

U.S. Trade Policy for Solar PV Products: Tariffs on China

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Abstract

The United States has high expectations for solar photovoltaic (PV) in the decarbonization plan. While China has established its dominant position in the global PV market, the U.S. has imposed trade tariffs on Chinese solar PV cells and modules to protect U.S. domestic PV manufacturers. This trade protectionism has increased the uncertainties in the U.S. solar PV market, creating a “Green Dilemma” over U.S. climate change policy. This paper explains the U.S. domestic political environment where domestic actors have been struggling to resolve this dilemma. The study shows how the institutional designs of U.S. trade laws and the diverse interests of stakeholders heighten the uncertainty of PV installation against the backdrop of a tougher U.S. stance toward China.

Keywords: U.S., China, Solar Photovoltaic, Trade Tariff, Green Dilemma

1. Introduction

As climate change has become a central global theme, installing renewable energy is an urgent policy challenge. Notably, the relationship between the United States and China, the world’s top investors in renewable energy and the largest energy consumers in 2021, will crucially determine the future of climate change¹⁾. However, the decade-long U.S.-China trade dispute over photovoltaic (PV) cells and modules has shadowed this bilateral cooperation. The U.S. government has been imposing tariffs on solar PV products from China, the largest supplier of solar PV technologies. Controversially, tariffs have served as an obstacle to the supply of solar PV, one of the most promising renewable technologies in the U.S. After former President Donald Trump imposed additional tariffs, the U.S. almost ceased to import PV modules from China²⁾.

Such trade tariffs aim to protect domestic industries from competition against imported goods. Japan and Europe adopted similar measures in the solar PV sector in the 2010s. Although the governments would desire to import cheaper products from abroad to encourage renewable energy installations and decarbonize the power sector, the countries decided to impose tariffs to protect domestic industry. This paradoxical situation is called the “Green Dilemma”³⁾. The critics of the tariff’s negative impact argue that the decline in solar PV module cost and policy incentives, such as tax credits and net metering, have partially offset the impact. However, the periodic reviews of tariff rates and the policy decision process over whether to continue the tariffs have heightened the uncertainty of the U.S. solar PV business. In 2018, the European Union lifted the tariff measures imposed on solar PV cells and modules from China in 2013 after considering

the need for solar PV modules to achieve the EU’s renewable energy targets in 2018⁴⁾.

The inauguration of President Joe Biden, who has stated climate change as one of his core priorities, raised hope for combating this dilemma; however, there has been no remarkable move after a year in office. Given the high expectations for solar PV in Biden’s future power mix plan explained in the next section, the imposition of tariffs will likely lead to an undesirable outcome for the administration. Furthermore, the fundamental question arises if the current PV-dependent power mix plan remains achievable when the U.S. has imposed tariffs on China, the largest supplier of PV products from polysilicon to modules. This paper explores why the Biden administration, which has taken a significant step toward climate change combat, has failed to address this dilemma.

The outline of this paper is as follows. The next section reviews the prospects for solar PV deployment and the current PV module supply in the U.S. and overviews China’s PV industry in the global context. The third section touches upon the outline of U.S. trade tariffs imposed during the Obama and Trump administrations amid the increasing concern over the precipitous growth of China’s solar PV industry. The fourth section addresses why the Biden administration fails to ease the tension regarding tariffs, focusing on the institutional design of each tariff and the preferences of U.S. domestic actors. Based on the existing literature on anti-dumping duty (AD) and countervailing duty (CVD) initially imposed during the Obama administration, the fourth section focuses on the institutional characteristics of the safeguard measures (Section 201) and tariffs on goods from China (Section 301), both of which were initially imposed during the

Trump administration under the Trade Act of 1974. The final section concludes the paper with a summary and policy implications.

2. Solar PV Industries in U.S. and China

2.1 U.S. Prospect for Solar PV in the Power Sector

The Biden administration announced its target to decarbonize the U.S. electricity sector by 2035. The U.S. Department of Energy (DOE) presented a scenario that the U.S. will need to produce 40% of its electricity from solar PV in 2035⁵). Given that solar PV technologies accounted for about 3% of its power mix as of 2021, the U.S. will need to boost new solar PV installations at a rapid pace by 2035 and later. The DOE estimated that the annual PV installations need to reach 30 GW from 2021 to 2025 and 60 GW from 2026 to 2030. In 2021, the U.S. solar PV installations reached a record high of 23.6 GW. Biden's decarbonization efforts in the power sector, thus, primarily rely on a steady and massive supply of solar PV products.

2.2 Supply of Solar PV Products in the U.S.

Solar PV installations in the U.S. depend heavily on imports from abroad. U.S. manufacturers have ceased producing wafers and solar PV cells in the past decade. Among the PV-related products, the U.S. currently manufactures only solar PV modules made of crystalline silicon and thin films. The DOE reported that U.S. manufacturers produced approximately 14% of the PV modules supplied in the U.S. in 2020⁶). The other modules are shipped mainly from Malaysia, Vietnam, and Thailand⁷). Southeast Asian manufacturers are, however, dependent on Chinese polysilicon and wafers to produce solar PV cells and modules. Also, it has been pointed out that Chinese companies are deeply involved in Southeast Asia's solar PV businesses⁸). In short, although U.S. dependence on Chinese PV products has decreased in direct trade, China's presence is still dominant if one watches the global PV supply chain.

2.3 China's Solar PV Industry in Global Context

China's solar PV industry began to develop in the 2000s. The solar PV cell and module manufacturers in China expanded their capacities for export to the center of demand, namely the U.S. and Europe, at that time. While China became a major exporter of solar PV products, accounting for approximately 40% of global PV cell

production by 2009, domestic PV installations stalled in the 2000s due to inadequate policy incentives.

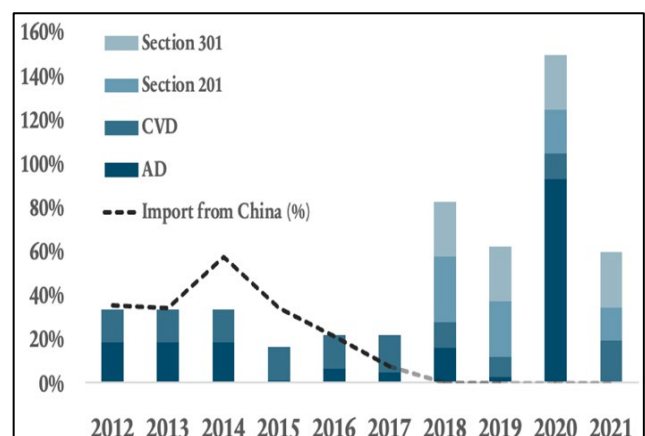
The external events, such as the 2008 financial crisis and tariff measures by other countries, heightened concerns about exports and turned China's focus on domestic PV installations⁹). In addition, the 12th Five-Year Plan (2011-2015) defined green energy as a strategic emerging industry and spurred support for the PV industry. For these factors, China expanded the manufacturing capacity of PV products at a rapid pace throughout the 2010s.

Consequently, the Chinese solar PV industry has built a dominant position. As of 2020, China accounted for over 80% of the total manufacturing capacity in the global PV supply chain¹⁰). Solar PV cell manufacturers outside China depend on Chinese wafers for cell production, as China monopolizes its production capacity. In 2021, China installed 54.9GW of solar PV panels, more than two-fold of the U.S. installment in the same year¹¹).

3. U.S. Tariffs on Chinese Solar PV Cell and Module

3.1. Overview

As of 2022, the U.S. implemented three tariffs (AD and CVD recognized as one kind of tariff) on China's solar PV cells and modules (Figure 1). This section summarizes AD and CVD under the Tariff Act of 1930, the safeguard tariffs under Section 201 of the Trade Act of 1974, and the tariffs on goods from China under Section 301 of the Trade Act of 1974.



(Source) National Renewable Energy Laboratory

Figure 1 U.S. Tariffs on Solar PV Cells and Modules from China (2012-2021)

3.2 AD/CVD

In 2012, the U.S. Department of Commerce (DOE)

announced the AD and CVD under the Tariff Act of 1930, targeting solar PV cells and modules from China. The AD provides relief to domestic industries injured or threatened by imported goods sold in the U.S. at prices that are less than fair market value¹²). The dumping margin, the percentage difference between fair value and dumped price, is charged as an AD tariff rate. Meanwhile, the CVD intends to provide relief to domestic industries injured or threatened by imported goods that receive government subsidies and can be sold at lower prices than U.S. equivalent goods. The AD and CVD measures set tariff rates for each targeted company; in 2012, the AD ranged from 18.32% to 249.09%¹³), and the CVD ranged from 14.78% to 15.97%¹⁴). These rates are subject to periodic review.

The initial AD and CVD measures in 2012 exempted PV modules manufactured in China using non-Chinese solar PV cells from tariffs, which gave China an incentive to circumvent tariffs and thus reconsider its supply chain. This loophole of tariffs led to the increase of Chinese PV modules, consisting of solar PV cells made in Taiwan, in the U.S. market. To tackle this China's circumvention, the U.S. imposed the new AD and CVD tariffs that expanded the scope of coverage to the cells and modules made in Taiwan¹⁵).

3.3 Safeguard (Section 201 Tariff)

In January 2018, the Trump administration announced the safeguard tariff on imported PV cells and modules under Section 201 of the Trade Act of 1974. The safeguard action provides import relief to the U.S. industry injured, or threatened, by increased import of goods¹⁶). The duration of safeguard measures is four years and can be extended to a maximum of eight years. The safeguard measures include not only the imposition of trade tariffs but also such options as tariff quotas and import quotas. The Trump administration adopted a tariff of 30% on solar PV modules and a 2.5 GW tariff-rate quota (TRQ) on solar PV cells¹⁷).

In February 2022, with the original measure faced with expiration, President Biden issued a Proclamation extending the safeguard measure¹⁸). The new safeguard measure, addressing the concerns about the domestic supply of PV products, exempt high demanded bifacial PV modules from the tariff and double TRQ for PV cells from 2.5GW to 5GW. The tariff on PV modules was 14.75%, less than half of the initial tariff rate in 2018.

3.4 China Tariff (Section 301 Tariff)

The Trump administration imposed the other tariff under Section 301 of the Trade Act of 1974. This symbolic move, "China Tariffs," reflected the worsening U.S.-China trade war. The Section 301 procedure provides relief to the U.S. industries threatened or injured by an unjustifiable, unreasonable, or discriminatory action. This sanction targets over 20,000 goods, including solar PV cells and modules imported from China¹⁹). Before the Trump Administration, the World Trade Organization (WTO) pursued dispute settlement when the U.S. used Section 301 authorities. However, Former President Trump, perceiving the WTO's settlement as insufficient to counter China, pushed for the U.S. unilateral action. The USTR published the list of targeted goods up to List 4. Solar PV cells and modules are subject to 25% tariffs²⁰).

4. Politics of Tariff Measures on PV Products

4.1 Domestic Actors in AD and CVD Processes

The domestic energy industry exerts significant influence in the U.S. energy policymaking process²¹). While the carbon-intensive industry, remarkably the fossil fuel sector, has been of great interest traditionally, the growing renewable energy industry, with the development of low-carbon technologies and increasing interest in climate change among politicians, came to exercise its influence on the political sphere²²). As a prominent example, the renewable energy industry seeks protection from cheap imported goods and supports trade protectionism to a greater extent²³). This trend caused the "Green Dilemma," in which the renewable energy industry, a major actor in decarbonization, stalls the domestic supply of renewable energy due to concerns about imported goods from abroad.

The Solar PV industry is no exception to this dilemma. The U.S. solar PV cell and module manufacturers have expressed concerns about the influx of cheap imports and have supported the tariffs since the Obama administration. The unique political environment occurs here as the U.S. PV industry is divided between pros and cons over tariff measures. On the pros side, the U.S. cell and module manufacturers favor tariffs on cheap imports from abroad to keep the competitiveness of domestic manufacturers. On the cons side, the installers and engineering companies, who benefit from installing PV modules, oppose the tariffs that increase the cost of solar PV module procurement²⁴).

The existing literature on AD and CVD pointed out

that the petitioner for tariffs—PV cell and module manufacturers—had an advantage under the investigative processes by the United States International Trade Commission (ITC) and the U.S. Department of Commerce (DoC)²⁵. In the investigative processes, the ITC pays particular attention to injuries or threats caused by imported goods. On the other hand, the DoC looks closely at the extent of damages the ITC found. Although the interested parties can assert their opinions through petitions and hearings, the final determination largely depends on whether the injuries to petitioners exist. This institutional characteristic makes it hard for the opponents of tariffs to reflect their concerns about the tariff's negative impact on the domestic economy and climate change in the final determination.

It is worth noting that the tariff measures under Section 201 and Section 301 of the Trade Act of 1974 have different institutional designs from AD and CVD. In the Section 201 process, the ITC takes responsibility for the investigation, and the President makes a final decision. The President's consideration covers a broader range of issues than AD and CVD. The President "must weigh U.S. national economic and security interests." The Section 301 actions are characterized by the executive branch's unilateral decision-making process. The law grants the United States Trade Representative (USTR) and the President authority to investigate trade barriers and implement retaliatory actions. The following parts analyze the Section 201 and 301 tariffs with a particular focus on the institutional designs and the interactions of stakeholders, compared with AD and CVD if necessary.

4.2 Safeguard

4.2.1 Institutional Design

The safeguard actions under Section 201 of the Trade Act of 1974 are initiated by a written petition claiming injuries to domestic industries caused by the influx of imported goods. The petitioners can be firms, interest groups, USTR, House Ways and Means Committee, Senate Finance Committee, or ITC. Once a petition is filed, the ITC investigates whether the affected U.S. industry is seriously injured or threatened with a severe injury. If that is the case, the ITC examines whether an increase in imports is a substantial cause of the injury. The injuries to be considered include: "the significant idling of production facilities; the inability of a significant number of firms to

carry out domestic production at a reasonable output level; and significant unemployment or underemployment within the U.S. industry²⁶." Unlike the AD and CVD investigations focusing on unfair trade practices such as subsidy and dumping, the safeguard process prioritizes whether increased quantities of imported are the substantial cause of serious injury or a threat to U.S. manufacturers²⁷. If the ITC commissioners make an affirmative injury determination, the ITC sends remedy recommendations to the President.

After receiving the ITC's recommendations, the President decides which recommendations to implement. The President may act in line with the recommendations, modify them, or do nothing. In doing so, the President must consider the national economic and security interests and the proposed remedy's possible impact on U.S. consumers and other industries²⁸. The Presidential actions include proclaiming a tariff, quota on imports, diplomatic negotiations, or submission of legislative proposals to Congress²⁹. If the President decides differently from the ITC's proposal or takes no action, Congress may enact a joint resolution of disapproval that, if enacted, makes the ITC's recommendation a remedy.

4.2.2 Actors and Process

In 2017, Suniva and SolarWorld, two major solar PV module manufacturers in the U.S., filed a petition for the ITC's safeguard investigation³⁰. The two firms claimed that the influx of solar PV cells and modules caused the oversupply and price erosion of such products in the U.S. market, resulting in the shutdown of manufacturing facilities and creating an unprofitable situation. The petitioners argued that the influx of imported goods is the significant cause of injuries to domestic manufacturers. They, therefore, called for government protection to ensure U.S. competitiveness in the field of advanced technologies.

Opposing the petitioners' claims, the Solar Energy Industries Association (SEIA), the national trade association for the U.S. solar and storage industry, expressed concern about the tariff's negative impact on the PV industry, except for the cell and module manufacturers. SEIA stressed that the additional tariff would increase the PV installation cost and enhance the uncertainty of future investment decisions. In the ITC's hearing, SEIA questioned the quality of solar PV products made by the petitioners and attributed the petitioners' predicament to a

lack of innovative effort to remain competitive with imported goods. Hence, the organization argued that the petitioners failed to meet the requirements for invoking the safeguard provisions³¹⁾.

Considering the claims from both sides, the ITC concluded that the increased quantities of imported PV cells and modules were the substantial cause of injuries to petitioners and reported its findings to the President³²⁾. The Section 201 investigative process by the ITC, as with the AD and CVD, focuses on the actual harm the petitioners suffered and examines if the damage comes from the increased quantities of imported goods. At the stage of ITC's investigation, the commissioners did not institutionally consider the tariff's negative impact as claimed by SEIA. In this regard, the ITC's safeguard investigative process is more favorable to petitioners' claims than other stakeholders' claims.

The presidential action for implementing remedies makes the Section 201 process different from the AD and CVD. However, as mentioned above, Congress may enact a joint resolution of disapproval if the legislators find that the presidential report, which describes the action and its reasons, deviates from the ITC's recommendations. The resolution, if enacted, turns ITC's recommendations into remedy; that is, although the President can modify the ITC's recommendations as specified in the law, the actions the President can take depend heavily on the ITC's suggestions in practice. The safeguard actions initiated by the Trump administration, in fact, mostly followed the ITC's recommendations—trade tariff and tariff quota—even though the presidential action adopted stricter remedies by targeting Canada that the ITC's recommendations exclude³³⁾. To sum up, the Section 21 process grants the executive branch the right to propose a final remedy, but the contents of the presidential proposal largely depend on the ITC's recommendations that strongly reflect the petitioners' claims as with AD and CVD.

4.3 China Tariffs

4.3.1 Institutional Design

The USTR and the President take responsibility for the decision-making processes, such as investigation and remedy proposal, under Section 301 of the Trade Act of 1974. Unlike the other tariff processes, Section 301 does not require investigations by an independent agency (ITC). This characteristic raises questions about the transparency

and consistency of the Section 301 process.

The USTR initiates its investigation when an interested person files a petition, or the USTR can self-initiate a case. The law requires the USTR to attempt to consult with a targeted foreign government upon initiating an investigation. The USTR examines whether the alleged conduct is unjustifiable and violates U.S. rights under the trade agreement. If the USTR's determination is affirmative, the USTR decides what action to take, if any, with the direction of the President³⁴⁾. The retaliatory action includes the imposition of trade tariffs, withdrawal from trade agreements, building new bilateral agreements, and so on. If the USTR takes import restrictions, trade duties (tariffs) must be the first option. The Section 301 actions terminate after four years if the USTR does not receive a request to continue the action.

4.3.2 Actors and Process

The "unfair trade practices" in Section 301 vary widely because of the breadth of the targeted industries. Regarding the solar PV industry, the US solar PV module manufacturer, SolarWorld, testified in the hearing and petitioned that China conducted cyber-attacks against the company and stole its intellectual property³⁵⁾. SolarWorld argued that the firm's business was in danger as Chinese solar PV modules became competitive in the U.S. market due to China's innovation in module production, driven by stolen information from the firm. The USTR showed that the stolen information helped Chinese products to enter the U.S. market at an incredible speed, costing SolarWorld about \$120 million.

SEIA, as the organization did in the safeguard process, expressed concern about the SolarWorld's move by arguing that the new trade tariff would have a further negative impact on the U.S. solar industry³⁶⁾. SEIA stressed that the share of Chinese solar PV cells and modules already fell to roughly 1% due to the other trade mechanisms and therefore claimed that the Section 301 tariffs are unlikely to give significant leverage on China. SEIA also warned that further job losses in the U.S. PV market would happen due to Section 301 and stated that the AD and CVD investigations could be adjusted to the Chinese unfair trade practices.

The USTR findings concluded that China's cyber-attacks against SolarWorld were an unreasonable infringement of the intellectual property of the U.S.

manufacturer and determined the imposition of additional duties on imported goods from China³⁷⁾. The cyber-attacks infringed on fair international trade based on international agreements, but the U.S. policy had failed to provide sufficient relief to the targeted U.S. companies, explained the USTR. The USTR also pointed out that the U.S. companies could not identify and recover legal costs by themselves, and thus China's cyber-attacks burden U.S. commerce. The USTR, however, does not address the possible impact of tariffs on the import status of Chinese goods and employment in the U.S. industry, as claimed by SEIA.

5. Conclusion

This paper tried to address why the U.S. has struggled with tackling the "Green Dilemma" situation by examining the institutional design of each tariff measure and the preferences of domestic actors. The previous sections showed that the current tariffs on China's solar PV products are based on three investigative processes. First and foremost, it is worth noting that the investigative processes, in common, are designed to give preferences to the petitions by the solar PV cell and module manufacturers in the U.S. In the AD and CVD processes, the ITC and DoC pay exclusive attention to the petitioners' damages caused by dumping and subsidy. The safeguard process includes the presidential decision that considers the impact of the tariff on national security and the economy, besides the ITC investigation. However, this presidential intervention (or recommendation) is institutionally limited to deviating from the ITC's recommendations that exclusively reflect the petitioners' claims. Amid bipartisan anti-China sentiment in Congress, the Section 301 process is more likely to have worked to the advantage of SolarWorld, a victim of China's unfair practice, than SEIA.

In summary, the U.S. tariffs on Chinese PV products are characterized by the fact that the small minority in the U.S. solar PV industry—cell and module manufacturers—have the leverage on final determinations. Also, it is striking that all three investigative processes explained in this paper lack consideration of the tariff's possible impact on climate change measures. Going back to the question, the divergence between the trade policy to protect the domestic industry and the climate policy to decarbonize U.S. power generation has made it challenging to deal with the "Green Dilemma." As climate change emerges as an

influential agenda, the question of how the U.S. will respond to the tariffs on PV products as a domestic institutional issue, not limited to the problem with China, has important implications not only for the progress of solar PV installations in the country but also the development of overall climate change measures.

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