



Trade Remedies: Targeting the Renewable Energy Sector





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The study and the meeting are part of a larger effort by UNCTAD to analyze issues arising at the interface of trade policy and green economy, more specifically renewables, which is shorthand for goods and services used in conjunction with renewable energy sources.

In recent years, trade remedies - anti-dumping and countervailing duties - have increasingly been directed towards renewables - solar panels, wind turbines and biofuels. A priori, this puts these measures at cross purposes with national and international climate and environment policies.

The geopolitics and political economy are more complicated though. The developed as well as the developing countries are using these measures. And while one can argue that a given amount of environmental expenditure would go further in the absence of trade remedies, it is not clear that the amount of public support would remain at the same level.

There can be little doubt that trade remedies are a sensitive area. Trade remedies may have a significant effect on value and job creation throughout the supply chain as a whole. Trade remedies are bound to have competitive implications. Trade remedies against renewables provide a counterpoint to the initiative to reduce tariffs on environmental goods, particularly since some of the most active users of trade remedies participate in the initiative. Trade remedies shatter the alliances among interest groups. On the dispute settlement front, clearly what we see there is disputes on trade remedies that happen to involve renewables rather than disputes about renewables that happen to involve trade remedies. These disputes are about how trade remedies work and in many ways are a continuation of discussion and negotiations that have been going on for the past 12 -13 years about issues such as public interest test, lesser duty etc., which suddenly become relevant again in the context of renewables.

The study is far from an exhaustive examination of these issues, of course. In many areas, the analysis is speculative, aimed at raising questions and suggesting areas where policy makers and analysts may need to consider undertaking further analysis. Whether any given governmental measure is consistent with WTO rules is a highly contextual question that may well depend on the exact design features of that particular measure, and its broader context – regulatory, technological and commercial. Thus, nothing in this study should be considered as a judgment that any actual measure of any particular government violates WTO rules.

What are the actual or potential effects of trade remedies involving renewables? What kind of conclusions can be drawn from trade remedies cases since 2008? Are there alternative approaches that might lessen the impact of trade remedies on the deployment of renewable energy? What is the impact of trade remedies on jobs and value added? Are competitors with different supply chain using trade remedy cases to “raid” each other? Can aligning the anti-dumping rules with the competition or anti-trust rules help make sure they only remedy truly anti-competitive behavior - as opposed to undesired competition? Are there ways of providing more robust, empirically sound and predictable outcomes in trade remedies investigations and better connect trade law to the “real world”? Do trade remedies constitute a problem for the liberalization of trade in environmental goods and services? How can countries, individually and collectively, manage the interface between two deeply held goals: “fair international trade” and “GHG control”? These questions still remain open.

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I. INTRODUCTION

Since the Great Recession erupted in 2008, the rise of protectionist measures has been worrying. Anti-dumping (AD) and countervailing duties (CVD), along with tariff increases, accounted for nearly 40 percent of the global total of discriminatory measures imposed (see Evenett 2013).¹ AD and CVD penalty duties are imposed by national authorities, without prior authorization from the World Trade Organization (WTO). Provided the duties respect WTO rules, they will not be overturned by the WTO Dispute Settlement Body, if contested in subsequent WTO litigation.

AD and CVD trade remedies² are no longer limited to a core group of traditional user countries, but have been widely imposed by new users, especially developing countries. AD and CVD remedies are defended as a means to level the playing field against “unfair” trade practices. However, these measures are often intended to protect domestic firms, regardless of the “fairness” of trade practices abroad.

A. Clash between trade remedies and environmental goals

By our count, some 41 AD and CVD cases have been initiated since 2008 on biofuels, solar energy and wind energy products. Notably, almost half of these measures target solar energy products. The trade remedy trend accelerated during 2012-2013 among major producers of renewable energy, including Australia, China, European Union, India, and the United States.

The use of trade remedies in the renewable energy space exemplifies the clash between two deeply-held goals: the control of green-house gases and fair international trade. In 2011, around 20 percent of total electricity generation came from renewable sources and about 115 gigawatts of new installed capacity was powered by renewable energy in 2012. Globally, in 2012, new global investment in renewable energy was \$240 billion (IEA 2013a). Developed and developing countries alike are implementing green policies that aim to lower the cost of renewable energy production in the medium-term and improve the competitiveness of renewables relative to fossil fuels.³

Such efforts are often coupled with the goal of creating manufacturing jobs, thereby ensuring a short-term payoff for domestic constituencies and promoting support for green policies. This is where AD and CVD

measures enter the picture: to further the protection of manufacturing jobs. Since the overwhelming majority of green technologies are subsidized, public support for spending taxpayer money might be weakened if too much money “leaked out” of the country to “unfair” imports. However, the growing use of penalty duties against renewable imports not only disrupts trade but also restricts access to competitively priced goods and services that could accelerate the deployment of green energy. Moreover, the spurt of trade remedies seems at odds with efforts to dismantle barriers to environmental goods and services trade, particularly the launch of plurilateral talks to liberalize environmental goods trade by 14 countries.⁴

B. Outline of the report

An extensive body of literature has assessed the general economic impact of trade remedies, but few studies have assessed their specific impact on the renewable energy sector. Our study aims to help fill that gap. We conduct a global survey of AD and CVD cases in the renewable energy sector from the onset of the Great Recession in 2008 through early 2014, and offer rough estimates of their impact on bilateral and global trade. Section II sketches the literature on trade remedies and the case for and against such policy measures in the renewable energy sector. Section III reports the estimated impact on renewables trade of AD and CVD penalties. Section IV summarizes cost estimates for renewable energy generation. Section V profiles recent disputes over green trade policies brought to the WTO. Section VI concludes by outlining policy options moving forward.

II. OVERVIEW OF TRADE REMEDIES

The WTO refined the procedural rules governing the use of AD and CVD remedies in the Uruguay Round.⁵ Agreed procedures permit member countries to levy AD and CVD penalties on imported products when domestic firms can establish the existence of dumping or subsidization, and can prove that, as a result, the domestic industry suffers “material injury” (a low threshold of adverse effects). Penalty duties are intended to offset the margin of dumping or subsidization; initially they can be in place no longer than 5 years, but they can be extended following a “sunset review.”

The use of trade remedies has evolved significantly in the past two decades. Until the 1990s, the “traditional” users centered around a core group of countries, namely the United States, the European Union, Canada, and Australia. But new users, especially developing countries have accounted for the substantial growth in recent trade remedy cases (Bown 2011; Prusa 2005). Bown and McCulloch (2012) report that major developing countries more than doubled their use of trade remedies between 2004 to 2011, and that, by 2011, about 3 percent of their imports (at the 6-digit level) were subject to trade remedies. By contrast, developed country usage remained around 2 percent of imports over the past decade. China’s emergence as a major trader player shaped the landscape of trade remedies. By 2011, China was a dominant target of penalty duties: nearly 11 percent of China’s exports to developing countries and 5 percent of exports to developed countries were subject to trade remedy duties (Bown and McCulloch 2012, 21). Trade remedies on renewables have broadly followed these trends, but in a more compressed timeframe over the past 5 years.

An important reason for the growth of trade remedies has been the evolution of more relaxed rules for their imposition. As Mavroidis, Messerlin and Wauters (2008, p. 6) note, “this drift has always been in one direction, making it easier to prove the existence of dumping and injury and of a causal link between dumping and injury.”⁶ Before the Second World War, AD laws were designed to thwart “predatory pricing”, namely the use of cut rate prices to bankrupt foreign firms and then monopolize the market. But gradually, over the past 50 years, AD laws were relaxed to allow penalty duties against almost any form of below cost or discriminatory pricing, including forms that are perfectly acceptable when practiced within a national territory.⁷ As a result, trade remedies (especially ADs) have become increasingly flexible for dealing with the pressures of trade liberalization and for buttressing industrial policies (Bown and McCulloch 2012, p. 14).

As anti-dumping has become the most frequently used remedy measure – and the most skeptically viewed by economists – the academic literature has focused on AD practice.⁸ In basic economic analysis trade remedies are portrayed as similar to tariffs, with well known effects. Tariffs increase domestic prices and reduce the volume of imports, thereby generating gains for domestic producers and tariff revenues for governments, but imposing losses in the form of higher

prices both on domestic consumers and downstream industries. The net effect is almost always a loss for the importing country.⁹

The net costs of remedy measures often go beyond the immediate impact on production and consumption. We briefly summarize a few of the main findings here; for a more detailed overview see Bown and McCulloch (2012); Bown (2011); Mavroidis, Messerlin and Wauters (2008); and Blonigen and Prusa (2003).

Broadly speaking, the direct effect of AD and CVD measures is to reduce imports by raising their price. Empirical studies more closely examine channels of influence. Staiger and Wolak (1994) find that the dampening of trade is most significant during the filing and investigation phases of an AD case. Prusa (1997) analyzed industry-level data for US AD cases from 1980 to 1988, and found that AD protection caused substantial trade diversion: as imports fell from the countries targeted by the investigation, imports increased from third countries competing in the US market (such diversion potentially undermines the restrictiveness of AD duties). Bown and Crowley (2007) estimated the impact of US AD and safeguard measures on Japanese imports between 1992 and 2001. They found that US duties caused a diversion of Japanese exports of the sanctioned products to third countries (a deflection effect). These mentioned studies focused on trade effects at the product level. Vandebussche and Zanardi (2010) also found evidence that AD measures exert a chilling effect on aggregate bilateral imports, owing to various “spillover” channels. The authors used gravity model analysis and found that for countries that systematically use AD measures, so-called “tough users,” the annual reduction of global imports is about 6 percent, or \$14 billion imports. They outline the various spillover channels through which AD measure can effect trade and conclude that “AD policy can have ambiguous effects on trade” and that the “various effects can play at once” (Vandebussche and Zanardi 2010, p. 4). These channels include: (1) trade destruction effect, i.e., the suppression of trade in the specific products targeted; (2) trade diversion effect, i.e., the increase of imports from other trading partners not targeted by the AD measure; (3) downstream effects, i.e., the suppression of trade for downstream producers that rely on intermediate inputs; (4) deterrent effect on trading partners seeking to sell into the markets of frequent users of AD measures; (5) anti-competitive effects, i.e., AD measures that can serve as a collusive

device for firms and suppress trade; (6) foreign direct investment effects, i.e., prompting exporters to avoid AD measures and directly invest in the protected market, for example setting up production plants; and (7) retaliation effects, i.e., the empirical observation that new users of AD measures generally target traditional users.

Theoretical analyses of trade remedies center on the strategic behavior of petitioning firms. Some studies argue that, rather than correcting for anti-competitive behavior, AD protection can instead facilitate collusion between domestic and foreign firms (see Prusa 1992; Zanardi 2004; Blonigen and Prusa 2003).¹⁰ “Strategic dumping,” designed to promote collusion or achieve economies of scale, may affect the calculations of both domestic and foreign firms (see Staiger and Wolak 1994; Bown and McCulloch 2012). Retaliatory motives may prompt complaints against countries that instigated petitions in past investigations (see Finger 1993; Prusa and Skeath 2002). One important conclusion from these investigations was that the spread of AD protection cannot be solely explained by an increase in unfair trade practices.

A few studies narrowly examined trade remedies in the renewable energy space. The Swedish National Board of Trade (2013) assessed AD and CVD investigations by the European Union, highlighting recent measures that target environmental products. The Board found that trade remedies on renewable energy affect an import value of EUR 14 billion, representing about 75 percent of the total import value for all trade remedy cases currently in force. Three of the recently imposed measures -- the AD/CVD penalties on solar panel imports from China, biodiesel imports from Argentina and Indonesia, and biodiesel imports from the United States -- rank among the EU’s five largest measures in terms of affected trade. As for solar panels, Prognos (2013) found that the small gains to EU producers are offset by greater costs resulting from less demand for solar power and jobs lost in the installation and serving industries. Other studies of a qualitative nature assess the scope of AD/CVD measures in renewables, as well as policies that could better govern their use (see Wu and Salzman 2013; Kasteng 2013; Lester and Watson 2013; Levine and Walther 2013). The takeaway from these studies is to highlight the potential adverse effects of trade remedies on the renewable energy sector. To summarize:

- Higher prices for renewable energy products will lead to less accessibility for user industries and con-

sumers (Swedish National Board of Trade 2013);

- The consequent likelihood that trade remedies will increase the price of renewable electricity, eroding its competitiveness with fossil fuels to the detriment of the environment;
- The possibility that AD and CVD measures affecting intermediate inputs will raise costs incurred by downstream firms in supply chains, thereby undermining “supply chain optimization” (Bown and McCulloch 2012); and
- The possibility that trade remedies will foster retaliatory behavior among targeted countries.

III. TRADE IN RENEWABLE ENERGY PRODUCTS AFFECTED BY AD/CVD CASES

We conducted a global survey of AD and CVD cases in the renewable energy sector from the onset of the Great Recession in 2008 through early 2014. The quality of trade remedy data varies widely across countries. Our analysis is largely based on data compiled in the Global Antidumping Database (GAD) and the Global Countervailing Duties Database (GCVD), which form parts of the Temporary Trade Barriers database created by Chad Bown at the World Bank. These databases offer the most comprehensive data documenting AD and CVD investigations from the 1980s through 2012, giving detailed information on relevant dates, outcome of each case (affirmative, negative, withdrawn), the products under investigation (classified at the 8-digit or 10-digit level), the domestic and foreign firms involved, and the preliminary and final duties imposed.¹¹ Our survey also consulted supplemental sources including the Global Trade Alert (<http://www.globaltradealert.org>) coordinated by Simon Evenett for the Center for Economic Policy Research, as well as official government documents to update, where possible, existing cases that advanced to new phases during 2013 and 2014, and new cases initiated during that time period.

AD and CVD investigations have three stages: initiation, preliminary, and final. A single investigation can last more than a year, while the individual stages often last only a few months.

Tables A1 and A2 list the AD and CVD cases initiated since 2008 that we could identify.¹² We recorded 41

Table 1. Comparative statistics of countries that impose anti-dumping (AD) and countervailing measures (CVD) targeting renewable energy products

Country	GDP, 2012 (US\$ billions, current prices)	Renewable electricity net generation, 2012 (TWh) ^b	AD cases		CVD cases		Total imports affected for 41 AD/CVD cases in renewables (US\$ millions)
			Number of cases in renewable energy since 2008	Number of total cases (2008-2012) ^a	Number of cases in renewable energy since 2008	Number of total cases (2008-2012) ^a	
Australia	1 532	29.0	3	49	1	7	456
China	8 227	797.4	3	53	2	6	2 144
European Union	16 687	684.1	10	75	8	21	24 408
India	1 842	162.0	4	167	0	0	502
Peru	204	22.1	1	10	1	7	40
United States	16 245	507.8	5	68	3	44	4 414
Total	n.a.	n.a.	26	422	15	85	31 965

n.a. = not applicable; TWh = terawatt hours; AD = anti-dumping; CVD = countervailing duties

^a The total number of AD and CVD cases is through year-end 2012, based on Bown (2012a) and (2012b).

^b Renewable energy sources include biomass, hydro, geothermal, solar, wind, ocean thermal, wave action, and tidal action. Data for China and India from 2011; EU data from 2010; all other data from 2012.

Note: Cases that target multiple countries but concern the same product(s) are counted separately.

Sources: GDP from World Bank, World Development Indicators Database, <http://data.worldbank.org/indicator>; electricity generation from US Energy Information Administration, International Energy Statistics, <http://www.eia.gov/countries/data.cfm#undefined>; AD/CVD cases from tables A1 - A2, Bown (2012a) and Bown (2012b); total imports covered by AD/CVD cases from authors' calculations, see table 3.

cases involving renewable energy products: 26 anti-dumping cases, 15 of which pursued parallel subsidy investigations. AD/CVD investigations that target multiple countries but concern the same products are counted separately. While our analysis aims to be comprehensive, the actual number of cases could be higher, given the likelihood of missing data in WTO notifications and other official documents.¹³

In our sample, a core group of six countries pursued renewable investigations during the time period studied, namely Australia, China, the European Union, India, Peru, and the United States. These countries comprise some of the largest producers of renewable energy and collectively, their AD/CVD cases covered \$32 billion of trade in renewable energy products (table 1). Targeted countries of these investigations include Argentina, Canada, China, the European Union, Indonesia, Korea, Malaysia, Singapore, Taiwan, the United States, and Vietnam. In our sample, the European Union initiated the greatest number of AD/CVD cases involving renewable energy products, namely 18 cases, about two-fifths of the renewable cases identified. The United States and China accounted for 8 and 5 of the cases initiated, respectively.

A. Methodology for the trade remedy survey

The International Energy Agency (IEA 2012) defines renewable energy as “energy that is derived from natural processes that are replenished constantly. In its various forms, it derives directly or indirectly from the sun, or from heat generated deep within the earth. Included in the definition is energy generated from solar, wind, biomass, geothermal, hydropower and ocean resources, and biofuels and hydrogen derived from renewable resources.”¹⁴ We identified AD/CVD cases in renewable energy, based on the 8-digit or 10-digit product codes specified in national tariff schedules under the Harmonized System (HS).¹⁵

The challenges of classifying renewable energy products, and environmental goods (EGs) at large, are well-known. In large part, the challenges reflect the political economy of trade liberalization: “gain maximum access for exports” is the typical negotiator’s maxim. The definition of EGs determines which products will be targeted for tariff liberalization, and that changes the classification exercise from a technical discussion into a contentious market access negotiation.¹⁶

A separate technical issue with HS codes and the classification of EGs in particular, is that even at the 6-digit level, HS codes cover dual-use products.¹⁷ Indeed, UNCTAD (2011, p.7) reports that, out of 440 products in the WTO list of EGs, only half a dozen classify as “singularly-used for environmental purposes,” and within these, there are only two renewable energy products, namely hydraulic turbines (HS 841011, 841012, 841013) and wind-powered electricity generation sets (HS 850231).¹⁸ Consequently, many EG products are classified under HS codes that include unrelated products, meaning that estimates of global trade in renewables are often imprecise. This systemic feature of tariff classification tends to inflate the size of environmental goods trade. However, AD and CVD cases usually specify disaggregated codes at the 8-digit or 10-digit HTS product level, which as a rule can be readily identified as renewable energy products.¹⁹

That said, our analysis considers only those cases involving inputs directly linked to the renewable energy sector. To narrowly identify AD/CVD cases related to renewable energy, we drew upon WTO (2011a), Hufbauer and Kim (2012) and APEC (2012) as guidance for the main renewable energy products at the 6-digit level.²⁰ In this regard, the identification of most cases was straightforward, especially cases targeting biodiesel and solar cells and modules. However, some cases required our judgment call. One example was the EU anti-dumping case against China regarding continuous filament glass fiber products and certain woven and/or stitched glass fiber fabrics (case references EUN-AD-705 and EUN-AD-729, respectively). While these products are sold to various end user industries, they are major inputs to wind turbine blade production; moreover, almost as confirmation, the investigations were opposed by the European Wind Energy Association.²¹ These cases were verified by other studies as renewable energy investigations and were included in our assessment.²² By contrast, the US anti-dumping and subsidy investigations in 2011 on aluminum extrusions imports from China were not included in our sample; though aluminum extrusions are inputs for finished products including solar panels (frames and mounting), they are also critical inputs for window frames, door frames, curtain walls, furniture, and many other goods. Moreover, certain final finished goods containing aluminum extrusions, such as solar panels, were excluded from the scope of the case (USITC 2010).

From 2008 to the beginning of 2014, the countries in our sample investigated 75 unique HTS products, and imposed anti-dumping or countervailing duties on 72 products. Out of the 41 cases, 16 cases involved biofuels, namely biodiesel and bioethanol; 18 cases involved solar energy products (11 of these cases involved solar cells and modules, 5 cases solar grade polysilicon, and 2 cases solar glass); and 7 cases involved wind energy products (2 cases involved glass fiber products used in wind turbine blades, and 5 cases wind towers).

B. Findings from the survey

The growing number of AD/CVD investigations coupled with sizable global environmental goods trade – said to be worth \$955 billion annually²³ – suggests a substantial amount of trade could be impacted by penalty duties imposed on renewable energy products.

To estimate the impact, we calculate the value of affected trade as the sum of imports of the complainant country for all products specified by the HTS code in the AD/CVD case.²⁴ The calculated value of affected trade is based on average imports in recent years, from 2009 to the year the duty was imposed (if the investigation is ongoing and a final duty has not been levied, the year of the preliminary duty is used).²⁵ A trade average covering several years is used to smooth out fluctuations in bilateral trade flows that occur for reasons having nothing to do with the trade remedy case.

Based on these calculations, we estimate that AD/CVD cases targeting the renewable energy sector affect about \$32 billion of trade in green products (table 2). To size up the potential trade reduced, we first compile the AD and CVD penalties imposed on foreign firms. Where separate duties are specified for the majority of “cooperating firms” in the investigation and a country-wide duty is specified for “all other firms,” we use the duty applied to the cooperating firms, as these firms generally account for a larger percentage of trade of the products concerned. A majority of cases implement preliminary or definitive duties on an *ad valorem* basis – duty rates are generally expressed as a percentage of the CIF import cost.²⁶ For the few cases that call for specific duties – duties based on weight, number or volume, e.g., US\$ per metric tons, we alternatively use the calculated dumping or subsidy margins, or estimate our own *ad valorem* equivalent.²⁷ The simple average of dumping and countervailing *ad*

Table 2. Estimated trade affected by AD/CVD cases in the renewable energy sector, 2008-12

Case	Complainant country	Respondent country under investigation	Product and date AD/CVD imposed	Imports from respondent country (US\$ millions) ^c				Average trade from 2009 to year measure imposed (US\$ millions) ^d
				2009	2010	2011	2012	
1	Australia ^a	United States	Biodiesel (2011) ^e	5	6	16	0	9
2	Australia	China	Wind towers (2013) ^b	261	295	409	769	433
3	Australia	Korea	Wind towers (2013) ^b	4	6	14	30	13
4	China ^a	United States	Solar grade polysilicon (2014)	431	980	1 025	702	785
5	China	Korea	Solar grade polysilicon (2014)	361	658	1 199	490	677
6	China ^a	European Union	Solar grade polysilicon (2013) ^b	552	644	866	668	682
7	European Union ^a	United States	Biodiesel (2009)	4 572	4 649	11 498	710	4 572
8	European Union ^a	Canada	Biodiesel (circumvention) (2011) ^f	635	571	1 184	34	797
9	European Union ^a	Singapore	Biodiesel (circumvention) (2011) ^f	332	458	1 263	9	684
10	European Union	China	Continuous filament glass fiber products (2011)	142	205	166	130	171
11	European Union	China	Certain woven and/or stitched glass fiber fabrics (2012) ^b	38	54	58	116	67
12	European Union ^a	United States	Bioethanol (2013)	634	995	1 589	882	1 025
13	European Union ^a	Argentina	Biodiesel (2013) ^g	759	1 146	1 919	1 814	1 410
14	European Union ^a	Indonesia	Biodiesel (2013) ^g	167	531	1 414	1 359	868
15	European Union ^a	China	Crystalline silicon photovoltaic modules and key components (2013)	8 284	20 005	19 698	10 692	14 670
16	European Union ^a	China	Solar glass (2013) ^b	105	165	168	145	146
17	India	Malaysia	Solar cells (est. 2014)	5	21	185	82	73
18	India	China	Solar cells (est. 2014)	22	76	606	310	253
19	India	Taiwan	Solar cells (est. 2014)	89	54	178	55	94
20	India	United States	Solar cells (est. 2014)	24	34	133	135	82

est. = estimated date as neither a preliminary decision nor a final decision on the AD/CVD has been announced as of February 2014
n.a. = data not available

^a Indicates parallel dumping and subsidy investigations. The total AD and CVD cases amount to 41.

^b Indicates that the "date AD/CVD imposed" is based on the preliminary decision as the final decision has not been reached as of February 2014.

^c The value of affected trade for each year is calculated as the sum of imports in the complainant country for all HTS (harmonized tariff schedule) product subheadings specified in the AD and CVD case. For a detailed listing of the HTS codes for each case, see tables A1 and A2.

^d We take the average of trade from 2009 to the year the preliminary or final measure was imposed to smooth out fluctuations in bilateral trade flows that occur for reasons having nothing to do with the trade remedy case.

^e Trade data for Australia is subject to gaps in available data for biodiesel imports from United States due to revised HTS classifications in Australia. Figures reported may underestimate actual trade flows. For context, biodiesel exports from the United States to Australia, based on HS 382490, averaged \$44.5 billion per year from 2009-2011.

^f The EU initiated separate investigations based on evidence that US biodiesel exporters were circumventing AD/CVD penalties and entering the EU market via transshipment through Canada and Singapore. In May 2011, the EU extended duties on imports consigned from Canada and terminated the case against Singapore (see Council Implementing Regulation [EU] No 444/2011 & No 443/2011). In April 2013, the EU initiated an interim review of the extension.

^g Trade data for European Union biodiesel cases against Argentina and Indonesia drawn from Eurostat data and Commission Regulation (EU) No 490/2013 to account for gaps in Eurostat data for certain HTS codes.

Notes: EU trade figures originally reported in Euros and converted to US dollars using annualized bilateral exchange rates as reported by the European Central Bank, see <http://sdw.ecb.europa.eu/browseSelection.do?DATASET=0&sf1=4&FREQ=A&sf3=4&CURRENT=CY=USD&node=2018794>.

Source: AD/CVD case data from tables A1 - A2; trade data from the International Trade Centre, <http://www.trademap.org/>; EU trade data from Eurostat, International Trade database, EU27 trade since 1988 by CN8, http://epp.eurostat.ec.europa.eu/portal/page/portal/international_trade/data/database; US trade data from US International Trade Commission, <http://dataweb.usitc.gov/>; authors' calculations.

Case	Complainant country	Respondent country under investigation	Product and date AD/CVD imposed	Imports from respondent country (US\$ millions) ^c				Average trade from 2009 to year measure imposed (US\$ millions) ^d
				2009	2010	2011	2012	
21	Peru ^a	United States	Biodiesel (2010)	61	19	9	15	40
22	United States ^a	China	Crystalline silicon photovoltaic cells and modules (2012)	667	1 547	3 177	2 139	1 882
23	United States ^a	China	Utility scale wind towers (2012)	199	133	243	539	278
24	United States	Vietnam	Utility scale wind towers (2012)	82	67	91	73	78
25	United States ^a	China	Crystalline silicon photovoltaic modules and key components (est. 2014)	667	1 547	3 177	2 139	1 882
26	United States	Taiwan	Crystalline silicon photovoltaic modules and key components (est. 2014)	173	338	225	435	293
Total trade affected				19 272	35 202	50 512	24 471	31 965

valorem duties for those cases that reached a preliminary or final decision is moderately high, approximately 27 and 26 percent, respectively. For cases with parallel dumping and subsidy investigations, the total duty from combined AD and CV penalties averaged 59 percent. There were 8 cases in our sample that have not imposed preliminary or definitive duties due to incomplete or ongoing stages of the investigation.²⁸

To estimate the total reduction of trade in renewable energy products, we assume an elasticity of import demand of -1.0 (meaning that a 1 percent increase in price of the good results in a 1 percent decrease in the quantity imported).²⁹ For example, if the AD duty is 25 percent, we assume that the calculated pre-remedy average level of imports will be reduced by 25 percent. Based on this assumption, we estimate the total reduction of trade to be about \$14 billion annually (table 3). As AD and CVD penalties are effective for 5 years, pending the sunset review, the annual figure translates into a global trade loss of approximately \$68 billion over 5 years.

Cases initiated by the European Union and the United States account for 91 percent of the global reduction of imports, translating into estimated annual import reductions of \$8.0 and \$4.4 billion respectively (table 4). As for respondent countries, Chinese exports were targeted most heavily by AD and CVD cases, accounting for \$9 billion annually of exports lost, or about 64 percent of the global reduction of exports. China was followed by US exports, which accounted for \$3.1 billion of exports lost, or 23 percent of the global reduction.

The total trade reduced of \$14 billion annually is sizable in dollar terms, but only accounts for about 4 percent of total global trade in the targeted renewable products, which we estimate at about \$375 billion annually (table 5).³⁰ As might be expected, the trade reduction was concentrated in a few products. The largest number of cases, namely 18, targeted solar energy products, including solar grade polysilicon, solar cells and modules, and solar glass. These products represent about \$10 billion of imports reduced, or 70 percent of the total trade reduced on account of AD and CVD penalties. This figure will likely grow depending on the outcomes of the current US investigations of solar cell and module imports from China and Taiwan, and the Indian investigations of solar cell imports from China, Malaysia, the United States and Taiwan. Moreover, the particular solar products already subject to AD and CVD penalties account for 10 percent of global trade in solar goods. By contrast, the 16 cases that target biofuels (namely, biodiesel and ethanol), account for almost 2 percent of global trade in these products; counted separately, biodiesel accounts for 9 percent of global trade. The 5 cases that target wind towers cover about 4 percent of global trade.

It is important to note that AD/CVD duties are levied on top of existing duties. While applied tariffs on solar and wind products are generally low among the countries that impose trade remedies, near zero percent for solar PV and ranging between 2.5 and 8 percent for wind turbine equipment, the tariffs can be substantial on biodiesel and ethanol (table 6). Moreover, non-OECD countries generally impose higher bound and applied tariffs than OECD countries (OECD 2013).

Table 3. Estimated trade reduced by AD/CVD cases in the renewable energy sector, 2008-12

Case	Complainant country	Respondent country under investigation	Product and date AD/CVD imposed	Average trade (US\$ millions) ^c	AD duty imposed ^d (%)	CVD imposed ^d (%)	Total duty imposed (%)	Estimated trade reduced (US\$ millions) ^e
1	Australia ^a	United States	Biodiesel (2011)	9	est. 40.0 ^f	est. 55.0 ^f	95.0	9
2	Australia	China	Wind towers (2013) ^b	433	16.2	n.a.	16.2	70
3	Australia	Korea	Wind towers (2013) ^b	13	12.1	n.a.	12.1	2
4	China ^a	United States	Solar grade polysilicon (2014)	785	57.0	2.1	59.1	464
5	China	Korea	Solar grade polysilicon (2014)	677	12.3	n.a.	12.3	83
6	China ^a	European Union	Solar grade polysilicon (2013) ^b	682	P	P	est. 59.4 ⁱ	406
7	European Union ^a	United States	Biodiesel (2009)	4 572	19.3	36.0	55.3	2 528
8	European Union ^a	Canada	Biodiesel (circumvention) (2011) ^a	797	19.3	36.0	55.3	441

n.a. = duty not applicable as an investigation did not occur and no duty was imposed

est. = estimated date or duty as neither a preliminary decision nor a final decision on the AD/CVD has been announced as of February 2014

P = case is in the preliminary phase and has not reached a decision as of February 2014

^a Indicates parallel dumping and subsidy investigations. The total AD and CVD cases amount to 41.

^b Indicates that the "date AD/CVD imposed" is based on the preliminary decision as the final decision has not been reached as of February 2014.

^c The value of affected trade is based on the average trade from 2009 through the year in which the measure was imposed to smooth out fluctuations in bilateral trade flows that occur for reasons having nothing to do with the trade remedy case. The value of affected trade for each year is calculated as the sum of imports in the complainant country for all HTS (harmonized tariff schedule) product subheadings specified in the AD and CVD case. For a detailed listing of the HTS codes, see tables A1 and A2.

^d AD and CV penalties are expressed as ad valorem duties (or ad valorem equivalent). For cases which distinguish a weighted-average duty for the majority of "cooperating firms" in the investigation and a country-wide duty for "all other firms," we use the duty applied to the cooperating firms in the sample as these firms generally account for a larger percentage of trade of the products concerned.

^e Estimated trade reduced is calculated assuming a -1.0 elasticity of import demand for foreign goods and multiplying the total ad valorem duty imposed (the sum of AD and CVD rates) by the average trade over the specified period.

^f According to Australia Customs notices, the final AD and CV specific duties imposed by Australia on the United States remain undisclosed and are available only to affected importers. To estimate the effect on trade, we assume protective duties based on the published dumping and subsidy margins.

^g The EU initiated separate investigations based on evidence that US biodiesel exporters were circumventing AD/CVD penalties and entering the EU market via transshipment through Canada and Singapore. In May 2011, the EU extended duties on imports consigned from Canada and terminated the case against Singapore (see Council Implementing Regulation [EU] No 444/2011 & No 443/2011). In April 2013, the EU initiated an interim review of the extension.

^h In August 2013, China and the EU reached a price undertaking agreement, which established a minimum import price, namely EUR 0.56/watt, for Chinese solar exporters in lieu of duties. The EU reports that about 75% of Chinese solar panel exports to the EU are covered by the undertaking and are not subject to AD/CVD penalties. Those exporters that do not agree to the price undertaking are subject to AD duties in range of 27.3% to 64.9% and CVD duties in range of 3.5%-11.%, with a combined duty of 59.2% for the cooperating firms in the investigation. The majority of Chinese imports are subject to the price undertaking. However, as we do not have an AVE for the effect on trade of the minimum import price of EUR 0.56/watt, we conservatively assume an effect of half the residual duty of 59.2% or 29.6%.

ⁱ As the preliminary phase of the investigation is ongoing, these figures are based on a conservative assumption of the average duty imposed by the cases in the sample to broadly estimate the possible protective effect.

^j As the preliminary phase of the investigation is ongoing, these figures are based on alleged dumping margins published by the US Department of Commerce (2014). See case factsheet, <http://enforcement.trade.gov/download/factsheets/factsheet-multiple-solar-cells-initiation-012313.pdf>.

Source: AD/CVD case data from tables A1- A2; trade data from the International Trade Centre, <http://www.trademap.org/>; EU trade data from Eurostat, International Trade database, "EU27 trade since 1988 by CN8," http://epp.eurostat.ec.europa.eu/portal/page/portal/international_trade/data/database; US trade data from US International Trade Commission, <http://dataweb.usitc.gov/>; authors' calculations.

Case	Complainant country	Respondent country under investigation	Product and date AD/CVD imposed	Average trade (US\$ millions) ^c	AD duty imposed ^d (%)	CVD imposed ^d (%)	Total duty imposed (%)	Estimated trade reduced (US\$ millions) ^e
9	European Union ^a	Singapore	Biodiesel (circumvention) (2011) ^g	684	0.0	0.0	0.0	0
10	European Union	China	Continuous filament glass fiber products (2011)	171	13.8	n.a.	13.8	24
11	European Union	China	Certain woven and/or stitched glass fiber fabrics (2012)	67	0.0	0.0	0.0	0
12	European Union ^a	United States	Bioethanol (2013)	1 025	9.5	n.a.	9.5	97
13	European Union ^a	Argentina	Biodiesel (2013)	1 410	24.6	n.a.	24.6	347
14	European Union ^a	Indonesia	Biodiesel (2013)	868	18.9	n.a.	18.9	164
15	European Union ^a	China	Crystalline silicon photovoltaic modules & key components (2013)	14 670	47.7 ^h	11.5 ^h	29.6 ^h	4 342
16	European Union ^a	China	Solar glass (2013) ^p	146	42.1	P	42.1	61
17	India	Malaysia	Solar cells (est. 2014)	73	P	n.a.	est. 26.6 ⁱ	19
18	India	China	Solar cells (est. 2014)	253	P	n.a.	est. 26.6 ⁱ	66
19	India	Taiwan	Solar cells (est. 2014)	94	P	n.a.	est. 26.6 ⁱ	25
20	India	United States	Solar cells (est. 2014)	82	P	n.a.	est. 26.6 ⁱ	21
21	Perua	United States	Biodiesel (2010)	40	26.0	22.0	48.0	19
22	United States ^a	China	Crystalline silicon photovoltaic cells and modules (2012)	1 882	24.5	15.2	39.7	747
23	United States ^a	China	Utility scale wind towers (2012)	278	70.6	28.3	98.9	275
24	United States	Vietnam	Utility scale wind towers (2012)	78	58.5	n.a.	58.5	46
25	United States ^a	China	Crystalline silicon photovoltaic cells and modules (est. 2014)	1 882	P	P	est. 165.0 ^j	3 106
26	United States	Taiwan	Crystalline silicon photovoltaic cells and modules (est. 2014)	293	P	P	est. 75.7 ^j	222
Total trade				31 965				13 584
Addendum								
Average duty imposed					26.6	26.3	59.4	

Table 4. Estimated renewable energy trade reduced by country for AD/CVD cases

Complainant country	Value of imports from respondent country											Total			
	Argentina	Australia	Canada	China	European Union	India	Indonesia	Korea	Malaysia	Peru	Singapore		Taiwan	United States	Vietnam
Australia	0	0	0	70	0	0	0	2	0	0	0	0	9	0	80
China	0	0	0	0	406	0	0	83	0	0	0	0	464	0	953
European Union	347	0	441	4 427	0	0	164	0	0	0	0	0	2 626	0	8 004
India	0	0	0	66	0	0	0	0	19	0	0	25	21	0	132
Peru	0	0	0	0	0	0	0	0	0	0	0	0	19	0	19
United States	0	0	0	4 128	0	0	0	0	0	0	0	222	0	46	4 396
Total	347	0	441	8 692	406	0	164	85	19	0	0	246	3 138	46	13 584

Note: All initiated AD/CVD cases are included regardless of the outcome, i.e., whether ruled affirmative, negative, or withdrawn.

Source: Estimated trade reduced from table 3; authors' calculations.

Table 5. Renewable energy products targeted in AD/CVD investigations

Product	Number of AD/CVD cases	Total trade affected		Estimated trade reduced		Global trade in targeted renewable energy products (US\$ billions) ^a
		Value (US\$ millions)	% of total global trade	Value (US\$ millions)	% of total global trade	
Biofuels (biodiesel and bioethanol)	16	9 404	3.6	3 605	1.4	259
Solar energy						
Crystalline silicon photovoltaic cells & modules	11	19 230	21.7	8 549	9.6	89
Solar grade polysilicon	5	2 144	29.5	953	12.0	7
Solar glass	2	146	6.8	61	2.8	2
Wind energy						
Wind turbine blades (glass fiber products)	2	238	3.2	24	0.3	7
Wind turbines	5	804	8.3	393	4.1	10
Total	41	31 965	8.5	13 584	3.6	374

^a Total global trade is estimated based on the 6-digit HS codes that correspond to the HTS codes specified in each AD/CVD case. Global trade is calculated as the average imports of specified products in recent years, 2009 to 2012. Because 6-digit HS codes include some unrelated products this is an imprecise overestimate of actual global trade in the specified renewable energy products.

For some cases, the identification of which 6-digit HS codes to draw on from the AD/CVD cases relied on authors' judgment:

Specifically for biofuels: due to trading under HTS codes that can differ widely among countries such as light oils and preparations, animal or vegetable fats and oils, among others, the measure of biofuels trade can be imprecise. For our purposes, we use a broad measure based on: bioethanol measured under HS 220710 and 220720 (undenatured and denatured ethyl alcohol); biodiesel measured under HS 382490; and HS 271011 (light oils and preparations), which is used since it is both targeted in the Australian and EU cases against biofuels and indicated on the WTO list of environmental goods.

Specifically for wind towers: HS 730820 (towers and lattice masts) and HS 850290 (wind-powered generating sets) are used.

All other specified products: global trade is based on all 6-digit HS codes drawn from the AD/CVD cases.

Sources: Trade affected and trade reduced from Tables 3 and 4 and authors' calculations; global trade from World Bank World Integrated Trade Solution (WITS) database, <http://wits.worldbank.org/wits/> and authors' calculations.

Table 6. Average tariffs of major importers on selected renewable-energy products

Country	Photovoltaic cells				"Wind-powered generating sets (HS 850231)"				Ethanol					
	Whether or not assembled into modules or panels (HS 854140)		Parts (HS 854190)		Bound		MFN applied		Biodiesel (HS 3826)		Undenatured (HS 220710)		Denatured (HS 220720)	
	MFN applied	Bound	MFN applied	Bound	MFN applied	Bound	MFN applied	Bound	MFN applied	Bound	MFN applied	Bound	MFN applied	Bound
Australia	0%	0%	0%	0%	0-5%	0-10%	AUD 0.38/liter	10%	5%	5%	10%	5%	5%	8%
China	0%	0%	0%	0%	8%	8%	6.50%	6.5%	40%	40%	40%	40%	30%	30%
European Union	0%	0%	0%	0%	2.7%	2.7%	6.5%	6.5%	EUR 19.2/hi	EUR 19.2/hi	EUR 19.2/hi	EUR 10.2/hi	EUR 10.2/hi	EUR 10.2/hi
India	0%	0%	0%	0%	7.5%	25%	10%	40%	150%	150%	150%	7.50%	150%	150%
United States	0%	0%	0%	0%	2.5%	2.5%	4.6-6.5%	6.5%	2.5%	2.5%	2.5%	1.9%	1.9%	1.9%

HS = Harmonized System; MFN = most favored nation; AUD = Australia dollar; EUR = Euro; hi = hectoliter
 Source: Bahar, Egeland, and Steenblik (2013), table A.6 and table A.10.

Table 7. World renewable electricity generation and capacity, 2011 - 18

Renewable energy source	2011		2012		2013		2014		2015		2018	
	Generation TWh	% of total generation	Capacity (GW)	Generation (TWh)	Capacity (GW)	Generation (TWh)	Capacity (GW)	Generation (TWh)	Capacity (GW)	Generation (TWh)	Capacity (GW)	
	Hydropower	3 567	16.4%	1 071	3 792	1 102	3 888	4 010	1 173	4 136	1 209	4 570	1 330
Bioenergy	352	1.6%	75	373	82	396	428	96	463	105	560	125
Wind	438	2.0%	236	519	282	626	725	368	840	413	1 220	559
Onshore	428	1.9%	232	505	276	606	697	357	803	399	1 144	531
Offshore	10	0.0%	4	13	5	20	28	11	36	14	76	28
Solar PV	62	0.3%	69	100	98	138	178	161	221	194	368	308
Solar CSP	3	0.0%	2	6	3	9	14	6	18	7	34	12
Geothermal	70	0.3%	11	72	11	77	80	12	83	13	97	15
Ocean	1	0.0%	1	1	1	1	1	1	1	1	2	1
Total	4 492	20%	1 465	4 862	1 579	5 136	5 436	1 815	5 762	1 941	6 851	2 351

TWh = terawatt hour; GW = gigawatt; PV = photovoltaic; CSP = concentrated solar power

Notes: Data for 2011 and 2012 are IEA estimates, 2013 - 2018 are IEA forecasts

For generation data: hydropower includes generation from pumped storage (75 TWh in 2011). The difference in onshore and offshore wind is estimated from historical data.

For capacity data: presented as cumulative installed capacity, regardless of grid connection status. Grid-connected solar PV capacity is counted at the time the grid connection is made; off-grid solar PV systems are included at the time of the installation.

Source: Medium-term Renewable Energy Market Report - Executive Summary © OECD/IEA, 2013, tables 1 and 2, pages 10-11, as modified by authors, <http://www.iea.org/Textbase/npsum/MTrrenew2013SUM.pdf>.

Table 8. Renewable energy generation by source for select countries, 2012

Country	Biomass		Geothermal		Hydrob		Solarc		Wind		Total renewable energyd	
	Production (TWh)	Installed capacity (GW)*	Production (TWh)	Installed capacity (GW)*	Production (TWh)	Installed capacity (GW)*	Production (TWh)	Installed capacity (GW)	Production (TWh)	Installed capacity (GW)*	Production (TWh)	Installed capacity (GW)*
Australia	3.3	0.8	0.009*	0.0	17.8	8.0	0.8	1.3	7.0	2.2	29.0	12.4
China	43.6	8.2	0.2	0.0	855.5	231.0	3.0	3.1	73.2*	62.4	797.4*	304.7
European Union	161.4	30.4	9*	0.9	363.4**	103.2	23.6**	52.4	176.3*	94.3	684.1**	281.2
India	2 012.0	3.5	0.0	0.0	126.1	42.4	1.0	0.5	26.0	16.1	162*	62.4
Peru	0.7*	n.a.	0.0	0.0	21.4*	3.5	n.a.	n.a.	0.0	0.0	22.1*	3.5
United States	67.8	13.2	16.8	3.5	276.5	78.8	1.8	0.0	140.1	46.0	507.8	142.9
OECD countries	261.3	50.9	46.4	7.3	1 374.5	362.5	30.0**	62.0	334.2*	152.7	2 066.4*	635.4
non-OECD countries	93.9*	25.8	27.0*	4.1	2 063.7**	586.5	1.2**	4.8	112.1*	84.6	2 231.7**	705.9

n.a. = not available; TWh = terawatt hour; GW = gigawatt; * = data from 2011; ** = data from 2010

^a The term biomass and waste used here is similar to combustible renewables and waste.

^b Hydroelectric generation excludes generation from hydroelectric pumped storage.

^c Solar category also includes tidal and wave action.

^d Renewable energy sources include biomass, hydro, geothermal, solar, wind, ocean thermal, wave action, and tidal action.

Note: Generation data consist of both utility and nonutility sources. Because 2012 data were not yet available for some countries, data for 2012 and in some cases 2011 data for OECD, non-OECD and EU-27 as a region, could not be calculated. Latest available data used for all countries and regions.

Sources: US Energy Administration Information, International Energy Statistics, 2012, <http://www.eia.gov/countries/data.cfm#undefined>.

IV. RENEWABLE ENERGY COSTS

Over the medium-term, the costs of renewably-generated electricity are expected to fall as technologies become more competitive. Table 7 shows the global estimated electricity generation and capacity from renewable energy sources. Renewable electricity generation accounted for 20 percent of total generation in 2011. Globally, solar PV and onshore wind account for the greatest growth of renewable energy, primarily due to lower generation costs compared to offshore wind, solar CSP, and geothermal energy (IEA 2013a). Table 8 illustrates the breakdown of renewable energy generation by country for 2012. IEA projections indicate that, between 2012 and 2018, renewable electricity generation will increase by 40 percent (for more detail, see IEA 2012).

The “levelized cost of electricity” (LCOE) is often cited as a measure of the competitiveness of different generating technologies. LCOE is defined as the “per-kilowatt hour cost (in real dollars) of building and operating a generating plant over an assumed financial life and duty cycle” (EIA 2013). The IEA (2010) reports that for OECD countries, the lowest levelized costs of generating electricity from traditional technologies (coal and natural gas) are within the range of \$65 to \$105 per megawatt hour (MWh). By contrast, the levelized costs for wind power plants generally range between \$48 and \$163/MWh for onshore; and \$146 and \$261/MWh for offshore wind turbines. For higher capacity solar plants, the levelized costs range between \$215 and \$333/MWh, while lower capacity solar plants have levelized costs above \$600/MWh.

These cost comparisons indicate the distance renewable energy must go to compete with fossil fuels (see IEA 2013b). By stifling competition, trade remedies probably slow the convergence between renewable and conventional electricity costs. However, the main driver of convergence has to be new technology, beyond what is on offer in any country today.

V. WTO DISPUTES RELATING TO RENEWABLE ENERGY

The number of AD and CVD cases targeting renewable energy products has greatly expanded in the past five years, and this trend will likely continue.

Trade remedies against foreign companies probably increase the likelihood of “tit-for-tat” trade disputes in renewables – the ongoing US and EU solar disputes with China seem to illustrate retaliatory behavior (Wu and Salzman 2013; Horlick 2013). Empirical and theoretical analyses both show that strategic considerations (so-called “first mover” advantages) can drive AD investigations (Prusa and Skeath 2002; Blonigen and Bown 2003; Staiger and Wolak 1994). National actions against dumped or subsidized imports have significant advantages over WTO dispute settlement procedures: WTO procedures can be long and costly; they do not allow for retroactive damages; and only governments, not companies, can be petitioners or respondents (Wu and Salzman 2013). In short, trade remedies “offer a much faster, direct, and politically popular means of response to unfair industrial policies compared to WTO disputes” (Wu and Salzman 2013, p. 50). In large part, these features explain the entrenched resistance to reforms that would constrain the imposition of trade remedies.

Indeed, the number of AD/CVD cases far outnumber the handful of disputes that have arrived at the WTO Dispute Settlement Body (DSB). Even so, WTO disputes have grown since the first major renewables case in 2010, which challenged Canada’s wind turbine support schemes. Box 1 sketches the cases making their way through the DSB, which either challenge outcomes of anti-dumping and countervailing measures targeting renewable energy products, or challenge other support schemes that allegedly favor domestic firms and suppliers.³¹ By our count, nearly a dozen WTO dispute cases have been pursued since 2010; these are concentrated among countries which are at the helm of the AD/CVD cases, including Argentina, China, the European Union, India, Japan, and the United States. Two disputes directly relate to the proceedings of trade remedy cases. Many cases have not proceeded to the establishment of a WTO panel, but their outcomes will have implications for parallel AD/CVD investigations.

Box 1. Challenging AD/CVD cases targeting renewable energy

- Argentina versus the European Union regarding biodiesel AD procedures.** In December 2013, Argentina requested consultations with the European Union regarding: (1) the EU's anti-dumping investigative proceedings and duties imposed on Argentinean biodiesel in November 2013; and (2) EU legislation on protection against dumped imports (Council Regulation [EC] 1225/2009 of November 2009), which specifies procedures for estimating costs associated with the production and sale of products under investigation.³² Argentina claims that these measures are inconsistent with certain provisions of the WTO Anti-Dumping Agreement concerning methods for determining dumping and injury to the domestic market, the disclosure of information, and overall compliance with the AD Agreement, the General Agreement on Tariffs and Trade (GATT), and the WTO Agreement. Russia and Indonesia have requested to join the consultations.
- China versus the United States regarding AD/CVD procedures.** In September 2012, China requested consultations with the United States concerning AD and CVD measures against China from November 2006 through March 2012, including measures on wind turbines and solar panels.³³ China's concerns include: (1) US legislation (Public Law 112-99) that allows special application of CVD to non-market economies; (2) CVD decisions against China between November 2006 and March 2012; (3) AD measures and their combined effect with CVD measures; and (4) the failure of the United States to delegate authority to the Department of Commerce to identify and avoid double remedies initiated during the specified time period (for a comprehensive overview of this issue see Durling and Prusa 2012). China considers these various measures to be inconsistent with the Subsidies and Countervailing Measures (SCM) Agreement, the GATT, and the Anti-Dumping Agreement. The WTO DSB established a panel in December 2012 and the final report is pending.

Challenging renewable energy support schemes

- Argentina versus the European Union regarding biodiesel support schemes.** In August 2012, Argentina requested consultations with the European Union and Spain concerning certain measures affecting biodiesels imports.³⁴ Argentina challenged the Spanish Ministerial Order, which regulates the allocation of quantities of biodiesel, based on the EU's mandatory targets for biofuels under the country-wide regulatory framework for renewable energy. Argentina claims that this measure is inconsistent with the GATT, the Trade-Related Investment Measures (TRIMs) Agreement, and the WTO Agreement. Australia and Indonesia joined the consultations in 2012. Argentina requested the establishment of a panel in December 2012, but the request was deferred. In May 2013, Argentina requested new consultations with the European Union regarding measures affecting the importing and marketing of biodiesel and measures that support the EU biodiesel industry.³⁵ Argentina's concerns include: (1) measures that promote the use of renewable energy and reduce greenhouse emissions; and (2) measures that establish support schemes for the biodiesel sector. Argentina claims these measures are similarly inconsistent with the GATT, the SCM Agreement, the TRIMs Agreement, the Technical Barriers to Trade (TBT) Agreement, and the WTO Agreement.
- United States versus India regarding solar support schemes.** In February 2013, the United States requested consultations with India concerning the use of local content requirements (LCRs) under Phase I of India's Jawaharlal Nehru National Solar Mission (JNNSM) for solar cells and modules.³⁶ The United States claims that the measures are inconsistent with the GATT, the TRIMs Agreement, and the SCM Agreement. Japan and Australia joined the consultations. In February 2014, the United States filed a separate request for consultations regarding Phase II of the JNNSM. Under this phase, LCRs were expanded to also cover thin film technology, which was previously exempt under Phase I. The United States claims that these continued measures similarly violate provisions under the GATT and the TRIMs Agreement; however there is no claim of violation of the SCM Agreement.
- China versus the European Union regarding renewable energy support schemes.** In November 2012, China requested consultations with the European Union, Greece and Italy regarding measures affecting the renewable energy sector, including LCRs attached to the feed-in tariff programs of EU member states.³⁷ China claims that these measures are inconsistent with the GATT, the SCM Agreement, and the TRIMs Agreement. Japan, Australia, and Argentina requested to join the consultations; Japan's request was accepted.

- **United States versus China regarding wind energy support schemes.** In December 2010, the United States entered into consultations with China regarding support schemes (e.g., grants, funds, awards) offered to domestic manufacturers of wind power equipment contingent on the use of domestic goods over imports.³⁸ The United States claims that these measures are inconsistent with SCM Agreement, and that China's failure to notify such measures violates the GATT and the SCM Agreement. In addition, the United States also claims that China's delay in making translations available in an official language of the WTO violates obligations under its Protocol of Accession (Part I, Paragraph 1.2). The European Union and Japan have requested to join the consultations.
- **European Union and Japan versus Canada on its feed-in tariff program.** In 2010, Japan and the European Union (in 2011) requested consultations with Canada to review claims that LCRs attached to Canada's renewable energy and feed-in tariff programs violated WTO obligations, including the SCM Agreement, the GATT, and the TRIMs Agreement. On December 2012, the WTO Panel ruled that Canada's program violated the nondiscrimination provisions of GATT and TRIMs, but rejected the claim that the LCR was a prohibited subsidy under the SCM Agreement. Following appeals by both sides, a final ruling was issued in May 2013: the WTO Appellate Body upheld most of the Panel's finding, with a few exceptions, but did not make a ruling on the subsidy question.³⁹

VI. POLICY OPTIONS AND CONCLUSIONS

By our count, 41 cases of trade remedies in renewables have been pursued since 2008, and 10 cases are making their way through the WTO DSB. Concerns that environmental disputes will undermine progress toward curbing greenhouse gas emissions underlie the calls to reform laws governing trade remedies and dispute procedures (see Kasteng 2013; Wu and Salzman 2013; Lester and Watson 2013; Levine and Walther 2013). These calls may find resonance in the plurilateral talks announced by a group of 14 countries, including Australia, China, the European Union and the United States – leading complainant countries in our sample – to liberalize tariffs on environmental goods.

Lester and Watson (2013) argue that “modest reform may not be enough to ensure open, competitive markets, yet may still be too much to appease political interests.” Instead they argue that while ambitious, a “peace clause” should be pursued, allowing renewables to be fully exempt from trade remedies.

Wu and Salzman (2013) consider this peace clause proposal to be “politically unrealistic.” Instead they propose new rules that would curtail the number of trade remedies permitted against renewables and the duration and size of duties levied. They also propose that governments should be required to undertake economic analysis on the effect of import protection

before a trade remedy is pursued, and if duties are levied, to channel a proportion of the tariff revenues back to consumers.

Kasteng (2013) offers both intermediate steps toward restraining the use of AD/CVD measures and long-term policy solutions. He argues that a two-prong approach should be considered: (1) improving current WTO agreements on trade remedies in general; and (2) special consideration of environment-specific provisions. Improving current WTO agreements would entail new rules that ensure that AD and CVD measures target only anti-competitive behavior and not “normal competition,” and new rules that would clarify procedures involving proof of injury and causality.⁴⁰ Environment-specific provisions would explore an *ex-ante* public interest test and limitations on duty levels, product scope, and the duration of AD/CVD penalties, similar to proposals by Wu and Salzman (2013). To summarize:

- **Lesser duty rule:** trade remedy penalties could be limited by making use of the lesser duty rule. In European Union practice, a duty is levied only to remove the injury inflicted on the domestic industry; accordingly penalties are no higher than the lesser of the dumping or subsidy margin, or the injury margin.
- **Time limit:** a time limit for the trade remedies on renewables could shorten the current allowance of duties, which are effective for 5 years.
- **Scope limit:** trade remedies could be permitted only in a certain number of products or import value.

- **Public interest test:** a mandatory public interest test would force governments to first assess the environmental consequences of trade remedies and higher prices.
- **Temporary peace clause:** a peace clause could limit recourse to AD/CVD measures by calling for “non-use” of trade remedies in certain circumstances and by enumerating “non-actionable” environmental subsidies.

In our view, a complete carve-out for environmental policies is not politically feasible at this juncture in trade policy. However, if our estimates are roughly right, some \$14 billion of trade in renewable energy products is lost annually, and about \$68 billion over 5 years, with concentrated effects on solar energy products. Again in our view, the lesser duty rule and shorter time limits are the most promising reforms. A public interest test, by way of obligatory disclosure, but not as a barrier to AD or CVD cases, also seems possible.

VII. APPENDIX

This appendix attempts to comprehensively identify trade remedy measures involving renewable energy products that were initiated since 2008. Most of data for the cases were drawn from the Global Antidumping Database (Bown 2012a) and the Global Countervailing Duties Database (Bown 2012b), which form parts of the Temporary Trade Barriers database created by Chad Bown at the World Bank. Other sources were also consulted to update new cases. The appendix offers detailed information on relevant dates of each stage of the case (initiation, preliminary, definitive), the outcome of each case (affirmative, negative, withdrawn), the products under investigation (classified at the 8-digit or 10-digit level), the domestic and foreign firms involved, and the preliminary and final duties imposed. Tables A1 and A1.1 list anti-dumping cases targeting renewables and the outcomes for the preliminary and definitive stages, respectively. Tables A2 and A2.1 list countervailing duty cases targeting renewables, and the outcomes for the preliminary and definitive stages, respectively.

Table A1. AD measures in the renewable energy sector (preliminary decisions), 2008-12

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Related CVD case ^c	Preliminary decision					
									Date of initiation of investigation	Date of preliminary dumping decision	Dumping/injury decision	Dumping margin	Type of AD measure	Preliminary AD measure imposed
1	Australia	AUS-AD-493	United States	Biodiesel	27101180, 27101980, 27109180, 27109980, 38249020, 38249030 ^d	Biodiesel Producers Limited	All exporters	AUS-CVD-13	06/22/2010	10/18/2010	A	40.0%	SD	MI
2	Australia	n.a.	China	Wind towers	7308200002, 7308900049, 8502311031	A.C.N. 009 483 694 Pty Ltd (Haywards), Keppel Prince Engineering Pty Ltd. (KPE)	Shanghai Taisheng Wind Power Equipment Co. Ltd., all exporters	n.a.	08/28/2013	12/06/2013	A	16.2%	AND	MI
3	Australia	n.a.	Korea	Wind towers	7308200002, 7308900049, 8502311032	A.C.N. 009 483 694 Pty Ltd (Haywards), Keppel Prince Engineering Pty Ltd. (KPE)	Korea Win&P Ltd., all exporters	n.a.	08/28/2013	12/06/2013	A	12.1%	AND	MI
4	China	CHN-AD-199	United States	Solar grade polysilicon	28046190	Jiangsu Zhongneng Silicon Technology Development Co. Ltd., Jiangxi Saiwei LDK Photovoltaic Silicon Technology Co. Ltd., China Silicon Corporation Ltd., Daqo New Energy Co. Ltd.	REC Solar Grade Silicon LLC, REC Advanced Silicon Materials LLC, Hemlock Semiconductor Corporation, MEMC Pasadena, Inc., AE Polysilicon Corporation, all other exporters	CHN-CVD-5	07/20/2012	07/18/2013	A	53.3% - 57.0% (all other firms)	AND	57.0%
5	China	CHN-AD-200	Korea	Solar grade polysilicon	28046190	Jiangsu Zhongneng Silicon Technology Development Co. Ltd., Jiangxi Saiwei LDK Photovoltaic Silicon Technology Co. Ltd., China Silicon Corporation Ltd., Daqo New Energy Co. Ltd.	Woongjin Polysilicon Co. Ltd., OCI Company Ltd., Hankook Silicon Co. Ltd., KCC Corp and Korean Advanced Materials (KAM) Corp, Innovation Silicon Co. Ltd., all other exporters	n.a.	07/20/2012	07/18/2013	A	2.4% - 48.7%, 12.3% (all other firms)	AND	12.3%
6	China	CHN-AD-203	European Union	Solar grade polysilicon	28046190	Jiangsu Zhongneng Silicon Technology Development Co. Ltd., Jiangxi Saiwei LDK Photovoltaic Silicon Technology Co. Ltd., China Silicon Corporation Ltd., Daqo New Energy Co. Ltd.	MI	CHN-CVD-6	11/01/2012	1/24/2014 ^e	B	.	.	.

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Related CVD case ^a	Preliminary decision					
									Date of initiation of investigation	Date of preliminary dumping decision	Dumping injury decision	Dumping margin	Type of AD measure	Preliminary AD measure imposed
7	European Union	EUN-AD-683	United States	Biodiesel	38249091, 38249097, 27101941, 15162098, 15180091, 15180099	Biopetrol Industries AG, Daka Biodiesel A.M.B.A., Diester Group, Diester Industries SAS, Ecomotion Gmbh, Ecomotion Group, Gate Global Alternative Energy Germany Gmbh, Mannheim Bio Fuel Gmbh, Natural Energy West Gmbh, Neochim Sa, Novacol Austria Gmbh, Novacol Sfl	Peter Cremer North America LP, Cargill Inc., Imperium Renewables Inc., Archer Daniels Midland Company, World Energy Alternatives LLC, Green Earth Fuels of Houston LLC	EUN-CVD-61	06/13/2008	03/11/2009	A	3.4% - 73.4%, 33.7% (all cooperating firms); 57.3% (all other firms)	SD	€122.9 / tonne net (all cooperating firms); €182.4/ tonne net (all other firms)
8	European Union	n.a.	Canada	Biodiesel (circumvention of US imports)	38249091, 38249097, 27101941, 15162098, 15180091, 15180099	Biopetrol Industries AG, Daka Biodiesel A.M.B.A., Diester Group, Diester Industries SAS, Ecomotion Gmbh, Ecomotion Group, Gate Global Alternative Energy Germany Gmbh, Mannheim Bio Fuel Gmbh, Natural Energy West Gmbh, Neochim Sa, Novacol Austria Gmbh, Novacol Sfl	MI	EUN-CVD-61	08/12/2010	.	B	.	.	.
9	European Union	n.a.	Singapore	Biodiesel (circumvention of US imports)	38249091, 38249097, 27101941, 15162098, 15180091, 15180099	Biopetrol Industries AG, Daka Biodiesel A.M.B.A., Diester Group, Diester Industries SAS, Ecomotion Gmbh, Ecomotion Group, Gate Global Alternative Energy Germany Gmbh, Mannheim Bio Fuel Gmbh, Natural Energy West Gmbh, Neochim Sa, Novacol Austria Gmbh, Novacol Sfl	MI	EUN-CVD-61	08/12/2010	.	B	.	.	.
10	European Union	EUN-AD-705	China	Continuous filament glass fibre products	70191100, 70191200, 70191910, 70193100	European Glass Fibre Producers Association, Johns Manville Slovakia, European Owens Corning Fiberglass, Owens Corning France, PPG Industries BV	Changzhou New Changhai Fiberglass Co. Ltd., Jiangsu Changhai Composite Materials Holding Co. Ltd., All Other Companies	n.a.	12/17/2009	09/16/2010	A	43.6%	AVD	43.6%
11	European Union	EUN-AD-729	China	Certain woven and/or stitched glass fibre fabrics	70193900, 70194000, 70199000	Glass Fibre Fabrics Defence Coalition	MI	n.a.	07/28/2011	05/22/2012	W ^a	n.a.	n.a.	n.a.

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Related CVD case ^a	Preliminary decision			Preliminary measure imposed	
									Date of initiation of investigation	Date of preliminary dumping decision	Dumping margin/ injury decision		Type of AD measure
12	European Union	EUN-AD-733	United States	Bioethanol	22071000, 22072000, 22089099, 27101111, 27101115, 27101121, 27101125, 27101131, 27101141, 27101145, 27101149, 27101151, 27101159, 27101170, 27101190, 38140010, 38140090, 38200000, 38249097	European Producers Association; Abengoa Energy Netherlands B.V.; BioWanze S.A.; Wanzee Crop Energies Bioethanol GmbH, Ensus, Lantmännen Energi/Agroetanol, Tereos BENP	Marquis Energy LLC, Patriot Renewable Fuels LLC, Platinum Ethanol LLC, Plymouth Energy Company LLC, POET LLC	EUN-CVD-75	11/25/2011	B	.	.	
13	European Union	EUN-AD-745	Argentina	Biodiesel	15162098, 15180091, 15180095, 15180099, 27101943, 27101946, 27101947, 27102011, 27102015, 27102017, 38249097, 38260010, 38260090	Bio-Oils Huelva S.L., Huelva, Biocom Energia S.L., Valencia, Diester Industrie S.A.S., Paris; Elin Biotuels S.A., Kifissia; Novaol S.R.L., Milan; Perstorp BioProducts A.B., Stenungsund; Preol A.s., Lovosice; VERBIO Vereinigte BioEnergie A.G., Leipzig	Louis Dreyfus Commodities S.A., Group "Renova" (Molinos Rio de la Plata S.A., Oleaginoso MoreNo Hermanos S.A.F.I.C.I y A. and Vincentin S.A.I.C.); Group "TIG" (Aceitera General Deheza S.A., Bunge Argentina S.A.), other cooperating companies, all other exporters	EUN-CVD-80	08/29/2012	05/28/2013	A	7.9% (cooperating firms); 10.6% (all other firms)	SD €75.97/tonne (cooperating firms); €104.92/tonne (all other firms)
14	European Union	EUN-AD-746	Indonesia	Biodiesel	15162098, 15180091, 15180095, 15180099, 27101943, 27101946, 27101947, 27102011, 27102015, 27102017, 38249097, 38260010, 38260090	Bio-Oils Huelva S.L., Huelva; Biocom Energia S.L., Valencia; Diester Industrie S.A.S., Paris; Elin Biotuels S.A., Kifissia; Novaol S.R.L., Milan; Perstorp BioProducts A.B., Stenungsund; Preol A.s., Lovosice; VERBIO Vereinigte BioEnergie A.G., Leipzig	PT. Cilandra Perkasa, Jakarta; PT. Muslim Mas, Medan; PT. Pelita Agung Agrindustri, Medan; PT. Wilmar Bioenergi Indonesia, Medan and PT. Wilmar Nabati Indonesia, Medan; other cooperating companies, all other exporters	EUN-CVD-81	08/29/2012	05/28/2013	A	6.5% (cooperating firms); 9.6% (all other firms)	SD €57.14/tonne (cooperating firms); €83.84/tonne (all other firms)

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Related CVD case ^a	Preliminary decision				Preliminary measure imposed	
									Date of initiation of investigation	Date of preliminary dumping decision	Dumping/injury decision	Type of AD measure		
15	European Union	EUN-AD-747	China	Crystalline silicon photovoltaic modules and key components	38180010, 85013100, 85013200, 85013300, 85013400, 85016120, 85016180, 85016200, 85016300, 85016400, 85414090	MI	Changzhou Trina Solar Energy Co. Ltd, Delsolar (Wujiang) Co. Ltd, Jiangxi LDK Solar Hi-Tech Co. Ltd, JingAo Group, Jinzhou Yangguang Energy, Wuxi Suntech Power Co. Ltd, Yingli Green Energy Holding Company	EUN-CVD-79	09/06/2012	06/04/2013	A	AVD	47.7% (cooperating firms); 67.9% (all other firms)	
16	European Union	n.a.	China	Solar glass	70071980	EU ProSun Glass	Fiat Solar Glass Group Co. Ltd. and related companies, Xinyi PV Products (Anhui) Holdings, Zhejiang Hehe Photovoltaic Glass Technology Co. Ltd.	.	02/28/2013	11/26/2013	A	79.8% (cooperating firms); 86.2% (all other firms)	AVD	38.4% (cooperating firms); 42.1% (all other firms)
17	India	IND-AD-661	Malaysia	Solar cells	85414011	Indosolar Ltd, Jupiter Solar Power Limited, Websol Energy Systems Ltd	MI	n.a.	11/23/2012	Est. 05/22/2014 ¹	.	.	.	.
18	India	IND-AD-662	China	Solar cells	85414011	Indosolar Ltd, Jupiter Solar Power Limited, Websol Energy Systems Ltd	MI	n.a.	11/23/2012	Est. 05/22/2014 ¹	.	.	.	.
19	India	IND-AD-663	Taiwan	Solar cells	85414011	Indosolar Ltd, Jupiter Solar Power Limited, Websol Energy Systems Ltd	MI	n.a.	11/23/2012	Est. 05/22/2014 ¹	.	.	.	.
20	India	IND-AD-664	United States	Solar cells	85414011	Indosolar Ltd, Jupiter Solar Power Limited, Websol Energy Systems Ltd	MI	n.a.	11/23/2012	Est. 05/22/2014 ¹	.	.	.	.
21	Peru	PER-AD-121	United States	Biodiesel	3824909999	Industrias del Espino S.A., Heaven Petroleum Operators S.A.	Archer Daniels Midland Company, AGP Corporate Headquarters, Cargill Incorporated, Carolina BioFuels LLC, Corporate Headquarters, Direct Fuels, Ecoy Biofuels LLC, Freedom Fuels LLC, Fuel Bio Holdings LLC, Galveston Bay Biodiesel LP, GeoGreen Fuels LLC, Green Hunter Energy Inc., Green Earth Fuels of Houston LLC, Griffin Industries Inc., Imperium Renewables Inc., Innovation Fuels Inc., Johann Haltermann Ltd., Lake Erie Biofuels, LDH Energy, Memphis Biofuels LLC, Nova Biosource Fuels Inc., Organic Fuels Ltd., Owensboro Grain Company LLC, Peter Cremer North America LP, Renewable Biofuels Inc., Renewable Energy Group Inc., Twin Rivers Technologies, Vinmar International, Vitrol Inc., Western Iowa Energy LLC, World Energy Alternatives LLC, ED&F Man Biofuels Inc., Trafigura A.G.	PER-CVD-13	07/13/2009	11/10/2009	A	MI	SD	US\$ 212/ton

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Related CVD cases ^a	Preliminary decision					
									Date of initiation of investigation	Date of preliminary dumping decision	Dumping injury decision	Type of AD measure imposed		
22	United States	USA-AD-1190	China	Crystalline silicon photovoltaic cells and modules	8501610000, 85072080, 8541406020, 8541406030, 8501318000	SolarWorld, MX Solar US, Helios Solar Works, and other firms	Changzhou Trina Solar Energy Co. Ltd., Trina Solar (Changzhou) Science and Technology Co. Ltd., Wuxi Suntech Power Co. Ltd., Luoyang Suntech Power Co. Ltd., Suntech Power Co. Ltd., Yangzhou Rietech Renewal Energy Co. Ltd., Zhenjiang Huanhai Silicon Science & Technology Co. Ltd., Kuttler Automation Systems (Suzhou) Co. Ltd., Shenzhen Suntech Power Co. Ltd., Wuxi Sunshine Power Co. Ltd., Wuxi University Science Park International Incubator Co. Ltd., Yangzhou Suntech Power Co. Ltd., Zhenjiang Rietech New Energy Science & Technology Co. Ltd	USA-CVD-551	10/27/2011	5/25/2012 (dumping); 12/16/2011 (injury)	A	18.32% -249.96%	AVD	31.14% -249.96% (all other firms)
23	United States	USA-AD-1195	China	Utility scale wind towers	73082000, 8502310000	Broadwind Towers Inc., DMI Industries, Katana Summit LLC, Trinity Structural Towers Inc.	Chengxi Shipyard Co., Ltd, Titan Wind Energy (Suzhou) Co., Ltd, CS Wind Corporation, Guodian United Power Technology Baoding Co., Ltd, Sinovel Wind Group Co., Ltd	USA-CVD-556	01/06/2012	2/17/2012 (injury); 8/2/2012 (dumping)	A	MI	AVD	72.69% (all other firms)
24	United States	USA-AD-1196	Vietnam	Utility scale wind towers	73082000, 8502310000	Broadwind Towers Inc., DMI Industries, Katana Summit LLC, Trinity Structural Towers Inc.	The CS Wind Group (CS Wind Vietnam Co., Ltd. and CS Wind Corporation	n.a.	01/06/2012	2/17/2012 (injury); 8/2/2012 (dumping)	A	MI	AVD	59.91% (all other firms)
25	United States	n.a.	China	Crystalline silicon photovoltaic cells and modules	8501610000, 8507208030, 8507208040, 8507208060, 8507208090, 8541406020, 8541406030, 8501318000	SolarWorld Industries America, Inc.	MI	Yes	01/22/2014	02/14/2014 (injury); est. 06/9/2014 (dumping)	A (injury)	Est. 165%	.	.
26	United States	n.a.	Taiwan	Crystalline silicon photovoltaic cells and modules	8501610000, 8507208030, 8507208040, 8507208060, 8507208090, 8541406020, 8541406030, 8501318000	SolarWorld Industries America, Inc.	MI	n.a.	01/22/2014	02/14/2014 (injury); est. 06/9/2014 (dumping)	A (injury)	Est. 75.7%	.	.

HTS = Harmonized Tariff Schedule; n.a. = not applicable; "." = indicates that the investigation has not reached that phase so information is not available; MI = data that is missing or unable to be found; Est. = estimated

Preliminary and final dumping decision: A = Affirmative; N = Negative; W = Withdrawn prior to ruling by petitioning industry; B = bypassed, as sometimes the preliminary decision is skipped and the first decision is the final decision

Type of AD measure imposed: AVD = ad valorem duty; SD = specific duty; PU = price undertaking; DPU = duty if price falls under a given level

^a Case ID drawn from Bown (2012a) for cases documented in the Global Antidumping Database and Bown (2012b) for Global Countervailing Duties Database, updated through 2012.

^b The Harmonized System (HS), managed by the World Customs Organization classifies commodities up to the 6-digit tariff level. The HS system is used as the basis for national tariff systems (Harmonized Tariff Systems, or HTS), which further break down 6-digit tariff classifications to 8-digit or 10-digit levels according to national needs. Disaggregated coding is unique to national tariff classifications.

^c In 2011, the Australia Customs and Border Protection amended its national tariff classification and statistical codes (Notice no. 2011/50). Subsequently, the tariff codes subject to the final AD decision on biodiesel were revised to: 27102000/31, 27109180/82, 27109980/91, effective as of January 1, 2012.

^d China's Ministry of Commerce Announcement no.81 issued on 11/4/2013 extended the AD investigation period by six months to end date May 1, 2014.

^e Withdrawal letter was submitted on 03/12/2012 before a preliminary decision was reached.

^f India's Ministry of Commerce and Industry's Memorandum No.354/2281/2013-TRU issued on 12/9/2013 extended the AD investigation period to end date May 22, 2014.

Note: for duties and margins, ranges indicate duties for specific firms; duties and margins for "all others" are weighted average duty applied country wide.

Sources: Bown, Chad P. (2012a) "Global Antidumping Database," available at <http://econ.worldbank.org/ftbd/gad/>; Global Trade Alert, trade defense measures statistics, <http://www.globaltradealert.org/>; various official government documents drawn from: Australia Customs and Border Protection Service, Anti-dumping Commission, <http://www.customs.gov.au/anti-dumping/default.asp>; China Ministry of Commerce, <http://english.mofcom.gov.cn/article/policyrelease/>; European Commission, <http://eur-lex.europa.eu/en/index.htm>; India Department of Commerce, http://commerce.nic.in/traderemedies/ad_casesindia.asp?id=2; Peru Commission Investigating Dumping and Subsidies, <http://www.elperuano.com.pe/edicion/>; United States International Trade Commission, http://www.usitc.gov/trade_remedy/731_ad_701_cvd/investigations/active/index.htm and US Department of Commerce, International Trade Administration, <http://trade.gov/enforcement/index.asp>.

Table A1.1. AD measures in the renewable energy sector (final decisions), 2008-12

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Date of final AD decision	Dumping/injury decision	Final decision			
										Date of imposition of final AD measure	Type of final AD measure	Final dumping margin	Final AD measure imposed
1	Australia	AUS-AD-493	United States	Biodiesel	27101180, 27101980, 27109180, 27109980, 38249020, 38249030 ^c	Biodiesel Producers Limited	All exporters	12/22/2010	A	04/18/2011	SD/DPU	40.0%	MI
2	Australia	n.a.	China	Wind towers	7308200002, 7308900049, 8502311031	A.C.N. 009 483 694 Pty Ltd (Haywards), Keppel Prince Engineering Pty Ltd. (KPE)	Shanghai Taisheng Wind Power Equipment Co. Ltd., all exporters	Est. 3/21/2014	.	.	.	.	.
3	Australia	n.a.	Korea	Wind towers	7308200002, 7308900049, 8502311032	A.C.N. 009 483 694 Pty Ltd (Haywards), Keppel Prince Engineering Pty Ltd. (KPE)	Korea Win&P Ltd., all exporters	Est. 3/21/2014	.	.	.	.	.
4	China	CHN-AD-199	United States	Solar grade polysilicon	28046190	Jiangsu Zhongneng Silicon Technology Development Co. Ltd., Jiangxi Saiwei LDK Photovoltaic Silicon Technology Co. Ltd., China Silicon Corporation Ltd., Daqo New Energy Co. Ltd.	REC Solar Grade Silicon LLC, REC Advanced Silicon Materials LLC, Hemlock Semiconductor Corporation, MEMC Pasadena, Inc., AE Polysilicon Corporation, all other exporters	01/20/2014	A	01/20/2014	AVD	MI	53.3 - 57% (all other firms)
5	China	CHN-AD-200	Korea	Solar grade polysilicon	28046190	Jiangsu Zhongneng Silicon Technology Development Co. Ltd., Jiangxi Saiwei LDK Photovoltaic Silicon Technology Co. Ltd., China Silicon Corporation Ltd., Daqo New Energy Co. Ltd.	Woongjin Polysilicon Co. Ltd., OCI Company Ltd., Hankook Silicon Co. Ltd., KCC Corp and Korean Advanced Materials (KAM) Corp, Innovation Silicon Co. Ltd., all other exporters	01/20/2014	A	01/20/2014	AVD	MI	2.4 - 48.7%; 12.3% (all other firms)
6	China	CHN-AD-203	European Union	Solar grade polysilicon	28046190	Jiangsu Zhongneng Silicon Technology Development Co. Ltd., Jiangxi Saiwei LDK Photovoltaic Silicon Technology Co. Ltd., China Silicon Corporation Ltd., Daqo New Energy Co. Ltd.	MI	Est. 05/01/2014 ^d	.	.	.	.	.
7	European Union	EUN-AD-683	United States	Biodiesel	38249091, 38249097, 27101941, 15162098, 15180091, 15180099	Biopetrol Industries AG, Daka Biodiesel A.M.B.A, Diester Group, Diester Industries SAS, Econotion Gmbh, Econotion Group, Gate Global Alternative Energy Germany Gmbh, Mannheim Bio Fuel Gmbh, Natural Energy West Gmbh, Neochim Sa, Novaol Austria Gmbh, Novaol Srl	Peter Cremer North America LP, Cargill Inc., Imperium Renewables Inc., Archer Daniels Midland Company, World Energy Alternatives LLC, Green Earth Fuels of Houston LLC	07/10/2009	A	07/10/2009	SD	10.1% - 88.4%; 33.5% (cooperating firms); 39.2% (all other firms)	€115.6/tonne (cooperating firms) or 19.3% AVD; ^e €172.2/tonne (all other firms)
8	European Union	n.a.	Canada	Biodiesel (circumvention of US imports)	38249091, 38249097, 27101941, 15162098, 15180091, 15180099	Biopetrol Industries AG, Daka Biodiesel A.M.B.A, Diester Group, Diester Industries SAS, Econotion Gmbh, Econotion Group, Gate Global Alternative Energy Germany Gmbh, Mannheim Bio Fuel Gmbh, Natural Energy West Gmbh, Neochim Sa, Novaol Austria Gmbh, Novaol Srl	MI	05/11/2011	A	05/12/2011	SD	MI	€115.6/tonne (cooperating firms) or 19.3% AVD; ^e €172.2/tonne (all other firms)
9	European Union	n.a.	Singapore	Biodiesel (circumvention of US imports)	38249091, 38249097, 27101941, 15162098, 15180091, 15180099	Biopetrol Industries AG, Daka Biodiesel A.M.B.A, Diester Group, Diester Industries SAS, Econotion Gmbh, Econotion Group, Gate Global Alternative Energy Germany Gmbh, Mannheim Bio Fuel Gmbh, Natural Energy West Gmbh, Neochim Sa, Novaol Austria Gmbh, Novaol Srl	MI	05/11/2011	N	n.a.	n.a.	n.a.	n.a.

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Final decision				
								Date of final AD decision	Dumping/injury decision	Date of imposition of final AD measure	Type of final AD measure	Final dumping margin	Final AD measure imposed
10	European Union	EUN-AD-705	China	Continuous filament glass fibre products	70191100, 70191200, 70191910, 70193100	European Glass Fibre Producers Association, Johns Manville Slovakia, European Owens Corning Fiberglass, Owens Corning France, PPG Industries BV	Changzhou New Changhai Fiberglass Co. Ltd., Jiangsu Changhai Composite Materials Holding Co. Ltd., All Other Companies	A	03/15/2011	AVD	9.6% - 29.7% (all other firms)	13.8% (all other firms)
11	European Union	EUN-AD-729	China	Certain woven and/or stitched glass fibre fabrics	70193900, 70194000, 70199000	Glass Fibre Fabrics Defence Coalition	MI	n.a.	n.a.	n.a.	n.a.	n.a.
12	European Union	EUN-AD-733	United States	Bioethanol	22071000, 22072000, 22089099, 27101111, 27101115, 27101121, 27101125, 27101131, 27101141, 27101145, 27101149, 27101151, 27101159, 27101170, 27101190, 38140010, 38140090, 38200000, 38249097	European Producers Union of Renewable Ethanol Association; Abengoa Energy Netherlands B.V., BioWanze S.A., Wanze; Crop Energies Bioethanol GmbH, Ensus, Lanntmännen Energi/Agroetanol, Tereos BENP	Marquis Energy LLC, Patriot Renewable Fuels LLC, Platinum Ethanol LLC, Plymouth Energy Company LLC, POET LLC	A	02/23/2013	SD	9.5%	€62.3/tonne or 9.5% AVD ^c
13	European Union	EUN-AD-745	Argentina	Biodiesel	15162098, 15180091, 15180095, 15180099, 27101943, 27101946, 27101947, 27102011, 27102015, 27102017, 38249097, 38260010, 38260090	Bio-Oils Huelva S.L., Huelva; Biocom Energia S.L., Valencia; Diester Industrie S.A.S., Paris; Elin Biofuels S.A., Kfissia; Novaol S.R.L., Milan; Perstorp BioProducts A.B., Stenungsund; Preol A.s., Lovosica; VERBIO Vereinigte BioEnergie A.G., Leipzig	Louis Dreyfus Commodities S.A., Group "Renova" (Molinos Rio de la Plata S.A., Oleaginosa MoreNo Hermanos S.A.F.I.C.I y A. and Vincentin S.A.I.C.); Group "TG" (Aceitera General Deheza S.A., Bunge Argentina S.A.), other cooperating companies, all other exporters	A	11/27/2013	SD	46.8% (cooperating firms); 49.2% (all other firms)	€237.05/tonne (cooperating firms) or 24.6% AVD; €245.67/tonne (all other firms) or 25.7% AVD ^c

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Final decision					
								Date of final AD decision	Dumping/injury decision	Date of imposition of final AD measure	Type of final AD measure	Final dumping margin	Final AD measure imposed
14	European Union	EUN-AD-746	Indonesia	Biodiesel	15162098, 15180091, 15180095, 15180099, 27101943, 27101946, 27101947, 27102011, 27102015, 27102017, 38249097, 38260010, 38260090	Bio-Oils Huekva S.L., Huekva; Biocom Energia S.L., Valencia; Diester Industrie S.A.S., Paris; Elin Biofuels S.A., Kifissia; Novaol S.R.L., Milan; Perstorp BioProducts A.B., Stenungsund; Preol A.s., Lovosice; VERBIO Vereinigte BioEnergie A.G., Leipzig	PT. Cilandra Perkasa, Jakarta; PT. Mustim Mas, Medan; PT. Pelita Agung Agrindustri, Medan; PT. Wilmar Bioenergi Indonesia, Medan and PT. Wilmar Nabati Indonesia, Medan; other cooperating companies, all other exporters	11/19/2013	A	11/27/2013	SD	20.1% (cooperating firms); 23.3% (all firms)	€166.95/tonne (cooperating firms) or 18.9% AVD; €178.85/tonne (all other firms) or 20.5% AVD ^c
15	European Union	EUN-AD-747	China	Crystalline silicon photovoltaic modules and key components	38180010, 85013100, 85013200, 85013300, 85013400, 85016120, 85016180, 85016200, 85016300, 85016400, 85414090	MI	Changzhou Trina Solar Energy Co. Ltd, Delsolar (Wujiang) Co. Ltd, Jiangxi LDK Solar Hi-Tech Co. Ltd, JingAo Group, Jinzhou Yangguang Energy, Wuxi Suntech Power Co. Ltd, Yingli Green Energy Holding Company	12/02/2013	A	12/06/2013	AVD/PU	88.1% (cooperating firms); 115.5% (all other firms)	EUR 0.56/watt minimum import price; or 47.7% (cooperating firms); 64.9% (all other firms)
16	European Union	n.a.	China	Solar glass	70071980	EU ProSun Glass	Fiat Solar Glass Group Co. Ltd. and related companies, Xinyi PV Products (Anhui) Holdings, Zhejiang Hehe Photovoltaic Glass Technology Co. Ltd.	Est. 5/27/2014	.	.	.	.	.
17	India	IND-AD-661	Malaysia	Solar cells	85414011	Indosolar Ltd., Jupiter Solar Power Limited, Websol Energy Systems Ltd	MI	.	.	.	.	.	.
18	India	IND-AD-662	China	Solar cells	85414011	Indosolar Ltd., Jupiter Solar Power Limited, Websol Energy Systems Ltd	MI	.	.	.	.	.	.
19	India	IND-AD-663	Taiwan	Solar cells	85414011	Indosolar Ltd., Jupiter Solar Power Limited, Websol Energy Systems Ltd	MI	.	.	.	.	.	.
20	India	IND-AD-664	United States	Solar cells	85414011	Indosolar Ltd., Jupiter Solar Power Limited, Websol Energy Systems Ltd	MI	.	.	.	.	.	.

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Final decision					
								Date of final AD decision	Dumping/injury decision	Date of imposition of final AD measure	Type of final AD measure	Final dumping margin	Final AD measure imposed
21	Peru	PER-AD-121	United States	Biodiesel	3824909999	Industrias del Espino S.A., Heaven Petroleum Operators S.A.	Archer Daniels Midland Company, AGP Corporate Headquarters, Cargill Incorporated, Carolina BioFuels LLC, Corporate Headquarters, Direct Fuels, Ecofy Biofuels LLC, Freedom Fuels LLC, Fuel Bio Holdings LLC, Galveston Bay Biodiesel LP, GeoGreen Fuels LLC, Green Hunter Energy Inc., Green Earth Fuels of Houston LLC, Griffin Industries Inc., Imperium Renewables Inc., Innovation Fuels Inc., Johann Haltermann Ltd., Lake Erie Biofuels, LDH Energy, Memphis Biofuels LLC, Nova Biosource Fuels Inc., Organic Fuels Ltd., Owersboro Grain Company LLC, Peter Cremer North America LP, Renewable Biofuels Inc., Renewable Energy Group Inc., Twin Rivers Technologies, Vinmar International, Vitrol Inc., Western Iowa Energy LLC, World Energy Alternatives LLC, ED&F Man Biofuels INC, Trafigura A.G.	06/22/2010	A	06/26/2010	SD	MI	US\$212/ton or 26% AVE ^c
22	United States	USA-AD-1190	China	Crystalline silicon photovoltaic cells and modules	8501610000, 85072080, 8541406020, 8541406030, 8501318000	SolarWorld, MX Solar US, Helios Solar Works, and other firms	Changzhou Trina Solar Energy Co. Ltd., Trina Solar (Changzhou) Science and Technology Co. Ltd., Wuxi Suntech Power Co. Ltd., Luoyang Suntech Power Co. Ltd., Suntech Power Co. Ltd., Yangzhou Rietech Renewal Energy Co. Ltd., Zhenjiang Huanfeng Silicon Science & Technology Co. Ltd., Kuttler Automation Systems (Suzhou) Co. Ltd., Shenzhen Suntech Power Co. Ltd., Wuxi Sunshine Power Co. Ltd., Wuxi University Science Park International Incubator Co. Ltd., Yangzhou Suntech Power Co. Ltd., Zhenjiang Rietech New Energy Science & Technology Co. Ltd.	10/17/2012 (dumping); 12/6/2012 (injury)	A	12/07/2012	AVD	18.32% - 29.14%; 24.48% (cooperating firms); 249.96% (all other firms)	249.96% (all other firms)
23	United States	USA-AD-1195	China	Utility scale wind towers	73082000, 8502310000	Broadwind Towers Inc., DMI Industries, Katana Summit LLC, Trinity Structural Towers Inc.	Chengxi Shipyard Co., Ltd, Tian Wind Energy (Suzhou) Co., Ltd, CS Wind Corporation, Guodian United Power Technology Baoding Co., Ltd, Sinovel Wind Group Co., Ltd	12/26/2012 (dumping); 12/8/2013 (injury)	A	02/15/2013	AVD	44.99% - 47.59; 70.63% (all other firms)	70.63% (all other firms)
24	United States	USA-AD-1196	Vietnam	Utility scale wind towers	73082000, 8502310000	Broadwind Towers Inc., DMI Industries, Katana Summit LLC, Trinity Structural Towers Inc.	The CS Wind Group (CS Wind Vietnam Co., Ltd. and CS-Wind Corporation	12/26/2012 (dumping); 12/8/2013 (injury)	A	02/15/2013	AVD	51.50%; 58.49% (all other firms)	58.49% (all other firms)

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Final decision				
								Date of final AD decision	Dumping/injury decision	Date of imposition of final AD measure	Type of final AD measure	Final dumping margin	Final AD measure imposed
25	United States	n.a.	China	Crystalline silicon photovoltaic cells and modules	8501610000, 8507208030, 8507208040, 8507208060, 8507208090, 8541406020, 8541406030, 8501318000	SolarWorld Industries America, Inc.	MI	Est. 8/25/2014 (dumping); est. 10/09/2014 (injury)				
26	United States	n.a.	Taiwan	Crystalline silicon photovoltaic cells and modules	8501610000, 8507208030, 8507208040, 8507208060, 8507208090, 8541406020, 8541406030, 8501318000	SolarWorld Industries America, Inc.	MI	Est. 8/25/2014 (dumping); est. 10/09/2014 (injury)				

HTS = Harmonized Tariff Schedule; n.a. = not applicable; “.” = indicates that the investigation has not reached that phase so information is not available; MI = data that is missing or unable to be found. Preliminary and final dumping decision: A = Affirmative; N = Negative; W = Withdrawn prior to ruling by petitioning industry; B = bypassed, as sometimes the preliminary decision is skipped and the first decision is the final decision

Type of AD measure imposed: AVD = ad valorem duty; AVE = ad valorem equivalent; SD = specific duty; PU = price undertaking; DPU = duty if price falls under a given level

^a Case ID drawn from Bown (2012a) for cases documented in the Global Antidumping Database and Bown (2012b) for cases from the Global Countervailing Duties Database, updated through 2012.

^b The Harmonized System (HS), managed by the World Customs Organization classifies commodities up to the 6-digit tariff level. The HS system is used as the basis for national tariff systems (Harmonized Tariff Systems, or HTS), which further break down 6-digit tariff classifications to 8-digit or 10-digit levels according to national needs. Disaggregated coding is unique to national tariff classifications.

^c The Australia Customs and Border Protection issued Notice no. 2011/50 which amended the national tariff classification and statistical codes. Subsequently, the tariff codes subject to the final AD decision on biodiesel were revised to: 27102000/31, 27109180/82, 27109980/91, effective as of January 1, 2012.

^d China's Ministry of Commerce Announcement no. 81 issued on 11/4/2013 extended the AD investigation period by six months to end date May 1, 2014.

^e For the EU, ad valorem duties are drawn from European Commission regulations which first specify the AVD duty based on the dumping and injury margins, and then convert the AVD to the specific duties.

^f India's Ministry of Commerce and Industry's Memorandum No.354/2281/2013-TRU issued on 12/9/2013 extended the AD investigation period to end date May 22, 2014.

^g For Peru, specific duties are converted to ad valorem equivalents using the unit value method. Under this method, the value of imports is first divided by the import volume to derive the unit value of imports. The AVE is calculated as the specific duty expressed as a percentage of the unit value. While the value of imports was available for Peru, detailed import data by volume at the 10-digit national tariff level was not readily accessible. Thus, US exports at the 6-digit HS level, namely HS 382490 was used, giving a volume of 73.8 MT imports of biodiesel in 2009. For detail on the debate over AVE calculation methods, see WTO (2004).

Note: for duties and margins, ranges indicate duties for specific firms; duties and margins for “all others” are weighted average duty applied country wide.

Sources: Bown, Chad P. (2012a) “Global Antidumping Database,” available at <http://econ.worldbank.org/ttbtd/gad/>; Global Trade Alert, trade defense measures statistics, <http://www.globaltradealert.org/>; various official government documents drawn from: Australia Customs and Border Protection Service, Anti-dumping Commission, <http://www.customs.gov.au/anti-dumping/default.asp>; China Ministry of Commerce, <http://english.mofcom.gov.cn/article/policyrelease/>; European Commission, <http://eur-lex.europa.eu/en/index.htm>; India Department of Commerce, http://commerce.nic.in/traderemedies/ad_cases/india.asp?id=2; Peru Commission Investigating Dumping and Subsidies, <http://www.elperuano.com.pe/edicion/>; United States International Trade Commission, http://www.usitc.gov/trade_remedy/731_ad_701_cvd/investigations/active/index.htm and US Department of Commerce, International Trade Administration, <http://trade.gov/enforcement/index.asp>.

Table A2. CVD measures in the renewable energy sector (preliminary decisions), 2008-12

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Related AD case ^a	Preliminary decision				
									Date of initiation of investigation	Date of preliminary subsidy and injury decision ^c	Type of CVD measure	Preliminary CVD imposed	
1	Australia	AUS-CVD-13	United States	Biodiesel	27101180, 27101980, 27109180, 27109980, 38249020, 38249030	Biodiesel Producers Limited	All exporters	AUS-AD-493	06/22/2010	10/18/2010	A		
2	China	CHN-CVD-5	United States	Solar grade polysilicon	28046190	Jiangsu Zhongheng Silicon Technology Development Co. Ltd., Jiangxi Saiwei LDK Photovoltaic Silicon Technology Co. Ltd., China Silicon Corporation Ltd., Daqo New Energy Co. Ltd.	Hemlock Semiconductor Corporation, REC Solar Grade Silicon LLC, REC Advanced Silicon Materials LLC, MEMC Pasadena, Inc., AE Polysilicon Corporation, all other exporters	CHN-AD-199	07/20/2012	09/16/2013	A	AVD	6.5%
3	China	CHN-CVD-6	European Union	Solar grade polysilicon	28046190	Jiangsu Zhongheng Silicon Technology Development Co. Ltd., Jiangxi Saiwei LDK Photovoltaic Silicon Technology Co. Ltd., China Silicon Corporation Ltd., Daqo New Energy Co. Ltd.	MI	CHN-AD-203	11/01/2012	24/01/2014	B		
4	European Union	EUN-CVD-61	United States	Biodiesel	38249091, 38249097, 27101941, 15162098, 15180091, 15180099	Biopetrol Industries AG, Daka Biodiesel A.M.B.A, Diester Group, Diester Industries SAS, Ecomotion GmbH, Ecomotion Group, Gate Global Alternative Energy Germany GmbH, Mannheim Bio Fuel GmbH, Natural Energy West GmbH, Neochim Sa, Novaoel Austria GmbH, Novaoel Srl	Peter Cremer North America LP, Cargill Inc., Imperium Renewables Inc., Archer Daniels Midland Company, World Energy Alternatives LLC, Green Earth Fuels of Houston LLC	EUN-AD-683	06/13/2008	03/11/2009	A	SD	€237/tonne
5	European Union	n.a.	Canada	Biodiesel (circumvention of US imports)	38249091, 38249097, 27101941, 15162098, 15180091, 15180099	Biopetrol Industries AG, Daka Biodiesel A.M.B.A, Diester Group, Diester Industries SAS, Ecomotion GmbH, Ecomotion Group, Gate Global Alternative Energy Germany GmbH, Mannheim Bio Fuel GmbH, Natural Energy West GmbH, Neochim Sa, Novaoel Austria GmbH, Novaoel Srl	MI	EUN-AD-683	08/12/2010		B		
6	European Union	n.a.	Singapore	Biodiesel (circumvention of US imports)	38249091, 38249097, 27101941, 15162098, 15180091, 15180099	Biopetrol Industries AG, Daka Biodiesel A.M.B.A, Diester Group, Diester Industries SAS, Ecomotion GmbH, Ecomotion Group, Gate Global Alternative Energy Germany GmbH, Mannheim Bio Fuel GmbH, Natural Energy West GmbH, Neochim Sa, Novaoel Austria GmbH, Novaoel Srl	MI	EUN-AD-683	08/12/2010		B		

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Preliminary decision				
								Related AD case ^a	Date of initiation of investigation	Date of preliminary subsidy and injury decision ^c	Subsidy / injury decision	Type of CVD measure	Preliminary CVD imposed
7	European Union	EUN-CVD-75	United States	Bioethanol	22071000, 22072000, 22089099, 27101111, 27101115, 27101121, 27101125, 27101131, 27101141, 27101145, 27101149, 27101151, 27101159, 27101170, 27101190, 38140010, 38140090, 38200000, 38249097	European Producers Union of Renewable Ethanol Association; Abengoa Energy Netherlands B.V.; BioWanze S.A.; Wanze; Crop Energies Bioethanol GmbH, Ensus, Lantmännen Energi/Agroetanol, Tereos BEMP	Marquis Energy LLC, Patriot Renewable Fuels LLC, Platinum Ethanol LLC, Plymouth Energy Company LLC, POET LLC	EUN-AD-733	11/25/2011	B		
8	European Union	EUN-CVD-79	China	Crystalline silicon photovoltaic modules and key components	38180010, 85013100, 85013200, 85013300, 85013400, 85016120, 85016180, 85016200, 85016300, 85016400, 85414090	MI	Changzhou Trina Solar Energy Co. Ltd, Delsolar (Wujiang) Co. Ltd, Jiangxi LDK Solar Hi-Tech Co. Ltd, JingAo Group, Jinzhou Yangguang Energy, Wuxi Suntech Power Co. Ltd, Yingli Green Energy Holding Company, all other exporters	EUN-AD-747	08/11/2012	08/07/2013	B	
9	European Union	EUN-CVD-80	Argentina	Biodiesel	15162098, 15180091, 15180095, 15180099, 27101943, 27101946, 27101947, 27102011, 27102015, 27102017, 38249097, 38260010, 38260090	European Biodiesel Board	MI	EUN-AD-745	11/10/2012	n.a.	W ^d	

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Related AD case ^a	Preliminary decision				
									Date of initiation of investigation	Date of preliminary subsidy and injury decision ^c	Type of CVD measure	Preliminary CVD imposed	
10	European Union	EUN-CVD-81	Indonesia	Biodiesel	15162098, 15180091, 15180095, 15180099, 27101943, 27101946, 27101947, 27102011, 27102015, 27102017, 38249097, 38260010, 38260090	European Biodiesel Board	MI	EUN-AD-746	11/10/2012	n.a.	W ^d		
11	European Union	n.a.	China	Solar glass	70071980	EU ProSun Glass	MI		04/27/2013		B		
12	Peru	PER-CVD-13	United States	Biodiesel	3824909999	Industrias del Espino S.A.	Refinería la Pampilla, Repsol YPF Trading	PER-AD-121	08/27/2009	12/17/2009	A	SD	US\$ 178/ton
13	United States	USA-CVD-551	China	Crystalline silicon photovoltaic modules and key components	8501610000, 85072080, 8541406020, 8541406030, 8501318000	Solar World Industries	Changzhou Trina Solar Energy Co. Ltd., Trina Solar (Changzhou) Science and Technology Co. Ltd., Wuxi Suntech Power Co. Ltd., Luoyang Suntech Power Co. Ltd., Suntech Power Co. Ltd., Yangzhou Rietech Renewable Energy Co. Ltd., Zhenjiang Huantai Silicon Science & Technology Co. Ltd., Kurier Automation Systems (Suzhou) Co. Ltd., Shenzhen Suntech Power Co. Ltd., Wuxi Sunshine Power Co. Ltd., Wuxi University Science Park International Incubator Co. Ltd., Yangzhou Suntech Power Co. Ltd., Zhenjiang Rietech New Energy Science & Technology Co. Ltd.	USA-AD-1190	10/27/2011	12/16/2011 (injury); 3/26/2012 (subsidy)	A	AVD	2.9% - 4.73%; 3.61% (all other firms)
14	United States	USA-CVD-556	China	Utility scale wind towers	73082000, 8502310000	Broadwind Towers Inc., DMI Industries, Katana Summit LLC, Trinity Structural Towers Inc.	"Titan Wind Energy (Suzhou) Co., Ltd. (Titan Wind), Titan Lianyungang Metal Products Co. Ltd. (Titan Lianyungang), Baotou Titan Wind Energy Equipment Co., Ltd. (Titan Baotou), and Shenyang Titan Metal Co., Ltd. (Titan Shenyang) (collectively, Titan Companies)"	USA-AD-1195	01/06/2012	2/17/2012 (injury); 6/06/2012 (subsidy)	A	AVD	19.87% (all other firms)
15	United States	n.a.	China	Crystalline silicon photovoltaic cells and modules	8501610000, 8507208030, 8507208040, 8507208060, 8507208090, 8541406020, 8541406030, 8501318000	SolarWorld Industries America, Inc.	MI	Yes	01/22/2014	02/14/2014 (injury); est. 03/26/2014 (subsidy)	A (injury)		

HTS = Harmonized Tariff Schedule; n.a. = not applicable; "." = indicates that the investigation has not reached that phase so information is not available; MI = data that is missing or unable to be found. Preliminary and final subsidy decision: A = Affirmative; N = Negative; W = Withdrawn prior to ruling by petitioning industry; B = bypassed, as sometimes the preliminary decision is skipped and the first decision is the final decision; OTH = Other, explained in notes section.

Type of CVD measure imposed: AVD = ad valorem duty, SD = specific duty, PU = price undertaking

- ^a case ID drawn from Bown (2012b) for cases documented in the Global Countervailing Duties Database and Bown (2012a) for cases in the Global Antidumping Database, updated through 2012.
- ^b The Harmonized System (HS), managed by the World Customs Organization classifies commodities up to the 6-digit tariff level. The HS system is used as the basis for national tariff systems (Harmonized Tariff Systems, or HTS), which further break down 6-digit tariff classifications to 8-digit or 10-digit levels according to national needs. Disaggregated coding is unique to national tariff classifications.
- ^c The date of the subsidy and injury investigation or ruling is the same unless otherwise noted for countries like the United States that conduct a "dual-track" investigative process using different agencies.
- ^d This case was terminated on 11/16/2013 after the complainant formally withdrew the complaint (European Commission Regulation No. 1198/2013).

Note: for duties and margins, ranges indicate duties for specific firms; duties and margins for "all others" are weighted average duty applied country wide.

Sources: Bown, Chad P. (2012b) "Global Countervailing Duties Database (GCVD)," available at <http://econ.worldbank.org/ttbd/gcvd/>; Global Trade Alert, trade defense measures statistics, <http://www.globaltradealert.org/>; various government official documents.

Australia Customs and Border Protection Service, Anti-dumping Commission, <http://www.customs.gov.au/anti-dumping/default.asp>; China Ministry of Commerce, <http://english.mofcom.gov.cn/article/policyrelease/>; European Commission, <http://eur-lex.europa.eu/en/index.htm>; India Department of Commerce, http://commerce.nic.in/traderemedies/ad_casesindia.asp?id=2; Peru Commission Investigating Dumping and Subsidies, <http://www.elperuano.com.pe/edicion/>; United States International Trade Commission, http://www.usitc.gov/trade_remedy/731_ad_701_cvd/investigations/active/index.htm and US Department of Commerce, International Trade Administration, <http://trade.gov/enforcement/index.asp>.

Table A2.1. CVD measures in the renewable energy sector (final decisions), 2008-12

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Final decision					
								Date of final subsidy/injury decision ^c	Final subsidy/injury decision	Date of CVD measure imposed	Type of CVD measure	Final margin	Final CVD imposed
1	Australia	AUS-CVD-13	United States	Biodiesel	27101180, 27101980, 27109180, 27108980, 38249020, 38249030	Biodiesel Producers Limited	All exporters	12/22/2010	A	04/18/2011	SD/DPU	55.0%	MI
2	China	CHN-CVD-5	United States	Solar grade polysilicon	28046190	Jiangsu Zhongneng Silicon Technology Development Co. Ltd., Jiangxi Saiwei LDK Photovoltaic Silicon Technology Co. Ltd., China Silicon Corporation Ltd., Daqo New Energy Co. Ltd.	Hemlock Semiconductor Corporation, AE Polysilicon Corporation, all other exporters	01/20/2014	A	01/20/2014	AVD	MI	2.1%
3	China	CHN-CVD-6	European Union	Solar grade polysilicon	28046190	Jiangsu Zhongneng Silicon Technology Development Co. Ltd., Jiangxi Saiwei LDK Photovoltaic Silicon Technology Co. Ltd., China Silicon Corporation Ltd., Daqo New Energy Co. Ltd.	MI	Est. 5/01/2014 ^d	.	.	.	.	.
4	European Union	EUN-CVD-61	United States	Biodiesel	38249091, 38249097, 27101941, 15162098, 15180091, 15180099	Biopetrol Industries AG, Daka Biodiesel A.M.B.A, Diester Group, Diester Industries SAS, Ecomotion Gmbh, Ecomotion Group, Gate Global Alternative Energy Germany Gmbh, Mannheim Bio Fuel Gmbh, Natural Energy West Gmbh, Neochim Sa, Novaoel Austria Gmbh, Novaoel Srl	Peter Cremer North America LP, Cargill Inc., Imperium Renewables Inc., Archer Daniels Midland Company, World Energy Alternatives LLC, Green Earth Fuels of Houston LLC	07/10/2009	A	07/10/2009	SD	29% - 41%; 36%	€237/tonne (all other firms) or 36% AVD ^e
5	European Union	n.a.	Canada	Biodiesel (circumvention of US imports)	38249091, 38249097, 27101941, 15162098, 15180091, 15180099	Biopetrol Industries AG, Daka Biodiesel A.M.B.A, Diester Group, Diester Industries SAS, Ecomotion Gmbh, Ecomotion Group, Gate Global Alternative Energy Germany Gmbh, Mannheim Bio Fuel Gmbh, Natural Energy West Gmbh, Neochim Sa, Novaoel Austria Gmbh, Novaoel Srl	MI	05/11/2011	A	05/12/2011	SD	36.0%	€237/tonne (all other firms) or 36% AVD ^e
6	European Union	n.a.	Singapore	Biodiesel (circumvention of US imports)	38249091, 38249097, 27101941, 15162098, 15180091, 15180099	Biopetrol Industries AG, Daka Biodiesel A.M.B.A, Diester Group, Diester Industries SAS, Ecomotion Gmbh, Ecomotion Group, Gate Global Alternative Energy Germany Gmbh, Mannheim Bio Fuel Gmbh, Natural Energy West Gmbh, Neochim Sa, Novaoel Austria Gmbh, Novaoel Srl	MI	05/11/2011	N	n.a.	n.a.	n.a.	n.a.

Case	Complainant country	Case ID ^a	Country under investigation	Product	HTS codes ^b	Domestic firms	Foreign firms	Final decision						
								Date of final subsidy/injury decision ^c	Final subsidy/injury decision	Date of CVD measure imposed	Type of CVD measure	Final margin	Final CVD imposed	
10	European Union	EUN-CVD-81	Indonesia	Biodiesel	15162098, 15180091, 15180095, 15180099, 27101943, 27101946, 27101947, 27102011, 27102015, 27102017, 38249097, 38260010, 38260090	MI	MI	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
11	European Union	n.a.	China	Solar glass	70071980	EU ProSun Glass	MI
12	Peru	PER-CVD-13	United States	Biodiesel	3824909999	Industrias del Espino S.A.	Refinería la Pampilla, Repsol YPF Trading	08/17/2010	A	08/23/2010	SD	MI	\$178/ton or 24% AVE ^d	
13	United States	USA-CVD-551	China	Crystalline silicon photovoltaic modules and key components	8501610000, 85072080, 8541406020, 8541406030, 8501318000	Solar World Industries	Changzhou Trina Solar Energy Co. Ltd., Trina Solar (Changzhou) Science and Technology Co. Ltd., Wuxi Suntech Power Co. Ltd., Luoyang Suntech Power Co. Ltd., Suntech Power Co. Ltd., Yangzhou Rietech Renewal Energy Co. Ltd., Zhenjiang Huanai Silicon Science & Technology Co. Ltd., Kuttler Automation Systems (Suzhou) Co. Ltd., Shenzhen Suntech Power Co. Ltd., Wuxi Sunshine Power Co. Ltd., Wuxi University Science Park International Incubator Co. Ltd., Yangzhou Suntech Power Co. Ltd., Zhenjiang Rietech New Energy Science & Technology Co. Ltd.	10/17/2012 (subsidy); 12/6/2012 (injury)	A	12/07/2012	AVD	14.78% -15.97%	15.24% (all other firms)	
14	United States	USA-CVD-556	China	Utility scale wind towers	73082000	Broadwind Towers Inc., DMI Industries, Katana Summit LLC, Trinity Structural Towers Inc.	"Titan Wind Energy (Suzhou) Co., Ltd. (Titan Wind), Titan Lianyungang Metal Products Co. Ltd. (Titan Lianyungang), Baotou Titan Wind Energy Equipment Co., Ltd. (Titan Baotou), and Shenyang Titan Metal Co., Ltd. (Titan Shenyang) (collectively, Titan Companies)"	12/26/2012 (subsidy); 2/8/2014 (injury)	A	15/02/2013	AVD	21.86% -34.81%; 28.34% (all other firms)	28.34% (all other firms)	
15	United States	n.a.	China	Crystalline silicon photovoltaic cells and modules	8501610000, 8507208030, 8507208040, 8507208060, 8507208090, 8541406020, 8541406030, 8501318000	SolarWorld Industries America, Inc.	MI	Est. 06/11/2014 (subsidy); 07/28/2014 (injury)	.	.	.	.	.

HTS = Harmonized Tariff Schedule; n.a. = not applicable; “-” = indicates that the investigation has not reached that phase so information is not available; MI = data that is missing or unable to be found. Preliminary and final subsidy decision: A = Affirmative; N = Negative; W = Withdrawn prior to ruling by petitioning industry; B = bypassed, as sometimes the preliminary decision is skipped and the first decision is the final decision; OTH = Other, explained in notes section

Type of CVD measure imposed: AVD = ad valorem duty, AVE = ad valorem equivalent, SD = specific duty, PU = price undertaking

^a Case ID drawn from Bown (2012b) for cases documented in the Global Countervailing Duties Database and Bown (2012a) for cases in the Global Antidumping Database, updated through 2012.

^b The Harmonized System (HS), managed by the World Customs Organization classifies commodities up to the 6-digit tariff level. The HS system is used as the basis for national tariff systems (Harmonized Tariff Systems, or HTS), which further break down 6-digit tariff classifications to 8-digit or 10-digit levels according to national needs. Disaggregated coding is unique to national tariff classifications.

^c The date of the subsidy and injury investigation and ruling is the same unless otherwise noted for countries like the United States that have a “dual-track” investigative process (e.g., USITC injury decision).
^d China’s Ministry of Commerce Announcement No. 82 issued on 11/4/2013 extended the CVD investigation period by six months to end date May 1, 2014.

^e For the EU, ad valorem duties are drawn from European Commission regulations which first specify the AVD duty based on the dumping and injury margins and then convert the AVD to the specific duties. The European Commission decided not to adopt a provisional CVD as the main US subsidy scheme in force during the investigation period had ceased and no longer conferred a benefit. However, due to evidence that the US might reinstate the scheme found to be countervailable which would entail potential retroactive effects, Custom authorities were directed to register imports. Products became subject to registration on 08/24/2012. The case was terminated 12/21/2012.

^g For Peru, specific duties are converted to ad valorem equivalents using the unit value method. Under this method, the value of imports is first divided by the import volume to derive the unit value of imports. The AVE is calculated as the specific duty expressed as a percentage of the unit value. While the value of imports was available for Peru, detailed import data by volume at the 10-digit national tariff level was not readily accessible. Thus, US exports at the 6-digit HS level, namely HS 382490 was used, giving a volume of 73.8 MT imports of biodiesel in 2009. For detail on the debate over AVE calculation methods, see WTO (2004).

Note: for duties and margins, ranges indicate duties for specific firms; duties and margins for “all others” are weighted average duty applied country wide.

Sources: Bown, Chad P. (2012b) “Global Countervailing Duties Database (GCVD),” available at <http://econ.worldbank.org/ttbd/gcvd/>; Global Trade Alert, trade defense measures statistics, <http://www.globaltradealert.org/>; various government official documents.

Australia Customs and Border Protection Service, Anti-dumping Commission, <http://www.customs.gov.au/anti-dumping/default.asp>; China Ministry of Commerce, <http://english.mofcom.gov.cn/article/policy/release/>; European Commission, <http://eur-lex.europa.eu/en/index.htm>; India Department of Commerce, http://commerce.nic.in/traderemedies/ad_cases/india.asp?ic=2; Peru Commission Investigating Dumping and Subsidies, <http://www.elperuano.com.pe/edicion/>; United States International Trade Commission, http://www.usitc.gov/trade_remedy/731_ad_701_cvd/investigations/active/index.htm and US Department of Commerce, International Trade Administration, <http://trade.gov/enforcement/index.asp>.

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Notes

- 1 Bown's (2011) analysis of trade remedies following the global economic crisis shows that G20 countries increased the share of imports subject to trade remedies by 25 percent during the crisis, but this was mostly attributed to developing country G20 members. These countries increased the product coverage of trade remedies by 40 percent, compared to 5 percent by developed countries. However, Bown (2011) argues that these rates of increase generally follow pre-crisis trends, suggesting that the recession was not an explanatory factor for the differential jump in developing country remedies.
 - 2 For our purposes, the term "trade remedies" means anti-dumping and countervailing measures; the term does not include safeguard measures, which are much harder to impose and thus considerably less used, and are not covered in this report.
 - 3 Such policies entail market and technology incentives, including feed-in tariffs and premiums, quotas, green certificates, government funding, grants, as well as tax and other investment incentives. For a comprehensive overview of the policies across countries, see Bahar, Egeland, and Steenblik (2013).
 - 4 For detail, see "U.S., 13 Other WTO Members Unveil Plans To Negotiate Green Goods Deal," *Inside US Trade*, January 30, 2014 www.insidetrade.com (accessed on February 10, 2014).
 - 5 For a comprehensive overview of the legal and economic justifications leading to the use of trade remedies, see Mavroidis, Messerlin and Wauters (2008).
 - 6 Numerous amendments to AD laws and regulations have broadened the definition of "less than fair value" (the technical term for dumping) to include various forms of price discrimination and sales below cost.
 - 7 Several empirical studies highlight this development; see Shin (1998); Bourgeois and Messerlin (1998) and Barfield (2003).
 - 8 Bown (2011) reports that for Mexico, South Africa, Australia and Canada, AD measures covered more than 98 percent of products subject to a trade remedy between 1990 and 2009; while for the United States, the European Union and India, this figure was slightly less than 90 percent.
 - 9 The net loss outcome assumes that the importing country cannot affect world prices. If it can, net gains are possible provided that the trade remedy sufficiently depresses the world price for the imported product. This is an unusual occurrence.
 - 10 As with other forms of protection, trade remedies are likely to reduce the number of firms that are active in the domestic market, thereby facilitating collusion among the survivors. Even if the surviving firms do not collude, the effect of a smaller pool of competitors will be a lower elasticity of demand facing each of them, thereby raising the equilibrium markup of price over cost. Moreover, because anti-dumping duties raise the cost of imported inputs, they can assist more-efficient competitors to force out their less-efficient domestic rivals.
 - 11 Comprehensive data is provided for 31 countries in the AD database, and 17 countries in the CVD database from the 1980s through 2012. Less comprehensive data is available for an additional 20 countries, most of which are developing countries; however, few of these countries launched AD/CVD cases after 2008.
 - 12 See tables A1 and A2 for preliminary decisions and tables A1.1 and A2.1 for final decisions.
 - 13 Beyond missing data, official submissions of AD/CVD activity via country reports to the WTO are sometimes inconsistent with the detail provided in a country's internal government records (Prusa 2005).
 - 14 The definition of renewables conspicuously excludes nuclear energy.
 - 15 The Harmonized Commodity Description and Coding System, or Harmonized System (HS), managed by the World Customs Organization, classifies about 5,000 commodity groups up to the 6-digit tariff level. No uniform product coding exists beyond this level. The system is used as the basis for national tariff systems (Harmonized Tariff Systems, or HTS), which further break down 6-digit tariff classifications to 8-digit or 10-digit levels according to national needs. Disaggregated coding is unique to national tariff classifications.
 - 16 See Hufbauer and Kim (2012).
 - 17 For example, solar panels fall within the HS subheading 854140, but this subheading also includes semiconductor devices and light emitting diodes (Hufbauer and Kim 2012).
 - 18 The WTO list was developed by the WTO Committee on Trade and Environment in Special Session (CTESS) in 2005, based on submissions of member countries.
 - 19 Many of these products are indicated as "ex outs," the indication that "a narrowly-defined product (tariff line) is further subdivided because it has two or more duties." Importantly for trade analysis, international import statistics "will be for the product (tariff line) as a whole, not for each subdivision." See "WTO Tariff Analysis Online (TAO)," http://www.wto.org/english/tratop_e/tariffs_e/tao_help_e.htm (accessed on February 13, 2014).
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- 20 These three lists include: (1) the list of EGs gathered by the WTO Committee on Trade and Environment Special Session, which lists more than 400 tariff lines categorized under broad headings, including renewable energy (see WTO 2011a); (2) a shorter list of renewable energy products drafted by Hufbauer and Kim (2012) that serves as the foundation for a proposed Sustainable Energy Trade Agreement; and (3) the list of EGs announced by APEC (2012) of which nearly 20 subheadings out of 54 pertain to renewable energy products. The OECD also developed a list, which we did not use.
- 21 For example, see EWEA, “Anti-dumping procedure regarding the import of certain woven and or stitched glass fibre fabrics from the People’s Republic of China,” <http://www.vindkraft.no/Files/Filer/AD%20576%20EWEA%20position%209%2001%2012.pdf>.
- 22 Other analyses on the EU’s use of trade remedies directed at renewable energy products are in accord; see, for example, Swedish National Board of Trade (2013) and Kasteng (2013).
- 23 This figure comes from the Office of the US Trade Representative; see “U.S., 13 Other WTO Members Unveil Plans To Negotiate Green Goods Deal,” *Inside US Trade*, January 30, 2014 www.insidetrade.com (accessed on February 10, 2014).
- 24 Import data is drawn from the International Trade Centre (<http://www.trademap.org/>), which compiles bilateral trade flows at the 8-digit and 10-digit product level based on national statistical agencies.
- 25 It could be argued that the relevant trade base for judging the impact of an AD or CVD investigation is the year of the preliminary duty, since Besedeš and Prusa (2013) find that the most significant effects on trade occur early in the investigation. Likewise, Staiger and Wolak (1994) find evidence that an AD case has effects on trade through the mere initiation of an investigation.
- 26 CIF values are generally used as the “customs valuation.” See “Technical Information on Customs Valuation,” World Trade Organization, http://www.wto.org/english/tratop_e/cusval_e/cusval_info_e.htm (accessed on March 7, 2014).
- 27 Three countries specify AD or CVD penalties as specific duties. For Australia, the specific duties remain confidential; thus our analysis is based on published dumping margins expressed on an *ad valorem* basis. For the European Union, *ad valorem* duties are published along with converted specific duties, so our analysis is based on the initial *ad valorem* estimates. For Peru, an *ad valorem* equivalent is estimated for the specific duties imposed based on the unit value method; see WTO (2004) and the notes to table A1 for more detail.
- 28 The European Union case on certain woven and/or stitched glass fiber fabrics from China was withdrawn in 2012 before duties were imposed. Seven other cases in our sample have not reached a preliminary decision: (1) China’s investigation on solar grade polysilicon involving the European Union found that dumping and subsidized imports were adversely affecting the Chinese market, but the Ministry of Commerce did not impose preliminary duties, citing the “complexity of the case” and extending the investigative period; (2) India’s dumping investigations on solar cell imports from China, Malaysia, United States and Taiwan were subject to extended deadlines for the investigative period; and (3) US dumping and subsidy investigations on solar cells and modules involving China and Taiwan are still in the preliminary phase (in February 2014, the US International Trade Commission found an indication of material injury to the US solar market, but the preliminary duties imposed will not be released until the US Department of Commerce completes its investigation, possibly in March 2014 for the subsidy case and July 2014 for the dumping cases). For the China and India cases, we broadly assume a protective effect of the average duty imposed in the sampled cases. For the US cases, we assume a protective effect based on the alleged dumping and subsidy margins published by the US Department of Commerce.
- 29 Empirical evidence is available for the general magnitude of import demand elasticities, but product level estimates are not available for renewables; some studies have assessed the effects of increased renewable energy generation on import demand. Calculation of elasticities across multiple markets and products was beyond the scope of this study. For a survey of general estimates, see Hufbauer, Schott and Wong (2010), table 2A.13.
- 30 Our estimate of total global trade is based on the 6-digit HS codes that correspond to the HTS codes specified in each AD/CVD case. As discussed previously, because 6-digit HS codes include some unrelated products this is an imprecise overestimate of actual global trade in the specified renewable energy products. Our estimate for renewable products is smaller than the USTR figure of \$955 billion, cited earlier, which includes a broader array of environmental goods, likely based on the APEC list of 50 plus products, compared to our list of 8 renewable energy products.
- 31 This section draws heavily from WTO dispute summaries.
- 32 “European Union — Anti-Dumping Measures on Biodiesel from Argentina,” Dispute Settlement: Dispute DS473, updated as of February 7, 2014, http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds473_e.htm (accessed on February 9, 2014).
- 33 “United States — Countervailing and Anti-dumping Measures on Certain Products from China,” Dispute Settlement: Dispute DS449, updated as of September 30, 2013, http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds449_e.htm (accessed on February 9, 2014).

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- 34 “European Union and a Member State — Certain Measures Concerning the Importation of Biodiesels,” Dispute Settlement: Dispute DS443, updated as of August 17, 2012 http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds443_e.htm (accessed on February 17, 2014).
 - 35 “European Union and Certain Member States — Certain Measures on the Importation and Marketing of Biodiesel and Measures Supporting the Biodiesel Industry,” Dispute Settlement: Dispute DS459, http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds459_e.htm (accessed on February 8, 2014).
 - 36 “India — Certain Measures Relating to Solar Cells and Solar Modules,” Dispute Settlement: Dispute DS456, http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds456_e.htm (accessed on February 8, 2014).
 - 37 “European Union and certain Member States — Certain Measures Affecting the Renewable Energy Generation Sector,” Dispute Settlement: Dispute DS452, http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds452_e.htm (accessed on February 4, 2014).
 - 38 “China — Measures concerning wind power equipment,” Dispute Settlement: Dispute DS419, http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds419_e.htm (accessed on February 8, 2014).
 - 39 “Canada — Certain Measures Affecting the Renewable Energy Generation Sector,” Dispute Settlement: Dispute DS412, http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds412_e.htm (accessed on February 8, 2014); and “Canada—Measures Relating to the Feed-in Tariff Program,” Dispute Settlement: Dispute DS426, www.wto.org/english/tratop_e/dispu_e/cases_e/ds426_e.htm (accessed on February 8, 2014).
 - 40 The new rules would modify AD procedures to more closely follow existing competition or anti-trust rules and would create higher thresholds for initiating AD investigations when petitioners have a “dominant position” in the industry, or when “price undercutting” is alleged (Kasteng 2013, p. 10).
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