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What is the Safeguard Duty Safeguarding?

**Analysing Impact on
Solar Manufacturing and
Deployment in India**

Policy Brief I June 2019

Arjun Dutt, Manu Aggarwal, and Kanika Chawla



The imposition of safeguard duties is intended to offer Indian PV manufacturers protection against cheap imports and facilitate structural improvements that will enhance their competitiveness.

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The Council on Energy, Environment and Water (CEEW) is one of South Asia's leading not-for-profit policy research institutions. The Council uses data, integrated analysis, and strategic outreach to explain - and change - the use, reuse, and misuse of resources. The Council addresses pressing global challenges through an integrated and internationally focused approach. It prides itself on the independence of its high-quality research, develops partnerships with public and private institutions, and engages with the wider public.

In 2019, CEEW once again featured extensively across nine categories in the '2018 Global Go To Think Tank Index Report', including being ranked as South Asia's top think tank (15th globally) with an annual operating budget of less than USD 5 million for the sixth year in a row. CEEW has also been ranked as South Asia's top energy and resource policy think tank in these rankings. In 2016, CEEW was ranked 2nd in India, 4th outside Europe and North America, and 20th globally out of 240 think tanks as per the ICCG Climate Think Tank's standardised rankings.

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The Council's major projects on water governance and security include the 584-page National Water Resources Framework Study for India's 12th Five Year Plan; irrigation reform for Bihar; Swachh Bharat; supporting India's National Water Mission; collective action for water security; mapping India's traditional water bodies; modelling water-energy nexus; circular economy of water; participatory irrigation management in South Asia; domestic water conflicts; modelling decision making at the basin-level; rainwater harvesting; and multi-stakeholder initiatives for urban water management.

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“The imposition of safeguard duty neither provides adequate protection nor addresses the underlying causes of competitive disadvantage of Indian PV manufacturing. The brief examines these aspects of the imposition of safeguard duty, as well as the disruption caused in project deployment, throwing the need for alternative approaches to support PV manufacturing into sharp relief.”



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Manu is a climate and energy expert and works on the efficient allocation of risks to minimise resource wastage. His current research interests lie at the intersection of development policy, finance, technology, and institutions. He designs market-transformative insurance products, and restructures commercial contracts to de-risk renewables. In his previous avatars, he worked in business analytics, energy commodities trading, and international development. Manu is a graduate in Mechanical Engineering from Thapar University and is waiting for his CFA charter from the CFA Institute, USA.

“India would fail in spurring its solar PV manufacturing if its policy framework is not rooted in a deep understanding of global supply chains, factory economics of solar manufacturing, and the international trade regime.”



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Kanika Chawla is a policy specialist working at the intersection of renewable energy and financial markets. She is the Director of the CEEW Centre on Energy Finance and also manages the Council’s research and outreach in renewable energy policy, regulation, markets, and socio-economic value. She is actively engaged with private and public enterprises within and outside India in designing and developing financial de-risking instruments. Kanika has an MSc in Economics and Development Economics from the University of Nottingham, and an undergraduate honours degree in Economics from Miranda House, University of Delhi.

“At a time when the renewable energy sector should be seeing pareto efficiency enhancing interventions, the imposition of the safeguard duty on solar cells and modules does quite the opposite. It adversely impacts discoms, IPPs, investors, and electricity regulators, all while not creating the necessary conditions to boost domestic manufacturing.”



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Abbreviations

BOS	balance of system
CEEW	Council on Energy, Environment and Water
CERC	Central Electricity Regulatory Commission
CPSU	central public sector undertaking
CVD	countervailing duty
DCR	domestic content requirement
DGAD	Directorate General of Anti-dumping and Allied Duties
DGTR	Directorate General of Trade Remedies
DOC	United States Department of Commerce
DTA	domestic tariff area
EPC	engineering procurement construction
ESDM	electronic systems design and manufacturing
EU	European Union
GATT	General Agreement on Tariffs and Trade
GUVNL	Gujarat Urja Vikas Nigam Limited
GW	gigawatt
HS	harmonised system
INR	Indian rupee
ITC	United States International Trade Commission
JNNSM	Jawaharlal Nehru National Solar Mission
KREDL	Karnataka Renewable Energy Development Limited
kWh	kilowatt-hour
LCOE	levelised cost of electricity
MIP	minimum import price
MNRE	Ministry of New and Renewable Energy
MoF	Ministry of Finance
Mono-PERC	monocrystalline passivated emitter and rear contact
M-SIPS	Modified Special Incentive Package Scheme
MW	megawatt
NTPC	National Thermal Power Corporation Limited
PPA	power purchase agreement
PV	photovoltaic
R&D	research and development
RE	renewable energy
RFS	request for selection
SECI	Solar Energy Corporation of India
SEZ	special economic zone
SURYA	Solar Utpaadan and Rozgaar Yojana
TRIMS	trade-related investment measures
UPNEDA	Uttar Pradesh Non-conventional Energy Development Agency
US	United States
USD	United States dollar
VGF	viability gap funding
WTO	World Trade Organization



The imposition of safeguard duty not only impacts the business prospects of manufacturers, but also has wide-ranging implications for the entire solar sector, including project deployment, job creation, and investor sentiment.

Executive Summary

In July 2018, the Government of India imposed a two-year safeguard duty on solar cells and modules, in an attempt to protect domestic manufacturing. The measure, which majorly impacts imports from China, Malaysia, and Taiwan, resulted in a 25 per cent duty on solar cell and module imports for a year starting from July 2018. The duty rates will decline to 20 per cent for six months starting July 2019, and will further be reduced to 15 per cent for another six months. In addition to the impact on the business prospects of manufacturers, the move has wide-ranging implications for the entire solar sector, including aspects like project deployment, job creation, and investor sentiment. This policy brief analyses the potential impact of the safeguard duty on these facets of the industry, as well as the associated effects it has on the solar sector as a whole.

At present, India's solar cell and module manufacturing capacity is 3.1 and 8.9 GW per annum, respectively. A sizeable proportion of this capacity is located in special economic zones (SEZ). Indian manufacturers situated in SEZs will also be subject to the duty, reducing their competitiveness. However, while the sales of modules cleared from SEZs to the domestic tariff area (DTA) are subject to safeguard duty, the duty is applicable only on the value of imported inputs and not on the value added inside the SEZ. Cells manufactured in SEZs and then sold in the DTA are exempt from safeguard duty (imported wafers-the raw material used in cell manufacturing-are not subject to safeguard duties). Stand-alone module manufacturers located in the domestic tariff area (DTA) will face increased costs as a result of the safeguard duty as they often import cells for their modules. However, cells manufactured in the DTA would benefit from the safeguard duty.

The relatively underdeveloped state of Indian PV manufacturing can be attributed to the competitive disadvantages of PV manufacturing in India vis-à-vis other countries, particularly China. China accounts for close to 88 per cent of India's PV imports and dominates global PV manufacturing. Upon assessment, the policy support received by Chinese solar PV manufacturers presents a stark contrast to the conditions in which manufacturers in India operate. While the safeguard duty aims to correct this disparity, it alone has little effect. This is better understood when we consider the supply glut in the PV manufacturing market, created as a result of a reduction in solar deployment targets (with subsidy support) in China. This has caused the prices of solar cells, wafers, and modules

manufactured in China to fall further. As per estimates from active industry players in India, the prices of imported modules have crashed to as low as USD 0.21/Watt. Thus, in the current market, the prices of imported modules with the safeguard duty are competitive with or lower than those of domestically manufactured modules.

Further, the revision of commissioning timelines for solar projects in India from 13-15 months to 21-24 months (from June to early January 2019) and 15-18 months (from January 2019 onwards) allows developers to delay the procurement of modules and pay lower safeguard duties or bypass the duty all together. Thus, the safeguard duty offers only a limited competitive edge to domestic manufacturing, but it also has significant adverse effects. It has created uncertainty in the market, which has marred investor confidence and industry appetite significantly. In its current form, the safeguard duty will hinder the decline of solar tariffs; it will also increase regulators' administrative burden as they adjudicate pass through of the cost of the duty as per the change in law clause in the power purchase agreement to the discoms.

Globally, trade protection measures have historically been ineffective in reviving domestic solar PV manufacturing. The Chinese industry avails numerous benefits spanning fiscal support schemes, access to affordable capital, integrated value chains, and affordable input variable costs; thus, a declining short-term safeguard duty will not be adequate to balance the scales. Systemic interventions, based on an understanding of global supply chains and PV factory economics, are necessary to address the competitive disadvantage of the Indian PV manufacturing industry. Measures such as capital subsidies, domestic procurement, investment in the R&D of frontier technologies, interest rate subvention, and the provision of concessional electricity could help the resurgence and growth of the domestic PV industry. The imposition of the safeguard duty has resulted in additional flows into the Indian exchequer. The duty amount collected, approximately INR 1,500 crore for the period of August to December 2018, could be used to implement a combination of the proposed market-making incentives to strategically advance the domestic solar PV manufacturing market without creating uncertainty for solar developers or causing setbacks to the tariff advances made by the solar sector.

1. Introduction

India's solar energy deployment has accelerated rapidly over the last three years, with annual deployment rising from 3 GW in FY 2015-16 to 9.4 GW in FY 2017-18.¹ Though the pace of deployment has risen considerably as the country races to meet the 100 GW by 2022 target, the enhanced demand for modules has largely been met through imports. While imported cells (whether or not assembled in modules) commanded a market share of over 90 per cent in terms of sales (MW capacity) over the course of FY 2015 to FY 2018, Indian solar photovoltaic (PV) manufacturing has struggled to compete.² In response to petitions by five Indian cell and module manufacturers, Indian authorities initiated a safeguard duty investigation and imposed duties on cell imports (whether or not assembled in modules) in order to protect the domestic industry from foreign competition.

The imposition of safeguard duties is intended to offer Indian PV manufacturers protection against cheap imports and facilitate structural improvements that will enhance their competitiveness. However, the extent of the protection offered by safeguard duties depends on how they interact with other policy and market developments. Additionally, the facilitation of structural adjustments is contingent upon the extent to which the duties tackle the underlying reasons for the competitive disadvantage of the local PV industry. On the other hand, the imposition of duties adversely affects project deployment in terms of regulatory uncertainty and higher module costs, which translate into higher tariffs and potential resistance in procurement from discoms. This study aims to present a holistic picture of the impact of safeguard duties on the Indian solar energy ecosystem.

The brief first sets the context for the analysis. This includes a description of the legal framework surrounding these duties, the sequence of events leading up to their imposition in India, and an analysis of trade protection measures employed internationally to protect domestic PV manufacturing. This is followed by an analysis of the challenges pertaining to PV manufacturing in India. In the light of these challenges, the brief examines the effectiveness of safeguard duties in protecting the Indian PV industry and facilitating structural adjustments within it; it also analyses the other effects that the duties may have on India's solar energy ecosystem. The brief concludes with a look ahead at the period beyond the applicability of the currently imposed safeguard duties.

1 Central Electricity Authority, *Growth of Electricity Sector in India From 1947-2018*, 2018

2 Directorate General of Trade Remedies, Ministry of Commerce and Industry, Government of India, *Safeguard investigation concerning imports of "Solar Cells whether or not assembled in modules or panels" into India - Final Findings*, 2018



Safeguards are emergency measures permitted under the WTO regime that enable member countries to protect domestic industries from a surge in imports of like or directly competitive products.

Image: iStock

2. Under what conditions can countries impose safeguard duties to protect their domestic industries?

The World Trade Organization (WTO) permits various trade protection measures that may be applied under specific conditions (Table 1). This section describes in detail the legal framework surrounding safeguard duties-the trade protection measure employed in the Indian context.

	Anti-dumping duty	Countervailing duty	Safeguard duty
How does it protect the domestic industry?	Aims to nullify the impact of dumping, or the sale of an imported product at a price below that charged in its domestic market	Aims to nullify the impact of subsidies offered in the domestic market of the imported product	Aims to protect the domestic industry against a surge in imports of a competing product

TABLE 1:

Motivations for applying various trade protection measures

Source:

World Trade Organization

2.1 The WTO regime on safeguard duties



Safeguard duties under the WTO regime fall under the purview of the WTO Agreement on Safeguards and Article XIX of the General Agreement on Tariffs and Trade (GATT) 1994.³ Under the WTO regime, safeguards are emergency measures that enable member countries to protect domestic industries from a surge in imports of like or directly competitive products.⁴ The increase in imports justifying the application of safeguard measures may be in absolute terms or in

relative terms; for example, in the case of a shrinking market where there can be an increase in the market share of imports relative to domestic production without an actual increase in the quantity of imports.

Safeguard measures may be imposed only after an investigation by the competent authorities. The process for the initiation of investigation varies across countries⁵ - in India, an investigation pertaining to a specific product may be initiated by a petition from a domestic

³ WTO, *WTO Analytical Index Agreement on Safeguards - Article 1 (Jurisprudence)*, 2018

⁴ WTO, "Anti-dumping, subsidies, safeguards: contingencies, etc", https://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm8_e.htm, Accessed on 20-11-2018

⁵ WTO, "Introduction to Safeguards in the WTO", https://ecampus.wto.org/admin/files/Course_385/Module_1591/ModuleDocuments/SG-L1-R1-E.pdf, Accessed on 22-3-2019

producer of the like product or suo moto by the competent authority.⁶ Safeguard measures are imposed when increased imports are found to have caused or threaten to cause serious injury to the domestic industry, through adverse changes in market share, profitability, sales, production, etc. of the domestic industry relative to the competing imported goods. Safeguard measures may be employed only when the increase in imports is found to have occurred due to unforeseen developments,⁷ that could not have been envisioned at the time of setting import tariffs for the product under consideration.

The petitioner, which initiates the safeguard duty investigation, is also required to submit an adjustment plan. This plan proposes the steps that the domestic industry plans to implement in order to become more cost-competitive (Section 7.1 lists out an example of an adjustment plan that was submitted by Indian PV manufacturers to the Directorate General of Trade Remedies (DGTR)).⁸ Safeguard measures may take the form of quantitative import restrictions or higher import tariffs or a combination of the two. Although these measures are supposed to be non-discriminatory in their application (they are to be imposed on imports of the product from all countries), there are exemptions for imports from developing countries. Imports from developing countries accounting for less than three per cent of the product concerned are exempt from the imposition of safeguard measures, provided that these countries do not collectively account for more than nine per cent of imports.⁹

If imposed for more than a year, safeguard measures must be progressively reduced at regular intervals during the period of application. The maximum duration of application of safeguard measures is four years (six years if imposed by a developing country). However, the period of application may be extended if the relevant national authority finds, through a new investigation, that the measures must continue to prevent or remedy injury and if the domestic industry demonstrates evidence of structural adjustments.¹⁰ The total period of application of safeguard measures and extensions cannot exceed eight years (ten years for a developing country).

6 Central Board of Indirect Taxes & Customs, Department of Revenue, Ministry of Finance, Government of India, "Customs Tariff (Identification and Assessment of Safeguard Duty) Rules, 1997", <http://www.cbic.gov.in/htdocs-cbec/customs/cs-act/formatted-htmls/cs-import-rule20>; Accessed on 19-12-2018.3 WTO, WTO Analytical Index Agreement on Safeguards – Article 1 (Jurisprudence), 2018

7 WTO, *WTO Analytical Index Agreement on Safeguards - Article 1 (Jurisprudence)*, 2018

8 From the domestic industry's submissions to the DGTR

9 WTO, "Technical Information on Safeguard Measures", https://www.wto.org/english/tratop_e/safeg_e/safeg_info_e.htm#special, Accessed on 20-11-2018

10 WTO, "Anti-dumping, subsidies, safeguards: contingencies, etc", https://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm8_e.htm, Accessed on 20-11-2018

2.2 The Indian regime on safeguard duties



Under Indian law, safeguard duties fall under the purview of the Customs Tariff Act, 1975, and the Customs Tariff (Identification and Assessment of Safeguard Duty) Rules, 1997, notified by the central government under Section 8B of the Act.^{11,12} The Indian regime on safeguard duties is largely aligned with the WTO regime. However, one point of difference is that the Indian regime does not require the investigating authority to demonstrate that the surge in imports occurred due to unforeseen circumstances.¹³ Nonetheless, because of the requirements of the WTO regime, the DGTR has examined unforeseen developments in its investigations.¹⁴

While the regulatory framework governing safeguard duties is clear, the path towards the imposition of safeguard duties was characterised by uncertainties and legal challenges. This is outlined in the next section.

11 Central Board of Indirect Taxes and Customs, Department of Revenue, Ministry of Finance, The Customs Tariff Act, 1975

12 Central Board of Indirect Taxes & Customs, Department of Revenue, Ministry of Finance, Government of India, "Customs Tariff (Identification and Assessment of Safeguard Duty) Rules, 1997", <http://www.cbic.gov.in/htdocs-cbec/customs/cs-act/formatted-htmls/cs-import-rule20>; Accessed on 19-12-2018.

13 Directorate General of Trade Remedies, Ministry of Commerce & Industry, Government of India, *Safeguard investigation concerning imports of "Solar Cells whether or not assembled in modules or panels" into India - Final Findings*, 2018

14 Ibid



Uncertainty surrounding the availability of pass-through of safeguard duty resulted in reduced participation from developers in tenders.

Image: iStock

3. The road to the imposition of safeguard duties on solar cell and module imports in India

Before filing the safeguard duty petition, Indian PV manufacturers had petitioned the Directorate General of Anti-dumping and Allied Duties (DGAD) in June 2017 to initiate an anti-dumping investigation on solar cells (whether or not assembled in modules) imported from China, Taiwan, and Malaysia. However, before the DGAD could issue its final ruling, the petitioners withdrew their case. The petitioners in their request to terminate the investigation stated that the injury to the domestic industry had worsened over the course of the investigation and the injury for the period of investigation claimed did not accurately reflect the aggravated situation.¹⁵ Thus, trade protection for the domestic PV industry has been limited to safeguard duties on cell and module imports.

In December 2017, Indian PV manufacturers petitioned the DGTR to impose safeguard duties on solar cells imports (whether or not assembled in modules).¹⁶ The DGTR conducted an investigation, and in January 2018, it recommended a preliminary duty of 70 per cent for a period of 200 days.¹⁷ The preliminary ruling also included special economic zones (SEZs) in the definition of domestic industry, thereby making units located in SEZs also eligible for protection from imports.¹⁸ This was at odds with the findings of a previous safeguards investigation on imports of unwrought aluminium into India, which excluded SEZs from the definition of domestic industry.¹⁹

The DGTR's recommendation to impose a provisional duty was challenged by a developer in the Madras High Court, and the court issued a temporary stay on the imposition of the duty. In April, the court dismissed the petition calling it premature, since the DGTR's findings were only preliminary and recommendatory in nature.²⁰ Nonetheless, the preliminary duty was not

15 Directorate General of Anti-dumping & Allied Duties (DGAD), Ministry of Commerce & Industry, "Termination Order Case No. OI - 33/2017", http://www.dgtr.gov.in/sites/default/files/Termination-order-Solar-23-3-18_0.pdf, Accessed on 1-12-2018.

16 Directorate General of Trade Remedies, Ministry of Commerce & Industry, Government of India, *Safeguard investigation concerning imports of "Solar Cells whether or not assembled in modules or panels" into India - Final Findings*, 2018

17 Ibid

18 Directorate General of Trade Remedies, Ministry of Commerce & Industry, Government of India, *Safeguard investigation concerning imports of "Solar Cells whether or not assembled in modules or panels" into India - Preliminary Findings*, 2018

19 Directorate General of Safeguards, Ministry of Finance, Government of India, *Safeguard Investigation concerning Imports of "Unwrought Aluminium (Aluminium not alloyed and Aluminium alloys)" into India - Final Findings-Reg.*, 2018

20 Madras High Court, *M/s.Shapoorji Pallonji Infrastructure Capital Co Ltd. Vs Union of India and The Director General, Directorate General of Safeguards*, Order dated 16-4-2018

notified.²¹ However, the uncertainty surrounding the availability of pass through of safeguard duty (in case of its potential imposition) if it had not been factored in bid prices resulted in reduced participation from developers in tenders. Between January and April 2018, only 1.25 GW of capacity was awarded against 13.3 GW of capacity tendered.²²

Period	Safeguard duty
July 30, 2018 - July 29, 2019	25 per cent
July 30, 2019 - January 29, 2020	20 per cent
January 30, 2020 - July 29, 2020	15 per cent

In order to lower the uncertainty surrounding the safeguard duty, in April 2018, the Ministry of New and Renewable Energy (MNRE) issued a clarification regarding the change in law provision in the Ministry of Power's competitive bidding guidelines for solar projects. This made it clear that Clause 5.7.2 of the guidelines, which included "change in the rates of any taxes which have a direct effect on the project" as a change in law event extended to "changes in rates of taxes, duties and cess".²³ However, since the guidelines are not binding on central or state agencies tendering out projects, this clarification effectively only enabled the pass through of safeguard duties provided that the change in law provision of the power purchase agreement (PPA) included the imposition of safeguard duties.²⁴ In the case of PPAs that do not mention safeguard duties within the scope of their change in law clause, the respective regulatory commission must determine if the existing change in law clause is broad enough to include safeguard duties within it. Nonetheless, the reduction in uncertainty provided an impetus to the tendering and awards of solar projects, with 8 GW of capacity awarded out of 17.8 GW tendered from May to July.²⁵

On 16 July 2018, the DGTR released its final findings, recommending the levy of safeguard duties on the import of solar cells (whether or not assembled in modules) for two years (Table 2). The safeguard duty recommended was applicable on imports into the DTA, which includes the whole of India excluding the SEZs.²⁶ The duty effectively impacted cell imports (whether or not assembled into modules) from China, Malaysia, and Taiwan (the main sources of India's solar PV imports) as well as module sales within the DTA from the facilities of Indian manufacturers located in the SEZs.

TABLE 2:

Directorate General of Trade Remedies' recommendations on safeguard duties

Source:

Directorate General of Trade Remedies, *Safeguard investigation concerning imports of "Solar Cells whether or not assembled in modules or panels" into India - Final Findings*, Ministry of Commerce & Industry, Government of India (2018)

21 The Economic Times, "India won't levy duty on solar gear imports", <https://m.economictimes.com/industry/energy/power/india-wont-levy-duty-on-solar-gear-imports/articleshow/64393677.cms>, Accessed on 22-12-2018

22 CEEW analysis based on Mercom reports of solar capacity tendered and awarded. The capacity awarded figure excludes 500 MW of capacity awarded in a March GUVNL tender that was subsequently scrapped.

23 MNRE, "Clarification to Guidelines for Tariff Based Competitive Bidding Process for Procurement of Power from Grid Connected Solar PV Power Projects, notified on 03 August 2017, under clause 20 of these Guidelines", <https://mnre.gov.in/sites/default/files/webform/notices/Clarification-Guidelines-for-TBCB-process-for-procurement-of-power-from-GCSPV-projects.pdf>, Accessed on 1-12-2018

24 Ibid.

25 CEEW analysis based on Mercom reports of solar capacity tendered and awarded.

26 Directorate General of Trade Remedies, Ministry of Commerce & Industry, Government of India, *Safeguard investigation concerning imports of "Solar Cells whether or not assembled in modules or panels" into India - Final Findings*, 2018

Applicability of safeguard duties on sales from SEZ to DTA

The exclusion of SEZs from the definition of domestic industry came as a surprise since it was not in line with the preliminary findings.²⁷ The Ministry of Commerce and Industry reaffirmed the exclusion of SEZs in a clarification issued in November 2018.²⁸ However, while the sales of modules cleared from SEZs to the DTA are subject to safeguard duty, the duty is applicable only on the value of imported inputs and not on the value added inside the SEZ.²⁹ Thus, duties on modules manufactured in SEZs using imported cells and then sold inside the DTA are applicable only on the value of the imported cells used in the manufacture of the modules. Cells manufactured in SEZs and then sold inside the DTA are exempt from safeguard duty since imported wafers (the raw materials for cell manufacturing) are not subject to safeguard duties.

A solar developer filed a petition before the Orissa High Court challenging the DGTR's recommendations. The high court issued an interim order on July 23, 2018 directing the central government not to notify the imposition of safeguard duty based on the recommendations of DGTR, without obtaining the leave of the court, till further orders.³⁰ However, despite the high court's stay order, the Ministry of Finance notified the imposition of the duty, without taking leave of the court, with effect from July 30, 2018.³¹ Contempt proceedings were then initiated against the government for acting against the court's orders. Subsequently, the government began to assess the duty on imported solar cells (whether or not assembled into modules) only on a provisional basis without insisting on the payment of duties if the party being assessed submitted a simple undertaking or bond till further orders from the court.³² The government filed a special leave petition before the Supreme Court challenging the Orissa High Court's interim order.³³ The Supreme Court subsequently lifted the stay on the imposition of safeguard duty, paving the way for the government to start collecting safeguard duties.³⁴ Subsequently, the central government instructed customs authorities to commence collection of safeguard duties as per its notification on July 30, 2018 and also to finalise the assessments done on a provisional basis.³⁵ Table 3 summarises the salient events leading to the imposition of safeguard duties, thus underscoring the uncertainty created by the issue for solar PV tenders.



While the sales of modules cleared from SEZs to the DTA are subject to safeguard duty, the duty is applicable only on the value of imported inputs and not on the value added inside the SEZ

27 Ibid.

28 Ministry of Commerce & Industry, "Applicability of Safeguard duty on Solar Cells and Solar PV Modules cleared from SEZ to DTA - Ref DoR Notification No. 01/2018-Customs (SG) dated 30th July 2018", <http://sezindia.nic.in/upload/uploadfiles/files/Circular.pdf>, Accessed on 15-1-2019

29 Based on market intelligence

30 Interim order of the Orissa in Writ Petition (Civil) No. 12817 (2018)

31 Ministry of Finance, *Notification No. 01/2018-Customs (SG)* (2018)

32 Instruction No. 12/2018 - Customs dated 13-8-2018 issued by Department of Revenue, Ministry of Finance, Government of India

33 Instruction No. 14/2018 - Customs dated 13-8-2018 issued by Department of Revenue, Ministry of Finance, Government of India

34 The Economic Times, "Supreme Court lifts stay on safeguard duty on solar imports", <https://economictimes.indiatimes.com/industry/energy/power/sc-lifts-stay-on-safeguard-duty-on-solar-imports/articleshow/65759673.cms>, Accessed on 1-12-2018

35 Instruction No. 14/2018 - Customs dated 13-8-2018 issued by Department of Revenue, Ministry of Finance, Government of India

December 5, 2017	Indian PV manufacturers petition DGTR to impose safeguard duties
December 19, 2017	Investigation initiated by the DGTR
January 5, 2018	DGTR recommends a preliminary safeguard duty of 70 per cent for 200 days on imported cells (whether or not assembled in modules), and includes SEZs within the definition of domestic industry
January 22, 2018	Madras High Court puts a temporary stay on the DGTR's recommendation
April 2, 2018	The MNRE issues a clarification regarding the change in law clause pertaining to the guidelines for tariff-based competitive bidding for solar power projects
April 16, 2018	The Madras High Court dismisses the petition against the imposition of a preliminary safeguard duty
July 16, 2018	The DGTR issues its final recommendations on the safeguard duty, and excludes SEZs from definition of domestic industry
July 23, 2018	The Orissa High Court, through an interim order, directs the Union government not to issue any notification imposing a safeguard duty on the basis of the recommendations of DGTR without obtaining the leave of court
July 30, 2018	The Ministry of Finance notifies the safeguard duty with effect from July 30, 2018
August 13, 2018	The Ministry of Finance announces that only provisional assessments of duties will be made on cell and module imports, and it will not insist on the payment of duties in light of the Orissa High Court's stay order
September 10, 2018	The Supreme Court nullifies the Orissa High Court's stay order, making safeguard duties effective from July 30, 2018
September 13, 2018	The Ministry of Finance instructs customs authorities to finalise provisional assessments and collect safeguard duties per the notification of July 30, 2018
November 30, 2018	The Ministry of Commerce and Industry clarifies that the sale of PV modules from the SEZ to the DTA will be subject to safeguard duties (on the value of imported cells used as inputs)

TABLE 3:

Timeline of events surrounding the imposition of safeguard duties

Source:
CEEW analysis based on government notifications and media reports

4. How have countries used trade barriers to protect their domestic PV manufacturing industries?

The use of trade barriers to safeguard the interests of domestic manufacturing in the solar PV manufacturing industry is not unprecedented. This section describes how such barriers have been used in international jurisdictions and analyses their effectiveness.

4.1 United States of America

Imposition of anti-dumping and countervailing duties on PV imports



Based on a petition from a US-based PV manufacturer in 2011, the US Department of Commerce (DOC) initiated an investigation into alleged unfair trade practices involving imported Chinese PV cells (whether or not assembled in modules), namely, dumping and subsidy support in their domestic market.³⁶ In 2012, US trade authorities (the DOC and the International Trade Commission (ITC)) concluded that the domestic PV manufacturing industry was suffering due to unfair trade practices employed by Chinese exporters. Final anti-dumping duties ranging from 18.32 per cent to 249.96 per cent and countervailing duties ranging from 14.78 per cent to 15.97 per cent were imposed on Chinese PV cell imports, whether or not assembled into modules; the duties imposed varied among the manufacturers, depending on the extent of dumping or subsidy support availed.³⁷

In 2013, after the imposition of duties, the share of imports in US module supply declined; however, this proved to be short-lived, with imports clawing back their share from the following year onwards. This can be attributed to two major factors. Firstly, Chinese module manufacturers circumvented US duties by sourcing cells made from other jurisdictions (particularly Taiwan) and relocating production facilities to other jurisdictions.^{38,39} Secondly,

36 Department of Commerce, United States of America, "Commerce Finds Dumping and Subsidization of Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules from the People's Republic of China", http://ia.ita.doc.gov/download/factsheets/factsheet_prc-solar-cells-ad-cvd-finals-20121010.pdf, Accessed on 21-11-2019

37 Ibid

38 Executive Office of the President of the United States, "Section 201 Cases: Imported Large Residential Washing Machines and Imported Solar Cells and Modules", <https://ustr.gov/sites/default/files/files/Press/fs/201%20Cases%20Fact%20Sheet.pdf>, Accessed on 21-11-2018

39 PV Tech, "Thailand and Vietnam become lead countries for OEM solar module supply", <https://www.pv-tech.org/editors-blog/thailand-and-vietnam-become-lead-countries-for-oem-solar-module-supply>, Accessed on 17-1-2019

a 60 per cent decline in the prices of PV cells and modules between 2012 and 2016 (due to a global supply glut) negated the impact of the trade protection measures.⁴⁰ In 2015, the DOC responded by imposing new anti-dumping and countervailing duties on solar cells (whether or not assembled in modules) sourced from both China and Taiwan.⁴¹

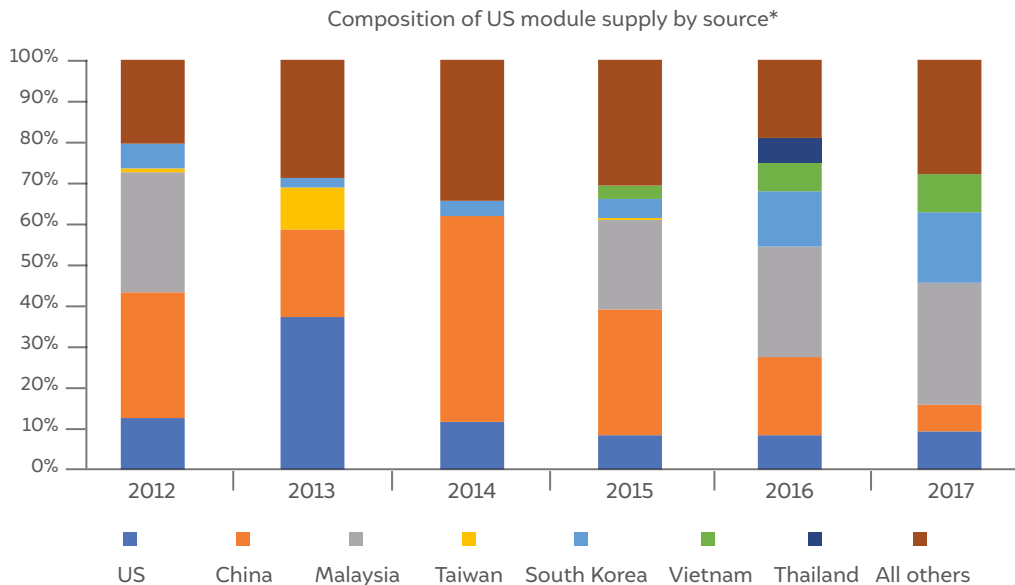


FIGURE 1:

Trade barriers did not drive substantial gains for US PV manufacturing

*Notes:

1 The market share data refers to shares in module supply (in MW) comprising domestically manufactured modules, modules purchased from US manufacturers' inventory for resale, and imported modules. These do not necessarily total up to actual sales (domestic and exports) because a portion remains unsold and constitutes inventory for the next year.

2 The 'All Others' category for each year includes imports for all other countries besides those shown separately for that year

Source:
US Energy Information Administration

While the share of Chinese imports in US module supply has declined after the imposition of duties in 2015, the share of imports from other countries has risen steadily. This could be indicative of the shifting of production facilities by Chinese module manufacturers to other Asian countries, apart from the producers in these countries increasingly exporting to the US.⁴²

The imposition of these trade protection measures translated into a 34 per cent increase in PV module production capacity and a 24 per cent increase in production between 2012 and 2016.⁴³ However, considering that the cumulative US solar installed capacity grew roughly 460 per cent from 7.2 GW to 40.5 GW over the same time period, the gains for US PV manufacturing were disproportionately lower (Source: Solar Energy Industries Association).

Imposition of safeguard duties on PV imports

With the rapid increase in solar PV imports, in 2017, US-based PV manufacturers made fresh petitions to US authorities seeking remedial measures against the impact of imported PV cells and modules on the domestic industry.⁴⁴ Based on these petitions, US trade authorities

40 Executive Office of the President of the United States, "Section 201 Cases: Imported Large Residential Washing Machines and Imported Solar Cells and Modules", <https://ustr.gov/sites/default/files/files/Press/fs/201%20Cases%20Fact%20Sheet.pdf>, Accessed on 21-11-2018

41 US Congressional Research Service, "Domestic Solar Manufacturing and New U.S. Tariffs", <https://fas.org/sgp/crs/misc/IF10819.pdf>, Accessed on 21-11-2018

42 PV Tech, "Thailand and Vietnam become lead countries for OEM solar module supply", <https://www.pv-tech.org/editors-blog/thailand-and-vietnam-become-lead-countries-for-oem-solar-module-supply>, Accessed on 17-1-2019

43 US Congressional Research Service, "Domestic Solar Manufacturing and New U.S. Tariffs", <https://fas.org/sgp/crs/misc/IF10819.pdf>, Accessed on 21-11-2018

44 GTM Research, "Suniva, SolarWorld and Their Opponents File New Trade Remedy Proposals", <https://www.greentechmedia.com/articles/read/suniva-solarworld-file-new-trade-remedy-proposals>, Accessed on 21-11-2018

determined that increased imports were a substantial cause of serious injury to the domestic industry.⁴⁵ The US imposed safeguard duties on imports of PV cells and modules in February 2018 for a period of four years, starting at 30 per cent for the first year and declining to 15 per cent by the fourth year.⁴⁶ The US further imposed an additional 25 per cent duty on Chinese PV imports in August 2018 as a part of the retaliatory trade barriers between the two countries.⁴⁷

The safeguard duties resulted in a decline in import shipments by 39 per cent year-over-year in the first ten months of 2018.⁴⁸ This includes a 16 per cent year-over-year increase in imports in January, in anticipation of the imposition of safeguard duties in February.⁴⁹ The lack of data on US module supply from domestic sources for 2018 (as this brief is being written) makes it challenging to estimate market share gains for domestic manufacturers. However, given that the year-over-year decline in project installations in Q2 and Q3⁵⁰ of the calendar year 2018 stood at nine per cent⁵¹ (corresponding to the expected period of utilisation of modules imported post the imposition of duties in February), which was considerably lower than the decline in imports, it is reasonable to assume that some gain in market share is likely to have occurred for domestic manufacturers.

4.2 European Union



Based on petitions by European PV manufacturers, the European Commission initiated investigations into potential dumping and subsidisation of Chinese PV cell and module imports in November 2012. In December 2013, the European Commission concluded that the dumping and subsidisation of Chinese cells and modules did cause injury to European cell and module manufacturers. Anti-dumping duties ranging from 27.3 per cent to 64.9 per cent and countervailing duties of up to 11.5 per cent were imposed on Chinese cell and module imports for a period of two years beginning December 2013.⁵²⁻⁵³ The duties imposed varied by manufacturer, depending on the extent of dumping or the subsidy support availed. However, a compromise was reached between European trade authorities and Chinese manufacturers in December 2013, whereby Chinese imports were exempted from punitive tariffs if they were sold above a minimum import price (MIP).⁵⁴ Imports sold below the MIP were subject to

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- 45 Executive Office of the President of the United States, "Section 201 Cases: Imported Large Residential Washing Machines and Imported Solar Cells and Modules", <https://ustr.gov/sites/default/files/files/Press/fs/201%20Cases%20Fact%20Sheet.pdf>, Accessed on 21-11-2018
- 46 US Congressional Research Service, "Domestic Solar Manufacturing and New U.S. Tariffs", <https://fas.org/sgp/crs/misc/IF10819.pdf>, Accessed on 21-11-2018
- 47 PV Magazine, "United States confirms additional 25% tariffs on Chinese cells, modules", <https://pv-magazine-usa.com/2018/08/07/united-states-confirms-additional-25-tariffs-on-chinese-cells-modules/>, Accessed on 21-2-2019
- 48 US Energy Information Administration, "Monthly Solar Photovoltaic Module Shipments Report", https://www.eia.gov/renewable/monthly/solar_photo/, Accessed on 21-2-2019
- 49 Ibid
- 50 Data for Q4 2018 was not available at the time of writing of the brief
- 51 Based on Solar Energy Industries Association reports for US solar installations
- 52 Official Journal of the European Union, "Council Implementing Regulation (EU) No 1238", <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:325:0001:0065:EN:PDF>, Accessed on 22-11-2018
- 53 European Commission, "The European Union's Measures Against Dumped and Subsidised Imports of Solar Panels From China", http://trade.ec.europa.eu/doclib/docs/2015/july/tradoc_153587.pdf, Accessed on 22-11-2018
- 54 Ibid

anti-dumping and countervailing duties. The MIP was determined based on a benchmark of international spot prices of modules, and was adjusted on a quarterly basis.⁵⁵

The impact of these measures is hard to assess in absolute terms as a result of a sharp decline in EU demand for solar PV cells and modules in 2013, following the freezing of support schemes pertaining to renewables in addition to general economic uncertainty.^{56,57} Therefore, market share is the metric that has been considered to assess the impact of these measures. The imposition of the trade protection measures translated into an increase in the market share of domestic producers from 25 per cent in 2012 to 35 per cent in 2015 (Figure 2).⁵⁸ This time period corresponds to the timeframe from the initiation of the investigation to the time period considered in the expiry review. However, while EU producers did manage to claw back some lost ground in terms of market share, imported modules still retained a significant market share. While the imposition of trade restrictions on Chinese imports resulted in a decline in the market share of Chinese module imports from 66 per cent in 2012 to 41 per cent in 2015, there was also a rise in the market share of imports from other countries from 9 per cent in 2012 to 25 per cent in 2015 (Figure 2). This was attributed to the circumvention of the European trade restrictions (in an anti-circumvention review initiated in May 2015) by Chinese manufacturers by consigning exports from Taiwan and Malaysia, as evidenced by the rising share of imports from Taiwan and Malaysia in PV module imports to the EU (Figure 3).⁵⁹ Subsequently, anti-dumping and countervailing duties were extended to imports into the EU from Taiwan and Malaysia as well.⁶⁰

55 Official Journal of the European Union, "Commission Implementing Regulation (EU) 2016/12", <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0012&from=EN>, Accessed on 23-11-2018

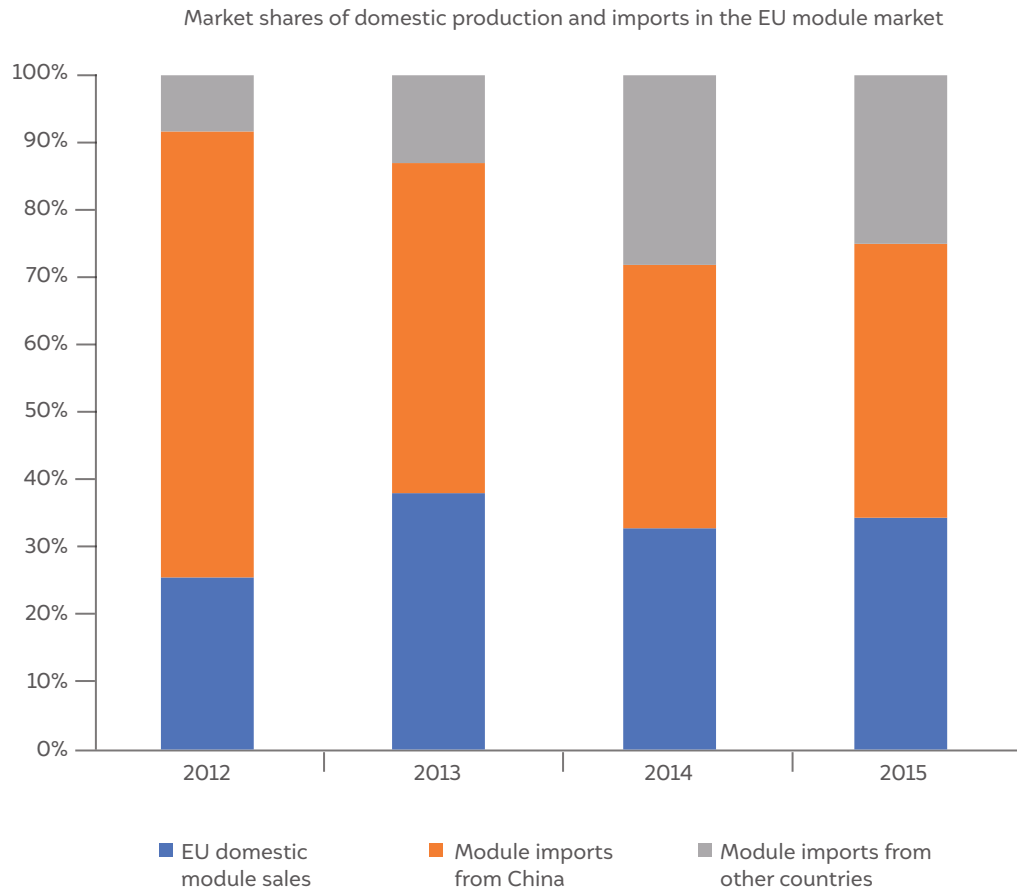
56 European Commission, "European Commission guidance for the design of renewables support schemes", https://ec.europa.eu/energy/sites/ener/files/documents/com_2013_public_intervention_swd04_en.pdf, Accessed on 23-11-2018

57 Official Journal of the European Union, "Commission Implementing Regulation (EU) 2017/367", http://trade.ec.europa.eu/doclib/docs/2017/march/tradoc_155403.solar-panels.def.en.L56-2017.pdf, Accessed on 23-11-2018

58 The figures for 2015 refer to the corresponding values for the period October 2014–September 2015, which was the period under consideration during the expiry review of the duties.

59 Official Journal of the European Union, "Commission Implementing Regulation (EU) 2016/184", http://trade.ec.europa.eu/doclib/docs/2016/february/tradoc_154264.extension.en.L37-2016.pdf, Accessed on 26-12-2018

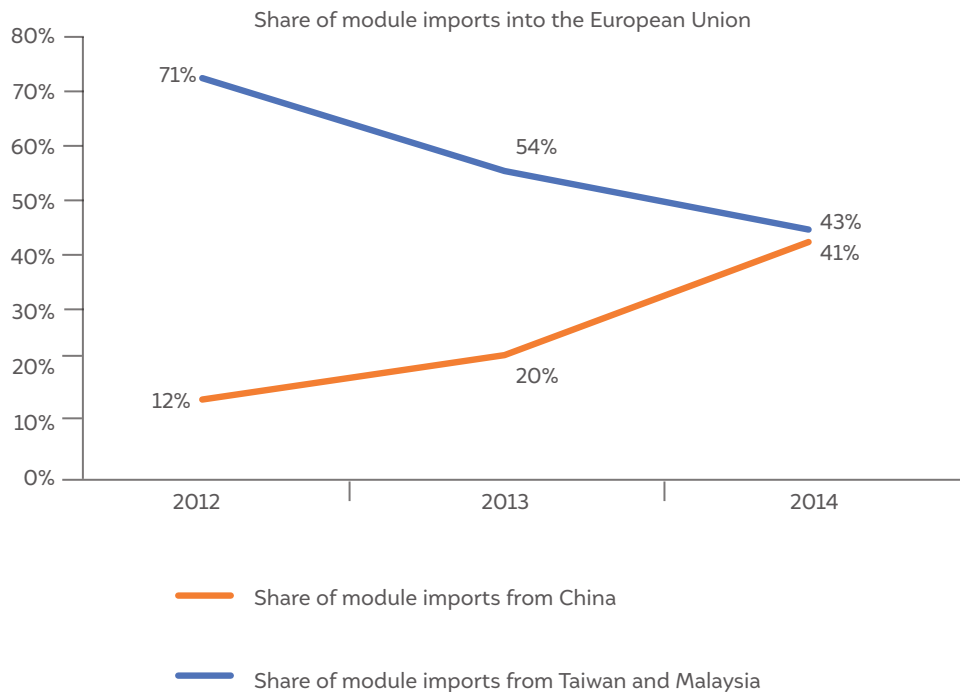
60 Ibid

**FIGURE 2:**

Chinese manufacturers circumvented EU trade barriers by routing exports through other countries

Note: The figures for 2015 refer to the corresponding values for the period October 2014-September 2015, which was the period under consideration during the expiry review of the duties.

Source: European Commission ruling in Official Journal of the European Union

**FIGURE 3:**

Chinese manufacturers consigned exports from Malaysia and Taiwan to circumvent EU duties

Source: European Commission ruling in Official Journal of the European Union

Towards the end of the two-year application period of the original order of anti-dumping duties that began in 2015, the European Commission initiated an expiry review based on a petition from European PV manufacturers. After the conclusion of the review in March 2017, the European Commission extended the applicable trade measures for a period of 18 months, as a compromise between the interests of developers and manufacturers (both European and international).⁶¹ However, the trade protection measures were to be phased out in order to enable the prices of imports to reflect market prices.⁶² The trade protection measures were phased out to facilitate an increase in the deployment of solar PV installations with the availability of cheaper imported modules; this was necessary for the achievement of European climate change related objectives.⁶³



Image: iStock

61 European Commission, "Commission decides not to extend trade defence measures on solar panels from China", <http://trade.ec.europa.eu/doclib/press/index.cfm?id=1904>, Accessed on 26-12-2018

62 Ibid

63 European Parliament, "Parliamentary questions Subject: Solar panels - expiry review on phase-out of minimum import price and trade measures", http://www.europarl.europa.eu/doceo/document/E-8-2018-002909_EN.html?redirect, Accessed on 23-11-2018

4.3 Canada




In 2014, Canadian trade authorities initiated an investigation into the potential dumping and subsidisation of imported Chinese PV modules based on a petition by domestic PV manufacturers.⁶⁴ In 2015, the investigation concluded that though Chinese imports had not caused injury to the domestic industry, they threatened to do so.⁶⁵ As a result, Canadian authorities imposed anti-dumping and countervailing duties on Chinese PV module imports for a period of five years, though the final determination of duties remain confidential.⁶⁶ The impact of these duties on the Canadian PV manufacturing industry is unclear due to the lack of availability of data.

Much like the aforementioned trade protection cases, India has chosen to use trade protection measures in the form of safeguard duties to protect its domestic PV manufacturing industry against imports. While the imposition of safeguard duties is geared towards protecting the domestic industry and facilitating a structural adjustment, it is important to first understand the problems faced by domestic PV manufacturers (Section 5). Only then can the effectiveness of safeguard duties be assessed (Sections 6 and 7).

64 Canada Border Services Agency, "Statement of reasons concerning the preliminary determinations with respect to the dumping and the subsidizing of certain photovoltaic modules and laminates originating in or exported from the Peoples' Republic of China ", <https://www.cbsa-asfc.gc.ca/sima-lmsi/i-e/ad1405/ad1405-i14-pd-eng.pdf>, Accessed on 23-11-2018

65 PV Magazine, "Canada issues ruling on anti-dumping case, final duties set", https://www.pv-magazine.com/2015/07/06/canada-issues-ruling-on-anti-dumping-case-final-duties-set_100020085/, Accessed on 23-11-2018

66 Ibid



The relatively underdeveloped state of Indian PV manufacturing can be attributed to the competitive disadvantages of PV manufacturing in India vis-à-vis other countries, particularly China.

Image: iStock

5. What plagues Indian solar PV manufacturing?

The Indian solar PV manufacturing industry is characterised by a small installed capacity of around 3.1 GW of cells and 8.8 GW of module manufacturing capacity, which is inadequate to cater to the country's annual requirements (~20 GW, if India is to meet its solar energy targets).⁶⁷ There is no upstream PV manufacturing capacity in India.⁶⁸ Furthermore, the installed manufacturing capacity is characterised by utilisation levels of less than 50 per cent, as a result of limited investments in technological improvements and R&D, and competition from PV imports.⁶⁹

The relatively underdeveloped state of Indian PV manufacturing can be attributed to the competitive disadvantages of PV manufacturing in India vis-à-vis other countries, particularly China. This section focuses on comparison between Indian and Chinese manufacturers, since these account for around 88 per cent of India's PV imports and are the dominant force in global PV manufacturing, especially in the downstream stages.⁷⁰ However, comparisons with other international manufacturers have also been included where appropriate. Solar PV manufacturing is counted among China's "strategic emerging industries", which are provided favourable policy support on a variety of fronts including finance, taxation, and industrial policy.^{71,72} These measures feed into the underlying drivers of the success of Chinese PV manufacturing.

67 Directorate General of Trade Remedies, Ministry of Commerce & Industry, Government of India, *Safeguard Investigation Concerning Imports Of "Solar Cells Whether Or Not Assembled In Modules Or Panels" Into India - Final Findings*, 2018

68 Polysilicon, ingot and wafer manufacturing facilities are referred to as upstream stages in PV manufacturing, while cells and module manufacturing constituting the downstream stages.

69 MNRE, *Concept Note on Solar PV Manufacturing Scheme*, 2017

70 ICC & ICF Consulting, *Surya To Boost Solar Manufacturing in India*, 2017

71 Official Journal of the European Union, "Council Implementing Regulation (EU) No 1239/2013 of 2 December 2013", <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1239&from=EN>, Accessed on 3-12-2018

72 National Development and Reform Commission, People's Republic of China, *The 13th Five Year Plan For Economic And Social Development Of The People's Republic Of China*, 2016

5.1 Inferior terms of debt capital

Chinese PV module manufacturers enjoy access to debt capital on far more favourable terms than their Indian counterparts. The major Chinese integrated module manufacturers have access to short-and long-term loans at average interest rates of three to four per cent per annum.⁷³ Chinese PV manufacturers have access to debt capital from diversified sources including state-owned financial institutions. A portion of the loans from Chinese state-owned financial institutions has been extended to PV manufacturers at below commercial rates.^{74,75} By contrast, Indian PV manufacturers access debt capital at around 10 to 12 per cent per annum on purely commercial terms.⁷⁶ Access to capital on favourable terms constitutes a competitive advantage, particularly for upstream stages in the value chain such as polysilicon and wafer production (Table 4).



Access to cheap debt capital (at between 3 to 4 per cent) for leading Chinese PV manufacturers is a source of competitive advantage, particularly for upstream stages of PV manufacturing

5.2 Higher electricity prices

The upstream stages of PV manufacturing, particularly polysilicon production, are very energy-intensive. In the Indian electricity tariff structure, industrial consumers cross-subsidise residential consumers. In comparison, countries characterised by significant upstream PV manufacturing capacity tend to offer favourable tariffs for the PV industry, or tariff structures that offer cheap industrial prices. China, like India, has an electricity tariff structure in which industrial consumers cross-subsidise residential consumers.⁷⁷ Chinese PV manufacturers, however, benefit from access to electricity at preferential rates, though the exact quantum of the electricity subsidies offered to them is not clear.^{78,79} Other countries with significant upstream PV manufacturing capacity, such as Germany and South Korea, offer an electricity tariff structure with lower tariffs for industrial consumers as compared to residential consumers.^{80,81} The unavailability of cheap industrial electricity is one of the factors that hampers the development of the PV value chain in India, especially the upstream stages (Table 4).

Table 4 highlights the major variables that affect the selling prices of solar PV products across the value chain in India. These indicate the drivers of selling prices for the stand-alone production of each product. The major drivers for each PV product determine their competitiveness. Given the globalised nature of supply chains, it is possible to have a great degree of uniformity across countries in terms of raw material costs and plant and equipment

73 CEEW Analysis, based on SEC filings of Chinese PV manufacturers

74 ICC & ICF Consulting, *Surya To Boost Solar Manufacturing in India*, 2017

75 Chen Gang, *China's Solar PV Manufacturing and Subsidies from the Perspective of State Capitalism* (The Copenhagen Journal of Asian Studies, 2015)

76 Based on market intelligence.

77 Shawn Zhang and Xuqing Qin, *Lessons Learned from China's Residential Tiered Electricity Pricing Reform* (International Institute for Sustainable Development, 2015)

78 Chen Gang, *China's Solar PV Manufacturing and Subsidies from the Perspective of State Capitalism* (The Copenhagen Journal of Asian Studies, 2015)

79 ICC & ICF Consulting, *Surya To Boost Solar Manufacturing in India*, 2017

80 Eurostat, "Electricity price statistics", https://ec.europa.eu/eurostat/statistics-explained/index.php/Electricity_price_statistics#Electricity_prices_for_non-household_consumers, Accessed on 23-12-2018

81 Reuters, "S. Korea to propose three plans to revamp residential electricity prices", <https://www.reuters.com/article/southkorea-electricity/s-korea-to-propose-three-plans-to-revamp-residential-electricity-prices-idUSL4N1DO2IA>, Accessed on 23-12-2018

costs for each stage, in the absence of major trade barriers and supply bottlenecks. However, even with similar raw material and equipment costs, there are considerable differences in the cost of electricity and finance, which translate into differences in the competitiveness of production costs for each PV product.

Period	Polysilicon	Ingot	Wafer	Cell	Module
Electricity costs	33.5%	10.2%	6.9%	1.2%	0.3%
Raw materials	20.7%	73.9%	72.8%	82.9%	95.7%
Depreciation of plant and equipment	21.0%	8.0%	10.3%	8.2%	2.1%
Cost of finance	19.4%	7.4%	9.5%	7.6%	1.9%
Other utilities	5.5%	0.4%	0.5%	0.1%	0.0%

TABLE 4:

Shares of various drivers in selling prices of solar PV products

Source:
CEEW analysis based on data from Indian Chamber of Commerce & ICF Consulting India Pvt. Ltd., SURYA To Boost Solar Manufacturing In India, 2017

5.3 Lower scale of operations

Indian PV manufacturers are far smaller than their counterparts in other markets, particularly China, with the largest solar module manufacturing facility under a single manufacturer in India of the order of 1.5 GW.⁸² By contrast, the top Chinese module manufacturers had facilities with capacities of up to 8 GW⁸³ under a single manufacturer at the end of 2017⁸⁴ (around six per cent of the total global manufacturing capacity of 130 GW in 2017). The economies of scale of Chinese manufacturing facilities translate into lower unit production costs. Economies of scale are an even more crucial determinant of success for upstream PV manufacturing, particularly the energy- and capital-intensive production of polysilicon. The top five polysilicon manufacturers collectively account for close to 60 per cent of the 2018 global polysilicon production capacity.^{85,86} The larger scale of operations also gives international PV manufacturers greater bargaining power in sourcing raw materials on more favourable terms.

82 in the Solar, "About Adani Solar", <https://adanisolar.com/about-us>, Accessed on 3-12-2018

83 Based on SEC filings of Chinese PV manufacturers

84 PV Magazine, "The 9th ITRPV: Module Price Pressure To Continue As Production Capacity Tops 130 Gwp And Price Learning Curve Rises To 22.8%", <https://www.pv-magazine-india.com/2018/03/20/the-9th-itrpv-module-price-pressure-to-continue-as-production-capacity-tops-130-gwp-and-price-learning-curve-rises-to-22-8/>, Accessed on 19-12-2018

85 PV Magazine, "The Weekend Read: Polysilicon and Wafer Manufacturer Ranking", <https://www.pv-magazine.com/2018/02/24/the-weekend-read-from-the-top/>, Accessed on 20-12-2018

86 PV Magazine, "Solar PV 2018: Installs of 111 GW, a Polysilicon Factory Boom and \$0.30/W for modules", <https://www.pv-magazine.com/2017/12/01/solar-pv-2018-installs-of-111-gw-a-polysilicon-factory-boom-and-0-30w-for-modules-2/>, Accessed on 20-12-2018

5.4 Lack of vertical integration

Besides larger-scale operations, the top global module manufacturers are also characterised by greater vertical integration than their Indian counterparts. Though they do source a portion of their raw material requirements from external vendors, their own involvement in the intermediate stages of the PV value chain enables them to meet a considerable portion of these requirements in-house. For example, the top manufacturers meet most of their cell requirements (which account for 64 per cent of the raw material requirements for module manufacturing)⁸⁷ in-house (Table 5). This helps module manufacturers exert greater control over their costs. The same applies to the other stages of the PV manufacturing value chain. By contrast, the Indian PV manufacturing industry lacks manufacturers engaged in the upstream stages of production. Module manufacturers are largely reliant on imports for their cell requirements (see Section 6.1), and cell manufacturers are completely reliant on imports for their wafer requirements. This exposes them to fluctuations in the prices of these inputs, including those arising from the imposition of trade barriers.

Manufacturer	Silicon ingots (GW)	Wafers (GW)	Solar cells (GW)	Solar modules (GW)
Jinko Solar	-	8*	5	8
Trina Solar**	2.3	1.8	3.5	5.0
Canadian Solar	1.2	5	4.1	8.11
JA Solar	4.0	2.7	6.5	7.0
Hanwha Q-CELLS	1.6	1.1	4.3	4.3

Thus, besides the other determinants of cost competitiveness, economies of scale and vertical integration constitute additional reasons for the poor competitiveness of Indian PV manufacturing compared to global competitors.

5.5 The changing technological landscape

Global PV supply chains are witnessing a steady shift towards monocrystalline technology from the dominant multicrystalline technology.⁸⁸ Despite the higher efficiencies associated with monocrystalline technologies, the price differential between mono and multi cells has traditionally been large enough to offset the benefits accrued due to higher efficiency on the levelised cost of electricity (LCOE). However, the balance has now been tilted in favour of monocrystalline technology for several reasons: lower prices resulting from economies of scale, following an increase in monocrystalline wafer production by major Chinese manufacturers; higher efficiencies associated with monocrystalline passivated emitter and rear contact (mono-PERC) technology; and lower balance of system (BOS) costs (land requirements, civil works, mounting structures, cabling, and labour) associated with

TABLE 5:

List of top PV module manufacturers by manufacturing capacity at the end of Dec 2017

**Combined ingots and wafer capacity; **Represents capacities at the end of December 2015, though Trina Solar was the second-largest PV module manufacturer in 2017.*

Source: US Securities and Exchange Commission filings of the respective manufacturers

⁸⁷ ICC & ICF Consulting, *Surya To Boost Solar Manufacturing in India*, 2017

⁸⁸ PV Tech, "Mono and Multi Production 50:50 in 2018, But Mono Is The Future", <https://www.pv-tech.org/editors-blog/mono-and-multi-production-5050-in-2018-but-mono-is-the-future>, Accessed on 18-12-2018

mono-PERC systems.^{89,90} Monocrystalline technology is expected to become the dominant technology in terms of market share in 2019.⁹¹

Developers in India have historically favoured multicrystalline PV modules over monocrystalline modules because of the lower corresponding LCOE.⁹² However, monocrystalline technology is now gaining market share at the expense of multicrystalline technology, with the share of mono technology in PV crystalline modules rising to 15 per cent in 2018 from five per cent in 2017.⁹³ Given the improved competitiveness of monocrystalline technology, it is expected to become the preferred technology for developers in India towards the end of 2019.⁹⁴ Consequently, existing Indian cell and module manufacturers will need to retrofit their production lines in order to produce monocrystalline products. While the retrofitting process is an additional expenditure, it is not a capital-intensive process, accounting for less than five per cent of the capital costs of cell- and module-manufacturing facilities.⁹⁵

Any potential upstream manufacturing capacity would also need to adopt monocrystalline technology. However, in addition to considerations of cost competitiveness, constraints in raw material availability could also prove to be a hindrance for the setting up of monocrystalline ingot-and wafer-production facilities.⁹⁶ The production of monocrystalline ingots requires high-purity polysilicon as a raw material, the supply of which, in 2018, is estimated to be 36 per cent lower than its global demand.⁹⁷ Though the production volume of high-purity polysilicon is expected to increase as a result of planned expansions in manufacturing capacity, a supply deficit of around 24 per cent of demand could persist even in 2020.⁹⁸ Moreover, manufacturers planning to expand their production of high-purity

87 ICC & ICF Consulting, *Surya To Boost Solar Manufacturing in India*, 2017

88 PV Tech, "Mono and Multi Production 50:50 in 2018, But Mono Is The Future", <https://www.pv-tech.org/editors-blog/mono-and-multi-production-5050-in-2018-but-mono-is-the-future>, Accessed on 18-12-2018

89 PERC cells contain a passivation film on the rear surface of the cell which helps soak up scattered and reflected light, translating into improved efficiency.

90 Trina Solar, "What is solar PERC technology and why you need to know about it", <https://www.trinasolar.com/us/resources/blog/>, Accessed on 31-1-2019

91 PV Tech, "Mono and Multi Production 50:50 in 2018, But Mono Is The Future", <https://www.pv-tech.org/editors-blog/mono-and-multi-production-5050-in-2018-but-mono-is-the-future>, Accessed on 18-12-2018

92 Mercom, "Is the Indian Solar Market Ready to Make the Transition to Mono PERC Modules?", <https://mercomindia.com/indian-solar-market-mono-perc/>, Accessed on 4-12-2018

93 Ibid

94 Based on market intelligence.

95 Based on market intelligence.

96 Generally, the same company produces both monocrystalline ingots and wafers.

97 OCI, "IR Fact Book November 2018", https://oci.co.kr/eng/sub/investment/ir_fact_book_view.asp?idx=630&pageNo=1, Accessed on 19-12-2018

98 Ibid

polysilicon have entered into long-term supply contracts with prominent Chinese producers of monocrystalline ingots and wafers.⁹⁹ Thus, constraints in the supply of high-purity polysilicon could prove to be an additional hindrance in the setting up of monocrystalline wafer and ingot production facilities in India.

5.6 Demand uncertainty

Certainty of demand is an important determinant for the implementation of any large industrial capital investment plan. The higher production costs of Indian PV modules, as compared to Chinese ones, implies weak demand visibility for existing and planned Indian manufacturing capacity. In addition, Chinese manufacturers, which have access to finance from state-owned banks on favourable terms, have the potential to temporarily forego commercial returns in order to undercut Indian manufacturers, which further limits demand certainty. This undercutting of Indian manufacturers is even more likely given the prevailing supply glut in the Chinese PV industry. The lowering of feed-in tariffs and limiting of subsidy-support provided by the Chinese government has lowered the demand for PV modules, resulting in a sharp decline in prices.¹⁰⁰

Certainty of demand for Indian modules is contingent upon the availability of dedicated end-use applications for these modules. However, as the Domestic Content Requirement (DCR) scheme was successfully challenged at the WTO (see box below), the Central Public Sector Undertaking (CPSU) scheme is the only measure that offers demand certainty for Indian manufacturers.¹⁰¹ Under this scheme, CPSUs themselves will set up solar PV generation projects using domestically produced modules.

The MNRE's CPSU Scheme Phase-II, which aims at 12 GW of solar PV installations by both central and state government entities, received approval from the Cabinet Committee on Economic Affairs in February 2019.¹⁰² This scheme aims to incentivise the procurement of domestically produced modules (containing domestically produced cells) by public sector entities. Under the scheme, viability gap funding (VGF) of INR 8,580 crore would minimise the impact on tariffs of the use of domestically manufactured modules. The proposed 12 GW deployment is expected over a four-year period from FY 2019/20 to 2022/23 and would provide much-needed certainty of demand to domestic cell and module manufacturers, and could stimulate new investment in cell and module manufacturing capacities.

99 LONGi and Zhongguan are among the largest suppliers of monocrystalline ingots and wafers to high-purity polysilicon producers. LONGi plans to expand its monocrystalline wafer production capacity from 15 GW at the end of 2017 to 45 GW by the end of 2020.

100 Forbes, "Solar Leader China Is Slashing Its Subsidies On Solar Power - What You Need To Know", <https://www.forbes.com/sites/jillbaker/2018/06/18/solar-leader-china-is-slashing-its-subsidies-on-solar-power-what-you-need-to-know/#3d34e1322f9a>, Accessed on 19-12-2018

101 MNRE, *Concept Note on Solar PV Manufacturing Scheme*, 2017

102 Press Information Bureau, "CCEA Approves Proposal For Setting Up 12,000 MW Grid-Connected Solar Photovoltaic (PV) Power Projects", <http://www.pib.nic.in/Pressreleaseshare.aspx?PRID=1562963>, Accessed on 21-2-2019

Discontinuation of the Domestic Content Requirement (DCR) scheme

From the early phases of the Jawaharlal Nehru National Solar Mission (JNNSM) in 2010, a portion of the capacity was tendered under the DCR category.¹⁰³ This category of tendered capacity was reserved for projects utilising solar modules manufactured in India, and was aimed at boosting domestic PV manufacturing capacity. The United States successfully challenged the legality of the DCR programme under WTO rules, asserting that it violated national treatment obligations under GATT 1994 and the Trade-Related Investment Measures (TRIMs) Agreement of the WTO.¹⁰⁴ The national treatment principle mandates no discrimination between imported goods (once they have passed customs) and similar domestically produced goods.¹⁰⁵ India asserted the legality of its DCR programme under Article III.8(a) of GATT 1994, which permitted exceptions to the national treatment principle in the case of government procurement, with a stipulation to not engage in commercial resale.¹⁰⁶ However, the exception permitted under Article III.8(a) was found to be inapplicable as the product being procured (electricity) was not in a competitive relationship with the product being discriminated against (imported solar cells and modules).¹⁰⁷ In view of the WTO ruling on India's DCR programme, it was discontinued by the MNRE.¹⁰⁸

5.7 Ineffectiveness of existing schemes for promoting manufacturing

The central government has tried to promote PV manufacturing through the Modified Special Incentive Package Scheme (M-SIPS) for electronics manufacturing, and by combining project deployment with PV manufacturing through the Solar Energy Corporation of India (SECI)'s manufacturing-linked tenders. However, these have been unsuccessful in mobilising the setting up of new manufacturing capacity at scale.

103 International Centre for Trade and Sustainable Development, "WTO Decision On Local Content Requirements Will Not Affect India Solar Ambitions, Officials Say", <https://www.ictsd.org/bridges-news/biores/news/wto-decision-on-local-content-requirements-will-not-affect-india-solar>, Accessed on 31-1-2019

104 Ibid

105 WTO, "Principles of the Trading System", https://www.wto.org/english/thewto_e/whatis_e/tif_e/fact2_e.htm, Accessed on 31-1-2019

106 WTO, "National Treatment On Internal Taxation And Regulation", https://www.wto.org/english/res_e/booksp_e/gatt_ai_e/art3_e.pdf, Accessed on 31-1-2019

107 WTO, "India-Solar Cells", https://www.wto.org/english/tratop_e/dispu_e/cases_e/1pagesum_e/ds456sum_e.pdf, Accessed on 31-1-2019

108 MNRE, "Clarification in respect of Domestic Content Requirement under the National Solar Mission", <https://mnre.gov.in/file-manager/UserFiles/OM-clarification-on-replacement-of-DCR-Modules.pdf>, Accessed on 31-1-2019

M-SIPS

The M-SIPS was notified in 2012 with the objective of incentivising investments in the electronic systems design and manufacturing (ESDM) industries.¹⁰⁹ Solar PV manufacturing constitutes one of the eligible verticals for receiving incentives under this scheme.¹¹⁰ The scheme provided for: 1) a 25 per cent capex subsidy for solar PV plants (polysilicon, ingot, wafer, or cells) set up outside of SEZs, and a 20 per cent subsidy in the case of plants within SEZs; 2) the reimbursement of excise duty or countervailing duty (CVD) on the import of capital equipment for non-SEZ plants; and 3) a 10 per cent subsidy on the production turnover for both SEZ and non-SEZ facilities.¹¹¹ Module manufacturing facilities were eligible for capex subsidies and the reimbursement of excise duty and CVD, but not production subsidies. Manufacturers were to apply for these incentives with proof of financial closure for the project to be executed.¹¹² The scheme provided for incentives totalling INR 10,000 crore, with applications open till 31 December 2018.¹¹³

Though the M-SIPS scheme has received applications from solar PV developers, it has not been effective in providing support to the PV manufacturing industry.¹¹⁴ While solar PV manufacturing is eligible for incentives under M-SIPS, the scheme is not specifically targeted at the PV manufacturing segment. Applicants from that segment must compete with applicants from the broader ESDM sector for incentives. In addition, in cases where incentives have actually been sanctioned for PV manufacturers, there have been delays in approvals of applications and disbursement.¹¹⁵

SECI's manufacturing-linked tenders

SECI released its first tender for manufacturing-linked PV deployment capacity in 2018, tendering out 10 GW of solar PV capacity, linked to the setting up of 3 GW of integrated solar PV manufacturing capacity.¹¹⁶ The individual projects under this tender involved the setting up of 600 MW of manufacturing capacity and 2 GW of project deployment. However, the tender received only one proposal, and failed to attract interest from investors despite the bidding deadline being extended several times.¹¹⁷



Competition for incentives with other ESDM industry segments, and delays in disbursement of approved subsidies have limited the effectiveness of the MSIPS scheme in supporting investments in PV manufacturing

109 MeitY, "Modified Special Incentive Package Scheme (M-SIPS) to Offset Disability and Attract Investments in Electronics System Design and Manufacturing (ESDM)", <https://www.stpi.in/upld/msips.pdf>, Accessed on 12-3-2019.

110 Ibid

111 Ministry of Electronics & Information Technology, Modified Special Incentive Package Scheme (M-SIPS): Enhancement of scope and extension of timeline and other amendments - Revised Notification, 2015

112 Ministry of Electronics & Information Technology, "Incentive Schemes: Modified Special Incentive Package Scheme (M-SIPS)", <https://meit.gov.in/esdm/incentive-schemes>, Accessed on 26-2-2019

113 Ibid

114 PV Tech Magazine, "'No flow' Of incentives To Indian solar manufacturers", <https://www.pv-tech.org/news/no-flow-of-incentives-to-indian-solar-manufacturers>, Accessed on 26-2-2019

115 Ibid

116 SECI, *RfS No. SECI/C&P/RfS/5GW MANUFACTURING/P-1/052018*, 2018

117 Hindu BusinessLine, "SECI Extends Deadline For Manufacturing-Linked Bids", <https://www.thehindubusinessline.com/economy/policy/seci-extends-deadline-for-manufacturing-linked-bids/article25061755.ece>, Accessed on 26-2-2019

The manufacturing-linked tender did not address any of the underlying reasons for the competitive disadvantages associated with PV manufacturing in India discussed earlier in this section, thereby presenting a risky proposition for potential investors. In addition, the tender envisions the setting up of integrated PV manufacturing facilities, with polysilicon being the only raw material permitted for import.¹¹⁸ Considering that upstream PV manufacturing in India (such as ingot and wafer manufacturing) is less competitive than cell and module manufacturing, the requirement to construct these upstream facilities is an additional deterrent for investors.

In order to make manufacturing-linked deployment more attractive to investors, SECI released a request for selection (RFS) document for another manufacturing-linked tender in January 2019, which required the setting up of only cell-and module-manufacturing facilities, and removed the requirement for setting up upstream manufacturing facilities.¹¹⁹ This RFS document envisions the setting up of 3 GW of power plants linked to 1.5 GW of manufacturing. Individual projects under this tender involve the setting up of 1 GW of power plants along with 500 MW of manufacturing.

Building on the foregoing analysis of the challenges pertaining to solar PV manufacturing, the next two sections analyse the effectiveness of safeguard duties in protecting domestic PV manufacturing and facilitating structural adjustment in the industry, as well its effectiveness in attaining other key policy objectives.

118 SECI, RFS No. SECI/C&P/RFS/5GW MANUFACTURING/P-1/052018,2018

119 SECI, RFS No. SECI/C&P/RFS/1.5GW MANUFACTURING/P-2/012019, 2018



A considerable portion of India's module manufacturing capacity will witness an increase in input costs as a result of higher prices of imported cells under the safeguard duty regime.

6. To what extent does the safeguard duty give protection to the Indian solar PV manufacturing industry?

The effectiveness of safeguard duties in protecting the Indian solar PV manufacturing industry depends upon the proportion of Indian PV manufacturing that actually benefits from the application of duties. In addition, the effectiveness of such duties is also impacted by the interaction between the duty and other policy and market developments. This section examines these dimensions of the safeguard duty.

6.1 A considerable portion of Indian PV manufacturing capacity does not benefit

The imposition of the safeguard duty does not benefit all Indian PV manufacturers. Stand-alone module manufacturers located within the DTA have witnessed an increase in their raw material costs with imported cells being subject to the safeguard duty. Similarly, the sales of SEZ-based stand-alone module manufacturers in the DTA are subject to safeguard duties (on the value of imported cells used in the manufacture of modules). Given that Indian module-manufacturing capacities far outstrip cell manufacturing (Table 6), a considerable chunk of module-manufacturing facilities (which rely on imported cells) does not benefit from the imposition of safeguard duties. On the other hand, cell manufacturers located inside the DTA and SEZs clearly benefit as a result of the imposition of safeguard duties on imported cells, which for these manufacturers constitute direct competition. However, despite benefitting cell manufacturing, it is clear from the foregoing discussion that a considerable chunk of the overall Indian PV module manufacturing capacity does not benefit from the imposition of the safeguard duty (Table 6).

Type of manufacturing facility	SEZ	DTA
Cell manufacturing	2,000	1,164
Module manufacturing	3,825	5,053

TABLE 6:
Distribution of Indian PV manufacturing facilities (in MW) by location

Source:
Directorate General of
Trade Remedies, Ministry of
Commerce and Industry

6.2 Fall in module prices and longer commissioning timelines limit the effectiveness of safeguard duties

For cell and integrated cell and module manufacturing facilities, the imposition of safeguard duties has favourably, though only temporarily, enhanced their competitiveness relative to imports. This could potentially help generate more demand certainty for the domestic industry over the two-year period, and could translate into higher capacity-utilisation levels. The extent of protection offered to the domestic PV industry depends on the rate of the applicable safeguard duty-the higher the duty on imported cells and modules, the greater the support for the domestic industry in terms of generating potential demand.

Two policy- and market-related developments have contributed to limiting the effectiveness of safeguard duties in protecting the domestic industry. The first is the sharp decline in the prices of PV products across the value chain as a result of a decline in demand in China, with prices expected to decline further in 2019.¹²⁰ The sharp decline in the prices of Chinese cells and modules would limit the competitive gains that the Indian domestic industry may have experienced as a result of the application of the safeguard duty.

The second development is the applicability (from June 2018 to early January 2019) of expanded commissioning timelines of 21 to 24 months from the signing of the power purchase agreement (PPA)-increased from 13 to 15 months-to solar projects tendered by central agencies.¹²¹ The commissioning timelines were again reduced to 15 to 18 months in January 2019.¹²² The combination of these developments-the expected decline in module prices over the course of 2019, the tapering of safeguard duties after a one-year period (Table 2), and the expanded commissioning timelines - has given developers the leeway to delay their module purchases to periods of lower safeguard duties.

Only 45 per cent of the module procurement between August 2018 and July 2020 (for projects auctioned till December 2018, excluding projects that were cancelled after being awarded) is expected to occur during the 25 per cent safeguard duty period (Figure 4).¹²³ The bulk of the module procurement is expected to occur in periods characterised by lower duties, with 54 per cent of the procurement expected during the 15 per cent duty period and one per cent during the 20 per cent duty period (Figure 4). Though the shorter commissioning timelines of 15 to 18 months would be applicable to projects awarded from January 2019 onwards, these timelines are still long enough for developers needing to procure modules during the safeguard duty period to defer purchases to the 15 per cent duty period. Thus, given the expected module-procurement timelines, the effectiveness of safeguard duties in improving the competitiveness of the domestic industry is expected to be limited.



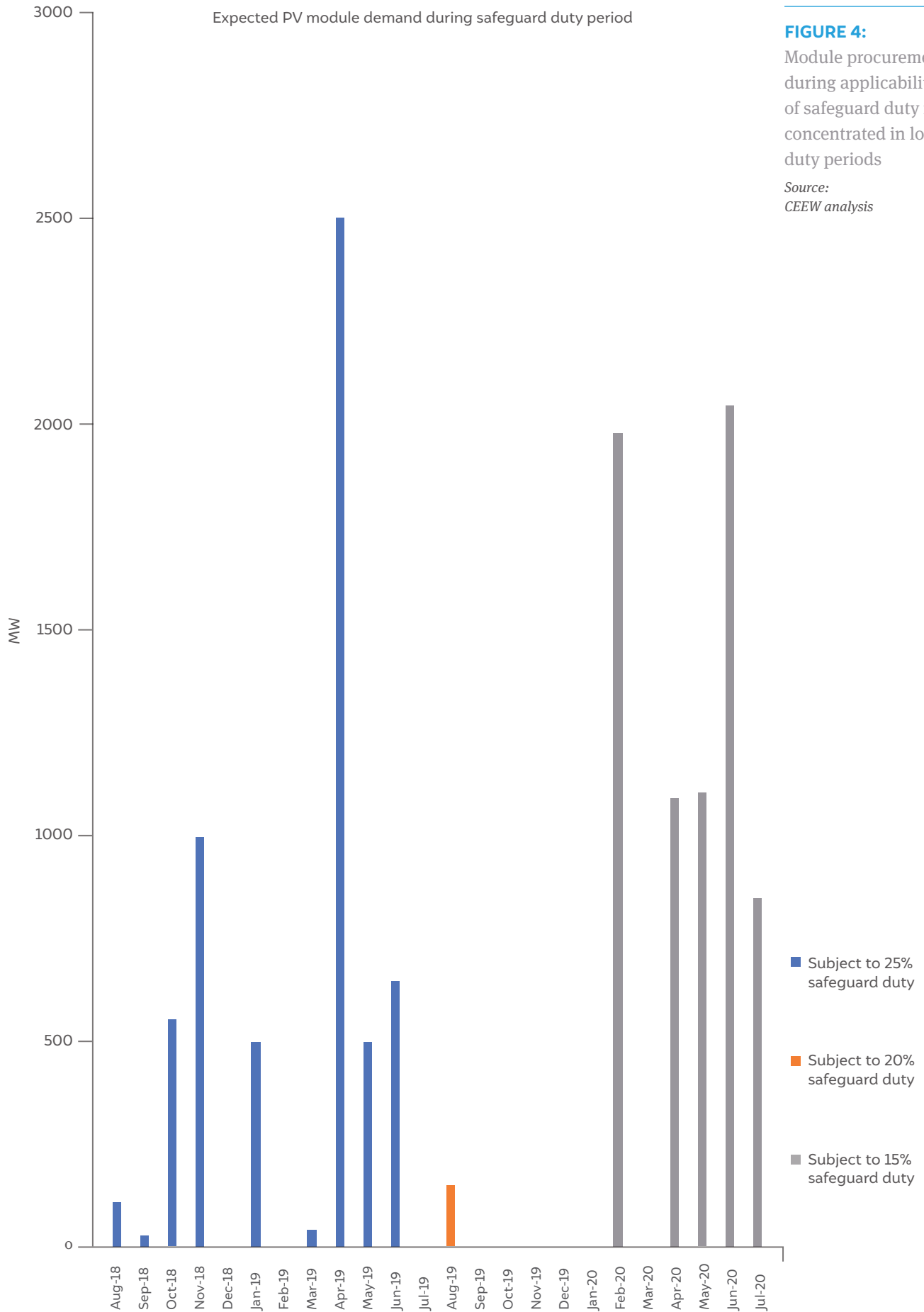
The applicability of expanded commissioning timelines (21-24 months from June to early January 2019 and 15-18 months thereafter) for solar PV projects has given developers the leeway to delay their module purchases to periods of lower safeguard duties

120 PV Tech, "Solar Module Prices Set To Fall 35% in 2018 - BNEF", <https://www.pv-tech.org/news/solar-module-prices-set-to-fall-35-in-2018-bnef>, Accessed on 11-12-2018

121 Expanded commissioning timelines have also featured in the power purchase agreements of some states.

122 MNRE, "Amendments to the Guidelines for Tariff Based Competitive Bidding Process for Procurement of Power from Grid Connected Solar PV Power Projects", <https://mnre.gov.in/sites/default/files/webform/notices/Amendment%20notified%20on%207%20Jan%202019%20%281%29.pdf>, Accessed on 22-1-2019

123 CEEW analysis, based on an examination of auctioned solar PV projects from June 2017 to December 2018 and their associated project timelines. It is assumed that the procurement of modules happens no later than three months before the scheduled commissioning date





While the imposition of safeguard duty has not triggered large-scale investments in PV manufacturing, the uncertainty generated has resulted in sluggish project deployment - representing potential losses in employment generation.

7. Can the safeguard duty fulfil the said and unsaid policy objectives?

The safeguard duty is geared towards providing support to the domestic industry in order to facilitate its improved competitiveness. At the same time, a greater PV manufacturing capacity implies greater employment in manufacturing. Integrated cell and module manufacturing generates roughly 2.60 full-time-equivalent jobs per MW of output.¹²⁴ Thus, 1 GW of manufacturing capacity, operating at 100 per cent capacity utilisation, would translate into approximately 2,600 jobs.

However, besides these potential positive outcomes, the imposition of the safeguard duty raises module costs for developers, which could translate into higher tariffs. In addition, the uncertainty pertaining to the imposition of duties could have a negative impact on investor sentiment. This section assesses these dimensions of the impact of the safeguard duty on India's solar energy ecosystem.

7.1 The duty does not address the causes of the competitive disadvantage associated with Indian PV manufacturing

When petitioning the DGTR for the imposition of safeguard duty, petitioners are expected to include information on a structural adjustment plan that details the steps that will be taken to improve the competitiveness of their manufacturing facilities.¹²⁵ The adjustment plan submitted by the solar PV manufacturers to the DGTR includes the following steps for boosting the cost competitiveness of the domestic industry:¹²⁶



The imposition of the safeguard duty is unlikely to trigger investments in new facilities because the underlying reasons for competitive disadvantage of the Indian PV industry remain unaddressed

124 Neeraj Kuldeep et al, Greening India's Workforce (CEEW,2017)

125 Directorate General of Safeguards, "Format as Prescribed under Rule 5(2) of Safeguard Duty Rules", <http://dgsafeguards.gov.in/Datafiles/cms/PDF/Format%20as%20Prescribed%20under%20Rule%205.pdf>, Accessed on 25-2-2019

126 Based on the submission to the DGTR filed by Seetharaman Associates on behalf of Indian Solar Manufacturers Association, Mundra Solar PV Limited, Indosolar Limited, Jupiter Solar Power Limited, Websol Energy Systems Limited and Helios Photo Voltaic Limited dated 25-6-2018

- Reduction in raw material costs by the renegotiation of existing supply contracts and the identification of new suppliers with a view to entering into long-term bulk contracts
- Forward and backward integration in the value chain
- Taking up projects based on superior technologies, specifically PERC and bi-facial
- Cost reduction through improvements in capacity utilisation, facilitated by improved relative competitiveness under the safeguard duty regime

The imposition of the safeguard duty could temporarily reduce unit costs for Indian manufacturers and improve cash flows by enhancing the capacity-utilisation levels of existing facilities. These improved cash flows could also support the retrofitting of existing cell and module facilities with new module technologies to some extent. However, the imposition of the safeguard duty is unlikely to trigger investments in new facilities, as envisaged by the adjustment plan, because the underlying reasons for competitive disadvantage of the Indian PV industry (as described in Section 6) remain unaddressed (See Table 7). Solar PV manufacturing facilities have useful lives of seven to ten years, and new investments are unlikely to be taken in the absence of clear demand visibility for the period of their useful lives.

Cost of capital	<ul style="list-style-type: none"> • Negligible impact, no change in long-term business prospects
Electricity prices	<ul style="list-style-type: none"> • No impact
Scale of operations and vertical integration	<ul style="list-style-type: none"> • Negligible impact, no change in long-term business prospects that would trigger new investments
Technology	<ul style="list-style-type: none"> • Negligible impact on investments in new facilities producing PERC and bi-facial modules, since lack of demand visibility still persists • Enhanced near-term utilisation levels and cash flows could facilitate upgrades of existing facilities • Does not impact constraints on the availability of high-purity polysilicon for monocrystalline ingot and wafer production
Demand visibility	<ul style="list-style-type: none"> • Marginal near-term improvement due to the higher prices of imports

TABLE 7:

Deterrents to scaling up solar manufacturing remain, despite the implementation of the safeguard duty

Source:

CEEW analysis

In the absence of improved competitiveness, the proposed forward and backward integration in the adjustment plan would remain largely unfulfilled. Electricity prices and cost of capital account for around 53 per cent of the selling price of polysilicon (Table 4), and competitive disadvantages pertaining to these factors are likely to preclude any new investments in polysilicon production. With regard to ingot and wafer production, besides the lack of cost competitiveness, supply-side constraints pertaining to high-purity polysilicon are likely to be deterrents for new investments (Section 5.4). The poor cost competitiveness of cell and module production is likely to deter large-scale investments in cell and module manufacturing. The global supply glut in the wake of China reducing its policy support to its solar industry, and the resulting collapse in prices across the solar PV value chain, translates into pressure on margins and is a further disincentive for investments in manufacturing.

Further, the absence of long-term demand visibility for the final product will preclude the signing of bulk long-term contracts for raw material supply.

7.2 Safeguard duty hinders further declines in tariffs

In the wake of the lowering of Chinese support to its solar PV industry through a policy announcement on May 31, 2018, the prices of solar PV modules declined considerably (by around 25 per cent by mid-December 2018).¹²⁷ This decline in prices is likely to have negated the impact of safeguard duties on tariffs. However, tariffs could have been six to ten per cent lower had safeguard duty not been imposed (Table 8), depending on the procurement timelines of the respective projects. Thus, the imposition of the safeguard duty acts as a hindrance to further reductions in tariffs.

Module Procurement	December 2018	August 2019	February 2020
Safeguard duty (%)	25	20	15
Module costs (USD c/W)	22	19.8	18.7
Normalised tariff	100	93.1	89
Normalised tariff in the absence of safeguard duty	89.9	85.9	83.8
Reduction in tariffs in absence of safeguard duty (%)	10	8	6

TABLE 8:

Impact of the imposition of safeguard duty on tariffs

Notes:

1. Estimated tariffs have been normalised with the tariff corresponding to module procurement in December 2018 (subject to a 25 per cent safeguard duty) assigned a value of 100 and other estimated tariffs assigned values relative to it.

2. Calculations have been carried out for projects at a solar park, assuming uniform inputs for all market-related factors besides module costs such as cost of capital and exchange rates.

3. Module price for December 2018 has been sourced from PV Insights.¹²⁸ The trajectory of price decline is based on market projections for 10 to 15 per cent decline in module prices over the course of 2019.¹²⁹

Source:

CEEW analysis

7.3 Negative impact on potential employment generation in solar energy sector

One of the co-benefits of growth in manufacturing is employment generation; however, PV manufacturing processes are highly automated: integrated cell and module PV manufacturing generates only around 2.60 direct full-time-equivalent jobs¹³⁰ per MW of modules manufactured.¹³¹ On the other hand, project deployment is far more labour-

127 PV Insights, Bloomberg, "Solar Prices Nosedive After China Pullback Floods Global Market", <https://www.bloomberg.com/news/articles/2018-06-20/solar-prices-nosedive-after-china-pullback-floods-global-market>, Accessed on 1-12-2018.

128 PV Insights, "Solar PV Module Weekly Spot Price", <http://pvinsights.com/>, Accessed on 11-12-2018

129 PV Tech, "Solar Module Prices Set to Fall 35% in 2018 - BNEF", <https://www.pv-tech.org/news/solar-module-prices-set-to-fall-35-in-2018-bnef>, Accessed on 11-12-2018.

130 "Full-time equivalent jobs per MW" refer to job-years per MW or the time spent by an employee on a particular project/task in a given year relative to the standard total working hours in a year. Job-years translate one-time or short-term employment into full-time equivalent jobs, thereby ensuring standardisation and comparison between two different segments through a common metric. For more details, please refer to Neeraj Kuldeep et al, Greening India's Workforce (CEEW, 2017).

131 Ibid

intensive, with every MW of utility and rooftop solar generating 3.45 and 24.72 direct full-time equivalent jobs.¹³² Thus, between PV manufacturing and project deployment, the latter is far more impactful from the perspective of direct employment generation.

The imposition of safeguard duties is unlikely to result in large-scale investments in PV manufacturing (Section 7.1). At the same time, the uncertainty created by the safeguard duty has translated into sluggishness in project deployment in the initial part of 2018 (Section 4). Subsequently, the safeguard duty regime, in conjunction with other policy developments (specifically the tariff caps on solar auctions recommended by the MNRE in August), have also slowed down the pace of project awards.¹³³ Developers have expressed reservations about the viability of the tariff caps recommended by the MNRE, in light of increased module costs resulting from the imposition of the safeguard duty.¹³⁴ As a result, only a fraction of tendering activity in 2018 translated into actual project awards, and was fraught with delays and cancellations of tenders. (Around 51.6 GW was tendered by central and state agencies between January and December 2018, while only 13 GW of project capacity was actually awarded. Some of these tenders, however, may be awarded in 2019.)¹³⁵ The slowdown in project deployment stemming from the imposition of duties represents losses in potential employment generation in the solar energy sector.

7.4 Effect on investors' confidence

Safeguard duties created great uncertainty for projects that were awarded in advance of their imposition but which needed to procure modules during their period of applicability. The following table specifies the quantum of project capacity impacted.

The degree of uncertainty created by the safeguard duty is determined by whether safeguard duties were factored into module purchases by developers. This depends upon the timeframe during which the project was awarded, relative to events pertaining to the imposition of the safeguard duty (Table 9). The uncertainty associated with the imposition of the duty was further compounded by the price anxiety that was generated by the expected trajectory of module prices in the period leading up to the imposition of duties (Table 9). Periods characterised by expectations of rising module prices are those characterised by higher price anxiety.

Time period of project award	Degree of uncertainty	Degree of price anxiety*	Solar capacities awarded (MW)	
			State	Centre
Before the announcement of preliminary ruling	Taken by surprise	High	607	1,021
From the preliminary ruling till the Ministry of Finance (MoF) notification	Highly uncertain	High	3,405	2,175

132 Ibid

133 The Economic Times, "Solar Project Developers Seek Reversal Of Cap In Tariffs", <https://economictimes.indiatimes.com/industry/energy/power/solar-project-developers-seek-reversal-of-cap-in-tariffs/articleshow/65851024.cms?from=mdr>, Accessed on 20-12-2018

134 Ibid

135 Based on Mercom reports of solar project capacity tendered and awarded



While the imposition of safeguard duty has not triggered large-scale investments in PV manufacturing, the uncertainty generated has resulted in sluggish project deployment - representing potential losses in employment generation

TABLE 9:

Projects subject to uncertainty pertaining to pass-through of safeguard duty

*Price anxiety is dependent on the forward price curve of modules. It is considered to be high before the 31 May 2018 Chinese announcement limiting support for solar PV deployment.

Source:
CEEW analysis

After the MNRE's clarification in April 2018, projects bid out before the imposition of safeguard duties were eligible for pass-through of duties, provided that the change in law clause in the corresponding PPA clearly included the imposition of new duties in its scope. In the case of projects whose PPAs do not specifically mention the imposition of safeguard duties under the change in law clause, eligibility would be subject to the interpretation of the change in law clause by the relevant regulatory commission to ascertain if it is broad enough to capture the introduction of the safeguard duties. This uncertainty has an added dimension for engineering procurement construction (EPC) contractors, which do not have recourse to regulatory commissions for claiming pass-through of duties as they are not classified as generating companies under the Electricity Act 2003.¹³⁶ In case of disputes between developers and EPC contractors with regard to the pass-through of duties, EPC contractors would need to approach civil courts or invoke arbitration under the provisions of their EPC contract. This may take years of litigation, in contrast to the relatively simpler process for developers under central offtake contracts-where the Central Electricity Regulatory Commission (CERC) has been instructed to expedite the disposal of pass-through petitions by the Ministry of Power-and therefore may affect project commissioning timelines.

Even for projects with clarity on the pass-through of duties, the process of availing pass-through benefits itself is quite time-consuming, as the relief for change in law (i.e., the impact on tariff) is subject to approval from the appropriate commission. In order to claim pass-through benefits, developers are expected to approach the relevant regulatory commission. While the Ministry of Power has instructed the CERC to expedite the processing of pass-through claims for PPAs signed by central agencies, no such directive has been issued at the state level.¹³⁷ The processing of these requests by the relevant regulatory commissions could take one to one-and-a-half years.¹³⁸ If developers are unsatisfied with the revised tariff or compensation awarded by the commission, they can appeal the decision, which could extend the time taken to arrive at the final resolution. The delay in the pass-through of duties could result in greater (unbudgeted) working capital requirements. This would adversely impact project viability and adversely impact investor confidence-particularly that of foreign investors-pertaining to RE investments and India as an investment destination in general.

136 CERC, "The Electricity Act, 2003", <http://www.cercind.gov.in/Act-with-amendment.pdf>, Accessed on 26-2-2019

137 Ministry of Power, Government of India, Notice No. 23/43/2018-R&R, 2018

138 Mercom, "Ministry of Power Asks CERC to Expedite Pass Through Option Process", <https://mercomindia.com/mop-letter-cerc-expedite-pass-through/>, Accessed on 19-12-2018



8. What lies ahead?

The imposition of the safeguard duty is supposed to give the domestic industry the opportunity to make structural adjustments to improve its competitiveness. Under safeguard duty regulation, the period of imposition of duties may be extended if the competent authority finds that its continued imposition is necessary to prevent or remedy serious injury, and if there is evidence of positive adjustment in the industry.¹³⁹ However, if extended beyond the initial period of application, the safeguard duty rate cannot be more restrictive than at the end of the initial period.¹⁴⁰ Thus, there is potential for the safeguard duty to be extended after the two-year period ending July 2020, though its effectiveness at a rate lower than in the initial period of imposition is likely to be even more diminished.

With the withdrawal of the anti-dumping petition by Indian manufacturers, currently no outstanding anti-dumping investigations remain pending. However, given the ineffectiveness of the currently imposed safeguard duties in protecting the domestic industry, future petitions seeking the imposition of trade protection measures cannot be ruled out.¹⁴¹

139 Central Board of Indirect Taxes & Customs, Department of Revenue, Ministry of Finance, Government of India, "Customs Tariff (Identification and Assessment of Safeguard Duty) Rules, 1997", <http://www.cbic.gov.in/htdocs-cbec/customs/cs-act/formatted-htmls/cs-import-rule20>, Accessed on 19-12-2018

140 WTO, "Agreement on Safeguards", https://www.wto.org/english/tratop_e/safeg_e/safeint.htm, Accessed on 17-1-2019

141 ET Energyworld, "Domestic Solar Equipment Makers May Plead Again For Safeguards", <https://energy.economictimes.indiatimes.com/news/renewable/domestic-solar-equipment-makers-may-plead-again-for-safeguards/67666150>, Accessed on 24-1-2019



While the safeguard duty is currently applicable till July 2020, a review investigation should be conducted well in advance to provide visibility to stakeholders about the period beyond this timeframe.

9. Conclusions

9.1 Trade protection measures have historically not been effective in reviving the fortunes of PV manufacturing globally.

- The imposition of anti-dumping and countervailing duties in the US and the EU has not translated into a revival in the fortunes of their respective PV manufacturing industries. Manufacturers in exporting countries have been able to circumvent these duties by using a variety of tactics: sourcing raw materials from jurisdictions exempt from duties, and routing exports through, or relocating manufacturing facilities to, such jurisdictions. In addition, market developments such as the decline in module prices have mitigated the effect of these trade protection measures.
- Though there is not enough data to definitively comment on the impact of the safeguard duties imposed by the US on PV imports in early 2018, preliminary data does suggest some gains in market share for domestic module manufacturers. However, it is hard to gauge at this stage whether the duty is sufficient to facilitate a structural improvement of the US PV manufacturing industry.
- Similar to trade protection measures imposed in other jurisdictions, the effectiveness of India's safeguard duties in protecting the domestic PV manufacturing industry will depend on its interactions with policy and market developments.

9.2 Safeguard duties only protect a portion of Indian PV manufacturers

- Not all Indian PV manufacturers benefit from the imposition of safeguard duties. While cell manufacturers located within the DTA and in SEZs would benefit from improved competitiveness resulting from the

imposition of duties on competing imported cells, the same is not true for module manufacturers.

- Indian module-manufacturing capacity (~8.9 GW) far outstrips cell-manufacturing capacity (~3.1 GW), and a considerable chunk of module manufacturers are reliant on imported cells. Module manufacturers located within the DTA and reliant on imported cells will witness an increase in input costs. Module manufacturers located in SEZs and reliant on imported cells will suffer from a loss in competitiveness as their sales in the DTA will be subject to safeguard duties to the extent of the value of the imported cells used as raw materials.

9.3 Interaction of safeguard duties with policy and market developments limit their effectiveness

- The effectiveness of safeguard duties in offering protection to Indian PV manufacturing is limited by the decline in module prices resulting from the curtailment of Chinese state support for its solar programme. Coupled with the extended commissioning timelines for solar projects (21 to 24 months between June 2018 and early January 2019, and 15 to 18 months thereafter), developers have the leeway to procure modules in periods characterised by low incidence of duties.
- Only 45 per cent of the projects awarded till December 2018 that need to procure modules during the safeguard duty period would do so while 25 per cent duties are active. About 54 per cent of these projects can procure modules in the period of 15 per cent duty, while one per cent of these projects can do so in the period of 20 per cent duties. Projects awarded from January 2019 onwards will have the leeway to procure modules in the period of 15 per cent duties or beyond.

9.4 Sources of competitive disadvantage for Indian PV manufacturing

- PV manufacturing in India suffers from a range of competitive disadvantages as compared to its counterparts in foreign jurisdictions, particularly China. These include inferior terms of debt capital, higher electricity prices, lower-scale operations, lack of vertical integration, outdated technology, and lack of demand visibility. These factors disincentivise the setting up of PV manufacturing facilities in India, across the value chain.
- The lack of investments in upstream manufacturing can specifically be explained by high electricity prices and cost of capital in India, as the competitiveness of upstream manufacturing industries is

particularly reliant on these factors. In addition, constraints on the availability of high-purity polysilicon discourages the setting up of ingot and wafer manufacturing plants.

9.5 Impact of safeguard duties on the solar PV ecosystem in India

Ineffectiveness of safeguard duties in reviving Indian PV manufacturing

- The imposition of safeguard duties does not materially impact any of the competitive disadvantages associated with Indian PV manufacturing. Thus, it is unlikely to trigger large-scale investments in the setting up of new PV manufacturing capacities. It is unlikely to support the structural adjustment of Indian PV manufacturing (as envisioned by the structural adjustment plan submitted to the DGTR by petitioners) through forward and backward integration, the signing of bulk raw material supply contracts, or investment in new technologies.
- The imposition of safeguard duties could provide a short-term boost to the capacity-utilisation levels and cash flows of existing facilities.

Hindering decline in tariffs

- The imposition of safeguard duties could hinder the realisation of lower tariffs possible in the absence of safeguard duties. Tariffs could be six per cent to ten per cent lower in the absence of safeguard duties, depending on the time frame of procurement of modules.

Negative impact on employment generation in the solar energy sector

- The uncertainty generated by the lack of clarity pertaining to pass-through provisions, combined with the impact of tariff caps on PV tenders, has slowed project awards. In addition, the safeguard duty is not likely to result in the setting up of new manufacturing capacities on a large scale. The slowing of project deployment represents losses in potential employment generation in the solar energy sector, without significant additional employment generation in manufacturing.

Dampening of investor sentiment

- The uncertainty regarding the applicability of pass-through provisions to projects tendered before the imposition of duties has dampened the pace of project awards and investment flows. In addition, the process for availing pass-through benefits is quite onerous and subject to delays. Any delays in the awarding of pass-through benefits could negatively impact the viability of projects, dampening investor sentiment pertaining to solar PV generation particularly, and for foreign investors in India more broadly.



Image: iStock

10. Recommendations

10.1 Improving understanding of manufacturing processes across the PV supply chain

- Setting up a vibrant PV manufacturing industry needs a holistic understanding of global supply chains and PV factory economics. Targeted interventions to mitigate the competitive disadvantages faced by Indian producers relative to foreign manufacturers could be part of the solution. The MNRE could undertake a detailed analysis of the PV value chain in order to identify the most impactful interventions. Measures such as capex subsidies, interest subvention, tax breaks, the provision of concessional electricity, and domestic procurement are some of the steps that could potentially help encourage the setting up of domestic PV manufacturing facilities. The implementation of these interventions could require inter-ministerial coordination between the MNRE and one or more of the Ministries of Finance, Power, and Electronics and Information Technology.
- The extent of support needed to make the domestic industry competitive would vary depending on the outcome desired. At the same time, measures must not run afoul of WTO regulations, as they could then be subject to challenges by other member countries.

10.2 Evaluating costs and benefits for each intervention

- While targeted interventions could help the domestic industry become more competitive, and trade protection measures could provide it with support, the benefits of such measures must be weighed against their costs. The most obvious cost is the dollar value of the support needed to achieve the level of competitiveness desired, or support required, for the domestic manufacturing industry.

- In addition, it is necessary - before implementation - to assess the externalities of any measure to support PV manufacturing on other parts of the solar energy ecosystem. For example, the imposition of safeguard duties created uncertainty which constrained the pace of new projects awarded and prevented tariffs from declining further. This also implies losses in terms of potential employment generation stemming from foregone project deployment. The MNRE must consider the costs of these externalities while determining the appropriate intervention for boosting the competitiveness of PV manufacturing.

10.3 Planning for long-term impact

- In addition to the assessment of costs and benefits, any measures aimed at stimulating the growth of the PV manufacturing industry in India should provide credible long-term support to manufacturing in order to translate into new investments at scale. Short-term or half-hearted measures may not translate into investments in new manufacturing facilities, and at the same time could end up hindering project deployment, causing more harm than good overall.

10.4 Timebound compensation for pass-through claims

- The process of claiming pass-through of safeguard duties from regulatory commissions is an onerous task for developers, particularly for those without specific provisions pertaining to safeguard duties in the change in law clauses of their respective PPAs. This could generate protracted litigation, uncertainty, and a dampening of investor sentiment.
- Policymakers at both the central and state level need to expedite the process for claiming pass-through benefits. While the Ministry of Power has accordingly issued directions to the CERC under Section 107 of the Electricity Act, this needs to be replicated at the state level in order to simplify processes for developers with PPAs at that level.¹⁴²



Safeguard duty collections totalling approximately INR 1,500 crores between August and December 2018 should be used to support the PV ecosystem

10.5 Plough back collections from duty to support PV ecosystem

- The imposition of the safeguard duty on the imports of cells, whether or not assembled in modules, has translated into considerable additional inflows for the Government of India. The collections obtained should be used to support the solar PV ecosystem in India. Between August and December 2018, the collections from the imposition of safeguard

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Central Board of Indirect Taxes & Customs, Department of Revenue, Ministry of Finance, Government of India, "Customs Tariff (Identification and Assessment of Safeguard Duty) Rules, 1997", <http://www.cbic.gov.in/htdocs-cbec/customs/cs-act/formatted-htmls/cs-import-rule20>, Accessed on 19-12-2018

duties generated revenues of around INR 1,500 crores.¹⁴³ The total for the two-year application period of duties is expected to be much higher. The MNRE should request the Ministry of Finance to consider earmarking these proceeds for the support of the solar PV ecosystem.

- Collections from the safeguard duty could be used to ensure low tariffs in solar PV auctions through the provision of viability gap funding support for project developers. Considering a hypothetical tariff cap of INR 2.50 per kWh for auctions-as per the recommendations of the MNRE to SECI in August 2018 for projects without safeguard duty¹⁴⁴ - VGF support from the safeguard duty collections till December 2018 would have been sufficient to mobilise 4 to 5 GW of project capacity awarded at higher tariffs, at the tariff cap of INR 2.50 per kWh.¹⁴⁵
- Alternatively, collections from safeguard duties could be used to fund the pass-through of safeguard duties for eligible projects.
- Collections from safeguard duties could also be used to support domestic manufacturing. The support could take the form of one of the measures described in Section 10.1.

10.6 Reduce uncertainty going forward

- While the safeguard duty is currently applicable till July 2020, a review investigation should be conducted well in advance in order to provide visibility to stakeholders about the period beyond this timeframe. The DGTR is mandated to conclude any review of safeguard duty within a period of eight months.¹⁴⁶ The MNRE should request the DGTR to initiate a suo moto review investigation by the end of the first year of imposition of safeguard duty (August 2019), in order to provide sufficient clarity to all stakeholders as to the applicability of duties beyond July 2020.
- The imposition of the safeguard duty has resulted in a sharp increase in the market share of imports of cells (whether or not assembled in modules) from Vietnam and Thailand, countries which are exempt from the application of duty by virtue of being developing countries which account for less than three per cent of imports of the product into India. As per CEEW analysis, the share of imports from both these countries in MW terms since the imposition of duties is nearing

143 CEEW analysis based on import data of cells, whether or not assembled into modules. Sourced from the Ministry of Commerce & Industry.

144 The Economic Times, "Solar Project Developers Seek Reversal Of Cap In Tariffs", <https://economictimes.indiatimes.com/industry/energy/power/solar-project-developers-seek-reversal-of-cap-in-tariffs/articleshow/65851024.cms?from=mdr>, Accessed on 24-2-2019

145 CEEW analysis based on capacity awarded by NTPC (2000 MW in August 2018), UPNEDA (500 MW in October 2018 and 550 MW in December 2018), SECI (840 MW in December 2018), KREDL (250 MW in October 2018), and GUVNL (700 MW in December 2018). These projects correspond to actual tariffs realised in the range of INR 2.59 per kWh to INR 3.17 per kWh. The implied VGF support ranges from INR 10 lakhs per MW to INR 70 lakhs per MW.

146 Central Board of Indirect Taxes & Customs, Department of Revenue, Ministry of Finance, Government of India, "Customs Tariff (Identification and Assessment of Safeguard Duty) Rules, 1997", <http://www.cbic.gov.in/htdocs-cbec/customs/cs-act/formatted-htmls/cs-import-rule20>, Accessed on 19-12-2018

the three per cent limit.¹⁴⁷ Considering these developments, the Ministry of Finance should clarify whether these countries would remain exempt from safeguard duty so that developers can plan their purchases accordingly.

10.7 Better recording of trade data for better policymaking

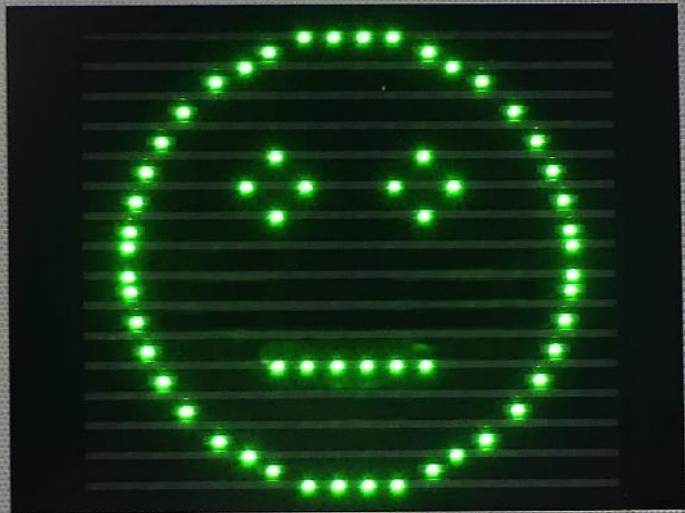
- The Ministry of Commerce and Industry could consider recording trade data pertaining to solar cells at a more granular level, following similar practices in other jurisdictions. Currently, trade data pertaining to solar cells is recorded under an eight-digit Harmonised System (HS) code, which aggregates data for all cells whether or not assembled into modules. However, in other jurisdictions such as the US, trade data is recorded at a more granular level (10-digit HS codes), which captures data separately for stand-alone solar cell imports and for solar cells assembled into modules. Recording data at a more granular level would enable the formulation of more targeted policies for the two separate products (cells and modules).
- The Ministry of Commerce and Industry's trade data pertaining to solar PV imports could also be improved by recording data in MW terms, in addition to the existing data in value terms and quantity. This would present a clearer picture pertaining to the trade of solar cells and modules, and would eliminate the effect of price fluctuations that impact data in value terms.

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Based on import data of cells, whether or not assembled into modules. Sourced from the Ministry of Commerce & Industry.



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