RED DRAGON GONE GREEN: CHINA'S APPROACH TO RENEWABLE ENERGY TECHNOLOGIES, ITS LEGAL IMPLICATIONS, AND ITS IMPACT ON US ENERGY POLICY

Nan Sato[*]

TABLE OF CONTENTS

[*] J.D., University of Illinois College of Law, 2012. The author would like to thank Dr. Conrad Weiler, Sean Herrmann, and members of the University of Illinois Journal of Law, Technology and Policy for their help and support in the publication process.

I. INTRODUCTION

Countries around the world are racing to develop clean energy technologies.[1] Who is the current leader in the race? It is neither the United States nor Europe, but China.[2] Chinese manufacturers of renewable energy technologies are on track to produce more than half the world's solar panels and wind turbines, more than 95% of which will be exported to the United States and Europe.[3] Even Warren Buffett, one of the most successful U.S. investors, visited an electric bus production base in Changsha, China in September 2010.[4] Chinese manufacturers have managed to achieve such success thanks to their government's aggressive policies, which not only grant generous land and monetary subsidies to producers of renewable energy technologies, but also mandate that banks loan money to renewable technology companies at extremely low interest rates.[5] China's policies, combined with its affordable labor prices, enable Chinese renewable energy technology companies to manufacture renewable technology products at much lower costs than their Western counterparts.[6]

The production of renewable energy technology equipment is one of the world's fastest growing industries. According to World Economic Forum, the global clean energy market will reach $450 billion annually by 2012 and $600 billion by 2020.[7] The United States, however, is quickly losing its leadership position to China in the development and production of renewable technologies because it is simply impossible for the United States to compete with Chinese prices. Many American green technology firms are struggling to survive. Some of these firms have already reduced their numbers of employees.[8] On August 31, 2011, Solyndra, a Silicon Valley solar-panel maker, announced that it would cease operations.[9] Two other major solar technology manufacturers, Evergreen Solar of Massachusetts and SpectraWatt of New York, also filed bankruptcy in August, 2011.[10] These bankruptcies and closings represent almost one-fifth of the solar panel manufacturing capacity in the United States.[11]

---

1. Editorial, *The Cold War in Clean Energy*, CHRISTIAN SCI. MONITOR (Oct. 19, 2010), http://www.csmonitor.com/Commentary/the-monitors-view/2010/1019/The-cold-war-in-clean-energy [hereinafter *The Cold War in Clean Energy*].

2. *See* Keith Bradsher, *On Clean Energy, China Skirts Rules*, N.Y. TIMES, Sept. 9, 2010, at A1 ("The booming Chinese clean energy sector, now more than a million jobs strong, is quickly coming to dominate the production of technologies essential to slowing global warming and other forms of air pollution.").

3. *Id.*

4. *US Billionaire Buffett Visits China's Clean Energy Automaker*, XINHUA NET NEWS (Sept. 27, 2010), http://news.xinhuanet.com/english2010/china/2010-09/27/c_13532032.htm.

5. *See* Bradsher, *supra* note 2, at A12 (describing government subsidies and low-interest bank loans in China).

6. *Id.*

7. WORLD ECON. FORUM, GREEN INVESTING – TOWARDS A CLEAN ENERGY INFRASTRUCTURE 15 (Jan. 2009), *available at* http://www.weforum.org/pdf/climate/Green.pdf.

8. *See* Bradsher, *supra* note 2, at A13 (giving examples of renewable technology companies' struggles to survive).

9. Matthew L. Wald, *Solar Firm Aided by U.S. Shuts Doors*, N.Y. TIMES, Sept. 1, 2011, at B1.

10. Keith Bradsher, *China Benefits as U.S. Solar Industry Withers*, N.Y. TIMES, Sept. 2, 2011, at B1.

11. *Id.*

The U.S. government must act urgently in order to keep the country's renewable technology industry alive and competitive. Politicians and scholars have suggested two main ways to achieve this goal. First, since it could be argued that the subsidies offered by the Chinese government and banks are in violation of the World Trade Organization (WTO) rules on subsidies and anti-dumping, the United States can adopt countervailing measures and anti-dumping taxes on renewable technology products imported from China.[12] Second, the United States can bring about changes from within by implementing progressive legislation that encourages development and production of clean energy technologies. Specifically, the U.S. government can take on measures such as allocating more funding to the clean technology sector, adopting feed-in tariffs, and removing subsidies for conventional, environmentally unfriendly energy sources. The United States should follow the latter approach and use a combination of clean-technology friendly measures to create strong incentives for the domestic production of such technologies.

Part II of this Note compares Chinese and American policies toward their respective renewable technology industries in recent years. Part III analyzes the legal grounds for challenging China's approach to renewable technology production and options available to the United States in maintaining the competitiveness of America's renewable technology industry. Part IV discusses policy concerns behind different measures that the United States can take in response to the strong competition from China and then recommends an approach for the United States. Part V concludes.

II. BACKGROUND

Renewable energy technologies are "technolog[ies] that exclusively rel[y] on an energy source that is naturally regenerated over a short time," such as the "sun, on wind, geothermal, hydroelectric, wave, or tidal energy, or on biomass or biomass-based waste products, including landfill gas."[13] The fundamental difference between renewable energy technologies and traditional technologies is that renewable energy technologies do not use high emission energy sources such as fossil fuel and natural gas.[14] Therefore, the wide adoption of renewable energy technologies will lead to more sustainable development, reduce

12. Agreement on Subsidies and Countervailing Measures. Apr. 15, 1994, 1867 U.N.T.S. 14, *available at* http://www.wto.org/english/docs_e/legal_e/24-scm.pdf [hereinafter ASCM]; Agreement on Implementation of Article VI of the General Agreement on Tariffs and Trade 1994, Jan. 1, 1995, *in* Marrakesh Agreement Establishing the World Trade Organization, 1867 U.N.T.S. 154, Annex 1A, *available at* http://www.wto.org/english/docs_e/legal_e/19-adp.pdf [hereinafter AIGATT].

13. *Texas RECs Glossary*, EVOLUTION MARKETS, http://new.evomarkets.com/index.php?page=Resources-Glossaries-Texas_RECs_Glossary (last visited Sept. 20, 2011).

14. *Types of Renewable Energy*, RENEWABLEENERGYWORLD.COM, http://www.renewableenergyworld.com/ rea/tech/home (last visited Sept. 23, 2011) ("Fossil fuels are non-renewable, that is, they draw on finite resources that will eventually dwindle, becoming too expensive or too environmentally damaging to retrieve."); Jeremiah Doner, *Barriers to Adoption of Renewable Energy Technology* 4 (Ill. State Univ. Inst. for Regulatory Policy Studies, May 2007), *available at* http://www.irps.ilstu.edu/research/documents/IRPSDonerWorkingPaper050707.pdf (stating that renewable energy technologies do not use natural gas as an energy source).

greenhouse gas emissions, and lower dependency on oil.[15] This Note will focus mainly on solar and wind technologies, as they are the current production focus of Chinese renewable technology manufacturers.

A. Solar Technologies

Solar energy is produced by collecting sunlight and converting it into power.[16] This conversion process uses solar panels, which are large flat panels made up of many individual solar cells.[17] A typical solar cell contains three major parts: the semiconductor, the semiconductor junction, and the contacts on the front and back of the cell.[18] The semiconductor absorbs light and converts it into electron-hole pairs.[19] The semiconductor junction separates the photo-generated carriers.[20] The contacts allow the current to flow to the external circuit.[21]

Crystalline silicon and thin films are the most widespread types of semiconductors.[22] Crystalline silicon solar cells occupy 80% to 90% of the market share.[23] Even though the trend in the renewable energy industry involves a move towards multicrystalline silicon, the industry currently uses both mono and multicrystalline types.[24] Monocrystalline silicon is produced by slicing wafers from a high-purity, single crystal boule.[25] In contrast, multicrystalline silicon is made by sawing a cast block of silicon, first into bars and then into wafers.[26] Thin film solar cells are a less expensive alternative to crystalline silicon wafers.[27] The fact that such cells are only about one micron thick helps significantly reduce costs on materials.[28] The most common materials used are amorphous silicon and polycrystalline materials.[29] All these materials can be deposited over a large area onto substrates of approximately one meter, and thus can be used for high volume manufacturing.[30]

The manufacturing of a solar panel normally contains four main steps: (1) silicon crystal growing or casting; (2) solar cell manufacturing; (3) module

15. EUROPEAN COMM'N, RENEWABLE ENERGY TECHNOLOGIES: LONG TERM RESEARCH IN THE 6TH FRAMEWORK PROGRAMME 2002|2006 at 5 (2007), *available at* ftp://ftp.cordis.europa.eu/pub/fp7/energy/docs/synopses_res_en.pdf.

16. *Solar Power: News and Information about Solar Energy Technologies*, SOLAR POWER, http://www.alternative-energy-news.info/technology/solar-power/ (last visited Sept. 23, 2011).

17. *Id*.

18. *Technologies*, SOLARBUZZ, http://www.solarbuzz.com/going-solar/understanding/technologies (last visited Sept. 20, 2011).

19. *Id*.

20. *Id*.

21. *Id*.

22. *Id*.

23. *Id*.

24. *Id*.

25. *Id*.

26. *Id*.

27. *Id*.

28. *See Photovoltaics: Characterizing Thin Film Solar Cells*, SCI. COMPUTING INT'L, http://www.sci-soft.com/Thin%20Film%20Solar%20Cells.htm ("With optical engineering, the thin film, often only 1 micron thick, can absorb a high percentage of the usable solar energy.").

29. *Id*.

30. *Id*.

assembly; and (4) systems assembly.[31] There are two main methods for growing silicon crystal. The traditional method is the Czochralski process.[32] This process alters monocrystalline wafers by pulling a single crystal from molten silicon held in a large heated quartz crucible.[33] A relatively new method is casting silicon in a re-useable graphite mold to produce blocks of multicrystalline silicon.[34] These blocks are first cut into bars, then into wafers, using a wire saw.[35] The sawed wafers are ready for cell manufacturing once they are cleaned.[36] As thin film plants do not use crystalline silicon wafers, the entire first step is avoided.[37] Instead, the production of thin film cells generally uses large-area glass sheets coated with a transparent conducting oxide layer.[38]

The next step is to take the wafers through a high technology semiconductor processing sequence to create working solar cells.[39] For crystalline silicon, wafers typically undergo a process sequence of etching, diffusion, and screen-printing steps before they are tested and graded for incorporation into modules.[40] For thin films, glass or stainless steel substrates are processed through steps of transparent conducting oxide deposition, semiconductor layer growth, laser scribing, and metallization.[41]

The third step is to assemble modules. This step involves soldering cells together to produce a string of cells, and then laminating it between toughened glass on the top and a polymeric backing sheet on the bottom.[42] The final step is to assemble and install the entire solar system.[43] After choosing an array structure based on the final location of the system, the electrical components are integrated with other parts of the solar energy system.[44]

The three biggest Chinese solar power companies all reported 2011 second-quarter sales increases of 33% to 63% from a year earlier.[45] China now supplies three-fifths of the world's demand for solar panels. Top-tier Chinese firms, therefore, are in the position to set a benchmark for the international pricing of solar equipment.[46]

---

31. *See Manufacturing*, SOLARBUZZ, http://www.solarbuzz.com/going-solar/understanding/manufacturing (last visited Sept. 20, 2011) (describing the solar system manufacturing process) [hereinafter *Manufacturing*].
32. *See id.* (explaining the differences in the two main methods of silicon crystal growing).
33. *Id.*
34. *Id.*
35. *Id.*
36. *Id.*
37. *Id.*
38. *Id.*
39. *How Products Are Made*, SOLAR CELL, http://www.madehow.com/Volume-1/Solar-Cell.html (last visited Sept. 20, 2011).
40. *Manufacturing*, *supra* note 31.
41. *Id.*
42. *Id.*
43. *See id.*
44. *See id.*
45. Bradsher, *supra* note 10, at B6.
46. *Id.*

B. Wind Technologies

Wind turbines are used to convert wind's kinetic energy into mechanical power.[47] A typical wind turbine consists of (1) a rotor that has wing-shaped blades attached to a hub, (2) a nacelle that houses a drivertrain, which contains a gearbox, connecting shafts, support bearings, the generator, and other machinery, (3) a tower, and (4) ground-mounted electrical equipment.[48]

The blades on the rotor harvest the energy in the wind stream by spinning from the force of the wind.[49] The rotor converts the kinetic energy from the wind to rotational energy transmitted through the drive train to the generator.[50] Generated electricity is either directly connected to the load or fed to the utility grid.[51] Most towers are made of steel that have been coated with a zinc alloy for protection.[52] Nacelles are made of fiberglass.[53] Because a nacelle contains many parts including the generator whose main components are steel and copper, a typical nacelle weighs approximately 22,000 pounds.[54] Blades can be made from many different types of materials.[55] The most dominant material is fiberglass with a hollow core.[56] Other materials in use include lightweight woods and aluminum.[57] Fiberglass blades are typically fifteen meters in length and 2,500 pounds in weight.[58]

In April 2011, China's Sinovel replaced General Electric Co. as the world's second largest winder turbine producer.[59] Sinovel occupied 11.1% of the global wind turbine market share at the end of 2010.[60] In addition, three other Chinese firms made the Top Ten List of the world's biggest wind turbine manufacturers by market share.

---

47. *How Wind Turbines Work*, U.S. DEP'T OF ENERGY, http://www1.eere.energy.gov/wind/wind_how.html (last visited Oct. 11, 2011).

48. Dan Ancona & Jim McVeigh, *Wind Turbine – Materials & Manufacturing Fact Sheet*, PRINCETON ENERGY RESOURCES INT'L, LLC (Aug. 29, 2001), *available at* http://www.perihq.com/documents/WindTurbine-MaterialsandManufacturing_FactSheet.pdf.

49. *Id.*

50. *Id.*

51. U.S. DEP'T OF ENERGY, WIND POWER TODAY 23 (May 2001), *available at* http://www.nrel.gov/docs/fy01osti/28921.pdf.

52. *Wind Turbine*, ENOTES, http://www.enotes.com/how-products-encyclopedia/wind-turbine (last visited Sept. 20, 2011).

53. *Id.*

54. *Id.*

55. *See id.* ("The most diverse use of materials and the most experimentation with new materials occur with the blades.").

56. *Id.*

57. *Id.*

58. *Id.*

59. Guanqun Wang, *China's Sinovel replaces GE as world's second largest wind turbine maker*, XINHUA NEWS (Apr. 6, 2011), http://news.xinhuanet.com/english2010/china/2011-04/06/c_13815773.htm.

60. *Id.*

C. Boosting the Renewable Energy Technology Industry—Chinese Style

1. Government Subsidies to Chinese Renewable Energy Technology Companies

Beijing, in hopes of becoming the global powerhouse for renewable energy technologies, has announced its goal of meeting 20% of its energy needs from renewable energy source by 2020.[61] The Chinese government has enacted numerous new laws in order to achieve this national goal.[62] These laws order authorities and financial institutions on both the national and local levels to create strong incentives for green technology companies to improve their technology development and equipment production capacity.[63] In 2009 alone, the Chinese government invested more than $30 billion to produce renewable technology equipment with lower carbon dioxide emissions.[64]

A major reason for China's almost obsessive emphasis on the production and use of renewable energy technology is the pressure to maintain the speed of the country's economic growth.[65] Ever since China opened up its market to the world in 1978, economic development has been the core objective of the nation.[66] China has had an average annual GDP growth rate of 9.9% for the last two decades, and has overtaken Japan as the world's second largest economy.[67] Securing energy supply is of fundamental importance to the continuous growth of the Chinese economy. Therefore, Chinese leaders see the energy issue as having a significant impact on the nation's economic development.[68]

In China, social stability and security are strongly tied to the condition of its economy. China is now the second largest oil consuming country in the world, behind only the U.S.[69] In the last decade, China has more than doubled the amount of its oil imports.[70] Chinese analysts are alarmed at the country's

---

61. Bruce Stokes, *Emerging Green Technology Poses Threat of Trade Wars*, YALE GLOBAL ONLINE (May 14, 2010), http://yaleglobal.yale.edu/content/emerging-green-technology-poses-threat-trade-wars.

62. *See, e.g.*, Renewable Energy Law of the People's Republic of China (promulgated by the Standing Comm. of the Nat'l People's Cong., Feb. 28, 2005, effective Jan. 1, 2006) 2005 STANDING COMM. NAT'L PEOPLE'S CONG., art. 1, 2, *available at* http://www.martinot.info/China_RE_Law_Beijing_Review.pdf.

63. *See, e.g.*, *id* (giving examples of what energy authorities must do to incentivize the development and use of new energy technology).

64. Joel Kirkland, *Steelworkers Accuse China of Unfair Trade Practices in Clean Technologies*, N.Y. TIMES, Sept. 10, 2010, http://www.nytimes.com/cwire/2010/09/10/10climatewire-steelworkers-accuse-china-of-unfair-trade-pr-10450.html.

65. Mei Gechlik, *Making Transfer of Clean Technology Work: Lessons of the Clean Development Mechanism*, 11 SAN DIEGO INT'L L.J. 227, 243 (2009).

66. *Id*.

67. *China Strategy: Refining Yours Could Open New Doors*, 63 GROWING YOUR BUS. 12, 15 (2011), *available at* http://www.pwc.com/us/en/private-company-services/publications/assets/growing-your-business-vol-63.pdf; Kevin Hamlin & Li Yanping, *China Overtakes Japan as World's Second-Biggest Economy*, BLOOMBERG NEWS (Aug. 16, 2010), http://www.bloomberg.com/news/2010-08-16/china-economy-passes-japan-s-in-second-quarter-capping-three-decade-rise.html.

68. *See* Gechlik, *supra* note 65, at 244 (explaining that Chinese leaders see climate change as a critical issue).

69. Matthew Forney, *China's Quest for Oil*, TIME, Oct. 18, 2004, http://www.time.com/time/magazine/article/0,9171,725174,00.html.

70. *Id*.

burgeoning dependence on foreign oil, and are "concerned about the negative impact of oil price fluctuations on China's economy and social stability."[71] The insufficiency of energy supplies might bring serious social implications.

To prevent the potential threat of the instability posed by China's dependence on traditional energy sources, the Chinese government passed the Renewable Energy Act in 2005.[72] This law promotes the development and production of renewable energy technologies, including technologies that use solar energy, wind energy, biomass energy, ocean energy, and geothermal energy.[73] The Renewable Energy Act created a national fund to support, both directly and indirectly, scientific and technological research on renewable energy, as well as the construction of renewable energy projects, including manufacturing plants for green technology companies.[74]

Under the Renewable Energy Act, the Chinese government has been extremely generous in providing monetary support to the country's renewable technology industry. In September 2010, Beijing announced a $743.49 billion investment plan in renewable energy over the next decade.[75] The Ministry of Finance set up a "special project fund for renewable energy development," the purpose of which is to make it easier for renewable technology firms to initiate and expand production and research.[76]

Further, the Chinese national and local governments subsidize renewable technology companies by selling them state-owned land at bargain prices.[77] This enables companies to build production facilities at low initial costs and begin manufacturing within the shortest possible time.[78] Sunzone Optoelectronics is a two-year-old solar panel company located in the southern Chinese city of Changsha.[79] Sunzone exports near 95% of its solar panels to Europe.[80] It has also set up sales offices in New York, Chicago, and Los Angeles in preparation for a push into the U.S. market next February.[81] The municipal government of Changsha has transferred twenty-two acres of valuable urban land to Sunzone at "a bargain-basement price."[82] This move by

71. Lin Yu and Chen Xiaobin, *Nengyuanzhuanjia tan Zhongguoyingduishiyouanquan de jinmouyuanlue* [*Energy Experts Discuss Short and Long Range Strategies for China's Oil Security*], ZHONGGUO KUANGYE BAO [CHINA MINING NEWS], June 10, 2003, CI; Jiuguojiyoujiabaozhangyijiguojiashiyouanquanwenti fang Zhongguoshichangjingjiyanjiusuosuozhang Chen Huaiboshi [Interview with Dr. Chen Huai, Deputy Director of the Market Economy Research Institute about the sharp increase in international oil prices and national oil security], ZHONGGUOJNGJISHIBAO [CHINA ECONOMIC TIMES], Sept. 20, 2000, CI.

72. Renewable Energy Law of the People's Republic of China (promulgated by the Standing Comm. of the Nat'l People's Cong., Feb. 28, 2005, effective Jan. 1, 2006) 2005 STANDING COMM. NAT'L PEOPLE'S CONG., *available at* http://www.martinot.info/China_RE_Law_Beijing_Review.pdf.

73. *Id*. arts. 1–2.

74. Gechlik, *supra* note 65, at 240.

75. Li Woke, *Clean Energy to Garner Foreign Investment, Technology*, GLOBAL TIMES (Sept. 21, 2010), http://business.globaltimes.cn/china-economy/2010-09/576047.html.

76. (可再生能源发展专项资金管理暂行办法) [Interim Measures for Special Funds for Renewable Energy Development], ch. 1, art. 2, Jun. 20, 2006, *available at* http://www.china.com.cn/chinese/PI-c/1248915.htm.

77. Bradsher, *supra* note 2, at A12.

78. *Id*. at A1, A12.

79. *Id*. at A1.

80. *Id*.

81. *Id*.

82. *Id*.

the municipal government significantly reduced the company's initial costs and increased its attractiveness to foreign investors.[83]

Moreover, Beijing offers low interest loans to renewable energy technology companies through government-controlled financial institutions such as the State Development Bank, the Industrial and Commercial Bank, and the Agriculture Development Bank.[84] Companies can secure bank loans with interest rates as low as 2%.[85] Such low-interest loans alleviate companies' burden in repaying interest and, therefore, reduce the cost of production.[86]

Additionally, the 2005 Renewable Energy Act also creates tax incentives for the production of renewable technologies and encourages foreign investments in the Chinese green energy technology industry.[87] Each policy mentioned above creates strong incentives for renewable technology firms to increase their production capacity as fast as possible. In aggregation, these policies enable the firms to manufacture clean technology equipment at incredibly low costs.

In addition to the 2005 Renewable Energy Act, China has also enacted a number of other rules and regulations to ensure the fast growth of the renewable energy technology sector. For instance, in 2002, the Standing Committee of the National People's Congress approved the Law on the Promotion of Clean Production.[88] This law requires individuals and entities to implement "cleaner production" systems that involve the utilization of low-pollution technologies and production methods.[89] In addition to monetary punishment, violators of this law may even face criminal liability.[90] In 2007, China adopted the National Climate Change Program, which clearly states that the problems of climate change should be addressed through the advancement of science and technology.[91] The program also establishes the development and dissemination of advanced technologies as a major initiative.[92] In the same year, the Chinese government revised its Energy Conservation Law.[93]

---

83. *Id*.

84. CANADIAN EMBASSY IN BEIJING, OVERVIEW OF THE RENEWABLE ENERGY SECTOR IN CHINA 6 (May 8, 2007), *available at* http://www.ottawaregion.com/media_lib/Research_Materials/OVERVIEW_OF_THE_RENEWABLE_ENEGRY_SECTOR_IN_CHINA.pdf.

85. Keith Bradsher, *Ch*ina's *Edge in Renewable Energy*, STATESMAN.COM (Feb. 7, 2010, 11:20 AM), http://www.statesman.com/opinion/insight/chinas-edge-in-renewable-energy-217186.html.

86. Jingbo Wang,(中美可再生能源政策比较分析) [Comparisons and analyses of China and U.S. renewable energy policies], SHANGHAI INFO. SERVS. PLATFORM (Jun. 24, 2004), http://www.istis.sh.cn/list/list.aspx?id=467.

87. Renewable Energy Law of the People's Republic of China (promulgated by the Standing Comm. of the Nat'l People's Cong., Feb. 28, 2005, effective Jan. 1, 2006) 2005 STANDING COMM. NAT'L PEOPLE'S CONG., *available at* http://www.martinot.info/China_RE_Law_Beijing_Review.pdf.

88. Cleaner Production Promotion Law (promulgated by the Standing Comm. of the Nat'l People's Cong., June 29, 2002, effective Jan. 1, 2003), CHINACP.COM, *available at* http://www.chinacp.com/EN/PolicyDetail.aspx?id=39.

89. *Id*. ch. 3.

90. *Id*. art. 38.

91. Gechlik, *supra* note 65, at 238.

92. PEOPLE'S REPUBLIC OF CHINA, NAT'L DEV. & REFORM COMM'N, CHINA'S NATIONAL CLIMATE CHANGE PROGRAMME 52–54 (June 2007), *available at* http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File188.pdf.

93. (中华人民共和国主席令第七十七号) [Presidential Order, No. 77] (promulgated by the President of the People's Republic of China, Oct. 28, 2007, effective Apr. 1, 2008), *available at* http://www.gov.cn/flfg/2007-

The revised law prohibits the use of energy-intensive equipment,[94] requires public entities to be champions of using energy-saving products,[95] and provides tax incentives for companies using energy-saving technologies.[96]

2. Complaints Filed Against China

In 2009, two major German renewable energy technology manufacturers, Conergy AG and Solarworld AG, objected to aggressive pricing by Chinese companies.[97] Germany's solar industry association, Bundesverband Solarwirtschaft e.V, is currently investigating whether Chinese solar panel makers are dumping panels on Germany's solar market in violation of the WTO anti-dumping rules.[98] China-based solar manufacturer Suntech is the world's largest producer of solar panel by volume.[99] Suntech's chief strategy officer Steven Chan has openly rejected the allegations of the German companies and criticized their accusations as "self-serving."[100]

Similarly in the United States, the largest American industrial union, the United Steelworkers (USW), recently filed a 5,000-page complaint with the U.S. Trade Representative's Office (USTR) accusing China of "using unfair trade practices to create jobs in its clean energy technology sector and get a permanent edge on U.S. manufacturers."[101] Specifically, the USW alleges, *inter alia*, China has violated WTO rules by supporting Chinese renewable energy technology companies through direct and indirect subsidies.[102] The USW claims that China's support of its renewable energy technology industry has unfairly contributed to the Chinese manufacturers expanding their market share for green technology equipment to the detriment of American workers.[103]

The USW invoked Section 301 of the Trade Act of 1974 (Section 301) requesting the USTR to investigate China's practice.[104] Section 301 gives the U.S. government the authority to investigate and sanction foreign countries whose acts and policies violate trade agreements.[105] However, when a Section 301 investigation involves an alleged violation of a bilateral, regional, or multilateral trade agreement in which both the U.S. and the nation at issue are participants, the USTR must follow that agreement's dispute settlement

10/28/content_788493.htm.

94. (中华人民共和国节约能源法) [Energy Conservation Law of the People's Republic of China] (promulgated by the Standing Comm. Nat'l People's Cong., Oct. 28, 2007, effective Apr. 1, 2008), arts. 16–17, 51, *available at* http://www.epa.gov/ogc/china/energy_conservation.pdf.

95. *Id.* arts. 47–51.

96. *Id.* arts. 60–67.

97. Andrew Donoghue, *Chinese Solar Maker Rejects German Dumping Claims*, BUSINESSGREEN (Sept. 9, 2009), http://www.businessgreen.com/articles/print/2249155.

98. *Id.*

99. *Id.*

100. *Id.*

101. Kirkland, *supra* note 64.

102. Walter J. Spak & David E. Bond, *Alerts – Steelworkers File Section 301 Petition on China's Support of Its Clean Energy* Sector, WHITE & CASE LLP (Sept. 2010), http://www.whitecase.com/alerts-09132010/.

103. *Id*.

104. *Id*.

105. 19 U.S.C. § 2411(a)(1)(B) (2006).

provisions.[106] In the present case, since the USW contends Chinese violations of WTO rules, all subsequent investigations by the United States must result in WTO dispute settlement proceedings.[107] Part III will discuss the causes of actions and remedies provided by WTO rules.

III. ANALYSIS

WTO rules provide two legal grounds for challenging China's renewable technology policy: illegal subsidies and prohibited dumping. However, as explained below, neither of these two grounds offers fast and effective remedies. In coping with the threat imposed by China, a more sensible approach for the United States is to boost the competitiveness of U.S. domestic renewable technology industry, rather than invoking risky and time-consuming remedies such as countervailing measures and anti-dumping duties.

A. Subsidies

Article 3.1(a) of the WTO Agreement on Subsidies and Countervailing Measures (ASCM) prohibits "subsidies contingent, in law or in fact, whether solely or as one of several other conditions, upon export performance . . . ."[108] In other words, although subsidies to domestically consumed products are permissible, those to manufacturers that produce products for exportation purposes are impermissible. This rule is in place because it is necessary for member countries of the WTO to have mutual assurance that a member's conduct of assisting its domestic industry will not injure the domestic industry of another member country.[109] Therefore, if a subsidy imposes a serious prejudice on the interest of another member, the subsidy is considered to have caused an "adverse effect" and thus gives rise to an actionable claim.[110] There are several ways to prove the existence of "serious prejudice." For example, serious prejudice exists when a subsidy significantly cuts the price of the subsidized product as compared with the price of a like product of another member state in the same market,[111] when the subsidy causes lost sales in another member state,[112] or when the subsidized product increases its world market share consistently over a period during which subsidies are granted.[113]

However, it is important to notice that "[t]he mere fact that a subsidy is granted to enterprises which export shall not for that reason alone be considered to be an export subsidy within the meaning of [Article 3.1(a)]."[114] If a subsidy is not legally designed to boost the export earnings of a product,

106. Spak & Bond, *supra* note 102.
107. *Id*.
108. ASCM art. 3.1(a).
109. *Id*. art. 5(a).
110. *See id*. ("No Member should cause . . . injury to the domestic industry of another Member.").
111. *Id*. art. 6.3(c).
112. *Id*.
113. This is measured by comparison to the average share the subsidized product had during the previous period of three years. *Id*. art. 6.3(d).
114. *Id*. art. 3.1(a).

then there must be facts demonstrating that the granting of the subsidy is indeed tied to actual or anticipated exportation.[115]

Legal remedies are available to countries whose industries are harmed by the prohibited subsidies. If a member country "has reason to believe that a prohibited subsidy is being granted" by another member country, the allegedly harmed country "may request consultation" with the other member country.[116] If the parties cannot reach an agreement within a set period of time after the consultation request,[117] either party may ask the Dispute Settlement Body to establish a panel to help resolve the matter.[118] Alternatively, the harmed country can adopt countervailing measures.[119] The harmed party must undergo several painstaking steps before it may legitimately assume countervailing measures. First, a domestic industry must file a written application for investigation of an alleged subsidy.[120] Before the commencement of any investigation, the harmed country must give the country granting subsidies an opportunity for consultations.[121] The countervailing duties may only be imposed if, after reasonable efforts of consultations, the harmed party can determine the existence and amount of the subsidy and the injury caused by the subsidized imports.[122] Even then, the importing country must ensure that the countervailing measures are in conformity with all provisions of the Agreement on Subsidies and Countervailing Measures and those of Article VI of The General Agreement on Tariffs and Trade (GATT) of 1994.[123]

B. Dumping

According to the Agreement on Implementation of Article VI of The General Agreement on Tariffs and Trade 1994 (AIGATT), dumping occurs when a product meant for consumption is exported from one country to another at a lower price less than the destination country's comprable product.[124] To establish a prima facie case of dumping, the importing country must prove: (1) dumping; (2) material injury; and (3) causal link between the dumped imports and the alleged injury.[125] As a remedy, the complaining country may impose anti-dumping duties on problematic products from the dumping country.[126] Importantly, an anti-dumping duty must not be greater in

115. *Id*.

116. *Id*. art. 4.1.

117. *Id*. arts. 4.1, 4.4, 7.4. The set period of time is either 30 days or 60 days, depending on whether the Member making the request has made its claim based on Article 3 or Article 5 of the Agreement on Subsidies and Countervailing Measures.

118. *Id*. art. 4.4.

119. *Id*. pt. V n.35 ("With regard to the effects of a particular subsidy in the domestic market of the importing Member, only one form of relief (either a countervailing duty . . . or a countermeasure under Articles 4 or 7) shall be available.").

120. *Id*. art. 11.1.

121. *Id*. art. 13.1.

122. *Id*. art. 19.1.

123. *Id*. art.10.

124. AIGATT art. 2.1.

125. *Id*. art. 5.2.

126. General Agreement on Tariffs and Trade, Oct. 30, 1947, 55 U.N.T.S. 194, art. VI.2, *available at* http://www.wto.org/english/docs_e/gattdocs_e.htm [hereinafter GATT].

amount than the margin of dumping with respect to the product.[127]

One defense available to China is that despite its rapid growth, it is still a developing country. AIGATT Article 15 allows leniency in applying the anti-dumping rules to developing countries.[128] Countries considering the imposition of anti-dumping duties shall first explore the possibilities of constructive remedies to minimize the negative impact on "the essential interest of developing country Members."[129]

The procedure for requesting anti-dumping remedies is similar to that of countervailing measures. First of all, a domestic industry or someone on its behalf must file a written application for an investigation.[130] If after the investigation a country decides that its rights under AIGATT have been nullified or impaired, it shall then attempt consultations with the accused country.[131] Only when such attempts have failed may the importing country refer the matter to the Dispute Settlement Body, which will then establish a penal committee to examine the issue.[132]

Despite the existence of such WTO rules, U.S. legal challenges to the Chinese renewable technology practice face great difficulties because current international law and WTO procedures are inadequate for resolving disputes over what is a subsidy, a trade barrier, or an otherwise unfair advantage in the field of green technologies. New industries like renewable technologies are often unable to live with uncertainty while the WTO takes time to make its decisions, because pressures are strong on each country to favor its clean energy technology sector and to create more green jobs.[133] The current dispute between China and the United States underscores the need for clear global rules on how governments can assist renewable energy technology industries while avoiding discrimination against foreign competitors.

C. Recommended Policy for the US

Upon the USW's petition against Chinese renewable energy technology policies, the Obama administration decided to investigate China's potential subsidies and anti-dumping violations.[134] It is difficult to predict what results the investigations will reach. While litigation might be helpful to buy time and perhaps weaken the onslaught of Chinese imports, it can only be a temporary and partial strategy at best, and must be combined with policies that make the United States more competitive.

---

127. *Id.*
128. AIGATT art. 15.
129. *Id*.
130. *Id.* art. 5.1.
131. *Id.* art. 17.3.
132. *Id.* art. 17.4.
133. *The Cold War in Clean Energy*, *supra* note 1.
134. David Moberg, *Obama Admin to Investigate Chinese 'Green Tech' Trade Violations*, IN THESE TIMES (Oct. 16, 2010), https://www.inthesetimes.com/working/entry/6567/obama_admin_to_investigate_chinese_green_tech_trade_violations/.

1. Countervailing Measures and Anti-Dumping Duties

As discussed above, it might be possible for the United States to adopt countervailing measures and/or anti-dumping duties if the it can sufficiently prove China's violations of WTO rules on subsidies and anti-dumping.

The introduction of countervailing measures and anti-dumping duties can protect domestic renewable technology manufacturers by reducing the impact of foreign competition. The imposition of import duties is the most direct method of controlling the quantity of imported goods and adjusting the prices of such goods. When the prices of imported products are artificially inflated, U.S. domestic renewable technology manufacturers will face weaker price competition.

However, such measures have many disadvantages as well. First, import duties are likely to be criticized by the international community as a form of trade protectionism. In response to President Obama's announced investigations, China has openly accused the U.S. of promoting "green protectionism."[135] Especially in a time when the U.S. wants to be perceived as the global leader of green energy technologies, it is extremely important to avoid such criticism.

Second, imposing countervailing and anti-dumping duties may trigger trade wars. China is already limiting the exportation of its rare earth minerals, which are essential material in the production of wind turbines.[136] If the U.S. imposes heavier duties on solar panels and wind turbines from China, it may trigger further deterioration of the already strained trade relationship between the two countries and lead to more restrictions from both sides.

Third, even though U.S. green technology producers would face strong competition if increased duties were not imposed, such competition brings down prices and therefore is beneficial for consumers.

Fourth, the WTO rules encourage negotiations and settlements between parties. The rules set up a multi-layered remedy requesting system and uses language such as "with a view to reaching a mutually satisfactory resolution of the matter"—this demonstrates the WTO's intention to encourage early settlements without implementing countervailing measures or anti-dumping duties.[137] Therefore, countervailing measures and anti-dumping duties cannot be recommended in the context of the current situation, and should not be introduced without in-depth discussions of its appropriateness and thorough consideration of possible repercussions.

135. *See China Rejects Double Standards on Clean Energy*, PEOPLE'S DAILY (Oct. 21, 2010), http://english.peopledaily.com.cn/90001/90780/91421/7173541.html ("The 301 investigation set a bad example of trade protectionism to the rest of the world . . . .").

136. H. Sterling Burnett, *The True Energy Threat to the United States National Security*, INST. FOR ENERGY RES. (Feb. 11, 2011), http://www.instituteforenergyresearch.org/2011/02/11/the-true-energy-threat-to-the-united-states-national-security/.

137. *See* ASCM arts. 4, 7, 9, 11; AIGATT arts. 5, 9, 17.

2. More Funding for the U.S. Domestic Renewable Technology Sector

United States renewable energy technology companies face many more difficulties than their Chinese counterparts. Most of these difficulties are financial.[138] Although the Obama Administration has talked extensively about the importance of transitioning to renewable energy, U.S. green technology companies so far have received only a limited amount of actual support from their government.

Section 1703 of Title XVII of the Energy Policy Act of 2005 (EP Act 2005) authorizes the Department of Energy (DOE) to issue loan guarantees to eligible projects that "avoid, reduce, or sequester air pollutants or anthropogenic emission of greenhouse gases" and "employ new or significantly improved technologies as compared to technologies in service in the United States at the same time the guarantee is issued."[139]

Under the American Recovery and Reinvestment Act of 2009 (ARRA), Congress established a temporary program under Section 1705 of Title XVII of EP Act 2005 that authorizes the DOE to make loan guarantees to certain renewable energy systems, electric transmission systems, and cutting edge biofuels projects that commence construction no later than September 30, 2011.[140] Under the objectives of "pav[ing] the way for federal support of clean energy projects that use innovative technologies, and spur[ring] further investment in these advanced technologies," the Loan Guarantee Program (LGP) allows the DOE to guarantee the debt of privately owned clean energy developers.[141] This means that when the developer of a green technology project is unable to repay a loan to a private lender, the government will step in and pay back the outstanding balance.[142] The government accounts for this risk by estimating its future liability, and deposits the corresponding amount of money in a special account.[143]

In President Obama's 2011 State of the Union address, he announced the administration's ambitious goal of generating 80% of America's electricity from clean sources by 2035.[144] The important question, however, is whether Congress is willing to implement the incentives necessary to achieve this goal. Even though programs such as the LGP exist, the actual implementation of these programs to date raises serious doubt about Congress' commitment to accomplishing President Obama's stated objective.

So far the LGP has only given conditional approval to eighteen renewable

138. *See* Bradsher, *supra* note 2, at A12 (listing American clean energy companies with financial struggles).

139. Energy Policy Act of 2005, Pub. L. No. 109-58, § 1703, 119 Stat. 594, 1120 (2005).

140. American Recovery and Reinvestment Act of 2009, Pub.L. No. 111-5, § 1705, 123 Stat. 115, 145(2009).

141. Press Release, U.S. Dep't of Energy, Department of Energy Issues Final Rule on Loan Guarantees (Dec. 7, 2009), *available at* https://lpo.energy.gov/wp-content/uploads/2010/09/FR-12709.pdf.

142. *See id.* (discussing new federal rules pertaining to clean energy loan guarantees).

143. Jake Caldwell & Richard W. Caperton, *End the Raids on Clean Energy Funding*, CTR. FOR AM. PROGRESS (Aug. 11, 2010), http://www.americanprogress.org/issues/2010/08/clean_ energy_raids.htm.

144. Barack Obama, President of the U. S., State of the Union Address (Jan. 25, 2011) (transcript available at http://www.whitehouse.gov/state-of-the-union-2011).

energy loan guarantees, and only four have led to the actual issuance of loans.[145] From 2005 to 2009, the LGP suffered a four-year-long freeze.[146] Merely four months after the re-launch of the LGP in July 2009, Congress removed $2 billion of the original $6 billion budgeted for the program to help extend the "Cash for Clunkers" program.[147] In August 2010, Congress again rescinded $1.5 billion in Recovery Act LGP funds in order to pay for the newly approved legislation for Federal Medical Assistance Percentage, which promised to increase federal funding for state Medicaid costs.[148] These two removals leave the program with no more than $2.5 billion in funds.[149] The overall reduction of $3.5 billion from the program causes a potential loss of $35 billion in private sector clean technology investment.[150] According to Michael El-Hillow, chief financial officer of Massachusetts-based green technology company Evergreen Solar, companies "can't get a penny in the United States, it doesn't matter who you call—banks, government. It's awful . . . ."[151] Compared to the Chinese government, the U.S. government grants a larger dollar amount of direct subsidies to the renewable technology industry.[152] However, this figure is deceptive because China's "state-owned banks also provid[ed] 'much crucial support' through low-interest loans . . . ."[153] Within the short time period from January to early August 2010, the state-controlled China Development Bank extended $24 billion in loans to five renewable energy technology companies.[154]

The strategy of increasing government funding for the U.S. clean technology industry has two main advantages. First, strong financial support is the most direct way to foster growth in the green technology sector. Second, government funding helps advanced technology companies attract critical private investments. Because of the high barriers to entry in the United States, direct monetary support can be crucial for American renewable technology companies in the challenging competition with their Chinese counterparts. For instance, the LGP recently granted $967 million to a 290 megawatt thin-film solar project, which is expected to be the largest of its kind in the world.[155] DOE's backing will support construction of NRG Solar's Agua Caliente Solar generating facility in Yuma County, Arizona.[156] This project "will deploy fault

145. Bradsher, *supra* note 2, at A13.

146. Megan Treacy, *DOE Awards First Clean Energy Loan Guarantee in Four Years*, YAHOO! GREEN (Mar. 26, 2009, 1:30 PM), http://green.yahoo.com/blog/ecogeek/1016/doe-awards-first-clean-energy-loan-guarantee-in-four-years.html.

147. Caldwell & Caperton, *supra* note 143.

148. *Id*.

149. *Id*.

150. *Id*.

151. Bradsher, *supra* note 2, at A13 (quoting Mr. Michael El-Hillow).

152. *Fossil Fuel Subsidies are 12 Times Support for Renewables, Study Shows*, RENEWABLE ENERGY FOCUS.COM (Aug. 4, 2010), http://www.renewableenergyfocususa.com/view/11492/fossil-fuel-subsidies-are-12-times-support-for-renewables-study-shows/.

153. *Id*.

154. *Id*.

155. *Weekly Clean Energy Roundup: January 26, 2011*, IBTIMES UK (Jan. 27, 2011), http://uk.ibtimes.com/articles/20110127/weekly-clean-energy-roundup-january-2011.htm.

156. *Id*.

ride-through and dynamic voltage regulation, technologies that are new to U.S. solar plants. The technologies improve the reliability and predictability of electricity generated by solar plants and supplied to the electricity grid."[157] When finished in 2014, the Agua Caliente Project "will power about 100,000 homes and create 400 solar jobs."[158]

Furthermore, government funding is essential for the development of advanced technologies. The need for government funding is partly because compared to their Chinese competitors, U.S. renewable technology companies are disadvantaged in terms of labor costs. To compensate for this disadvantage, the United States must focus on developing the areas in which it has comparative advantages over China, especially in advanced technologies. However, revolutionary new technologies, such as electricity storage that mimics photosynthesis and batteries that multiply the energy stored per pound, are usually too radical to be widely supported by private investors during their primary development stages. Government funding is indispensable for the survival of such technologies.[159] The most important role of government financing in such projects is that it increases the confidence in the viability of these new technologies and that it brings to public attention the projects' early signs of success.[160] As a result, government funding catalyzes private investment in new clean technology projects. Since 2009, six such projects "have made enough progress to attract $108 million in private venture capital financing . . . ."[161]

On the other hand, an increase in government funding for the development and adoption of renewable energy technologies creates the risk of intensified political fights over limited financial resources. As discussed above, strong competition for funding exists among different federal programs. Unless the U.S. government dramatically increases its tax rates, the available revenue will stay more or less at the current level in the coming years. More funding for renewable energy technologies means less funding for other critical programs, such as education and health care. With President Obama planning to freeze the budget and Congress looking for cuts, choosing which to support among the most essential federal programs will become an exceedingly challenging task, and green energy programs are not likely to fare very well.

3. Feed-in Tariffs

Feed-in tariffs, also called "renewable energy payments," are a cost-based policy mechanism that imposes an obligation on utility providers to purchase energy generated from renewable technologies at prices high enough to ensure the viability of such production.[162] Since the cost of generating renewable

157. *Id.*
158. *Id.*
159. Matthew L. Wald, *Energy Firms Aided by U.S. Find Backers*, N.Y. TIMES, Feb. 3, 2011, at B1.
160. *Id.*
161. *Id*.
162. *Feed-In Tariffs Are Good for Expensive Renewables, But Are They Good for Consumers?*, INST. FOR

energy is normally higher than that of generating conventional energy, it is not feasible for renewable energy producers to sell their energy at prices as low as energy generated using conventional methods. For example, the electricity produced by the wind farm off Cape Cod costs about twice the average price of electricity in the United States.[163] Feed-in tariffs are a way to make renewable energy affordable to average consumers and therefore to ensure the survival and stable growth of clean technologies. Under this policy scheme, state regulators require utilities to sign long-term wholesale contracts with renewable energy generators.[164] The rates are established at the level required "to ensure the generators a reasonable rate of return."[165] One proposal, for instance, suggests that the government pay wind projects $0.15–$0.23 per kilowatt hour, small hydro projects $0.12–$0.35 per kilowatt hour, and photovoltaic projects $0.46–$0.98 per kilowatt hour.[166]

Among all countries, Germany, Spain, and Denmark have been the most successful at creating sizable markets for clean energy.[167] A look at the energy histories of these countries reveals that all three have a history of stable feed-in tariff policies to promote renewable technology development.[168]

The most significant advantage of the feed-in tariff approach is that it guarantees the continuous development of diverse renewable technologies while enabling investors to receive reasonable returns on their investment in green energy. Feed-in tariffs incorporate the societal benefits of renewable resources in addition to the energy and capacity value of the power.[169] This approach can offer a solid foundation for renewable energy technologies to develop; as such, tariffs can most directly provide a stable and profitable market for clean energy.[170]

Germany provides a success story. In 2000, Germany enacted the Renewable Sources Act, part of which states:

> The compensation rates . . . have been determined by means of scientific studies, subject to the provision that the rates identified should make it possible for an installation—when managed efficiently—to be operated cost-effectively, based on the use of state-of-the-art technology and depending on the renewable energy sources

---

ENERGY RESEARCH (Sept. 10, 2010), http://www.instituteforenergyresearch.org/2010/09/10/feed-in-tariffs-are-good-for-expensive-renewables-but-are-they-good-for-consumers-2/ [hereinafter *Feed-In Tariffs*].

163. *Id*.

164. *Feed-In Tariffs – An Issue Paper of the National Rural Electric Cooperative Association*, NAT'L RURAL ELECTRIC COOPERATIVE ASS'N 1, *available at* http://www.nreca.coop/issues/FuelsOtherResources/DistributedGeneration/Documents/Feed-In%20Tariffs%20-%20An%20issue%20paper%20of%20the%20National%20Rural%20Electric%20Cooperative%20 Association.doc (last visited Sept. 22, 2011) [hereinafter *Issue Paper*].

165. *Id*.

166. *Id*.

167. JOANNA LEWIS & RYAN WISER, FOSTERING A RENEWABLE ENERGY TECHNOLOGY INDUSTRY: AN INTERNATIONAL COMPARISON OF WIND INDUSTRY POLICY SUPPORT MECHANISMS, ERNEST ORLANDO LAWRENCE BERKELEY NAT'L LAB. 17 (Nov. 2005), *available at* http://eetd.lbl.gov/ea/emp/reports/59116.pdf.

168. *Id*.

169. *Issue Paper*, *supra* note 164, at 2.

170. *See* LEWIS & WISER, *supra* note 167, at 17 (explaining how feed-in tariffs have historically offered the most successful foundation for wind manufacturing).

naturally available in a given geographical environment.[171]

Thanks to this legislation, German solar panel owners receive as much as €0.43 per kilowatt hour of power they generate; on-shore wind turbines receive about €0.10 per kilowatt.[172] As a result, Germany has become the largest user of wind power in the world and the leading global solar energy market.[173]

The feed-in tariff approach also has several disadvantages. One shortcoming is that, by requiring utilities to pay more for certain favored resources, feed-in tariffs will raise the cost of power for retail consumers. Even though the German renewable energy technology industry has developed rapidly thanks to the country's feed-in tariff policy, electricity consumers in Germany pay nearly four times the rate paid in the U.S. to help subsidize the German solar-power industry.[174] German consumers are projected to spend an estimated €100 billion on solar subsidies over the next twenty years.[175] The fact that utilities must purchase energy produced from each category of renewable technologies at a different price to make that category of technologies viable further burdens the consumers.

Even among renewable energy sources, some cost more to generate than others. For example, a feed-in tariff could require utilities to buy an equal amount of energy generated from solar technologies and wind technologies, even though solar energy could cost more than ten times the price of wind energy.[176] Another shortcoming of feed-in tariffs is that they do not create an incentive for developers to locate renewable generation efficiently where transmission capacity is available or planned.[177] As a result, it becomes difficult for utilities to engage in efficient regional transmission planning.[178]

4. Removal or Reduction of Fossil-Fuel Subsidies

While the clean energy industry is struggling to secure funding for the development and production of renewable technologies, fossil-fuel companies are receiving generous subsidies from the U.S. government.[179] The Center for American Progress has identified nine tax breaks for oil companies that will cost the United States $45 billion over the next ten years.[180]

---

171. FED. MINISTRY FOR THE ENV'T, NATURE CONSERVATION AND NUCLEAR SAFETY, ACT ON GRANTING PRIORITY TO RENEWABLE ENERGY SOURCES (RENEWABLE ENERGY SOURCES ACT) 16 (Mar. 2000), *available at* http://www.wind-works.org/FeedLaws/Germany/GermanEEG2000.pdf.

172. *Feed-In Tariffs*, *supra* note 163.

173. *Growing Improvements in Statistics About Solar Energy*, ARTICLESBASE (Dec. 8, 2010), http://www.articlesbase.com/diy-articles/growing-improvements-in-statistics-about-solar-energy-3813110.html.

174. *The Cold War in Clean Energy*, *supra* note 1.

175. *Feed-In Tariffs*, *supra* note 162.

176. *See Issue Paper*, *supra* note 164, at 2 (providing examples of the costs of solar energy and wind energy).

177. *Id*.

178. *Id*.

179. *See* Sima J. Gandhi, *Eliminating Tax Subsidies for Oil Companies*, CTR. FOR AM. PROGRESS (May 13, 2010), http://www.americanprogress.org/issues/2010/05/oil_company_subsidies.html (discussing President Obama's plan to reduce tax subsidies for oil companies and increase funding for renewable energy technologies).

180. *Id*.

One of the main reasons why U.S. consumers are able to purchase conventional energy at a much lower price than clean energy is because energy producers using fossil fuels receive large subsidies from the government.[181] The Environmental Law Institute found that fossil fuels received more than twice the level of subsidies that renewable energy sources received from the U.S. government in fiscal years 2002 through 2008.[182] Government spending and tax breaks amounted to $72.5 billion for fossil fuels but only $29 billion for renewable energy.[183] Over the same time period, oil and natural gas companies claimed a total of $15.3 billion in tax credits alone.[184]

The U.S. government can significantly reduce the amount of fossil-fuel subsidies or remove them all together. Revenues saved from fossil-fuel subsidy reduction or removal can be used to promote renewable energy technologies.

The removal of fossil-fuel subsidies, if adopted as a systematic approach, will provide the following advantages. First, legislation to repeal and remove subsidies for production and use of fossil fuels is a very effective measure for promoting renewable energy. The development and production of renewable energy technologies are handicapped by the significant reduction of government financing originally budgeted for such projects.[185] However, Congress would easily meet its original goal of $60 billion for renewable energy technologies if it is willing to redistribute only a relatively small portion of the $72.5 billion currently contributed to fossil fuels. Second, unlike fossil fuels, whose demand for subsidies increases over the years, renewable energy technologies' dependency on subsidies will gradually decrease. Although strong governmental support is necessary for the start up and initial development of green technologies, such technologies are able to generate energy more efficiently in the long run.

Denmark's introduction of wind power provides a convincing example. The Danish government began its wind power program in 1976, and in the next twenty years spent $75 million on wind turbine research and development.[186] The government subsidized at most 30% of the investment costs of a turbine in 1980, reduced the subsidy to 15% four years later, and completely repealed the subsidy when the market accepted the new technology in 1989.[187] Today, the Danish wind energy sector provides tens of thousands

181. *See* Tina Seeley, *U.S. Fossil-Fuel Subsidies Twice That of Renewables (Update2)*, BLOOMBERG (Sep. 18, 2009 15:15 EDT), http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a2ygdsSj.KQI (showing the large amount of subsidies that fossil fuels receive in comparison to renewable energy technologies).

182. *Id*. *But see* Bradford Plumer, *Fossil-Fuel Subsidies Still Dominate*, NEW REPUBLIC (Aug. 3, 2010), http://www.tnr.com/blog/the-vine/76750/fossil-fuel-subsidies-still-dominate (discussing a Bloomberg study which found that for all countries worldwide, fossil fuels receive twelve times more subsidies than renewable energy).

183. Seeley, *supra* note 181.

184. *Id*.

185. Caldwell & Caperton, *supra* note 143.

186. Richard L. Ottinger & Rebecca Williams, *Renewable Energy Sources for Development*, 32 ENVTL. L. 331, 348 (2002).

187. *Id.*

of jobs, and Danish consumers pay less for wind power than for coal power.[188]

The approach of removing fossil-fuel subsidies brings two main drawbacks. A sudden and large-scale funding cut might damage conventional energy industries and cause a temporary increase of job loss in those industries. A *New York Times* Op-Ed columnist criticized clean energy friendly agendas for being bad for the economy and called such legislation a "growth-slowing regulatory regime."[189] Furthermore, a decision to remove fossil-fuel subsidies will face strong political resistance. Congress adopts subsidies to fossil-fuel companies under pressure from the wealthiest elements of society to reduce their costs and increase their profits.[190] Big oil and natural gas companies usually have well-paid professional lobbyists and strong connections with the nation's decision makers. Their influence was evidenced by the Senate's refusal to pass the Comprehensive Climate and Energy Bill in 2010.

IV. RECOMMENDATIONS

A. Risks of Countervailing Measures and Anti-Dumping Duties

Countervailing measures and anti-dumping duties will be ineffective in the present case due to the uncertainty of international trade law as applied to renewable energy technologies and the slow process of WTO proceedings. It usually takes years for a WTO panel to reach a resolution or for parties to agree on a settlement.[191] In some cases, the disputes could last more than a decade.[192] As explained in Part III, the claiming party must go through several time-consuming stages, such as requesting consultations, attempting to reconcile, and waiting for the establishment of a panel to finally obtain permission to legally impose countervailing measures or anti-dumping duties.[193] Timeliness is especially critical in renewable energy technology cases because of the rapid development of new technologies. In the USW's case, it will likely take years before the United States is allowed to legitimately take on any measures under the WTO rules. By that time, significant changes might have happened to renewable technologies and the particular illegal subsidies that the United States fought hard over may no longer be relevant.

Furthermore, the imposition of countervailing measure or higher trade tariffs might result in international opposition and doubts with respect to the United States' commitment to environmental issues. Scholars and energy economists believe that pursuing trade sanctions is not the best approach for

188. *Id*.

189. Ross Douthat, *The Right and the Climate*, N.Y. TIMES, July 26, 2010, at A23.

190. Ottinger & Williams, *supra* note 186, at 344.

191. *See Chronological List of Disputes Cases*, WORLD TRADE ORG., http://www.wto.org/english/tratop_e/dispu_e/dispu_status_e.htm (last visited Sept. 20, 2011) (providing information key dates of each filed dispute).

192. *See, e.g.*, *Chile – Measures Affecting the Transit and Importing of Swordfish*, WORLD TRADE ORG., http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds193_e.htm (last visited Sept. 20, 2011) (indicating that the request for consultation was filed in April, 2000 and that the dispute lasted until May 2010).

193. *See supra* Part III.

the United States.[194] In order to be a global leader of renewable technology development and production, it must avoid any suspicion of green protectionism. Otherwise, President Obama's pressure on China would seem like an absurd hypocrisy. In response to the Section 301 investigation, China's Ministry of Commerce called the charges groundless and said that the U.S. is irresponsible for launching such an investigation.[195] The Ministry also criticized the investigation for setting a bad example of trade protectionism for the rest of the world.[196]

B. Increasing Competitiveness of U.S. Renewable Technology Industry

The U.S. government should demonstrate its strong determination to keep its commitment to the domestic clean energy industry by adopting a policy scheme that incorporates increased funding, feed-in tariffs, and the removal of fossil-fuel subsidies. Any of these approaches alone might not be sufficient to help the United States become a global leader in the renewable technology competition. For example, Solyndra's inability to survive despite its receipt of $535 million from the U.S. government shows that increased funding alone is not enough to help U.S. renewable technology firms stay competitive. However, a combination of several strategies, as mentioned above, could be an extremely powerful tool, which will enable the United States to win the war of clean energy technologies.

Strong determination is required to implement such a policy because intensified resistance from conventional energy companies is almost unavoidable. For instance, in California, Proposition 23 (Prop 23), which was funded by Texas oil companies, imposed serious threats to the progressive Global Warming Solutions Act of 2006 (AB 32).[197] AB 32 aims at establishing a comprehensive program to reduce greenhouse gas emissions from all sources throughout the state.[198] Specifically, AB 32 set the goal for 33% of energy to come from renewable sources by 2020.[199] However, the fact that California voters turned down Prop 23 shows that an increasing number of people realize the importance of switching to renewable energy technologies. Progressive government policies will eventually receive popular support and prevail.

V. CONCLUSION

The "Made in China" label is dominating the global market for renewable

194. *See, e.g.*, Kirkland, *supra* note 64 (discussing the opinions of Joanna Lewis from Georgetown University and Adele Morris from Brookings Institute).

195. *China Rejects Double Standards on Clean Energy*, PEOPLE'S DAILY (Oct. 21, 2010), http://english.peopledaily.com.cn/90001/90780/91421/7173541.html.

196. *Id*.

197. *See* Kristie, *The Golden State, California, Has Now Supercharged Solar & Wind Energy Production*, SOLAR PRODUCTS BLOG (Sept. 24, 2010), http://www.solar-products-blog.com/?p=1266 ("Prop 23, funded by Texas oil companies with refineries in California, would stop implementation of AB 32 in its tracks.").

198. *Id*.

199. *Id*.

technologies. In order to stay competitive in the green technology game, the United States should avoid undertaking legal procedures through the WTO to impose sanctions on China's renewable technology products, because such actions are time-consuming and ineffective. The pursuit of WTO remedies may even cause accusations of trade protectionism on the part of the United States and strain the diplomatic relationship between the two countries. Instead, the United States should adopt a progressive policy that incorporates a combination of clean-technology-friendly measures, such as increased funding, feed-in tariffs, and the removal of fossil-fuel subsidies, to foster growth of its domestic renewable technology sector.