The Rise of Renewable Energy Protectionism: 
Emerging Trade Conflicts and Implications for Low Carbon Development 

Joanna I. Lewis  
Edmund A. Walsh School of Foreign Service  
Georgetown University  
Science, Technology and International Affairs, ICC 512  
Washington, DC 20057  
jil9@georgetown.edu  

Forthcoming in Global Environmental Politics Volume 14, Number 4, November 2014  

November 23, 2013 unedited draft  

Abstract  

The emergence of several rapidly industrializing economies within leading renewable energy technology industries has contributed to more globalized supply chains and an increase in the international trade of renewable energy technologies. In most markets, wind and solar power technologies still require some form of government support in order to be deployed, yet few countries are willing to subsidize an industry that relies primarily on imported technology. These trends have led to an emergence of trade-related disputes, both via the World Trade Organization (WTO) and domestic trade remedy channels. Through an analysis of the emerging trade disputes and the prevalence of protectionist polices in the wind and solar industries, this paper examines the conflict between the political economy of domestic renewable energy support and the basic principles of global trade regimes, as well as the implications for nations’ abilities to transition to low carbon economies.
Introduction

Governments around the world have prioritized the development of renewable energy technologies with a range of policies and incentives. As the manufacturing and use of these technologies has grown rapidly in recent years, national leaders have shifted. The emergence of several rapidly industrializing economies in these industries has led to an increasingly globalized supply chain, and consequently an increase in the international trade of renewable energy technologies. It is therefore not surprising that the industry has seen a recent emergence in the frequency of trade-related disputes, either via the World Trade Organization (WTO) or domestic trade remedy channels.

Even with recent cost reductions, most renewable energy technologies, including wind and solar power technologies, require some form of government support in order to be deployed. While any form of direct government support that constitutes a subsidy could run into conflict with international trade rules, it is the programs that aim to simultaneously foster the growth of a domestic manufacturing industry which are most at risk of such conflict. If few countries are willing to subsidize an industry that relies primarily on imported technology, can nations continue to use renewable energy support measures to capture local economic development benefits without launching a global trade war? What are the implications of such trade conflicts for the continued global deployment of renewable energy?

This paper argues that there is a fundamental conflict between the political economy of domestic renewable energy support and the basic principles of global trade regimes, with direct implications for nations’ abilities to transition to low carbon economies. For governments to garner political support for renewable energy technologies they must frequently promise job creation and domestic technological progress, both of which compel direct interventions with international trade flows and may lead to direct conflict with multiple WTO provisions and domestic trade laws. While many have argued that trade conflict in narrow sectors—whether Chinese solar panels or French wine—can easily escalate into trade wars with serious economic and political consequences, few have examined the implications of such conflicts for environmental goals.1

This new era of renewable energy focused trade disputes certainly recalls earlier warnings about the challenge of addressing environmental concerns within the context of the broader dynamic of global competition,2 as well as the robust literature examining conflicts between trade and the environment.3 What is different about the renewable energy technology case, in contrast to many other “environmental” exceptions investigated in the literature, is both the indirect nature of the environmental benefit, as well as the range of WTO provisions potentially affecting the measures in question. Previous studies have demonstrated that the use of trade sanctions that force foreign exporters to comply with domestic environmental regulations encourages foreign exporters to invest in clean technology in order to maintain their competitiveness in regulated markets.4 Far less understood, however, is the extent to which trade sanctions targeting clean technology products influence the choice of policy instrument utilized

---

1 Evenett 2013.
to promote these industries, which in return will affect the broader trend of clean technology adoption.

Through an analysis of current legal and policy research and the emerging trade disputes, this paper explores the policies that many countries have used to build up renewable energy technology industries and the implications for trade disputes and for the increased deployment and trade of renewable energy globally. Reviewing the instances of trade disputes surrounding the preferential treatment of domestic renewable energy technology products, this paper examines the geographic distribution and regional politics of emerging trade disputes and the implications for future growth of renewable energy industries. It begins by framing the conflict between industrial policy and international trade, and identifying the particular challenges associated with promoting renewable energy technologies. It then reviews the shifting trade balances in key renewable energy technologies, focusing on the wind and solar power industries, as well as vulnerable policy types and trade disputes filed to date. After analyzing the relationship between countries’ roles in these industries, policies used to foster local industrial development, and instances of trade conflict, the paper puts forth recommendations for governments to consider regarding the implications of using trade sanctions in the context of larger international goals, including environmental goals. As the use of WTO dispute mechanisms and domestic trade remedies is likely to increase with increased competition in renewable energy markets, governments may want to explore other ways of settling disputes. Several existing and newly proposed international forums offer ways of preventing such disputes from escalating, though some will likely be more effective and politically viable than others.

**The Political Economy of Supporting Renewable Energy**

Now a $244 billion dollar industry globally, the political economy of renewable energy around the world is becoming increasingly consistent. Renewable energy has been identified as a strategic industry for promoting economic development in many countries around the world. Because the social benefit of reducing greenhouse gas emissions is not yet generally reflected in cost structures, the deployment of socially desirable technologies is generally not economically profitable. Policy tools can be used to adjust relative prices to encourage the adoption of alternative energy technologies through subsidies or other forms of public support. In order to garner such public support, the political rationale for renewable energy, namely carbon mitigation, is increasingly being directly linked to the economic rationale, namely job creation and technological leadership. While the carbon mitigation benefits to renewable energy may be global, economic development impacts are a benefit of renewable energy utilization that can be captured locally.

The global economic slowdown has made it even more difficult than before for governments to justify extending the costs associated with renewable energy to ratepayers unless they can also make the case for other direct economic benefits from promoting renewables.

---

5 UNEP 2013.
7 Chao and Peck 2000.
8 Alic, Mowery, and Rubin 2003.
as job creation and long-term economic competitiveness. As a result, countries are increasingly utilizing protectionist policies to encourage domestic manufacturing for renewable energy, and to raise barriers to foreign entry into domestic markets. Not all countries are well positioned to become competitive exporters of the same green technologies, but if industrial policies can help create competitive domestic manufacturers, there may be direct domestic economic benefits. There may be global benefits as well; new market entrants can lead to more competition in the sector, and encourage further technological innovation.

The fundamental principles of the global trading system, now enshrined in the WTO, appear to be in direct conflict with the entire idea of a domestic strategic industry supported by national policy incentives. The “Most Favored Nation” principle prevents discrimination against specific trading partners. The “National Treatment” principle says that imported and locally produced goods should be treated equally once they have entered the market. Additional principles aimed at promoting fair competition and non-discrimination, including dumping and subsidy regulations, aim to establish a level playing field as goods are traded across borders.

However, if free trade is viewed as a means to promote economic growth, government intervention may be more a result of disagreement over distributional impacts than fundamental principles as governments try to capture these benefits for their own jurisdictions.

These overarching principles are translated into specific provisions and agreements that can be used to dispute a range of national level industrial policy support. In addition to the WTO Agreement on Subsidies and Countervailing Measures (SCM agreement), there are several other WTO provisions that are relevant to industrial policy support for renewable energy. For example, the Government Procurement Agreement (GPA), while limited in signatories, targets the use of government purchasing and procurements to achieve domestic policy goals, including the promotion of specific local industry sectors. Other WTO provisions related to intellectual property rights and technology transfer are directly relevant to industrial policies. The Trade Related Investment Measures (TRIMS) provision of the WTO restricts local content requirements as well as technology transfer requirements. The Trade Related Intellectual Property (TRIPs) agreement explicitly addresses IPR enforcement, which also has implications for industrial policies and market access regulations.

The environmental rationale to support renewable energy may be insufficient to invoke exceptions to trade rules. Invoking, for example, GATT Article XX to justify the use of certain subsidies or industrial policies supporting renewable energy technology manufacturing or deployment may require member countries to demonstrate a complex, rather indirect link between renewable energy technology and health, and that such measures are a necessity to displace fossil fuels and prevent climate change. Furthermore, many of the measures in question that violate the SCM Agreement may not be eligible for GATT Article XX exceptions in accordance with recent Appellate Body decisions in ongoing disputes.

---

9 Ma and Pearson 2010.
10 Crosbey 2011.
11 While the focus here is on WTO, many of the same issues apply to regional trade agreements as well. See, e.g. Rowlands’ discussion of NAFTA and cross-border electricity trade (Rowlands 2009).
13 World Trade Organization 2011; World Trade Organization 2012.
While a variety of policy tools are used to promote the use of renewable energy, protectionist industrial policies and certain government subsidies pose the most direct conflict with international trade law. Examples of policies commonly used to support renewable energy industry development and the countries where they are used presented in Table 1. Particularly common is the use of direct subsidies either in the form of subsidized electricity tariffs (feed-in tariffs) or through capital subsidies, grants, rebates, or favorable loan terms. Even traditional subsidy policies may have an industrial policy element; for example, a national subsidy policy designed to promote local industry growth, such as a feed-in tariff or a tender program with a local content requirement.

Less common but still quite frequently used are local content requirements (LCR) that aim to encourage local over imported renewable energy technologies. Policies that encourage domestic manufacturing and technology transfers may create a particular problem with respect to international trade law that explicitly prohibits differential support to domestic over foreign technology. Other policies that may provide preferential treatment to local industries including financial or tax incentives directly used to promote local manufacturing, research and development (R&D) support for local firms, and the use of import tariffs or customs duties to support particular industries or to encouraged domestic manufacturing. Export credit assistance is sometimes used to promote local industries abroad. While several studies offer detailed legal analysis of such programs and have determined that many pose potential conflicts with international trade law, there is still minimal legal existing precedent to date on which to base such analysis.  

Perhaps no country has used industrial policy to promote renewable energy as effectively, and as controversially, as China. China’s policies to promote renewable energy have long included mandates and incentives to support the development of domestic technologies and industries. While some elements of these policies, such as LCRs, are unduly protectionist, others are far less controversial, such as R&D support, technology certification and quality control programs, and fiscal or other tax related incentives. In periodic science and technology (S&T) plans, as well as the five-year plans, the Chinese government has identified several renewable energy industries as strategic national priorities for S&T investment, and established a constant and increasing stream of government support for R&D and technology demonstration. Other forms of industry support have been given through more informal channels, such as low interest loans or other favorable loan terms given by central and local governments and state-controlled banks, low cost land grants, or expedited permitting.

As Table 1 demonstrates, however, China is certainly not the only country that has relied on industrial policy mechanisms to promote renewable energy industries. Other notable examples include the 2003 wind power tenders issued by the Canadian province of Quebec that included mandates for using local content as the Gaspé Peninsula tried to encourage a local wind power industry. In addition, several of Spain’s autonomous regional governments have insisted on the local assembly and manufacture of turbines and components before granting development concessions, and Brazil’s PROINFA program aimed to achieve a 60 percent local content rate for wind power technology by making project loans from the Brazilian development bank.

---

15 Lewis 2012b.
16 Lewis and Wiser 2006.
(BNDES) contingent on turbine manufacturers’ ability to meet this requirement. More recently, the Indian National Solar Mission included the mandated use of domestically manufactured solar photovoltaic technology and a mandated 30 percent local content requirement for solar thermal technology.

Table 1. Renewable Energy Industry Support Measures and Countries Where Utilized

<table>
<thead>
<tr>
<th>Support Measure</th>
<th>Countries Where Utilized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed-in Tariff</td>
<td>Australia; Austria; Canada; Croatia; Cyprus; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Ireland; Israel; Italy; Japan; Luxembourg; Malta; Netherlands; Portugal; Slovak; Slovenia; Spain; Switzerland; United Kingdom; Algeria; Argentina; Bosnia/Herzegovina; Bulgaria China; Dominican Republic. Ecuador; Iran; Jordan; Kazakhstan; Latvia; Lithuania; Macedonia; Malaysia; Mauritius; Montenegro; Panama; Peru; Serbia’ Thailand; Turkey; Uruguay; Armenia; Ghana; Honduras; India; Indonesia; Lesotho Moldova; Mongolia; Nicaragua; Nigeria; Pakistan; Palestinian Territories; Philippines; Senegal; Sri Lanka; Syria; Ukraine; Kenya; Rwanda; Tajikistan; Tanzania; Uganda</td>
</tr>
<tr>
<td>Direct capital subsidy, grant, rebate, or favorable loan</td>
<td>Australia; Austria; Canada; Croatia; Cyprus; Czech Republic; Denmark; Finland; France; Germany; Greece; Hungary; Italy; Japan; Luxembourg; Malta; Netherlands; Norway; Oman; Poland; Portugal; Slovak; Slovenia; South Korea; Spain; Sweden; Switzerland; United Kingdom; United States; Argentina; Bosnia/Herzegovina; Botswana; Bulgaria; Chile; China; Dominican Republic; Russia; Turkey; Uruguay; Egypt; Ghana; India; Indonesia; Lesotho; Nigeria; Pakistan; Philippines; Sri Lanka; Vietnam; Bangladesh; Kyrgyzstan; Nepal; Tanzania; Uganda; Zambia</td>
</tr>
<tr>
<td>Local Content Requirement</td>
<td>China (Wind, 1997); Brazil (Wind, 2002); India (Solar, 2010); Canada (Wind, 2003; Wind/Solar, 2009); Ukraine (Wind/Solar, 2013); USA (Wind/Solar/Others, 2009); Spain (Wind, 1994); Italy (Solar, 2011); France (Solar, 2012); Croatia (Wind/Solar/Others, 2012); South Africa (Wind/Solar, 2011); Turkey (Wind/Solar/Others, 2011); Argentina (Wind, 2005); Malaysia (Wind/Solar/Others, 2010)</td>
</tr>
<tr>
<td>Financial or Tax Incentives for Local Manufacturing</td>
<td>UK (Green Products, 2009); Brazil (Wind, 2009); USA (Wind/Solar/ Others, 2009)</td>
</tr>
<tr>
<td>Use of Customs Duties/Import Tariffs to Favor Domestic Goods or Promote Domestic Manufacturing</td>
<td>Brazil (Wind, 2009); Russia, Belarus and Kazakhstan (Solar, 2010); China (Wind, multiple years); Venezuela (all electricity generation products, 2009)</td>
</tr>
<tr>
<td>Export Credit Assistance</td>
<td>Denmark (Wind, various years); United States (Green Products to Korea, 2009; RE to Abu Dhabi, 2013; Others); OECD (All RE, 2012)</td>
</tr>
<tr>
<td>Research, Development and Demonstration Support for Domestic Companies</td>
<td>China (Wind, Solar, various years); United States (Solar, Offshore Wind; 2011/2013); Denmark (Wind, various years); Germany (Wind, Solar, various years)</td>
</tr>
</tbody>
</table>


17 Lewis 2007a; Ministry of Mines and Energy of Brazil 2010.
Trade Conflicts to Date and Role of Industrial Policy

While there have been relatively few international trade challenges in the renewable energy technology sector to date, this field has been evolving rapidly since mid-2010. The growing scale of the renewable energy sector and the size of the market at stake may mean that it is no longer immune to high-profile WTO challenges. This section reviews the evolution of the key cases that target the wind and solar industries focusing on the context behind each dispute and the relationship between the various disputes.\(^*\) The discussion is organized by type of dispute, rather than by country or by case, to aid in cross-case comparison.

**Antidumping and Countervailing Duty Disputes Targeting Solar and Wind**

In August 2009, German photovoltaic (PV) companies SolarWorld and Conergy began to raise concerns about China’s solar practices when they requested that an antidumping investigation of Chinese PV exports be initiated by the European Union. Claiming that Chinese PV price levels were impossible to maintain without State aid, they pointed to China’s Golden Sun Program and Solar Rooftops Program which provide direct subsidies to panel deployment in China and could be argued to influence module costs.\(^{20}\) While the EU opted not to pursue an investigation of China’s program at that time, tensions in the solar industry began to escalate.

In September 2010, the United Steelworkers (USW) filed a petition with the United States Trade Representative (USTR) requesting that it investigate China’s violation of its WTO commitments in clean energy, marking the start of what would be become multiple US investigations of China’s renewable energy practices.\(^{21}\) The combination of the lack of an EU investigation and the watered down response to the USW petition led several solar companies with a US presence, including Germany’s SolarWorld, to form the Coalition for American Solar Manufacturing (CASM) and file a petition with the US Department of Commerce and International Trade Commission (ITC) on October 19, 2011. The petition requested that the US Government challenge China’s “illegal” subsidies to solar companies and develop tariffs for Chinese crystalline silicon PV products.\(^{22}\)

After a preliminary hearing on November 8, 2011, Commerce initiated investigations on both antidumping duties (AD) and countervailing duties (CVD). On December 13, 2011 the ITC preliminarily found that the US solar industry had suffered “material injury,” establishing the necessary pre-conditions for the US to impose duties on Chinese solar imports. Preliminary determinations and duty levels were announced in March through May, and final determinations were released in October 2012, with final dumping margins ranging from 18.32 to 249.96 percent and countervailable subsidies from 14.78 to 15.97 percent.\(^{23}\) An appeal filed by CASM in February 2013 aimed to expand the scope of the original case in response to claims that

---

\(^{19}\) Note that the cases surrounding biofuels are not included, nor are the cases dealing with climate change (e.g. the EU Aviation directive) as the political and economic issues are fundamentally different in these instances.

\(^{20}\) Comfort and Weiss 2009.

\(^{21}\) United Steelworkers 2010.

\(^{22}\) US Department of Commerce, International Trade Administration 2011.

Chinese manufacturers were able to reconfigure their supply chains to evade duties on imports to the United States.\(^{24}\)

As the US-led case against the Chinese solar industry was unfolding, three related disputes targeting the solar industry were launched. The first was by China, launched in November 2011 in what appeared to be a direct retaliation to the US dispute and targeting several subnational renewable energy support programs in US states that may have used LCRs (elaborated below). The second related case again saw China also launching an investigation against the United States and targeting its solar industry. On July 20, 2012 the Chinese Ministry of Commerce (MOFCOM) launched an investigation that it said might lead to its levying retroactive duties pending the findings of AD and CVD investigations into polysilicon from the US and South Korea, later expanded to include the European Union.\(^{25}\)

The third related case came from the European Union, targeting the Chinese solar industry. On July 25, 2012, EU company ProSun filed a petition with the European Commission on behalf of EU solar producers against China, and on September 6, 2012, the European Commission announced the initiation of AD investigation on imports of crystalline silicon photovoltaic modules and key components originating in China. EU solar company ProSun has since filed another complaint with the European Commission to initiate an anti-subsidies probe into imported Chinese solar glass. Despite multiple negotiations between Chinese and European politicians, on June 4, 2013, the European Commission decided to impose provisional antidumping duties. While duties averaging 47.6 percent were announced, the EU opted to postpone imposing the full tariffs until August and instead imposed an 11.8 percent rate, reportedly to allow time for further negotiations.\(^{26}\) Days after the solar duties were announced, China launched a trade investigation against European wine exports, likely in direct response to the solar tariffs.\(^{27}\) On July 27, 2013, a price undertaking was worked out between the EU and Chinese governments under which an import quota of 7 GW per year would be applied to Chinese-made solar panels, along with a minimum import price of €0.56 per watt. Companies not agreeing to participate in the undertaking were subject to the original 46.7 percent duty, while those participating were exempted.\(^{28}\)

In addition to the solar investigations described above, a trade dispute surrounding the Chinese wind industry emerged in late 2011 when a few US wind component companies formed the Wind Tower Trade Coalition and filed a petition asking the US Department of Commerce to initiate CVD and AD investigations on imports of utility scale wind towers from China (and Vietnam). Commerce initiated investigations on a portion of the claims listed in the petition on January 24, 2012, including cash grants, cheap raw materials, free land, electricity, preferential loans and credit, and tax exemptions, among others. Preliminary tariffs were set in May 2012 at 26 percent, with the Commerce Department raising AD rates for Chinese firms to 45-71 percent and CVD rates to 22-35 percent in December 2012, and the ITC approving these rates in January 2013.\(^{29}\)

\(^{24}\) Elouaradia 2013.

\(^{25}\) Ministry of Commerce of the People’s Republic of China 2012b.

\(^{26}\) AP 2013.

\(^{27}\) Ministry of Commerce of the People’s Republic of China 2013; AP 2013.

\(^{28}\) Bayar 2013.

\(^{29}\) Sweet 2013.
Yet another anti-dumping investigation against the solar industry was launched in response to a petition filed by the Indian Solar Manufacturers’ Association on November 23, 2012 by India’s Ministry of Commerce against solar cells originating in China, Chinese Taipei, Malaysia and the United States.\(^{30}\) The case is also likely related to failed attempts to promote domestic solar manufacturers in India, including through the use of LCRs. Indian manufacturers have had trouble competing with more established overseas companies, including those based in the countries targeted in this dispute.\(^{31}\) A US challenge against India’s national solar program at the WTO followed the announcement of the Indian investigation, as discussed in the following section.

**Local Content Disputes Targeting Renewable Energy**

The first ever case concerning a specific renewable energy support program was challenged under the WTO when Japan initiated bilateral consultations with Canada over Ontario’s feed-in tariff (FIT) programs for wind and solar in September 2010. Japan claimed that Ontario’s renewable energy FIT program unfairly discriminates against foreign renewable energy products with its local content provision and is a prohibited subsidy, that it violates the national treatment requirements of the General Agreement on Tariffs and Trade (GATT), and that it is also inconsistent with the Agreement on Trade-Related Investment Measures (TRIMs Agreement), in addition to being a prohibited subsidy under the SCM Agreement.\(^{32}\) Canada, however, has argued that its FIT is a form of government procurement designed to ensure the affordable generation of clean energy in Ontario, and is consequently not subject to WTO agreements. Both the United States and the European Union joined the consultations in September 2010. Japan found initial consultations to be unsuccessful and on June 1, 2011, requested that the WTO dispute settlement panel. The EU had separately challenged the program in August 2011 and another panel was convened, causing the two panels to investigate in parallel and coordinate their findings.

The panels took longer than the usual six months to produce their final reports, requesting multiple extensions before the reports were released on December 19, 2012. The panels sided with Japan (and the EU) on most of their claims, including the GATT and TRIMS violations, but were divided on the subsidy issue. Canada appealed the decisions in February 2013, and the Appellate Body (AB) reports for the two disputes were released on May 6, 2013. The AB held that Ontario’s FIT program was inconsistent with Canada’s international trade obligations, including that the LCR gave preferential treatment to products made in Ontario and was in violation of the national treatment obligation in the TRIMS agreement as well as Article III of the GATT, though it disagreed with the Panel’s analysis on a few points of law, including the subsidy determination.\(^{33}\) As a result Canada has been told to bring its programs into compliance.

The second related case targeted a Chinese wind subsidy program. The investigation was initiated by the same September 2010 USW petition that triggered the start of what would be become multiple US investigations of China’s renewable energy practices, including the AD and CVD investigations discussed above. After investigating the petition’s claims in October 2010,

\(^{30}\) Government of India, Ministry of Commerce and Industry, Department of Commerce 2012.
\(^{31}\) Panchabuta 2012.
\(^{32}\) ICTSD 2012; WTO 2013b.
\(^{33}\) Sheargold 2013; WTO 2013a.
in December 2010 the USTR announced that out of the long list of Chinese policies and programs mentioned in the USW petition it would only investigate one Chinese wind subsidy program that included a LCR. Consultations with China were launched under the WTO on December 22, 2010, with both the European Union and Japan joining these consultations in January 2011.\footnote{WTO 2010.} WTO consultations were apparently not needed, however, when bilateral trade discussions between China and the United States resulted in the USTR claiming success after China agreed to remove the subsidy program and associated LCR in question on June 7, 2011.\footnote{Office of the United States Trade Representative 2010; Office of the United States Trade Representative 2011.}

While on this surface this may look like a successful bilateral intervention to prevent a larger trade conflict, in fact China’s reasons for opting to remove the wind LCR were likely more economically than politically driven. After the agreement was announced, multiple Chinese stakeholders reported that the LCR currently had a very minor impact on its wind industry and that its removal was insignificant.\footnote{Liu 2011.} Since China had long used industrial policies that were questionable under WTO to help build its now highly successful wind industry, such programs had likely already served their purpose by the time they were questioned by the US government.

The third dispute surrounding renewable energy support measures was launched by China just after US solar manufacturers filed a petition targeting the Chinese solar industry (discussed above). On November 25, 2011 China’s Ministry of Commerce (MOFCOM) announced that it was initiating its own investigation of US renewable energy policy support and subsidies in response to a petition raised by the China Chamber of Commerce for Import and Export of Machinery and Electronic Products and New Energy Chamber of Commerce of the All-China Federation of Industry and Commerce. The petition claimed that several state-level renewable energy incentives were in violation of provisions specified in Foreign Trade Law of the People’s Republic of China and Investigation Rules of Foreign Trade Barriers.\footnote{Ministry of Commerce of the People’s Republic of China 2012a.} On May 24, 2012, MOFCOM released its preliminary investigation conclusion, finding that the Washington Funds Project to Encourage Renewable Fuel Production, Wind Generation and Manufacturing Projects of Ohio, State Energy Program of New Jersey, State Rebate Program of Massachusetts, and California's Self-Generated Incentive Program constituted prohibited subsidies and violated provisions of Article 3 of SCM Agreement and Article 3 of the GATT, however China is yet to attempt to impose any retaliatory measures or trade remedies.

The fourth case targeting local content requirements was launched on November 5, 2012 when China requested WTO consultations with the European Union, Greece and Italy on various EU feed-in tariff programs, claiming that they were inconsistent with elements of the GATT, SCM Agreement and TRIMS Agreement.\footnote{WTO 2012, 452.} In November 2012, Japan, Australia and Argentina all requested to join the consultation, and as of June 2013 the consultations are still pending.\footnote{WTO 2012.}

A fifth case concerning local content requirements in renewable energy support programs was initiated by the United States against India on 6 February 2013. The WTO consultations concern certain measures under the Jawaharlal Nehru National Solar Mission that contain domestic content requirements for solar cells and solar modules, claiming that they violate the
SCM Agreement, the GATT and the TRIMs Agreements. In February 2013 both Japan and Australia requested to join the consultations, which are still in process as of June 2013.

It is looking increasingly likely that India will respond to the US-led dispute against its solar programs with a dispute against US state-level renewable energy support programs. In April 2013, India requested that the United States clarify its subsidy programs to promote renewable energy, expressing concern that some of these programs have provisions “relating to local or domestic content requirements which raise issues of consistency” with the SCM Agreement, the TRIMS agreements and the GATT. The query mentions a Minnesota program that provides rebates to consumers purchasing PV panels manufactured in Minnesota, as well as similar programs in Massachusetts and Connecticut. Other programs being investigated by India include Michigan’s Clean, Renewable, and Efficient Energy Act (Public Act 295) that gives credits for local equipment and local labor, the Los Angeles Solar PV Incentive Program that provides higher incentives for locally installed projects and local manufacturing, the California Self Generation Incentive Program that provides incentives for using energy storage technologies from California suppliers, and the Austin Solar PV Performance-Based Incentive Program that gives a higher incentive to equipment manufactured in the Austin Energy service area. While no WTO consultations have been initiated as of mid-June 2013, these ongoing investigations could lead India to launch the next case concerning the use of local content requirements in renewable energy support measures.

Determinants of Disputes

The current set of renewable energy-related disputes (summarized in Table 2) highlights the key policies being targeted, and the timing of several of the disputes suggests multiple instances of retaliation. Yet many countries, in addition to those currently being targeted, are likely guilty of international trade violations and use potentially controversial policies, as was illustrated in Table 1. In order to understand what has led to the rise in renewable energy related trade disputes in the first place, and why have certain countries been targeted and not others, this section examines four likely drivers of trade disputes in the renewable energy sector, including: (1) the increasing scale of the renewable energy industry; (2) the increasing role of emerging markets, and China of in particular; (3) the increasing imbalances between renewable energy technology producers and users, and (4) the rise of locally owned technology manufacturers in key markets.

40 WTO 2013c.
41 Ibid.
42 WTO Delegation of India 2013b.
43 WTO Delegation of India 2013a.
<table>
<thead>
<tr>
<th>Date Launched</th>
<th>Dispute Type</th>
<th>Forum</th>
<th>Complainant</th>
<th>Respondent</th>
<th>Third Parties</th>
<th>Industry or Program Targeted</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 2011</td>
<td>AD/CVD Investigation</td>
<td>US Department of Commerce/ITC</td>
<td>United States</td>
<td>China</td>
<td>NA</td>
<td>Solar panels</td>
<td>Tariffs in place, appeal filed to expand scope</td>
</tr>
<tr>
<td>November 2011</td>
<td>LCRs</td>
<td>MOFCOM</td>
<td>China</td>
<td>United States</td>
<td>NA</td>
<td>State-level RE support programs</td>
<td>Pending</td>
</tr>
<tr>
<td>July 2012</td>
<td>AD/CVD investigation</td>
<td>MOFCOM</td>
<td>China</td>
<td>United States, South Korea, European Union</td>
<td>NA</td>
<td>Polysilicon</td>
<td>Pending</td>
</tr>
<tr>
<td>July 2012</td>
<td>AD/CVD investigation</td>
<td>European Commission</td>
<td>European Union</td>
<td>China</td>
<td>NA</td>
<td>Solar panels</td>
<td>Price undertaking arranged, including an import quota and minimum price</td>
</tr>
<tr>
<td>January 2012</td>
<td>AD/CVD investigation</td>
<td>US Department of Commerce/ITC</td>
<td>United States</td>
<td>China, Vietnam</td>
<td>NA</td>
<td>Wind components</td>
<td>Tariffs in place</td>
</tr>
<tr>
<td>November 2012</td>
<td>AD/CVD investigation</td>
<td>Indian Ministry of Commerce</td>
<td>India</td>
<td>China, Taiwan, Malaysia, United States</td>
<td>NA</td>
<td>Solar panels</td>
<td>Pending</td>
</tr>
<tr>
<td>September 2010</td>
<td>LCRs, Subsidies</td>
<td>WTO</td>
<td>Japan, European Union</td>
<td>Canada</td>
<td>United States</td>
<td>Ontario Province’s FIT Policy</td>
<td>Canada asked to come into compliance</td>
</tr>
<tr>
<td>December 2010</td>
<td>LCRs, Subsidies</td>
<td>WTO</td>
<td>United States</td>
<td>China</td>
<td>European Union, Japan</td>
<td>Chinese wind subsidy</td>
<td>Resolved in bilateral negotiations</td>
</tr>
<tr>
<td>November 2011</td>
<td>LCRs, Subsidies</td>
<td>MOFCOM</td>
<td>China</td>
<td>United States</td>
<td>NA</td>
<td>US State-level RE support programs</td>
<td>Pending</td>
</tr>
<tr>
<td>November 2012</td>
<td>LCRs, Subsidies</td>
<td>WTO</td>
<td>China</td>
<td>European Union, Greece, Italy, Japan, Australia, Argentina</td>
<td>NA</td>
<td>Feed-in tariffs of certain EU member states’</td>
<td>Pending</td>
</tr>
<tr>
<td>February 2013</td>
<td>LCRs, Subsidies</td>
<td>WTO</td>
<td>United States</td>
<td>India</td>
<td>Japan, Australia</td>
<td>India’s National Solar Mission</td>
<td>Pending</td>
</tr>
<tr>
<td>TBD</td>
<td>LCRs, Subsidies</td>
<td>WTO?</td>
<td>India</td>
<td>United States</td>
<td>NA</td>
<td>US State-level support programs</td>
<td>No filing yet but information being gathered through WTO channels</td>
</tr>
</tbody>
</table>

Note: Last updated November 2013.
A Growing Industry

While renewable energy subsidies and protectionist policies have been utilized around the world for several decades, the rise in trade related disputed has coincided with the rapid growth in the sector in recent years. Total investment in clean energy (including both renewable energy and energy efficiency) was up 486 percent in 2012 from 2004 levels. While wind power has maintained a rather steady share of clean energy investment over this time period (up slightly from 42 to 48 percent), solar has seen a dramatic increase in its share of total investment, growing from 2 to 36 percent. Even more notable is the sharp increase in solar investment that occurred between 2010 and 2011, illustrated in Figure 1. This rise is particularly notable in how it corresponds with the timing of the rise in trade related tensions surrounding the global solar industry.

Figure 1. Total Global Investment in Clean Energy, and Percent Shares in Wind and Solar

Source: National Science Board 2012.

---

44 National Science Board 2012.
The Rise of China

Another important trend in the clean energy industry over the past few years has been the increasingly dominant role of China. China has attracted a steadily increasing share of global investment in recent years, as illustrated in Figure 2. This is also reflected in its dramatic build out of both wind and solar power capacity in recent years. As of 2012 China was the largest installer of wind power capacity in the world, and its wind turbine manufacturers had 21 percent of global market share.\(^{45}\) China’s solar manufacturing sector (including solar cell and module manufacturers) has been the largest in the world for several years, but it’s only been since 2010 that China’s own use of solar power has taken off. In 2012 China installed 3.2 GW of solar photovoltaics, representing 12 percent of global installations. At the same time, both the United States and European Union have seen declining investments in recent years, with the exception of increases experienced in the United States between 2009 and 2011 primarily as a result of federal stimulus funds directed at clean energy.\(^{46}\)

Figure 2. Share of Global Clean Energy Investment by Country

![Figure 2. Share of Global Clean Energy Investment by Country](image)

Source: Ibid.

Trade Imbalances

Countries that are leading in renewable energy technology manufacturing are not necessarily the same countries leading in renewable energy deployment. Imbalances in manufacturing and

\(^{45}\) BTM and Navigant Research 2013.

\(^{46}\) Aldy 2013.
utilization of renewables leads to a need for imports and exports, and substantial imbalances can be grounds for international trade tensions.

As recently as 2010, the United States had a positive trade balance with China in the solar sector, even though China led in module and cell production. This is because the US has been exporting higher value segments of the PV supply chain to China—namely PV capital equipment and polysilicon—and importing lower value segments—namely PV modules. This changed in 2011, however, when the US imported more PV equipment from China overall (measured in monetary value) than it exported, and resulting in a net trade deficit as illustrated in Figure 3. This shift most certainly played a role in heightening trade tensions between the US and China in the solar industry during 2011.

**Figure 3. Net Solar Exports from the United States to China (2010 and 2011)**

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PV Capital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PV Polysilicon</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PV Wafers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PV Cells</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PV Modules</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Greentech Media 2010; Greentech Media 2011; Coalition for American Solar Manufacturing 2012.

Note: Net exports were calculated based on exports to China minus imports from China in each solar component category as reported by ITC data using GTM’s methodology as estimated by CASM. Other studies, using proprietary data sources and less transparent methodologies for determining value creation have found somewhat different trade balances across the solar supply chain (The Pew Charitable Trusts 2013).

While declining exports and increasing imports may have triggered the US solar trade dispute with China, Europe is a far larger importer of Chinese solar photovoltaic technology than the United States, and a minimal exporter. In 2011, EU solar imports from China were almost $28 billion, which is much larger than the United States’ $3 billion in imports, and than European solar exports to China of $7.5 billion. Europe represents about 60 percent of China’s solar export market, and about 7 percent of China’s total exports to the European Union. In fact the

\[\text{Sources: AFP 2013; European Commission 2012.}\]

\[\text{Baetz 2013.}\]
EU-China solar dispute represents the most significant anti-dumping complaint the European Commission has ever investigated.49

A notable outcome of these solar trade disputes targeting China was a clear division within the domestic US and EU industries in supporting these trade measures. While CASM is coalition of US solar manufacturers that initiated investigations against China’s solar practices, the Coalition for Affordable Solar Energy (CASE) was formed in November 2011 to oppose CASM’s petition. CASM, led by SolarWorld, included primarily module manufacturers, while CASE members included many US solar installers like SolarCity, SunRun and Sungevity that often utilize panels made in China. Many US-based polysilicon manufacturers, as well as the Semiconductor Equipment and Materials International (SEMI), spoke out against the use of trade sanctions due to the harm it would inflict on the entire industry, with some companies noting concerns about retaliation from China.50 The EU saw similar splits along the solar supply chain. The EU ProSun Group, comprised of companies representing over 25 percent of EU crystalline silicon PV module production, led the filing of anti-dumping and anti-subsidy complaints against China, while the Alliance for Affordable Solar Energy (AFASE) sent a letter to the European Trade Commissioner signed by 1,024 companies opposing the solar import tariffs.51

The Rise of Local Technology Manufacturers

Protectionist policies such as LCRs aim to encourage the development of domestic renewable energy manufacturing companies. The Chinese wind industry has been one beneficiary of such support measures, as previously discussed. While several factors contributed to the rise of many new wind turbine manufacturers in China, the implication of their rise has been added competition for the foreign firms operating within the Chinese market.52 As China’s wind market has risen to become the largest in the world over the past few years, China’s homegrown wind turbine manufacturers have been able to capture the majority of Chinese market share (as illustrated in Figure 4), increasing competitive tensions between foreign and Chinese firms. While the US challenge to China’s LCR in wind power was removed in bilateral negotiations, the current size of the Chinese market, coupled with the dominance of Chinese firms, may again make the Chinese wind industry the target of future trade disputes.

49 European Commission 2012.
50 Barber 2012.
51 Alliance for Affordable Solar Energy 2013.
52 Lewis 2012b.
Can renewable energy deployment continue in the fact of increasing trade disputes? Current trade disputes threaten the very support measures that have led to the recent surge in renewable energy investment. Solar power use in particular is still directly tied to national subsidy programs. The recent tariffs levied on the Chinese solar industry will directly impact the cost of solar technology in leading markets, and will directly slow solar deployment. The only way to prevent this would be through further subsidization from the countries that have implemented tariffs, resulting in an even larger market distortion. Determination of AD and CVDs require calculations of fair market prices, which are further complicated by China’s heavy state control (including in the solar industry), as well as rapidly declining solar module and input materials prices.

China is both singled out for its high emission development pathway and for its problematic support of its own clean energy industries. This creates a particular challenge for policymakers within China trying to encourage the utilization of low carbon technologies, as well as in the US and EU trying to entice China to commit to a global climate change treaty with an implicit low carbon development pathway. The role Chinese wind and solar industries have played in increasing total manufacturing scale has likely been a key contributor to global technological learning, with benefits for future deployment of these technologies around the world.

The wind and solar industries, while experiencing a dramatic expansion, are still small compared with the fossil energy industries, and installed capacity has a very long way to go to make a real contribution to climate mitigation. A change in the way energy resources are subsidized and priced globally, or the introduction of a high price on carbon, could change the

---

53 Hatt 2013.
54 Lewis 2012b.
political economy of renewable energy support. But for this expansion to continue under the current political and economic rationale for renewable energy support, subsidies and policies that encourage local economic development benefits must persist; and as a result, continued trade conflict seems inevitable.

Conclusions

The challenge of climate change and other environmental problems, along with national energy security concerns, has resulted in the increased use of policies to promote renewable energy. If renewable energy must be subsidized in order to be viable, there are inherent conflicts between the use of such subsidies and international trade rules. This points to the need for a better international system to deal with issues related to clean energy and climate change, including subsidies, technology transfers, and trade in environmental goods and services.

One way to move forward would be to develop a new list of exempted subsidies for subsidies linked to the development and diffusion of low-carbon energy sources, comparable to the lapsed SCM Article 8 exemptions,\(^55\) in the context of the ongoing Doha Round of WTO negotiations. While seemingly a straightforward approach, the Doha round negotiations are notoriously deadlocked and may not be a viable means of developing new trade provisions in the near term. Furthermore, while key WTO members see their own economic competitiveness to be inextricably linked to the success of their domestic renewable energy companies, it seems unlikely that they would agree to give up the right to challenge subsidies provided to those companies’ foreign competitors.

Similar difficulties have plagued the negotiations to establish an Environmental Goods and Services Agreement (EGSA) under the Doha Round mandate calling for “the reduction, or as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services.”\(^56\) Outside the WTO, however, progress on an EGSA seems increasingly possible. In 2012, the 21 members of the Asia-Pacific Economic Cooperation (APEC) conference agreed to a list of environmental goods, including renewable energy technologies, on which member countries must reduce their applied tariff rates to 5 percent or less by December 31, 2015; APEC has also taken up the issue of LCRs and alternative ways to achieve similar local economic development objectives.\(^57\)

Trade issues also are frequently discussed in the context of multilateral environmental negotiations, and particularly in the context of the meetings of the parties to the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol. For example, a Technology Mechanism to facilitate the implementation of enhanced action on technology development and transfer in order to support action on mitigation and adaptation to climate change was established at COP 17 in Cancun in 2010.\(^58\) Still under development, the Technology Mechanism, either via the Executive Committee or the Climate Technology Center and Network, could serve as a platform for identifying types of low carbon energy support that should be protected from WTO challenge. There is some precedent for WTO dispute settlement panels

\(^{55}\) WTO 1994.
\(^{56}\) Janzen 2010.
\(^{57}\) APEC 2013.
\(^{58}\) UNFCCC 2010.
deferring to multilateral environmental agreements in cases where there is a conflict,\textsuperscript{59} although the political will of the UNFCCC has waned since the 2009 Copenhagen Conference failed to produce the stringent global agreement many had hoped for. Past studies too point out that without MEAs being exempted from WTO challenges, their authority in this space remains limited.\textsuperscript{60}

The regulation and coordination of energy issues in international law is highly fragmented, in that there is no overarching regulation that specifically addresses energy.\textsuperscript{61} There are international organizations with this mandate, such as the International Energy Agency, but membership is limited to OECD countries and its agenda potentially dominated by a subset of these.\textsuperscript{62} The International Renewable Energy Agency (IRENA), established in 2009 specifically to advance the adoption of renewable energy, has yet to venture into the trade sphere, and is still too young to sufficient political backing to take on the WTO. The large renewable energy industry associations, including those in the solar and wind industries with member companies from multiple parts of the world, have spoken out on recent trade disputes, and in some cases have even initiated them, but naturally take a self-interested perspective in line with their membership.

Due to the challenges associated with addressing renewable energy trade issues in the context of existing international agreements, some have proposed a new agreement that could take a holistic and integrated view of the sustainable energy sector and address a variety of market and trade-related barriers: a Sustainable Energy Trade Agreement.\textsuperscript{63} While such an agreement could constructively inform and perhaps even shape the course of future negotiations and work at the WTO as well as the UNFCCC, it is not likely that the international political will to negotiate and implement a new agreement currently exists for many of the reasons previously discussed.

While there is clearly a need to address the emerging conflicts between renewable energy policy and international trade law, negotiations involving many countries surrounding such sensitive politically charged issues such as trade and climate change may just not be politically feasible in the time frame in which such an agreement would be needed. As a result, a more accessible alternative may be to defuse such conflicts through bilateral initiatives, and particularly cross-border cooperation on clean energy development. Even major industry associations have called for bilateral resolution to the solar trade dispute.\textsuperscript{64} Such bilateral cooperation could even include jointly administered programs directed at clean energy innovation that would be mutually beneficial to countries that might otherwise seek to challenge each other’s subsidy programs. One such example is the U.S.-China Clean Energy Research Center (CERC), which has established a large–scale platform for collaborative clean energy technology development just as clean energy trade tensions between the two countries are escalating.\textsuperscript{65} While sometimes the incentives for conflict may overpower the incentives for cooperation, efforts like the CERC make the case for continuing to take a collaborative approach.

\textsuperscript{59} Janzen 2010.
\textsuperscript{60} Eckersley 2004.
\textsuperscript{61} Cottier et al. 2009
\textsuperscript{62} Graaf 2013.
\textsuperscript{63} Sugathan and Melendez-Ortiz 2011.
\textsuperscript{64} Solar Energy Industry Association (SEIA) 2013.
\textsuperscript{65} Lewis 2012c.
to working with major trading partners, and could help diffuse tensions that lead to feuds before the WTO.

While the future incidence of renewable energy trade disputes is uncertain, all signs point to a likely increase in the coming years. As countries continue to develop policies to support their renewable energy industries, many legal questions still remain around which types of industrial policies constitute a direct conflict with exiting trade rules. But any dispute, won or lost, can still be costly for this fledgling industry. The expanded utilization of renewable energy technologies will be a crucial part of any climate change solution, and escalating trade tensions will increase both the economic and political costs of deploying these technologies around the world.
References


WTO Delegation of India. 2013a. Certain local content requierements in some of the renewable energy sector programs - Questions by India to the United States. WTO Committee on Trade-Related Invesetment Measures.

WTO Delegation of India. 2013b. Subsidies questions posed by India to the United States under article 25.8 of the Agreement on Subsidies and Countervailing Measures - State level renewable energy sector subsidy programs with local content requirements. WTO Committee on Subsidies and Countervailing Measures.