministry of New and Renewable Energy fixes this and mandates that thin-film and crystalline modules, as well as cells are sourced from Indian manufacturers. State policies and other schemes such as renewable energy certificates should follow the same domestic manufacturing requirement. Photovoltaic manufacturers have benefitted from a 25 per cent capital subsidy given under special incentives package announced by the Department of Information Technology in 2006. Perhaps an extension of the same package is required for encouraging large-scale polysilicon, wafer and cell production in India.

An employee inspects solar modules at LDK Solar's production line in China

REUTERS

India can also choose to take the Italian route. Italy's solar policy for 2011-12 stipulates that developers get an extra 10 per cent on their tariff for 20 years if they use European modules. This would give Indian manufacturing a leg up on competition. There would, of course, be an added cost to the government because of this extra tariff. It would also mean adjustments in the bidding process where developers will have to confirm whether they would use Indian technology or not, before the winning bids are revealed. The Director General of Anti-Dumping (DGAD) is already considering the anti-dumping petition filed by Indian producers. If DGAD finds evidence, then anti-dumping duties need to be put in place.

The government needs to make it clear that the US Exim Bank funding is a disruptive trade tool that hinders Indian manufacturers from competing in the Indian market. There are indications that the government is gearing up to support a healthy domestic manufacturing industry for the solar sector.

Globally, the demand for solar is set to increase at a hefty pace in the coming years. China already has plans for installing 12 GW by 2015 and 50 GW by 2020. Huge demand is expected from Japan as well given the requirement for replacement of nuclear energy in the aftermath of the Fukushima disaster. Germany and other European markets, the US, the ever-growing markets in developing countries, and our own domestic market will fuel the demand for solar power. The manufacturers need to survive this phase to be able to compete with foreign companies in the coming years. India must decide today what it wants—a purely import-driven solar power industry that compromises energy security, or a robust domestic manufacturing base. The latter definitely seems the logical choice. ■