

# A Critical Companion: Why Climate Progressives Should Learn to Love the World Trade Organization

COLLMANN GRIFFIN\*

## TABLE OF CONTENTS

Introduction . . . . .	200
I. How the WTO Cuts the Costs of Renewable Energy . . . . .	202
A. The Law of Free Trade: The Most-Favored-Nation Principle, National Treatment Principle, and Low Tariffs . . . . .	203
B. The Economics of Free Trade: Comparative Advantage, Economies of Scale, and Relentless Competition. . . . .	204
C. The Effects of Free Trade: Cheaper Renewables Sooner . . . . .	206
II. How the WTO Discriminates Between Beneficial and Harmful Support for Renewables. . . . .	208
A. The Need to Support Renewables . . . . .	209
B. The Agreement on Subsidies and Countervailing Measures (“SCM”) . . . . .	210
1. SCM Articles 1 and 2: Government Support Measures Outside of the SCM . . . . .	210
2. SCM Article 5: Actionable Subsidies that Harm Other Members’ Industries . . . . .	211
3. SCM Article 3: Prohibited Subsidies that Distort Trade . . . . .	212
C. The Agreement on Trade-Related Investment Measures (“TRIMs”): A Backstop for the SCM . . . . .	213
D. <i>Chinese Photovoltaics</i> : Actionable and Export Subsidies. . . . .	214
1. SCM Article 3.1(b) and SCM Article 5 Applied to China’s Solar Subsidies. . . . .	214
2. The Economic and Environmental Effects of China’s Solar Subsidies. . . . .	216
E. <i>Canada—Renewable Energy, Canada—Feed-in Tariff, and India—Solar Cells</i> : Local Content Requirements (“LCRs”) . . . . .	218
1. SCM Article 3.1(a) and TRIMs Applied to Canada and India’s LCRs . . . . .	219
2. The Economic and Environmental Effects of Canada and India’s LCRs . . . . .	221
Conclusion. . . . .	224

---

\* J.D. 2016, Georgetown University Law Center. © 2017, Collmann Griffin.

## INTRODUCTION

The World Trade Organization (“WTO”) is not seen as a friend of the environment by many in the environmental community.<sup>1</sup> In *U.S.—Shrimp*, the WTO seemed to strike down a U.S. regulation requiring shrimp fishermen to use turtle excluder devices in their fishing nets that would allow endangered sea turtles to escape.<sup>2</sup> In *U.S.—Gasoline*, the WTO required the United States to change an “enforceable, trustworthy, and economically feasible”<sup>3</sup> rule promulgated under the Clean Air Act that ensured imported gasoline met U.S. standards for health-threatening air emissions.<sup>4</sup> And in *U.S.—Tuna II*, the WTO forced the United States to weaken a popular law designed to protect dolphins captured in tuna fishermen’s nets.<sup>5</sup>

More recently, WTO law has prevented the Canadian,<sup>6</sup> Chinese,<sup>7</sup> and Indian<sup>8</sup> governments from using subsidies to support renewable-energy technology and production capability. These recent WTO disputes seem especially perverse because they appear to undermine countries’ attempts to mitigate climate change. Knowledgeable economists and environmentalists predict catastrophic effects from climate change, including disruption of water supplies, decreased crop yields in the world’s poorest regions, invigorated tropical disease, mass extinctions on a scale not seen since the dinosaurs, and rising sea levels.<sup>9</sup> The most urgent thing we need to mitigate these catastrophic effects is to reduce anthropogenic emissions of the greenhouse gases (“GHGs”) that drive climate change—

---

1. See, e.g., *The WTO, the Environment, Health and Safety*, PUBLIC CITIZEN, <http://www.citizen.org/Page.aspx?pid=1425> (last visited Nov. 26, 2016).

2. See Appellate Body Report, *United States—Import Prohibition of Certain Shrimp and Shrimp Products*, WTO Doc. WT/DS58/AB/R (adopted Nov. 6, 1998).

3. Alan Tonelson & Lori Wallach, *We Told You So: The WTO’s First Trade Decision Vindicates the Warnings of Critics*, WASH. POST, May 5, 1996, at C4.

4. See Appellate Body Report, *United States—Standards for Reformulated and Conventional Gasoline*, WTO Doc. WT/DS2/AB/R (adopted May 20, 1996).

5. Appellate Body Report, *United States—Measures Concerning the Importation, Marketing and Sale of Tuna and Tuna Products*, ¶ 3, WTO Doc. WT/DS381/AB/R (adopted June 13, 2012).

6. See Appellate Body Report, *Canada—Certain Measures Affecting the Renewable Energy Generation Sector*, WTO Doc. WT/DS412/AB/R (adopted May 24, 2013) [hereinafter *Canada—Renewable Energy ABR*].

7. See Request for Consultations by the United States, *China—Measures Concerning Wind Power Equipment*, WTO Doc. WT/DS419/1 (Dec. 22, 2010) (United States initiating dispute by requesting consultations); see also Press Release, U.S. Trade Rep., *China Ends Wind Power Equipment Subsidies Challenged by the United States in WTO Dispute* (June 8, 2011), <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2011/june/china-ends-wind-power-equipment-subsidies-challenged> (announcing end to China’s program as a result of request for consultations).

8. See Request for Consultations by the United States, *India—Certain Measures Relating to Solar Cells and Solar Modules*, WTO Doc. WT/DS456/1 (Feb. 6, 2013) (United States initiating dispute by requesting consultations); see also Rajesh Roy, *WTO Panel Rules Against India’s Solar Program*, WALL STREET J. (Sept. 1, 2015, 9:04 AM), <http://www.wsj.com/articles/wto-panel-rules-against-indias-solar-program-1441112645>.

9. NICHOLAS STERN, STERN REVIEW: THE ECONOMICS OF CLIMATE CHANGE 57 (2006), [http://mudancasclimaticas.cptec.inpe.br/rmclima/pdfs/destaques/sternreview\\_report\\_complete.pdf](http://mudancasclimaticas.cptec.inpe.br/rmclima/pdfs/destaques/sternreview_report_complete.pdf).

carbon dioxide, methane, nitrous oxide, etc.<sup>10</sup> And a critically important way to reduce GHG emissions is to develop and deploy renewable-energy technologies that can produce energy more cheaply than our current GHG-emitting technologies.<sup>11</sup> Therefore, given the enormity of the climate-change problem and the outsized role that fossil energy has played, is it time to rethink the WTO's law regarding renewable energy?

This Note argues that the answer to this question is an emphatic “no.” One of the most important goals in any climate-mitigation strategy is cutting the cost of renewable sources so they can compete with fossil fuels. And if the WTO has one strength, it is the organization's ability to unleash the best forces for cutting these costs, as will be demonstrated below. In fact, the WTO deserves tremendous credit for the progress already achieved on this front, and is perhaps the only international institution that can ensure this progress continues. Furthermore, even when governments intervene to accelerate the adoption of solar and wind energy, they must do so in ways that preserve the cost-cutting forces guaranteed by the WTO.

The legal and economic arguments that underlie the assertion will be discussed in greater detail, but for now, consider the following illustration: Over the past few decades, prices for products that cannot easily be traded across international borders have risen or remained stubbornly high.<sup>12</sup> As examples, consider college tuition, childcare, healthcare, vehicle maintenance, and housing.<sup>13</sup> During the same period, prices for products that can easily be manufactured in one place and sold in another have plummeted. As examples, consider goods like toys, phones, personal computers, and televisions, the prices of which have dropped by 60% to 150% over the past decades.<sup>14</sup> Free trade has almost certainly played a role in the price difference between traded and non-traded products.<sup>15</sup> Do we want the cost of renewables to stay stubbornly high, like the cost of healthcare, childcare, and education? Or do we want the cost to plummet, like with toys, phones, or televisions?

The Note proceeds as follows: Part I introduces the General Agreement on Tariffs and Trade (“GATT”), and also explains the free-trade forces this agreement unleashes: comparative advantage, economies of scale, and global competition. Sections II.A, II.B, and II.C discuss the need to support renewables, the

---

10. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, RENEWABLE ENERGY SOURCES AND CLIMATE CHANGE MITIGATION: SUMMARY FOR POLICYMAKERS AND TECHNICAL SUMMARY 7 (Ottmar Edenhofer et al., eds. 2011), [https://www.ipcc.ch/pdf/special-reports/srren/SRREN\\_FD\\_SPM\\_final.pdf](https://www.ipcc.ch/pdf/special-reports/srren/SRREN_FD_SPM_final.pdf).

11. *Id.*

12. Annie Lowrey, *Changed Life of the Poor: Better Off, but Far Behind*, N.Y. TIMES, Apr. 30, 2014, at A1.

13. *Id.*

14. *Id.*

15. David Boaz, *The Benefit of Free Trade is Not Exports, It's Lower Prices on Things We Want*, CATO INST. (May 22, 2015, 10:55 AM), <http://www.cato.org/blog/benefit-free-trade-not-exports-its-lower-prices-things-we-want>.

Agreement on Subsidies and Countervailing Measures (“SCM”) and the Agreement on Trade-Related Investment Measures (“TRIMs”)—all of which explain how the WTO permits beneficial support for renewables but prohibits harmful support that undermines free trade. Sections II.D and II.E explore four cases—the *Chinese Photovoltaics* case, *Canada—Renewable Energy*, *Canada—Feed-in Tariff*, and *India—Solar Cells*—and argue that these four cases applied WTO law to achieve the best economic and environmental outcomes.

However, before beginning an analysis of WTO law and policy, it is important to clarify what this Note does not discuss. First, this Note does not consider the application of WTO law to a carbon tax or a carbon tariff.<sup>16</sup> This important legal issue is beyond the scope of this Note, which focuses on how the WTO reduces the costs of renewables. Second, this Note takes no stance on other controversial areas of free trade: Free trade may or may not lead to unemployment in the short run, given that workers cannot be retrained quickly enough to keep up with foreign competition.<sup>17</sup> Free trade may or may not exacerbate global inequality, since the poor are often less able to adapt to globalization than the rich.<sup>18</sup> And free trade may or may not permit regulatory and environmental arbitrage, where companies are able to escape legitimate regulation by relocating to less developed jurisdictions.<sup>19</sup> Instead of tackling these issues, this Note assumes that cutting the cost of renewables is so important that all other concerns must take a back seat.

## I. HOW THE WTO CUTS THE COSTS OF RENEWABLE ENERGY

Any discussion of the WTO begins with the General Agreement on Tariffs and Trade (“GATT”), which came into force in 1947,<sup>20</sup> and therefore predates the WTO by a half century. The 1995 Agreement Establishing the World Trade Organization<sup>21</sup> took an updated version of the GATT as its core,<sup>22</sup> adding

---

16. For an excellent discussion of WTO law’s application to carbon taxes and carbon tariffs, see JENNIFER HILLMAN, CHANGING CLIMATE FOR CARBON TAXES: WHO’S AFRAID OF THE WTO? (2013), <http://www.gmfus.org/file/3102/download>.

17. Compare Adam Weissman, *The Trans-Pacific Partnership: The Closed-Door Deal to Establish Corporate Power*, OCCUPY WALL STREET, <http://occupywallstreet.net/story/trans-pacific-partnership-closed-door-deal-establish-corporate-power> (last visited Dec. 1, 2016), with MATTHEW J. SLAUGHTER & PHILLIP SWAGEL, IMF, DOES GLOBALIZATION LOWER WAGES AND EXPORT JOBS? (1997), <https://www.imf.org/EXTERNAL/PUBS/FT/ISSUES11/issue11.pdf>.

18. Compare Weissman, *supra* note 17, with SLAUGHTER & SWAGEL, *supra* note 17.

19. Compare Weissman, *supra* note 17, with SLAUGHTER & SWAGEL, *supra* note 17.

20. General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A-11, 55 U.N.T.S. 194 [hereinafter GATT].

21. Marrakesh Agreement Establishing the World Trade Organization, Apr. 15, 1994, 1867 U.N.T.S. 154 [hereinafter Marrakesh Agreement].

22. General Agreement on Tariffs and Trade 1994, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, 1867 U.N.T.S. 187.

additional agreements to extend GATT principles to other areas<sup>23</sup> and a new Dispute Settlement Understanding (“DSU”) to better enforce the GATT.<sup>24</sup>

For our purposes, the GATT articulates three central legal principles: the most-favored-nation principle, the national-treatment principle, and the principle of converting all non-tariff restrictions on trade into tariffs, all of which are discussed in section I.A of this Note. Together, these three principles allow the economic forces of comparative advantage, economies of scale, and relentless global competition to work, as discussed in section I.B. Renewable-energy firms, such as the Danish wind giant Vestas, have taken advantage of these forces to produce better, cheaper products more quickly, as discussed in section I.C.

#### A. THE LAW OF FREE TRADE: THE MOST-FAVORED-NATION PRINCIPLE, NATIONAL TREATMENT PRINCIPLE, AND LOW TARIFFS

At first glance, the GATT seems quite complicated, with thirty-eight articles, nine annexes, and two appendices.<sup>25</sup> In reality, the GATT primarily consists of three principles. (It is the several exceptions that make things complicated.) These three principles are the most-favored-nation principle, the national-treatment principle, and the principle of conversion to tariffs.

GATT Article I articulates the most-favored-nation (“MFN”) principle: Whenever a party grants any “advantage, favour, privilege or immunity” to a product originating in another country, that party must immediately and unconditionally grant the same advantage to “like product[s]” originating in all other GATT parties.<sup>26</sup> Before MFN, governments used trade law as a political tool, discriminating between trade partners on the basis of geopolitics instead of economics.<sup>27</sup> Trade therefore developed according to political rather than economic reasons.<sup>28</sup> This, in turn, distorted the market in favor of goods and services that were more expensive or of lower quality.<sup>29</sup> MFN has been eroded in recent years by free trade agreements and customs unions.<sup>30</sup> Nevertheless, MFN remains the cornerstone of the GATT economic order.<sup>31</sup>

23. See, e.g., Agreement on Subsidies and Countervailing Measures, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, 1867 U.N.T.S. 14 [hereinafter SCM]; Agreement on Trade-Related Investment Measures, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, 1868 U.N.T.S. 186 [hereinafter TRIMs].

24. Understanding on Rules and Procedures Governing the Settlement of Disputes, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 2, 1869 U.N.T.S. 401.

25. GATT, *supra* note 20.

26. *Id.* art. I.1.

27. See PETER VAN DEN BOSSCHE, *THE LAW AND POLICY OF THE WORLD TRADE ORGANIZATION* 321 (2d ed., 2008).

28. *Id.*

29. *Id.*

30. *Id.* at 323.

31. *Id.* at 324.

GATT Article III articulates the national-treatment (“NT”) principle: Parties may not subject foreign products to either “internal taxes” greater than those imposed on like domestic products<sup>32</sup> or “laws, regulations and requirements affecting . . . internal sale” less favorable than those governing like domestic products.<sup>33</sup> In other words, once foreign goods cross the border and their tariff has been paid, GATT parties must treat them exactly the same as domestic goods.

GATT Article XI articulates the principle of converting non-tariff restrictions on trade—quotas, licenses, outright prohibitions, etc.—into tariffs, which can then be easily published.<sup>34</sup> Once tariffs were published, GATT parties endeavored to incrementally lower tariffs in a series of eight “rounds”—multilateral conferences where all parties were able to negotiate tariff cuts that, because of MFN, would apply to all other parties.<sup>35</sup> After seven successful rounds of tariff cuts between 1947 and 1979, the establishment of the WTO in 1995, and the unilateral lowering of tariffs, tariffs are now an order of magnitude lower than they were before the GATT and WTO.<sup>36</sup> In particular, tariffs on renewable-energy goods are now quite low: averaging just 4.2% among all parties and 2.0% among parties currently negotiating the Environmental Goods Agreement (“EGA”),<sup>37</sup> which make up 86% of trade in such goods.<sup>38</sup>

#### B. THE ECONOMICS OF FREE TRADE: COMPARATIVE ADVANTAGE, ECONOMIES OF SCALE, AND RELENTLESS COMPETITION

Together, MFN, NT, and low tariffs build the foundations for free trade. MFN means that consumers are free to purchase goods from different foreign countries, with no difference in treatment or taxation. NT means governments are prohibited from treating foreign goods differently than domestic goods in terms of higher taxes or more onerous regulation. And low tariffs mean that it is cheap

---

32. GATT, *supra* note 20, art. III.2.

33. *Id.* art. III.4.

34. *Id.* art. XI.1.

35. *The GATT Years: From Havana to Marrakesh*, WTO, [https://www.wto.org/english/thewto\\_e/whatis\\_e/tif\\_e/fact4\\_e.htm](https://www.wto.org/english/thewto_e/whatis_e/tif_e/fact4_e.htm) (last visited Dec. 1, 2016).

36. See Robert E. Baldwin, *The Changing Nature of U.S. Trade Policy Since World War II*, in *THE STRUCTURE AND EVOLUTION OF RECENT U.S. TRADE POLICY 6* (Robert E. Baldwin & Anne O. Krueger eds., 1984), <http://www.nber.org/chapters/c5828.pdf> (showing eighty-nine percent decrease in tariffs between 1930 and 1979 due to first seven GATT rounds); see also *Tariff Rate, Applied, Weighted Mean, All Products (%)*, WORLD BANK, <http://data.worldbank.org/indicator/TM.TAX.MRCH.WM.AR.ZS> (last visited Jan. 7, 2016) (showing an additional ninety-two percent decrease in tariffs between 1996 and 2010 due to establishment of WTO).

37. See EUR. COMM’N, *TRADE SUSTAINABILITY IMPACT ASSESSMENT ON THE ENVIRONMENTAL GOODS AGREEMENT 11 n.2, 148* (2015), [http://www.egatradesia.com/sites/all/docs/Final\\_Interim\\_Report-EGA\\_Trade\\_SIA\\_FINAL.pdf](http://www.egatradesia.com/sites/all/docs/Final_Interim_Report-EGA_Trade_SIA_FINAL.pdf) (listing negotiating parties and tariff lines currently considered for inclusion under EGA); see also *Tariff Analysis Online Facility*, WTO, <https://tao.wto.org/welcome.aspx?ReturnUrl=%2f%3fui%3d1&ui=1> (last visited Jan. 7, 2016).

38. *Environmental Goods Agreement*, U.S. TRADE REP., <https://ustr.gov/trade-agreements/other-initiatives/environmental-goods-agreement> (last visited Jan. 7, 2016).

to import and export goods. All of this gives producers the freedom to manufacture and sell their products wherever they see fit on the basis of economics rather than politics. This, in turn, unleashes three important economic forces that drive down costs: comparative advantage, economies of scale, and relentless global competition.

Comparative advantage is a powerful theory, but it is abstract and often misunderstood. Countries differ in the cost of making the same product due to what economists call “productivity” and “factor endowments”—abstract concepts that capture, *inter alia*, the effects of technology, education, managerial prowess, regulation, and the relative abundance of labor, land, capital, and entrepreneurship.<sup>39</sup> All of these differences mean that not only do absolute costs vary from country to country, but so do “opportunity costs”—the cost of making one product in terms of the foregone opportunities of making another.<sup>40</sup> So long as productivity and factor endowments differ from country to country, every country must, with mathematical certainty, have a unique “comparative advantage” that allows it to produce goods more efficiently than any other country.<sup>41</sup> Smart countries maximize their utility by specializing in making products according to their comparative advantage and trading for all other goods, which the removal of trade barriers allows.<sup>42</sup> Economists’ models of comparative advantage offer different predictions depending on which aspects of reality they include or ignore; however, all models agree that exploiting comparative advantage leads to cheaper products, both for individual countries and for the world.<sup>43</sup>

Economies of scale are also important, and, thankfully, a little more intuitive. Firms with complex manufacturing processes must spend significant capital on land, facilities, machines, and skilled, contracted labor before they can sell a single product.<sup>44</sup> These are what economists call “fixed costs”—costs that must be incurred regardless of how many units a firm produces.<sup>45</sup> When a firm produces only a few units, the prices of each individual unit must reflect these high fixed costs. However, the cost per unit falls dramatically when they are divided among a large quantity of output.<sup>46</sup> Renewable-energy firms typically have high fixed costs, because they must invent the necessary technology and build large, complex factories.<sup>47</sup> Therefore, the best way to offset these high fixed

---

39. See PAUL R. KRUGMAN ET AL., *INTERNATIONAL ECONOMICS: THEORY AND POLICY* 25–28, 37, 52, 81–88 (9th ed. 2012).

40. *Id.* at 25–28.

41. *Id.* at 32, 52, 81–82.

42. *Id.* at 34.

43. *Id.* at 34, 64, 90.

44. *Id.* at 158.

45. *Id.*

46. *Id.* at 159.

47. See *id.*

costs is with volume: the more, the better.<sup>48</sup> This, in turn, means the world is more efficient when markets are large enough to allow several facilities to achieve economies of scale while preserving competition.<sup>49</sup> Conversely, barriers to trade prevent producers from achieving economies of scale in small, domestic markets, which makes goods more expensive.<sup>50</sup>

Finally, global competition is crucial, both for the efficiency and the innovation that renewables need. All firms are much more likely to innovate if they know a new product may gain them market share or a competitor's new product may cost them market share.<sup>51</sup> But renewables, as discussed above, have high fixed costs. Therefore, a small, protected market may provide only enough volume for one or two firms to sufficiently offset fixed costs.<sup>52</sup> Such firms therefore have a natural monopoly or duopoly, which weakens the powerful incentives from competition.<sup>53</sup> Economically rational firms charge consumers a higher price, knowing that consumers have nowhere else to turn.<sup>54</sup> The same firms would also cut back on research and development expenses so that products remain expensive and technologically backward.<sup>55</sup> The way to avoid this trap is for all firms to compete in the global market.<sup>56</sup> This allows firms to produce at cost-efficient volumes, but concurrently ensures that there are enough firms for relentless competition.<sup>57</sup>

### C. THE EFFECTS OF FREE TRADE: CHEAPER RENEWABLES SOONER

What effects have comparative advantage, economies of scale, and global competition—guaranteed around the world by the GATT's MFN, NT, and low tariffs—had on renewables producers? It is clear that, under the WTO regime, the cost of renewables has fallen significantly over the past two decades.<sup>58</sup> The question is whether this drop in costs has occurred *because of* free trade or *in spite of* free trade.

---

48. *See id.* at 158.

49. *Id.* at 160.

50. *Id.* at 164.

51. *Id.* at 165–66.

52. *Id.* at 165.

53. *Id.* at 166–67. For an illustrative case study of this phenomenon, *see* THEODORE H. MORAN, FOREIGN DIRECT INVESTMENT AND DEVELOPMENT 47 (1998). Before NAFTA, Mexico imposed high tariffs and domestic content requirements on computer manufacturers, which limited competition and gave computer manufacturers with high fixed costs a monopoly within the Mexican market. *Id.* The result was higher prices and lagging technology for Mexican computer consumers. *Id.* Similar phenomena can be seen with other high fixed-cost industries in other developing countries, such as electronics, automobiles, petrochemicals, and computers. *Id.* at 44.

54. KRUGMAN ET AL., *supra* note 39, at 166.

55. *See id.* at 172.

56. *Id.* at 166. *See also* MORAN, *supra* note 53 and accompanying discussion.

57. KRUGMAN ET AL., *supra* note 39, at 165–66.

58. *See* INT'L RENEWABLE ENERGY AGENCY, RENEWABLE POWER GENERATION COSTS IN 2014, at 29, 70 (2015), [http://www.irena.org/documentdownloads/publications/irena\\_re\\_power\\_costs\\_2014\\_report.pdf](http://www.irena.org/documentdownloads/publications/irena_re_power_costs_2014_report.pdf).

The story of the Danish wind-turbine manufacturer Vestas suggests that the best renewables firms respond to free trade in the same way as their counterparts in other innovative, high fixed-costs industries. Vestas, the largest wind-turbine manufacturer in the world,<sup>59</sup> established itself as a turbine manufacturer in Denmark,<sup>60</sup> a jurisdiction whose low tariffs and non-tariff barriers<sup>61</sup> means that Vestas has had to grapple with the opportunities and challenges of free trade since its foundation. And Vestas seems to have responded to these opportunities and challenges exactly as it should. First, Vestas has scoured the globe, seeking the comparative advantage for each stage of production in order to cut costs: The firm carries out most of its management, research, and development in super-productive Denmark, but manufactures various turbine components in Brazil, China, the EU, India, and the United States, with the complexity of the component roughly corresponding with each country's productivity and relative abundance of low-skilled, medium-skilled, and high-skilled labor.<sup>62</sup> Second, Vestas is taking advantage of economies of scale: The company recently consolidated its thirty-one manufacturing sites around the world to nineteen, all while increasing megawatts shipped by an average of fourteen percent each year and continuing to reduce the cost of producing one megawatt hour.<sup>63</sup> These scales make sense for a company that sells its turbines and accessories in seventy-three countries around the world.<sup>64</sup> Finally, Vestas candidly acknowledges that it faces fierce competition from other turbine producers, but it stays ahead of the competition through continuous innovation that allows it to cut costs.<sup>65</sup> Vestas is a large, easily researchable company, but we would expect the same phenomena to drive the successes of other producers of panels and turbines.

Furthermore, the effects of ending the WTO's free trade regime on a company like Vestas are foreseeable. Vestas would have to relocate its production facilities to accord with politics, not comparative advantage, and production costs would rise. Vestas would also have to spread its production across jurisdictions insisting on localized production, destroying economies of scale and causing production costs to rise again. Finally, Vestas would find itself in a monopolistic position in

---

59. VESTAS, ANNUAL REPORT 2014, at 4 (2015), [https://www.vestas.com//media/vestas/investor/investor%20pdf/financial%20reports/2014/ar/150211\\_annual%20report%202014.pdf](https://www.vestas.com//media/vestas/investor/investor%20pdf/financial%20reports/2014/ar/150211_annual%20report%202014.pdf).

60. *Company Profile: Vestas History*, VESTAS, <https://www.vestas.com/en/about/profile#!history> (last visited Dec. 1, 2016).

61. See TERRY MILLER & ANTHONY B. KIM, HERITAGE FOUND., 2015 INDEX OF ECONOMIC FREEDOM 4 (2015). In 2015, Denmark earned a score of 88 out of 100 for "trade freedom," which takes into account a country's tariff and non-tariff barriers. *Id.* This put Denmark in the top ten countries in the world for trade freedom. *Id.*

62. See VESTAS, ANNUAL REPORT 2013, at 26 (2014), [https://www.vestas.com//media/vestas/investor/investor%20pdf/announcements/2014/140203\\_ca\\_uk\\_annualreport2013.pdf](https://www.vestas.com//media/vestas/investor/investor%20pdf/announcements/2014/140203_ca_uk_annualreport2013.pdf); see generally VESTAS, ANNUAL REPORT 2014, *supra* note 59 (demonstrating profitability of strategy of consolidation).

63. VESTAS, ANNUAL REPORT 2013, *supra* note 62, at 25.

64. VESTAS, ANNUAL REPORT 2014, *supra* note 59, at 2.

65. VESTAS, ANNUAL REPORT 2013, *supra* note 62, at 20; see also *Company Profile: Corporate Strategy*, VESTAS, <https://www.vestas.com/en/about/profile#!strategy> (last visited Dec. 1, 2016).

several smaller markets. Research and development spending would become superfluous, and innovation would slow. The date when Vestas' wind turbines could compete with fossil fuels on cost would be pushed further into the future.

## II. HOW THE WTO DISCRIMINATES BETWEEN BENEFICIAL AND HARMFUL SUPPORT FOR RENEWABLES

Comparative advantage, economies of scale, and relentless competition are all, essentially, arguments for free markets. Sometimes, however, markets fail. In particular, climate change seems to be “the greatest market failure the world has ever seen.”<sup>66</sup> The market's failure to address the problem of climate change suggests that a non-market solution may be necessary.

One common non-market solution is government intervention. Perhaps, therefore, the WTO should enforce free trade less rigidly, allowing governments to intervene and correct the market failure of climate change. In particular, perhaps the WTO should enforce its prohibitions on subsidies less rigidly, given that subsidies seem to be a crucial tool for stimulating the growth of the renewables industry.<sup>67</sup>

This section agrees that climate change is a market failure and subsidies are part of the solution to that failure. However, this section also argues that WTO disciplines on subsidies are beneficial for renewables, because they ensure that subsidies are applied in a way that preserves free trade's ability to dramatically cut costs. Far from preventing WTO members from subsidizing renewables, the WTO's disciplines on subsidies serve the important purpose of ensuring that members' subsidies do not end up doing more harm than good.

This section proceeds as follows. Section II.A identifies the market failures thought to underlie climate change and therefore require subsidies. Section II.B considers WTO members' abilities to address these market failures in compliance with the three WTO disciplines on subsidies: Article 5 of the Agreement on Subsidies and Countervailing Measures (“SCM”),<sup>68</sup> which disciplines subsidies

---

66. STERN, *supra* note 9, at viii.

67. For arguments in favor of rethinking the WTO subsidy regimes to support renewables, see Paolo Davide Farah & Elena Cima, *The World Trade Organization, Renewable Energy Subsidies, and the Case of Feed-in Tariffs: Time for Reform toward Sustainable Development?*, 27 GEO. INT'L ENVTL. L. REV. 515 (2015); see also Luca Rubini, *Ain't Wastin' Time No More: Subsidies for Renewable Energy, the SCM Agreement, Policy Space, and Law Reform*, 15 J. INT'L ECON. L. 525 (2012).

68. SCM, *supra* note 23, art. 5. The Agreement on Subsidies and Countervailing Measures came into force in 1995 as part of a package of new agreements that complemented the much older GATT. See Marrakesh Agreement, *supra* note 21. Many WTO members' domestic law and GATT Article XVI had long recognized that subsidies can affect trade. See, e.g., Dingley Act of 1897, ch. 11, 30 Stat. 151 (repealed 1979). Based on this experience, the architects of the WTO included in the SCM two mechanisms for members to address other members' subsidies that had unfair effects on trade: (1) bringing a dispute before the WTO, SCM, *supra* note 23, art. 7.1.; and (2) imposing a “countervailing duty” to counteract the subsidy, so long as the countervailing duty is imposed according to certain principles, *id.* art. 10. (The use of countervailing duties as a remedy predates the SCM, but was incorporated into and disciplined by the SCM. See GATT, *supra* note 20, art. VI.) Procedurally,

that harm other members' industries; SCM Article 3.1(a), which disciplines export subsidies;<sup>69</sup> and SCM Article 3.1(b), which disciplines subsidies contingent on local content.<sup>70</sup> Section II.C considers the Agreement on Trade-Related Investment Measures, an agreement that has become a backstop to govern measures that support renewable energy in ways that distort free trade.<sup>71</sup> Finally, sections II.D and II.E analyze four recent cases that applied the SCM and TRIMs—*Chinese Photovoltaics*, *Canada–Renewable Energy*, *Canada–Feed-in Tariff*, and *India–Solar Cells*—and argue that WTO law provided for the best economic and environmental outcome for each.

#### A. THE NEED TO SUPPORT RENEWABLES

The world's failure to address climate change may be *prima facie* evidence of market failure. But how, precisely, have renewable-energy markets failed? This question is important, because reckless government intervention may end up destroying the aspects of the market that *do* actually work, undermining the forces shown to be driving down renewables' costs. An apt analogy is to a brain surgeon: Even if she knows her patient has a neurological disorder, she should not willy-nilly slice open a patient's brain without properly diagnosing the problem.

The consensus seems to be that energy markets suffer from what economists call “externalities”<sup>72</sup>—a type of market failure that occurs when one economic actor's private costs do not align with society's public costs.<sup>73</sup> Specifically, traditional-energy producers create “negative externalities;” they escape most of the costs of their GHG emissions, and therefore lack the incentives to minimize the costs they would incur if they bore all those costs.<sup>74</sup> Conversely, renewable-energy producers create “positive externalities;” they cannot fully capture the benefits of clean energy that they provide to society, and therefore lack the incentives to maximize production if they could profit from every such benefit provided.<sup>75</sup> Economists' solution to both of these problems is to “internalize” these externalities—force traditional-energy producers to pay society for pollu-

---

these two mechanisms are very different; substantively, however, both mechanisms differentiate between “actionable subsidies” and “prohibited subsidies.”

69. SCM, *supra* note 23, art. 3.1(a).

70. *Id.* art. 3.1(b).

71. TRIMs, *supra* note 23, art. 2, Annex 1(a)–(b).

72. See STERN, *supra* note 9, at 24–25; see also Thomas Helbling, *What are Externalities?*, 47 FIN. & DEV., no. 4, Dec. 2010, at 48, 49; Michael Greenstone, *Paying the Cost of Climate Change*, BROOKINGS INST. (Sept. 19, 2014), <http://www.brookings.edu/blogs/planetpolicy/posts/2014/09/19-paying-cost-of-climate-change-greenstone>.

73. See JONATHAN M. HARRIS & BRIAN ROACH, ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS: A CONTEMPORARY APPROACH 35–39 (3d ed. 2013).

74. *Id.*

75. *Id.*

tion and force society to pay renewable-energy producers for clean energy.<sup>76</sup>

Subsidies are a popular solution to this market failure. By taxing society to pay renewable-energy producers for the benefits they provide but currently cannot capture, subsidies help internalize externalities for renewable energy such that the optimal amount of clean energy is produced. Most plans for promoting renewable energy, therefore, include some subsidies for renewable energy. The question is how best to apply these subsidies.

#### B. THE AGREEMENT ON SUBSIDIES AND COUNTERVAILING MEASURES (“SCM”)

Even if subsidies can be used to address the market failures that underlie climate change, such subsidies must not be applied in a way that risks interfering with the forces of free trade discussed above. For example, we do not want a subsidy that internalizes dirty-energy producers’ externalities but also makes renewables more expensive for consumers, specifically by eliminating comparative advantage, economies of scale, or global competition. Returning to the brain surgeon analogy: Even if the surgeon knows the location of a neurological disorder, she must think very carefully about whether and how to remove the tumor without damaging surrounding brain structures.

The WTO’s Agreement on Subsidies and Countervailing Measures<sup>77</sup> strikes this balance between subsidies that correct the climate-change market failure and subsidies that end up causing more market failures. The WTO strikes this balance in three ways. First, the SCM’s definition of subsidy excludes many beneficial government support measures from the agreement’s jurisdiction entirely, as discussed in section II.B.1. Second, the SCM permits many measures that do meet the SCM’s definition of a subsidy, but prohibits those that cause adverse effects on other WTO members’ industries, as discussed in section II.B.2. Third, the SCM prohibits trade-distorting subsidies contingent on exports or local content, as discussed in section II.B.3.

##### 1. SCM Articles 1 and 2: Government Support Measures Outside of the SCM

SCM Articles 1 and 2 set forth the definition of a “subsidy” that triggers the SCM. The definition begins broadly: subsidies include grants, loans, loan guarantees, equity infusions, tax credits, the provision of goods and services, or price support.<sup>78</sup> This definition would capture almost any support a government might provide, except that it is narrowed by two additional criteria. First, a subsidy must confer a “benefit,”<sup>79</sup> which has been interpreted to mean that the recipient must get something on terms more favorable than she could get

---

76. *Id.*

77. *See supra* note 68; *see also* GATT, *supra* note 20, art. XVI.

78. SCM, *supra* note 23, art. 1.1(a)(1).

79. *Id.* art. 1.1(b).

vis-à-vis the market.<sup>80</sup> This requirement releases many government support measures for renewables from the SCM. For example, a government program that provides grants, loans, or goods to renewable-energy producers at the same rate as the private sector does not implicate the SCM at all.<sup>81</sup> Second, a subsidy must be “specific”—limited, either in law or in fact, to certain industries or enterprises.<sup>82</sup> This requirement also releases many government support measures from the SCM. For example, tax credits to consumers of renewable energy do not implicate the SCM, so long as they are available to energy consumers regardless of industry or enterprise.<sup>83</sup> In short, the SCM’s definition of a subsidy leaves significant policy space for WTO members to address the underlying market failure of climate change.

## 2. SCM Article 5: Actionable Subsidies that Harm Other Members’ Industries

Once a subsidy has been established under SCM Article 1 and 2, SCM Article 5 prohibits subsidies that actually cause adverse effects on another WTO member’s industry, so-called “actionable subsidies.”<sup>84</sup> Specifically, a successful SCM Article 5 claim requires that at least two necessary conditions be met. First, the subsidy must be the cause of injury, a requirement that, like but-for cause under U.S. tort law, is designed to prevent injured industries from gaining protection when their injuries are due to other factors, such as general industry decline or their own incompetence.<sup>85</sup> Second, there must be actual adverse effects, the most commonly alleged of which is actual “injury.”<sup>86</sup> The WTO’s definition of injury is broadly written to include increased volumes of subsidized imports, price undercutting, and the actual impact on the domestic industry in terms of output, sales, market share, return on investment, inventories, and employment<sup>87</sup>—harms that actually matter to industries. Given these necessary

---

80. Appellate Body Report, *Canada—Measures Affecting the Export of Civilian Aircraft*, ¶ 149, WTO Doc. WT/DS70/AB/R (adopted Aug. 20, 1999).

81. See VAN DEN BOSSCHE, *supra* note 27, at 566–67.

82. SCM, *supra* note 23, art. 2.1.

83. See VAN DEN BOSSCHE, *supra* note 27, 568–69.

84. SCM, *supra* note 23, art. 5.

85. *Id.*

86. *Id.*

87. See *id.* art. 15. The SCM includes two other adverse effects, both of which are rarely used. The first is “nullification or impairment of benefits.” *Id.* art. 5. This describes a situation in which WTO members negotiate for accession to the WTO, and then one member adopts measures that eliminate or reduce a benefit that another WTO member reasonably and legitimately expected would accrue from WTO membership. Panel Report, *Japan—Measures Affecting Consumer Photographic Film and Paper*, ¶ 10.82, WTO Doc. WT/DS44/R (adopted Apr. 22, 1998). The vagueness of this doctrine may seem conducive to litigation, but it is rarely used: WTO panels and the Appellate Body have expressed concern about this vagueness and applied it sparingly. *Id.* ¶ 10.38. Finally, actionable subsidies are also sometimes alleged to cause “serious prejudice.” SCM, *supra* note 23, art. 5.(c). “Serious prejudice” can be thought of as a sort of shortcut for administrability purposes. Instead of inquiring into facts and evidence to determine whether industries have actually suffered harm, harm is simply “deemed to exist” whenever total ad valorem subsidization exceeds five percent of a product or subsidies

conditions, one way to think of SCM Article 5 is essentially as a “no harm, no foul” rule: A subsidy is permitted so long as it does not have an adverse effect on another member’s industry.<sup>88</sup>

This “no harm, no foul” rule leaves significant policy space for WTO members to address climate change, but also limits WTO members’ actions that harm other members. We clearly want WTO members to subsidize their renewable-energy industries where needed, but do we want them to do so to the extent that they bankrupt other members’ industries? This hardly seems conducive to mitigating climate change. SCM Article 5 is less an example of WTO overreach, and more like an example of how WTO law allows member states to address the market failure underlying climate change—the fact that producers of renewables are not fully compensated for the benefit they provide society—but prevents members from intervening so much that they inadvertently cause additional market failures. Furthermore, as we shall see in the *Chinese Photovoltaics* case, discussed below, SCM Article 5 makes environmental and economic sense as well: if renewable-energy companies’ fortunes depend on government subsidization, then a firm’s own exploitation of comparative advantage and ability to compete matter less, and mercurial policies and government relations matter more.<sup>89</sup>

### 3. SCM Article 3: Prohibited Subsidies that Distort Trade

SCM Article 3.1(a) governs export subsidies—subsidies contingent on export performance, whether in law or in fact.<sup>90</sup> The law here is quite simple: Export subsidies are per se inconsistent with the WTO, regardless of actual effect on trading partners.<sup>91</sup> Similarly, SCM Article 3.1(b) governs local content subsidies—subsidies contingent on the use of domestic good over imported goods.<sup>92</sup> As with export subsidies, the law here is quite simple: Local content subsidies are per se inconsistent with the WTO, regardless of actual effect on trading partners.<sup>93</sup>

Both export and local-content subsidies are prohibited so strictly because they are likely to affect other members’ industries. Unlike an actionable subsidy, whose effects are quite often only domestic, export and local content subsidies focus squarely on trade: exports and imports, respectively. Therefore, it seems to make sense that WTO law regulates them more closely.

---

cover the operating losses sustained by an industry or enterprise. *Id.* art. 6.1(a)–(c). In other words, WTO members cannot give so much support that the support divided by the sales is greater than five percent, or that allows enterprises that lose money to continue to produce. Neither nullification nor serious prejudice have ever been alleged in a renewables case.

88. *See id.*

89. *See infra*, sections II.D.1 and II.D.2.

90. SCM, *supra* note 23, art. 3.1(a).

91. *Id.* art. 3.2.

92. *Id.* art. 3.1(b).

93. *Id.* art. 3.2.

C. THE AGREEMENT ON TRADE-RELATED INVESTMENT MEASURES (“TRIMS”): A BACKSTOP FOR THE SCM

The Agreement on Trade-Related Investment Measures seems at first glance to be one of the most unassuming WTO agreements, with only nine articles and an annex.<sup>94</sup> TRIMS was only intended to be a barebones stand-in until a more comprehensive agreement governing international investment could be negotiated,<sup>95</sup> a goal that was never achieved.<sup>96</sup>

The barebones provisions of TRIMS are as follows. TRIMS Article 2.1 states that “no Member shall apply any TRIM that is inconsistent with the provisions of Article III or Article XI of GATT 1994.”<sup>97</sup> TRIMS declines to precisely define what a trade-related investment measure is; instead, TRIMS Article 2.2 directs readers to an “Illustrative List” of trade-related investment measures inconsistent with the NT or conversion to tariffs.<sup>98</sup> The Illustrative List includes measures that require the purchase of domestic products or limit the purchase of imported products,<sup>99</sup> as well as import quotas, export quotas, and restrictions on access to foreign exchange.<sup>100</sup> TRIMS was intended to prohibit government measures that permitted foreign investment but conditioned this permission on investors’ compliance with a series of measures intended to promote the trade policy.<sup>101</sup> Examples of such measures might include: conditioning a permit for foreign investment on using locally produced inputs, conditioning a permit for foreign investment on exporting a certain value of goods, or denying a foreign investor access to foreign exchange so that the investor would be forced to spend proceeds from the investment in the host country.<sup>102</sup>

TRIMS is relevant to a discussion of support for renewable energy because it has become an important WTO agreement for regulating government support that is not clearly a subsidy under SCM Article 1, but which nevertheless imposes a

94. See TRIMS, *supra* note 23.

95. The TRIMS preamble quotes the Punta del Este Declaration: “Considering that Ministers agreed in the Punta del Este Declaration that “[f]ollowing an examination of the operation of GATT Articles related to the trade restrictive and distorting effects of investment measures, negotiations should elaborate, as appropriate, further provisions that may be necessary to avoid such adverse effects on trade.” TRIMS, *supra* note 23, pmbl.; General Agreement on Tariffs and Trade, Ministerial Declaration of 20 September 1986, Part I.D, 25 I.L.M. 1624 (1986).

96. See Katia Tieleman, *The Failure of the Multilateral Agreement on Investment (MAI) and the Absence of a Global Public Policy Network*, U.N. VISION PROJECT ON GLOBAL PUB. POL’Y NETWORKS 3 (2000), [https://web.archive.org/web/20120214110423/http://www.gppi.net/fileadmin/gppi/Tieleman\\_MAI\\_GPP\\_Network.pdf](https://web.archive.org/web/20120214110423/http://www.gppi.net/fileadmin/gppi/Tieleman_MAI_GPP_Network.pdf).

97. TRIMS, *supra* note 23, art. 2.1. As discussed *supra* in section I.A, GATT Article III prescribes national treatment, and GATT Article XI prescribes converting non-tariff restrictions on trade to tariffs.

98. TRIMS, *supra* note 23, art. 2.2.

99. *Id.* at Annex 1.

100. *Id.* at Annex 2.

101. See, e.g., THEODORE H. MORAN, BEYOND SWEATSHOPS: FOREIGN DIRECT INVESTMENT AND GLOBALIZATION IN DEVELOPING COUNTRIES 111–16 (2002).

102. *Id.*

“local content requirement” (“LCR”). An LCR is a measure—such as a statute, regulation, or even a practice—which allows an entrepreneur to invest or manufacture in a country, but only under the condition that the manufacturer use local rather than foreign inputs. While parties must prove each of the elements of SCM Article 1 to bring a dispute under SCM Article 3, the lack of a definition of a trade-related investment measure and the agreement’s Illustrative List seem to require only that parties show some sort of LCR. Thus, as we shall see in the discussion of the *Canada—Renewable Energy*, *Canada—Feed-In Tariff*, and *India—Solar Cells* cases,<sup>103</sup> TRIMs can serve as a sort of backstop for SCM cases when proving the existence of a subsidy is difficult or impossible, but the measure in question violates the spirit of the SCM by imposing LCRs. LCRs significantly distort trade because they force entrepreneurs to select suppliers and sub-contractors based on geography and politics rather than economics and efficiency.<sup>104</sup> Accordingly, TRIMs also helps ensure that governments’ efforts to address the market failure underlying climate change do not cause more harm than good.

Recent WTO cases involving renewable energy appear to have brought about an overall increase in TRIMs activity. From the agreement’s entry into force in 1995 until 2010—the year in which the first renewable energy TRIMs dispute was initiated—there were twenty-six requests for consultation.<sup>105</sup> From 2010 through 2016, there were sixteen requests for consultation, half of which were directly related to renewable energy.<sup>106</sup> On average, TRIMs consultations have been requested 1.6 more times per year than they were prior to the advent of renewable-energy disputes under TRIMs.

#### D. CHINESE PHOTOVOLTAICS: ACTIONABLE AND EXPORT SUBSIDIES

The *Chinese Photovoltaics* case demonstrates the application of SCM principles to actionable and export subsidies, as discussed in section II.D.1, as well as the economic and environmental rationales for such principles, as discussed in section II.D.2.

##### 1. SCM Article 3.1(b) and SCM Article 5 Applied to China’s Solar Subsidies

In 2011, the Coalition for American Solar Manufacturing (“CASM”)<sup>107</sup>—led by U.S. solar-cell manufacturer SolarWorld Industries America Inc.—petitioned

---

103. See *infra*, section II.E.

104. See, e.g., MORAN, *supra* note 101, at 111–16.

105. See *Disputes by Agreement: Trade-Related Investment Measures (TRIMs)*, WTO, [https://www.wto.org/english/tratop\\_e/dispu\\_e/dispu\\_agreements\\_index\\_e.htm?id=A25](https://www.wto.org/english/tratop_e/dispu_e/dispu_agreements_index_e.htm?id=A25) (last visited Dec. 2, 2016).

106. *Id.*

107. CASM is an association of seven U.S. crystalline silicon solar cells and panels producers, the largest of which is SolarWorld Industries America, Inc., the American subsidiary of the German SolarWorld AG. See Press Release, Coal. for Am. Solar Mfg., U.S. Manufacturers of Solar Cells File Dumping and Subsidy Petitions

the U.S. Department of Commerce (“DOC”) and International Trade Commission (“ITC”) to impose countervailing duties on imports of crystalline silicon photovoltaic cells from China.<sup>108</sup> CASM argued that several Chinese government programs constituted subsidies under the U.S. domestic analogue to SCM Article 1.<sup>109</sup> Furthermore, these subsidies were either export contingent, in violation of the U.S. domestic analogue to SCM Article 3.1(a), or had an adverse effect on U.S. photovoltaic manufacturers, in violation of the U.S. domestic analogue to SCM Article 5.<sup>110</sup> In fact, CASM argued that Chinese subsidies were so large that they reduced the price of solar panels by forty percent in one year, leading to the closure or downsizing of seven U.S. solar plants and the elimination of thousands of U.S. jobs.<sup>111</sup>

U.S. domestic trade authorities agreed with CASM that Chinese subsidies violated WTO principles, causing harm to the U.S. solar industry. DOC examined several Chinese programs to support the Chinese solar industry and found that several constituted actionable and export subsidies to Chinese photovoltaic manufacturers, in the form of grants, preferential loans, the provision of polysilicon and land at discounted prices, and various tax breaks.<sup>112</sup> In particular, DOC found that a Chinese program designed to promote “famous brands” abroad and various one-off grants to photovoltaic producers were contingent on producers’

---

Against China (Oct. 19, 2011), <http://www.americansolarmanufacturing.org/news-releases/10-19-11-casm-files-illegal-dumping-subsidy-petition.htm>.

108. See Petition for the Imposition of Antidumping and Countervailing Duties: Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People’s Republic of China, DOC Inv. Nos. A-570-979, C-570-980, USITC Inv. Nos. 701-TA-481, 731-TA-1190 (Oct. 19, 2011), [https://www.troutmansanders.com/files/upload/Crystalline\\_Petition\\_Vol1.pdf](https://www.troutmansanders.com/files/upload/Crystalline_Petition_Vol1.pdf) [hereinafter CASM Petition]. The CASM petition alleged both dumping and subsidies, *see id.*, but this Note focuses only on the subsidies claim.

109. Technically, CASM filed its petition pursuant to sections 701 and 731 of the U.S. Tariff Act of 1930, 19 U.S.C. §§ 1671, 1673 (2012). For our purposes, we can regard these U.S. statutes as equivalent to SCM arts. 1, 3, and 5. The reasons for this equivalence are complex: Countervailing duties actually predate the WTO. *See, e.g.*, Dingley Act of 1897, ch. 11, 30 Stat. 151 (repealed 1979) (first U.S. countervailing duty law, for sugar). The SCM, unlike other WTO agreements, actually allows for parallel enforcement mechanisms: a WTO member may (1) bring a subsidies dispute before a WTO panel, SCM, *supra* note 23, art. 7.1; or (2) unilaterally impose a countervailing duty to counteract another member’s subsidies, so long as the countervailing duty is imposed in accordance with SCM principles, including SCM art. 3 and SCM art. 5. *Id.* art. 10. The United States brought its countervailing duty law into compliance with the SCM through the Uruguay Round Agreements Act, Pub. L. No. 103-465, 108 Stat. 4809 (codified as amended in scattered sections of 19 U.S.C.). Therefore, the legal principles in the *Chinese Photovoltaics* case are the same if the dispute were brought before a WTO panel, even if the cases are procedurally different.

110. See CASM Petition, *supra* note 108.

111. Coal. for Am. Solar Mfg., *supra* note 107.

112. Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, from the People’s Republic of China: Preliminary Affirmative Countervailing Duty Determination, 77 Fed. Reg. 17,439, 17,449–54 (Mar. 26, 2012) [hereinafter *Chinese Photovoltaics (Preliminary)*]; *see also* Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, from the People’s Republic of China: Final Affirmative Countervailing Duty Determination and Final Affirmative Critical Circumstances Determination, 77 Fed. Reg. 63,788 (Oct. 17, 2012) [hereinafter *Chinese Photovoltaics (Final)*]. Due to the quirks of U.S. countervailing duty law, the DOC determines whether subsidization occurs, and the ITC determines whether this subsidization causes adverse effects. 19 U.S.C. § 1671a.

export performance and were therefore export subsidies.<sup>113</sup> The ITC examined the effects of the Chinese subsidies on U.S. photovoltaic manufacturers and found that subsidized Chinese imports had actually caused a significant decline in U.S. manufacturers' market share, forcing many U.S. solar manufacturers to downsize or exit the market entirely.<sup>114</sup> Accordingly, the United States imposed countervailing duties of about fifteen percent on imports of Chinese photovoltaics.<sup>115</sup>

## 2. The Economic and Environmental Effects of China's Solar Subsidies

China's subsidies for solar panels initially seem to be conducive to climate progress. The Chinese government's support helped solar-panel producers internalize some of the positive externalities they were providing to society but were otherwise unable to capture, which is exactly what needs to happen for cheaper renewables to arrive more quickly. Furthermore, CASM itself alleged that the subsidies had reduced the price of solar panels by forty percent in one year.<sup>116</sup> Given the benefits of lower prices for renewables, concern for U.S. jobs seems counterproductive. The quest for cheaper renewables seems to demand this ruthless competition, and if U.S. solar manufacturers cannot keep up with this cost-cutting, perhaps they should exit the business.

A closer look demonstrates that China's export and actionable subsidies likely caused more market failures than they solved, actually delaying climate progress. Specifically, Chinese subsidies seem to have had three counterproductive effects: (1) raising the price of solar panels within China, (2) ensuring that the global solar industry develops according to political whims rather than true comparative advantage, and (3) triggering a counterproductive, tit-for-tat trade war.

First, export subsidies raise prices for consumers in the exporting country, even if they lower prices for consumers elsewhere.<sup>117</sup> The economic theory behind this is intuitive. If the Chinese government puts in place a subsidy contingent on export performance, Chinese producers know they can earn the international

---

113. Chinese Photovoltaics (Preliminary), 77 Fed. Reg. at 17,453–54.

114. Crystalline Silicon Photovoltaic Cells and Modules from China, Inv. Nos. 701-TA-481, 731-TA-1190, USITC Pub. 4360 (Nov. 2012) (Final).

115. Chinese Photovoltaics (Final), 77 Fed. Reg. at 63,789. China later challenged these countervailing duties before a WTO panel and the WTO Appellate Body, and was able to overturn some countervailing duties on complex legal grounds not at issue here: (1) that the state-owned entities providing some subsidies were not the Chinese government, and (2) that the United States improperly imposed both antidumping and countervailing duties. See Appellate Body Report, *United States—Countervailing Duty Measures on Certain Products from China*, ¶ 5.1, WTO Doc. WT/DS437/AB/R (Dec. 18, 2014). However, the Appellate Body actually overturned only a fraction of the specific U.S. countervailing duties, allowing most to stay in place. *Id.*

116. See *Coal. for Am. Solar Mfg.*, *supra* note 107.

117. It is also worth noting that China's export subsidies probably lowered prices for American consumers only because China is a price maker—a producer big enough for its decisions to have an impact on world markets—rather than a price taker. See KRUGMAN ET AL., *supra* note 39, at 203–04, 210. Export subsidies for smaller countries would likely not even have the benefit of lower prices for consumers abroad.

market price for their solar panels, as well as the amount of the export bounty.<sup>118</sup> Thus, it makes little sense for Chinese producers to sell to Chinese consumers, unless the consumers are willing to pay the international market price plus the price of the export bounty.<sup>119</sup> This means higher prices for domestic consumers.<sup>120</sup> The theory seems to bear out in practice. Prices for solar panels in China seemed to be significantly higher than prices outside China, as evidenced by the antidumping margins of about thirty percent DOC found in the same case.<sup>121</sup> Accordingly, Chinese producers exported almost all of the solar panels they produced: China exported about ninety-five percent of its solar panels in 2010, during the height of its subsidy program.<sup>122</sup> This is a particularly environmentally unfriendly result, because it means that relatively few solar panels were installed in China before 2012, despite the country's status as the biggest carbon emitter in the world.<sup>123</sup>

Second, export and actionable subsidies can distort comparative advantage, meaning that industries develop where it is politically but not economically rational for them to do so. This in turn probably means higher costs in the long run, even if prices are lower in the short run. For example, the United States is thought to have a comparative advantage in human- and physical-capital-intensive products, while China is thought to have a comparative advantage in labor-intensive products.<sup>124</sup> This means that the United States should actually be in a better position to manufacture solar panels at a lower cost, because solar panels require relatively more human and physical capital than low-skilled labor.<sup>125</sup> A close analysis of the economics of China's solar industry reveals that almost all of China's price advantage in solar can be explained by economies of scale and indirect government support, not by comparative advantage due to an abundance of cheap labor.<sup>126</sup> China's aggressive subsidization may have undermined firms in the United States that probably enjoyed a comparative advantage in solar panels, but which clearly lacked a government willing to violate international trade law to support their quest for global markets. And fewer

---

118. *See id.* at 204.

119. *See id.*

120. *See id.*

121. Chinese Photovoltaics (Final), 77 Fed. Reg. at 63,791, 63,795.

122. Bruce Einhorn, *Firing Up China's Solar Market*, BLOOMBERG (Mar. 15, 2012, 7:03 PM), <http://www.bloomberg.com/news/articles/2012-03-15/firing-up-chinas-solar-market>. This number fell to about seventy percent by 2012, after the United States initiated countervailing duty investigations. *Id.*

123. JOS G.J. OLIVER ET AL., EUR. COMM'N JOINT RES. CTR., TRENDS IN GLOBAL CO<sub>2</sub> EMISSIONS: 2015 REPORT 4 (2015).

124. Frank A. Wolak, *Can the U.S. Compete with China on Green Tech?: Our Comparative Advantage*, N.Y. TIMES (Jan. 19, 2011, 11:01 AM), <http://www.nytimes.com/roomfordebate/2011/01/18/can-the-us-compete-with-china-on-green-tech/our-comparative-advantage>.

125. *Id.*

126. Alan C. Goodrich et al., *Assessing the Drivers of Regional Trends in Solar Photovoltaic Manufacturing*, 6 ENERGY & ENVTL. SCI. 2811, 2813–15 (2013).

competitive solar-panel firms probably means a world with fewer choices for solar-panel consumers, which should translate into higher prices or lower quality.

Finally, export and actionable subsidies that harm another WTO member's industry are likely to provoke a response from that member, which can cause what economists call a "trade war."<sup>127</sup> A trade war can be understood as another example of the classic prisoner's dilemma: If two competing governments can reach an agreement like the SCM, both can elect not to subsidize their industries, which allows them to forgo the cost of subsidization.<sup>128</sup> Without such an agreement, both governments know that if their competitor subsidizes and they do not, they will suffer while their competitor benefits.<sup>129</sup> Both governments rationally choose to subsidize, such that the benefits of subsidization are counteracted, but both governments must bear the costs.<sup>130</sup> Although this will result in lower-cost renewables to consumers, the resources devoted to these counteracted subsidies must be diverted from somewhere else, which means governments must cut other programs, raise taxes, or some combination thereof. In short, even if consumers pay lower prices, society as a whole must nevertheless pay. This theory also seems to bear out in practice, as evidenced by the multi-year international litigation over Chinese solar subsidies discussed above.<sup>131</sup> Furthermore, had China been allowed to maintain its subsidies without consequence, other governments may have felt pressure to enact similar measures, only exacerbating the problem.

For all of these reasons, export and actionable subsidies that injure other countries' industries create more problems than they solve, thus slowing the renewables revolution. Therefore, subsidies for renewable energy are actually more effective when disciplined by SCM Articles 3.1(a) and 5. Enforcement of these provisions would allow governments to subsidize the consumption of solar and wind energy, curing a market failure behind climate change. At the same time, enforcement of these provisions would prevent counterproductive practices whereby governments distort the development of the nascent solar and wind industries in their attempts to build up their local renewable-energy industries.

E. *CANADA—RENEWABLE ENERGY, CANADA—FEED-IN TARIFF, AND INDIA—SOLAR CELLS:*  
LOCAL CONTENT REQUIREMENTS ("LCRS")

The *Canada—Renewable Energy*, *Canada—Feed-in Tariff*, and *India—Solar Cells* cases demonstrate the application of SCM and TRIMs law to measures that support renewable energy but impose LCRs, as discussed in section II.E.1, as

---

127. KRUGMAN ET AL., *supra* note 39, at 235.

128. *See id.* at 236.

129. *See id.*

130. *See id.*

131. *See supra*, sections II.D.1 and II.D.2.

well as the economic and environmental rationales for such laws, as discussed in section II.E.2.

### 1. SCM Article 3.1(a) and TRIMs Applied to Canada and India's LCRs

*Canada—Renewable Energy* and *Canada—Feed-in Tariff* were brought by the European Union and Japan, respectively, to challenge the same measure: a “feed-in tariff” (“FIT”) put in place by the Canadian province of Ontario.<sup>132</sup> Ontario’s FIT worked like many others: The government promised to purchase electricity from renewable-energy producers at high, predetermined prices, which provided a guaranteed market that producers could rely upon to attract investment and innovation.<sup>133</sup> Generally, FITs are seen as an economically efficient way to foster renewable-energy use. FITs directly address the market failure thought to underlie climate change by helping energy producers internalize the positive externalities they create.<sup>134</sup> However, Ontario’s FIT was different from most in one important way: In order to benefit from the program, energy producers had to use panels and turbines with “Minimum Required Domestic Content Levels” of twenty-five to sixty percent.<sup>135</sup>

The European Union and Japan challenged Ontario’s FIT at the WTO, arguing that the domestic content requirements were local-content subsidies prohibited under the SCM and TRIMs.<sup>136</sup> Both complainants probably thought they had good arguments under the SCM: The guaranteed minimum price for renewables seemed to satisfy SCM Article 1’s requirement that a subsidy be a financial contribution that conferred a benefit. Furthermore, receipt of this subsidy seemed to be clearly dependent on “Minimum Required Domestic Content Levels”—a violation of SCM Article 3.1(b) on its face.<sup>137</sup> For complex procedural reasons, the WTO was unable to complete its analysis of whether Ontario’s FIT provided a benefit,<sup>138</sup> and therefore did not consider whether any alleged subsidy was contingent upon the use of local content.

---

132. The WTO panel and Appellate Body effectively “merged” the respective complaints from Japan (*Canada—Renewable Energy*, dispute no. DS412) and the European Union (*Canada—Feed-in Tariff*, dispute no. DS426), considered them simultaneously, and published a single document containing two mostly overlapping reports. See *Canada—Renewable Energy* ABR, *supra* note 6, at 1 (Secretariat’s note explaining the dual-report situation). For the sake of simplicity, this section will only cite to *Canada—Renewable Energy* when discussing both disputes simultaneously.

133. *Canada—Renewable Energy* ABR, *supra* note 6, ¶ 1.3.

134. See generally WORLD FUTURE COUNCIL, FEED-IN TARIFFS—BOOSTING ENERGY FOR OUR FUTURE 6 (2007), [http://area-net.org/wp-content/uploads/2016/01/WFC\\_Feed-in\\_Tariffs\\_Brochure.pdf](http://area-net.org/wp-content/uploads/2016/01/WFC_Feed-in_Tariffs_Brochure.pdf).

135. *Canada—Renewable Energy* ABR, *supra* note 6, ¶ 1.4.

136. *Id.* ¶ 1.6.

137. SCM, *supra* note 23, art. 3.1(b).

138. Specifically, the WTO Appellate Body was unable to determine whether a benefit had been conferred to renewable-energy producers in Ontario, a necessary condition for the existence of a subsidy under SCM 1.1(b). The panel and Appellate Body agreed on the standard for assessing whether a benefit has been conferred: Whether a benefit exists is determined by comparing the advantage that a recipient receives from the government with a “benchmark” based on what the recipient would receive in the relevant market. *Canada—*

Fortunately, the WTO panel and Appellate Body were able to complete their analysis of the FIT's consistency with the prohibitions in TRIMs Article 2.1 and the Illustrative Annex. The WTO panel held that Ontario's "Minimum Required Domestic Content Levels"<sup>139</sup> were an example of a trade-related investment measure listed in the Illustrative List, in that the Ontario measure required "the purchase or use by an enterprise of products of domestic origin or from any domestic source."<sup>140</sup> This finding triggered TRIMs 2.1.<sup>141</sup> The panel and the Appellate Body further agreed that no exceptions applied, and that Ontario's domestic content requirements violated WTO law.<sup>142</sup> Because TRIMs does not specify the definition of a trade-related investment measure,<sup>143</sup> the WTO panel sidestepped the difficult element-by-element analysis that made it impossible to determine whether the FIT requirements were a subsidy.<sup>144</sup>

A WTO panel and the Appellate Body were given an opportunity to refine their application of TRIMs 2.1 in another dispute involving support for renewables, *India—Solar Cells*.<sup>145</sup> This dispute involved India's Jawaharlal Nehru National Solar Mission ("JNNSM"), a program that, like Ontario's FIT, sought to encourage renewable energy by purchasing electricity from solar providers at long-term, contractually guaranteed rates, creating the certain profits necessary to attract

---

*Renewable Energy ABR*, *supra* note 6, ¶¶ 5.159–5.166; *see also* *SCM*, *supra* note 23, art. 1.1(b), 14(d). However, the Appellate Body held that the panel erred in applying this standard: First, the panel erred by considering the parties' proposed benchmarks before considering the relevant market. *Canada—Renewable Energy ABR*, *supra* note 6, ¶ 5.169. This error might seem trivial to non-trade lawyers, but it could lead to a less objective analysis by making it easier for parties and panelists to shop for the benchmarks that benefit their respective positions. Second, the panel erred in selecting the market for electricity generated from all sources of energy as the relevant market for the benefit comparison. *Id.* ¶ 5.169. The panel selected this market on the theory that it enjoyed high "demand-side substitutability" between electricity generated through different technologies. *Id.* ¶ 5.170. The Appellate Body reasoned that the panel should also have considered "supply-side substitutability" factors: type of contract, size of customer, whether the electricity was generated for base-load or peak-load, etc. *Id.* Unfortunately, this holding had the effect of rendering the WTO Appellate Body unable to reach a decision: Like a U.S. Court of Appeals, the WTO Appellate Body can only consider questions of law, whereas the selection of the appropriate market benchmark is a question of fact. *See id.* ¶¶ 5.244–5.246 (Appellate Body explaining why it could not complete the panel's analysis and reach a decision on whether Ontario's FIT conferred a benefit). Yet, unlike a U.S. Court of Appeals, the WTO Appellate Body lacks the power to remand questions of fact to a panel for further analysis, and therefore cannot reach a decision if it lacks the necessary facts before it, as was the case here. *See id.* Thus, the WTO Appellate Body simply left unanswered the question of whether Ontario's FIT conferred a benefit. *Id.*

139. Panel Report, *Canada—Certain Measures Affecting the Renewable Energy Generation Sector*, ¶ 7.166, WTO Doc. WT/DS412/R (circulated Dec. 19, 2012) [hereinafter *Canada—Renewable Energy PR*].

140. *Id.* ¶ 7.115.

141. *Id.* ¶ 7.166.

142. *Id.*; *Canada—Renewable Energy ABR*, *supra* note 6, ¶ 5.33.

143. *See supra* section II.C.

144. *Canada—Renewable Energy PR*, *supra* note 139, ¶ 7.154.

145. Panel Report, *India—Certain Measures Relating to Solar Cells and Solar Modules*, WTO Doc. WT/DS456/R (circulated Feb. 24, 2016) [hereinafter *India—Solar Cells PR*]; Appellate Body Report, *India—Certain Measures Relating to Solar Cells and Solar Modules*, WTO Doc. WT/DS456/AB/R (adopted Oct. 14, 2016) hereinafter *India—Solar Cells ABR*].

investment to the sector. Like Ontario's FIT, the JNNSM also involved a series of domestic content requirements ("DCR" measures), which conditioned producers' participation in the program on the use of domestic content.<sup>146</sup> Furthermore, rather than prescribing a certain percentage of content that must be domestic, like Ontario's FIT, JNNSM simply set forth components that must be produced in India.<sup>147</sup> At first, renewables producers were required only to source "crystalline silicon" solar modules from India; as the program progressed, the requirements were tightened to prevent the use of "foreign thin-film modules" and entire "solar cells" as well.<sup>148</sup>

The WTO panel and Appellate Body largely followed the reasoning from *Canada—Renewable Energy* and *Canada—Feed-in Tariff*. The United States—the complainant in *India—Solar Cells*—entirely forewent any claims based on the SCM, instead focusing on arguments that JNNSM violates TRIMs and GATT Article III itself.<sup>149</sup> Although we do not know for sure, the United States likely focused on TRIMs in order to avoid the procedural difficulties that the complainants encountered under the SCM in *Canada—Renewable Energy* and *Canada—Feed-in Tariff*. Therefore, both the panel and Appellate Body discussed whether the DCR measures constitute TRIMs.<sup>150</sup> In this context, the WTO panel candidly noted that it was "not persuaded that the measures at issue in this case are distinguishable in any relevant respect from those examined by the Appellate Body in *Canada—Renewable Energy / Feed-In Tariff Program*."<sup>151</sup> Therefore, as in the Canada cases, the panel held that India's DCR measures were TRIMs because they required the purchase of domestic over foreign inputs, violating TRIMs 2.1 and GATT Article III.4.<sup>152</sup> Furthermore, the panel found that because no exceptions applied, India's domestic content requirements violated WTO law.<sup>153</sup> The Appellate Body upheld the panel's decision in its entirety.<sup>154</sup>

## 2. The Economic and Environmental Effects of Canada and India's LCRs

As with Chinese export subsidies for solar, Ontario and India's support for renewable energy seem to address the market failure underlying climate change.

---

146. *India—Solar Cells* PR, *supra* note 145, ¶¶ 7.7–7.14.

147. *Id.* ¶ 7.8.

148. *Id.* ¶¶ 7.8, 7.10.

149. First Written Submission of the United States, *India—Certain Measures Related to Solar Cells and Solar Modules*, 2, WT/DS456 (Oct. 24, 2014), [https://ustr.gov/sites/default/files/files/Issue\\_Areas/Enforcement/WTO/Pending/Sub1.fin.pdf](https://ustr.gov/sites/default/files/files/Issue_Areas/Enforcement/WTO/Pending/Sub1.fin.pdf).

150. *India—Solar Cells* PR, *supra* note 145; *India—Solar Cells* ABR, *supra* note 145.

151. *India—Solar Cells* PR, *supra* note 145, ¶ 7.120.

152. *Id.* ¶ 7.99.

153. *Id.* ¶¶ 7.187, 7.265, 7.333, 7.382.

154. *India—Solar Cells* ABR, *supra* note 145.

The Canadian and Indian governments' support helped renewable-energy producers internalize some of the positive externalities they were providing but were otherwise unable to capture. This is exactly what energy markets need in order to increase the production of cheaper renewables. As an added bonus, both programs' domestic content requirements seem to have helped create jobs and jumpstart industries. Apologists for Ontario's FIT point out that the program helped promote renewable energy and produce thousands of local jobs.<sup>155</sup> In fact, Siemens,<sup>156</sup> CS Wind,<sup>157</sup> Enercon,<sup>158</sup> and GE<sup>159</sup> all established facilities in Ontario shortly after the FIT was put in place, suggesting that the domestic content requirement may have played a role in establishing a local industry. Similarly, apologists for India's JNNSM point to the program's ability to deploy more solar panels in a country where many people still lack access to electricity, all while creating up to one million local jobs.<sup>160</sup>

A closer look demonstrates that Ontario and India's programs likely caused more market failures than they solved, actually delaying climate progress. Specifically, even if Ontario and India's support for renewables helped internalize externalities, these benefits were counteracted by the negative effects of LCRs: higher prices for solar panels and wind turbines in the relevant jurisdictions, limited competition and innovation, and a counterproductive, tit-for-tat trade war. As of the time of publication, less information is available on the economic effects of India's JNNSM, and so this section focuses on the economic effects of Ontario's FIT.

First, Ontario's LCRs likely increased the costs of renewable energy without providing environmental benefits. This result makes sense in theory: LCRs force renewable-energy producers to select solar panels or wind turbines based on where they were produced, not on whether they best fit the producers' needs at the lowest costs. This means that renewable-energy producers cannot enjoy the benefits of comparative advantage or economies of scale, and therefore likely

---

155. GREEN ENERGY ALL. & SHINE ONTARIO, ONTARIO FEED-IN TARIFF: 2011 REVIEW 9 (2011), <https://www.pembina.org/reports/on-feed-in-tarif-2011-review.pdf>.

156. Press Release, Siemens, Siemens Selects Tillsonburg, Ontario, as New Home for Canadian Wind Turbine Blade Manufacturing Facility (Dec. 2, 2010), <https://www.siemens.ca/web/portal/en/press/pages/tillsonburg-ontario-new-home-canadian-wind-turbine-blade-manufacturing-facility.aspx>.

157. Press Release, Ontario Ministry of Energy, New Wind Tower Plant Creates 700 Jobs in Windsor (Dec. 1, 2010), <http://www.samsungrenewableenergy.ca/sites/default/files/pdf/Windsor-Dec2-Full.pdf>.

158. Diane Bailey, *Enercon to Build Factory in Ontario*, WINDPOWER MONTHLY (Sept. 28, 2011), <http://www.windpowermonthly.com/article/1095866/enercon-build-factory-ontario>.

159. *GE to Manufacture 288 Wind Turbines for Ontario Wind Farms*, PLANT (Apr. 11, 2012), <http://www.plant.ca/sustainability/ge-to-manufacture-288-wind-turbines-for-ontario-wind-farms-60566/>.

160. Ben Lilliston, *What Goes Around Comes Around: U.S. Trade Agenda vs. Climate and Green Jobs*, COMMONDREAMS (May 13, 2014), <http://www.commondreams.org/views/2014/05/13/what-goes-around-comes-around-us-trade-agenda-vs-climate-and-green-jobs>; NAT. RES. DEF. COUNCIL, *SOLAR POWER JOBS: EXPLORING THE EMPLOYMENT POTENTIAL IN INDIA'S GRID-CONNECTED SOLAR MARKET* 7 (2014), <http://www.nrdc.org/international/india/files/renewable-energy-solar-jobs-report.pdf>.

face higher-cost turbines and panels.<sup>161</sup> Furthermore, this cost is likely to be borne by consumers of renewable energy.<sup>162</sup> Thus, the domestic content requirement put the costs of correcting the market failure on exactly the wrong parties—the consumers—whom we want to consume more renewable energy, not less. These theoretical predictions seem to have been borne out in practice: There is a consensus that Ontario’s domestic content requirements have increased the costs of renewable energy without providing significant environmental benefit.<sup>163</sup> And these higher costs likely contributed to the dramatic increase Ontario consumers saw in their electricity bills, which in turn sparked a significant political backlash.<sup>164</sup>

Second, Ontario’s LCRs likely reduced competition and innovation. Again, this result makes sense in theory: LCRs in small markets create barriers to entry that keep out competitors.<sup>165</sup> Rational producers respond to these conditions by setting up “screwdriver” factories where they produce the minimum necessary to comply with the domestic content rules,<sup>166</sup> and then sell expensive, technologically backward products to a captured market.<sup>167</sup> This also seems to have been borne out in practice: Many of the production facilities touted by proponents of Ontario’s requirements were in fact “screwdriver” operations that merely assembled components manufactured elsewhere, leading to disappointing results for employment and innovation.<sup>168</sup> The benefits of protecting a so-called “infant industry” from global competition are often illusory, undermining one of the

---

161. See KRUGMAN ET AL., *supra* note 39, at 159.

162. *See id.*

163. See Press Release, Ontario Ministry of Energy, Ontario Lowering Future Energy Costs (Dec. 11, 2013, 3:15 PM), <http://news.ontario.ca/mei/en/2013/12/ontario-lowering-future-energy-costs.html> (government of Ontario promising that repeal of LCRs will reduce costs of FIT by \$1.9 billion CAD over 25 years); see also JAN-CHRISTOPH KUNTZE & TOM MOERENHOUT, INT’L CTR. FOR TRADE & SUSTAINABLE DEV., LOCAL CONTENT REQUIREMENTS AND THE RENEWABLE ENERGY INDUSTRY—A GOOD MATCH? 21–22 (2013), <http://seti-alliance.org/sites/default/files/local-content-requirements-and-the-renewable-energy-industry-a-good-match.pdf>; Sherry M. Stephenson, *Addressing Local Content Requirements: Current Challenges and Future Opportunities*, INT’L CTR. FOR TRADE & SUSTAINABLE DEV. (July 25, 2013), <http://www.ictsd.org/bridges-news/biores/news/addressing-local-content-requirements-current-challenges-and-future>; SUSTAINABLE PROSPERITY, DOMESTIC CONTENT REQUIREMENTS FOR RENEWABLE ENERGY MANUFACTURING 5–6 (2012), <http://www.sustainableprosperity.ca/sites/default/files/publications/files/Domestic%20Content%20Requirements%20for%20Renewable%20Energy%20Manufacturing.pdf>.

164. See, e.g., Ben Eisen, *Ontario’s Energy Policies a Costly Blunder*, TORONTO SUN (Dec. 8, 2015, 8:40 PM), <http://www.torontosun.com/2015/12/08/ontarios-energy-policies-a-costly-blunder>.

165. See MORAN, *supra* note 101, at 111–16.

166. *Id.*

167. *Id.*

168. See John Laforet, *An Inconvenient Truth About Green Energy Jobs*, HUFFINGTON POST (Sept. 20, 2011, 3:16 PM), [http://www.huffingtonpost.ca/john-laforet/ontario-green-jobs\\_b\\_972088.html](http://www.huffingtonpost.ca/john-laforet/ontario-green-jobs_b_972088.html); John Ivison, *McGinty’s Clean Energy Poster Child Starving for Work*, NAT’L POST (Sept. 16, 2011, 6:00 AM), <http://news.nationalpost.com/full-comment/john-ivison-mcguintys-clean-energy-poster-child-starving-for-work>.

most common arguments in favor of local content requirements.<sup>169</sup>

Third, as with export and actionable subsidies, local content requirements are likely to provoke a response from other WTO members, sparking a wasteful trade war.<sup>170</sup> The dynamics are the same as for export subsidies: If one country imposes LCRs on renewable energy, other countries are likely to follow suit.<sup>171</sup> And one country's LCRs counteract any benefits of another's, such that all countries must pay without receiving any benefit.<sup>172</sup>

While Ontario and India's support for renewable energy may have helped renewable producers internalize negative externalities, these two jurisdictions' LCRs probably created their own set of market failures by interfering with comparative advantage, economies of scale, and competition. Thus, the WTO panels and Appellate Body reached the correct environmental and economic result in holding that these programs violated TRIMs.

#### CONCLUSION

Contrary to popular perception, the WTO is a friend to those seeking to control climate change, perhaps one of the most important friends currently available. The WTO principles of MFN, NT, and low tariffs have and will continue to foster global, competitive, and efficient solar-panel and wind-turbine industries. Under the principle of MFN, when a WTO member grants any "advantage, favour, privilege or immunity" to one trading partner, it must grant the same treatment to all its other trading partners.<sup>173</sup> Under the principle of NT, WTO members may not subject foreign products to either "internal taxes" greater than those imposed on like domestic products<sup>174</sup> or "laws, regulations and requirements affecting . . . internal sale" less favorable than those governing like domestic products.<sup>175</sup> As a result of the GATT's and WTO's focus on lowering tariffs, tariffs are now a fraction of what they were in the past.<sup>176</sup> Together, these principles allow entrepreneurs to take advantage of comparative advantage, economies of scale, and global competition.<sup>177</sup> The result is cheaper renewable energy, faster. Whatever the arguments for and against free trade in other areas, cheap renewables are crucial for bringing about a renewable-energy revolution that can mitigate climate change.

---

169. For arguments that renewable energy is an infant industry requiring protection, *see generally* Farah & Cima, *supra* note 67; Rubini, *supra* note 67.

170. *See* KRUGMAN ET AL., *supra* note 39, at 235.

171. *See id.* at 236.

172. *See id.*

173. GATT, *supra* note 20, art. I.1.

174. *Id.* art. III.2.

175. *Id.* art. III.4.

176. *See* Baldwin, *supra* note 36, at 6 (showing an eighty-nine percent decrease in tariffs between 1930 and 1979 due to the first seven GATT rounds); WORLD BANK, *supra* note 36.

177. *See* KRUGMAN ET AL., *supra* note 39, at 26–28, 37, 52, 81–88, 158–160.

Abandoning these principles will only delay the advent of renewable technologies able to compete with fossil fuels on cost. Furthermore, the SCM and TRIMs provide the policy space WTO members need to correct the market failures underlying climate change, while imposing important disciplines to ensure these corrections do more good than harm. Ultimately, environmentalists should learn to love the WTO. Abandoning it would only make things worse in the fight against climate change.