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## TECHNOLOGY TRANSFER TO COMBAT CLIMATE CHANGE: OPPORTUNITIES AND OBLIGATIONS UNDER TRIPS AND KYOTO

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“[T]here should not be, nor need be, any policy contradiction between upholding and safeguarding an open, non-discriminatory and equitable multilateral trading system on the one hand, and acting for the protection of the environment, and the promotion of sustainable development on the other[.]”

- WTO Ministerial Decision on Trade and Environment<sup>1</sup>

### I. Introduction

On October 12, 2007, the Norwegian Nobel Committee awarded the Nobel Peace Prize jointly to the Intergovernmental Panel on Climate Change (“IPCC”) and Albert Arnold (Al) Gore Jr. “for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change.”<sup>2</sup> Although global climate change has been at the forefront of scientific, political, and legal discussion since the end of the twentieth century, 2007 marked a high-point in public attention to the issue. Unequivocally, the discussion shifted from whether global warming is occurring to what can (and should) be done *now* to mitigate its effects.<sup>3</sup>

In a 2000 special report, the IPCC acknowledged the essential role of technological innovation and the “rapid and widespread transfer and implementation of technologies” to stabilize and reduce greenhouse gas (“GHG”) concentrations in the atmosphere.<sup>4</sup> The report states that the

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1. Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations, Apr. 15, 1994, 33 I.L.M. 1125 (1994), *archived at* <http://www.webcitation.org/5at0zukG2>.

2. Norwegian Nobel Committee, *The Nobel Peace Prize for 2007*, NOBEL FOUNDATION, Oct. 12, 2007, *archived at* <http://www.webcitation.org/5at1IGP1F>.

3. *Id.* (“Action is necessary now, before climate change moves beyond man’s control.”); Arthur Max, *UN Panel Gives Dire Warming Forecast*, ASSOCIATED PRESS, Nov. 18, 2007 (“Only urgent, global action will do,” quoting U.N. Secretary-General Ban Ki-moon commenting on the IPCC 4th assessment report).

4. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Summary for Policymakers*, in IPCC SPECIAL

implementation of mitigating measures under the United Nations Framework Convention for Climate Change (“UNFCCC”) requires the provision of necessary financial resources and transfer of technology to developing nations.<sup>5</sup> According to the IPCC, in most cases, current technologies may be adequate to reduce GHG emissions.<sup>6</sup> For example, Stephen Pacala and Robert Socolow describe how to stabilize global concentration of atmospheric carbon dioxide (CO<sub>2</sub>), considered the dominant anthropogenic<sup>7</sup> GHG, during the next fifty years using a combination of fifteen current technologies.<sup>8</sup> Because of the foreseeable rapid growth in energy demands in Asia and other developing countries, some environmental experts are calling for a shift in focus.<sup>9</sup> Rather than concentrating on efforts to reduce GHG emissions in developed countries, the focus should be on the implementation of renewable technologies in precisely those developing nations that are undergoing rapid growth.<sup>10</sup> A recent decision by the UNFCCC, the Bali Action Plan, calls for enhanced action on technology transfer and development, including scaling up transfer of technology to developing countries to promote access to environmentally sound technology (“EST”).<sup>11</sup>

More than seventy-five percent of the parties to the UNFCCC are also

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REPORT: METHODOLOGICAL AND TECHNOLOGICAL ISSUES IN TECHNOLOGY TRANSFER 3 (2000) [hereinafter IPCC REPORT], archived at <http://www.webcitation.org/5at1R4Ttd>.

5. See IPCC REPORT, *supra* note 4, § I, at 3.2 archived at <http://www.webcitation.org/5at1Y24ry> (reflecting on Articles 4.5 and 4.7 of the UNFCCC).

6. IPCC REPORT, *supra* note 4, § I, at 1.3.

7. The term “anthropogenic,” in this context, refers to emissions caused by human activity as opposed to naturally occurring emissions.

8. Stephen W. Pacala & Robert H. Socolow, *Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies*, 305 SCIENCE 968, 969 (2004). The authors argue that no single technological measure alone will suffice, but suggest that a portfolio of seven mitigation wedges, each wedge reducing the projected annual emissions by one billion tons of carbon per year (GtC/year), will allow for a stabilization of global CO<sub>2</sub> emissions at 7 GtC/year. *Id.* at 968. This level of emissions arises from the requirement to stabilize the atmospheric CO<sub>2</sub> concentration at about 500 parts per million (ppm), or less than double the pre-industrial concentration of 280ppm. *Id.* Attainment of the 500ppm target has been held as a means to prevent most damaging climate changes. *Id.* In comparison, under the business as usual scenario global CO<sub>2</sub> emissions will grow to 14 GtC/year by the year 2054, assuming a current growth rate of 1.5% a year. Pacala & Socolow, 305 SCIENCE 968, 968.

9. See Steven Ferrey, *Why Electricity Matters, Developing Nations Matter, and Asia Matters Most of All*, 15 N.Y.U. ENVTL. L. J., 113, 115 (2007). See also Thomas C. Heller & P.R. Shukla, *Development and Climate: Engaging Developing Countries*, in BEYOND KYOTO: ADVANCING THE INTERNATIONAL EFFORT AGAINST CLIMATE CHANGE 111, 111 (Pew Center on Global Climate Change 2003); Conference of the Parties to the Climate Change Convention, Dec. 5, 2005, *Fact Sheet: Why Technology is so important*, 2, archived at <http://www.webcitation.org/5at257SfY> (“Many developing countries experiencing rapid growth, are making huge investments worth billions of dollars in capital stock, such as infrastructure and power generation, that will be used for thirty years or more. Such investments need to contribute to sustainable development.”); the Secretary-General, *Background Note by the Secretary-General on the High-Level Event on Climate Change, 24 September 2007, ‘The Future in Our Hands: Addressing the Leadership Challenge of Climate Change’*, ¶ 19 (Aug. 27, 2007), archived at <http://www.webcitation.org/5avcMjMW2>.

10. Ferrey, *supra* note 9, at 159.

11. Conference of the Parties to the Climate Change Convention, *Bali Action Plan, Decision -/CP.13 1(d)* (2007), archived at <http://www.webcitation.org/5at2CsyKH>.

members of the World Trade Organization (“WTO”).<sup>12</sup> Some member countries of the UNFCCC view the current intellectual property rights framework imposed by the WTO as a barrier to transfer of ESTs to developing countries.<sup>13</sup> Among legal scholars, strong intellectual property rights protection and proprietary licensing have been criticized as impeding access to renewable energy technology.<sup>14</sup> This Note will explore the following legal issues arising from the UNFCCC mandate to transfer EST to developing countries: (1) the effect of the WTO Agreement on Trade Related Aspects of Intellectual Property Rights (“TRIPS”) on the transfer of EST, and (2) whether developing countries may use TRIPS provisions to achieve transfer of EST on economically favorable terms.

## II. History

### A. International Climate Change Agreements

#### a. The Intergovernmental Panel on Climate Change (“IPCC”)

In 1988 the World Meteorological Organization (“WMO”) and the United Nations Environment Programme (“UNEP”) jointly established the IPCC to assess available information on the science, impacts, and economics of climate change and to formulate adaptation and mitigation options.<sup>15</sup> The IPCC has produced a series of reports and technical papers that are standard works of reference for policymakers, scientists and other experts.<sup>16</sup> Notably, on February 2, 2007, the IPCC released its Fourth Assessment Report, stating “with very high confidence” that “the global average net effect of human

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12. Committee on Trade and Environment, *Matrix On Trade Measures Pursuant To Selected Multilateral Environmental Agreements*, 30, WT/CTE/W/160/Rev.4. (Mar. 14, 2007) (Discussing correlation between WTO members and Kyoto Protocol). Of the 164 parties that ratified the Kyoto Protocol, 132 (eighty percent) are members of the WTO. *Id.* at 32.

13. See International Institute for Sustainable Development, *COP 13 And COP/MOP 3 Highlights: Friday, 7 December 2007*, 12 EARTH NEGOTIATIONS BULLETIN 348 (Dec. 8, 2007) archived at <http://www.webcitation.org/5at2IvtRq> (reporting that at least one developing country has called on the United Nations Framework Convention on Climate Change governing body to formally ask the WTO to relax the intellectual property rights for ESTs).

14. Jason R. Wiener, *Sharing Potential and the Potential for Sharing: Open Source Licensing as a Legal and Economic Modality for the Dissemination of Renewable Energy Technology*, 18 GEO. INT’L ENVTL. L. REV. 277, 278 (2006).

15. IPCC REPORT, *supra* note 4, at v.

16. IPCC REPORT, *supra* note 4, at v. The IPCC provides Assessment Reports at regular intervals on the state of knowledge on climate change. See, e.g., *infra* note 17. Supplementary to the Assessment Reports and often at the request of other environmental conventions, such as the UNFCCC, the IPCC prepares Special Reports and Technical Papers, which focus on a particular topic (e.g. technology transfer). See IPCC, *IPCC Reports*, (2007) archived at <http://www.webcitation.org/5at2PGdYr>. Technical Papers are based on material already presented in the Assessment Reports or Special Reports. *Id.*

activities since 1750 has been one of warming.”<sup>17</sup> Prepared by over 600 authors, and reviewed by representatives from 113 countries, the report is regarded as the consensus on the anthropogenic influence on climate change.<sup>18</sup> The report cites increased global average air and ocean temperatures, extensive melting of glaciers and snow cover, and rising global average sea level as evidence of an “unequivocal” warming of the climate system.<sup>19</sup> The main culprit of global warming is said to be the rise in GHG concentrations from human activity.<sup>20</sup>

The IPCC also provides scientific and technical advice to the Conference of the Parties (“COP”) to the UNFCCC and its subsidiary bodies.<sup>21</sup> The COP, at its first session in Berlin in 1995, requested that the IPCC elaborate on the terms under which transfer of environmentally sound technologies and know-how could take place.<sup>22</sup> Subsequently, the IPCC prepared a special report addressing technology transfer in the context of all relevant UNFCCC provisions.<sup>23</sup>

#### b. The UNFCCC

The UNFCCC was adopted in 1992 with the objective to stabilize GHG concentrations in the atmosphere at an environmentally safe level.<sup>24</sup> Member states are to promote and cooperate in the development and diffusion of technologies to reduce GHG emissions.<sup>25</sup> Because the member states recognized that countries differ in their capacities to achieve the goals of the convention, they established several means, including financing and technology transfer, by which countries could cooperate to meet these goals.<sup>26</sup> Unlike the

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17. IPCC, *Summary for Policymakers*, in CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS. CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, & H.L. Miller eds., Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA) (2007) archived at <http://www.webcitation.org/5at2VTDAM>.

18. *Id.*

19. *Id.* at 5.

20. *Id.* at 10 (“Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.”).

21. See IPCC REPORT, *supra* note 4, at vii. See also UNFCCC, Report of the Subsidiary Body for Scientific and Technological Advice on its twenty-sixth session, held at Bonn from 7 to 18 May 2007 (stating the IPCC prepared, at the request of the UNFCCC Subsidiary Body of Scientific and Technological Advice, the 2006 IPCC Guidelines for National Greenhouse Gas Inventories).

22. IPCC REPORT, *supra* note 4, at vii.

23. IPCC REPORT, *supra* note 4, at 3.

24. United Nations Framework Convention on Climate Change, May 9, 1992, S. TREATY DOC. NO. 102-38, 1771 U.N.T.S. 107 [hereinafter UNFCCC TREATY] (entered into force Mar. 21, 1994), archived at <http://www.webcitation.org/5at2iBA15>. The convention defined GHGs as “those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation.” *Id.* art. 1.5.

25. *Id.* Preamble.

26. *Id.* arts. 4.1(c), 4.3, 4.5.

subsequently adopted Kyoto Protocol, the convention did not set any binding GHG emission targets.<sup>27</sup>

### c. The Kyoto Protocol

The Kyoto Protocol is an international law instrument setting stringent, legally binding emission reduction targets for six GHGs across a five-year commitment period.<sup>28</sup> Adopted in Kyoto, Japan in 1997, it was the first protocol to the UNFCCC.<sup>29</sup> So far, 182 member parties have ratified the Kyoto Protocol.<sup>30</sup> The GHGs regulated by the Kyoto Protocol include CO<sub>2</sub>, methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), sulfur dioxide (SO<sub>2</sub>), sulfur hexafluoride (SF<sub>6</sub>), hydrofluorocarbons (“HFCs”), and perfluorocarbons (“PFCs”).<sup>31</sup> The protocol commits developed countries to specific emission reduction targets, but there is no binding obligation for developing countries to reduce emissions or cap the growth of emissions.<sup>32</sup> The group target for the thirty-seven industrial countries and the European Community is a reduction in emissions to an average of five percent against the 1990 level over the period 2008 - 2012.<sup>33</sup> According to the protocol, target emission reductions can be achieved through national clean energy initiatives and through market-oriented, flexible mechanisms such as emissions trading and the Clean Development Mechanism (“CDM”).<sup>34</sup> The UNFCCC has acknowledged that the collective emission targets for the first commitment period will not be achieved without the use of the flexible mechanisms, and that the currently projected reduction of eleven percent is contingent upon the implementation of additional planned policies and measures.<sup>35</sup>

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27. UNFCCC, *Fact Sheet: The Kyoto Protocol*, 1 [hereinafter *Kyoto Facts*] archived at <http://www.webcitation.org/5at2oLGp4>.

28. David Freestone, *The UN Framework Convention on Climate Change, the Kyoto Protocol, and the Kyoto Mechanisms*, in LEGAL ASPECTS OF IMPLEMENTING THE KYOTO PROTOCOL MECHANISMS: MAKING KYOTO WORK, 3 (David Freestone & Charlotte Streck eds., Oxford University Press 2005). Under the protocol, thirty six states (called Annex I parties), consisting of highly industrialized countries and countries undergoing transition to a market economy, have legally binding GHG emission limitation and reduction commitments, while developing countries (non-Annex I parties) have non-binding obligations to limit emissions. See Press Release, UNFCCC, Start of Negotiations for Post-2012 Agreement Crucial for Health of the Planet – Yvo de Boer (Nov. 6, 2007), archived at <http://www.webcitation.org/5at2t12LT>.

29. Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, U.N. Doc. FCCC/CP/1997/L.7/Add.1, 37 I.L.M. 22 [hereinafter *Kyoto Protocol*], archived at <http://www.webcitation.org/5at2y1ixN> (following ratification by Russia, the Kyoto Protocol entered into force on 16 February 2005).

30. UNFCCC, *Kyoto Protocol Status of Ratification*, archived at <http://www.webcitation.org/5at33npAB>. As of 13 May 2008, 181 countries and one regional economic integration organization (the EEC) have deposited instruments of ratification, accession, approval or acceptance. *Id.*

31. *Kyoto Protocol*, *supra* note 29, Annex A.

32. *Kyoto Protocol*, *supra* note 29, art. 3 and Annex B.

33. *Kyoto Facts*, *supra* note 27, at 1.

34. *Kyoto Protocol*, *supra* note 29, art. 12.

35. *Kyoto Facts*, *supra* note 27, at 1.

## d. The Clean Development Mechanism

As one of the flexible mechanisms of the Kyoto Protocol, the CDM allows for emission reductions in projects carried out in developing nations.<sup>36</sup> It is designed to stimulate sustainable development in host countries while allowing industrialized countries to meet their reduction obligations abroad in a cost-effective way.<sup>37</sup> Credit for emission reductions generated under a CDM project only attaches if the reduction of GHG emissions is in addition to any that would occur in the absence of the project activity.<sup>38</sup> Despite the strict additionality requirement and other start-up problems, the CDM has gained momentum, and there are now more than 860 registered CDM projects in forty-nine developing countries.<sup>39</sup>

The incentive to invest in CDM projects is the generation of Certified Emission Reduction (“CER”) units, which can be traded and provide a return on the investment.<sup>40</sup> The Kyoto Protocol explicitly encourages private entity participation.<sup>41</sup> The benefit to host countries is access to technology for clean energy and sustainable development.<sup>42</sup> Each CDM project first needs to gain third-party validation before registration by the CDM executive board.<sup>43</sup> A Project Design Document (“PDD”) details all aspects of the CDM project, from the methodology to be used to the sustainability requirements, including how technology will be transferred, if any.<sup>44</sup> The PDD describes how the project meets the validation requirements and is made available for criticism during a thirty day public comment period.<sup>45</sup>

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36. *Kyoto Facts*, *supra* note 27, at 1.

37. Kyoto Protocol, *supra* note 29, art. 12.3.

38. Kyoto Protocol, *supra* note 29, art. 12.5(c).

39. Press Release, UNFCCC, Kyoto Protocol’s Clean Development Mechanism passes 100 millionth certified emission reduction milestone (Dec. 18, 2007), *archived at* <http://www.webcitation.org/5at38wXTM>. With another 2000 projects in the project registration pipeline, the CDM is expected to generate more than 2.6 billion CERs by the time the first commitment period of the Kyoto Protocol ends in 2012, each equivalent to one metric ton of CO<sub>2</sub>. *Id.*

40. See Maria Netto & Kai-Uwe Barani Schmidt, *CDM Project Cycle and the Role of the UNFCCC Secretariat*, in *LEGAL ASPECTS OF IMPLEMENTING THE KYOTO PROTOCOL MECHANISMS: MAKING KYOTO WORK*, 175 (David Freestone & Charlotte Streck eds., Oxford University Press 2005). See also *Kyoto Facts*, *supra* note 27, at 1 (“The carbon market spawned by [the Kyoto] mechanisms is a key tool in reducing emissions worldwide. It was worth 30 billion USD in 2006 and is set to increase.”).

41. See Kyoto Protocol, *supra* note 29, art. 10(c) (stating, *inter alia*, that all parties shall cooperate in “the creation of an enabling environment for the private sector”). See also *infra* note 93 and accompanying text.

42. Netto, *supra* note 40, at 175.

43. Netto, *supra* note 40, at 187.

44. Conference of the Parties of the Framework Convention on Climate Change, Marrakesh, MORROCO, Oct. 29-Nov. 10, 2001, *The Marrakesh Accords*, ¶ 17, U.N. DOC FCCC/CP/2001/13/Add.2 (2002), *archived at* <http://www.webcitation.org/5at3Dohrf>. The project design document shall include “[a] description of the project comprising the project purpose, a technical description of the project, including how technology will be transferred, if any, and a description and justification of the project boundary.” *Id.* Appendix B, at 2(a).

45. *Id.* at 40.

## B. International Intellectual Property Rights

### a. The TRIPS Agreement

As part of the WTO Agreement package, TRIPS requires developing countries to enact strong intellectual property right protection in exchange for greater access to developed country markets.<sup>46</sup> The philosophy underpinning the TRIPS Agreement is to strike a balance between the long-term social objective of providing incentives for future invention and creation, and the short-term objective of allowing the use of existing inventions and creations.<sup>47</sup>

The TRIPS Agreement champions strong minimum standards for the protection of intellectual property rights among the WTO members.<sup>48</sup> Member states are obligated to grant a twenty-year monopoly right to patent holders and not to afford preferential treatment to domestic inventors.<sup>49</sup> The following standards guarantee the protection of foreign intellectual property rights:<sup>50</sup> (1) National treatment - protection of non-nationals is to be no less favorable than for nationals;<sup>51</sup> (2) non-discrimination - patents are to be provided without discrimination as to place of invention, field of technology, or whether they are imported or locally produced;<sup>52</sup> (3) exclusivity - exclusive patent rights are granted with respect to making, using, selling, or importing of the technology;<sup>53</sup> and (4) duration - the term of patent protection is twenty years from the filing date.<sup>54</sup>

Member states may enact laws and regulations to “protect public health and nutrition” and to “promote the public interest in sectors of vital importance to their socio-economic and technological development,” as long as such measures conform to the terms of the agreement.<sup>55</sup> Thus, the TRIPS Agreement is intended to provide flexibility for nations to protect intellectual property rights in light of their social goals.<sup>56</sup> Specific TRIPS provisions that allow some flexibility in the implementation or amendment of national patent

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46. Agreement on Trade-Related Aspects of Intellectual Property Rights, 15 April 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, The Legal Texts: The Results of the Uruguay Round of Multilateral Trade Negotiations 320 (1999), 1869 U.N.T.S. 299 [hereinafter TRIPS Agreement] archived at <http://www.webcitation.org/5at3Jbuk4>.

47. WTO Secretariat, *Fact Sheet: TRIPS and pharmaceutical patents* (2006) [hereinafter *WTO Fact Sheet*] archived at <http://www.webcitation.org/5at3OJ5By>.

48. See Cameron J. Hutchison, *Does TRIPS Facilitate or Impede Climate Change Technology Transfer into Developing Countries?*, 3 U. OTTAWA L. & TECH. J. 517, 524 (2006).

49. *Id.* at 525.

50. *Id.*

51. See TRIPS Agreement, *supra* note 46, art. 3.

52. See TRIPS Agreement, *supra* note 46, art. 27.1.

53. See TRIPS Agreement, *supra* note 46, art. 28.

54. See TRIPS Agreement, *supra* note 46, art. 33.

55. See TRIPS Agreement, *supra* note 46, art. 8.

56. *WTO Fact Sheet*, *supra* note 47, at 2.

rights are:<sup>57</sup>

- (1) Article 6: Exhaustion of IP rights;<sup>58</sup>
- (2) Article 8.2: Measures to prevent abuses of IP rights and practices that affect trade and technology transfer;<sup>59</sup>
- (3) Article 27.1: Criteria for patentability;<sup>60</sup>
- (4) Article 27.2: Patentability exclusions;<sup>61</sup>
- (5) Article 30: Exceptions to exclusive rights;<sup>62</sup>
- (6) Article 31: Compulsory licensing;<sup>63</sup>
- (7) Article 40: Control of anti-competitive practices in licenses.<sup>64</sup>

#### b. Compulsory Licensing and The Doha Declaration on TRIPS and Public Health

The 2001 Doha Declaration on TRIPS and Public Health has clarified the flexibility afforded by TRIPS to member countries in setting intellectual property protection with respect to pharmaceutical patents.<sup>65</sup> Countries that cannot produce pharmaceuticals themselves may import pharmaceuticals made under a compulsory license.<sup>66</sup> Compulsory licensing occurs when a government uses, produces, or sells a patented product without consent of the

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57. See Hutchison, *supra* note 48, at 530.

58. See *WTO Fact Sheet*, *supra* note 47, at 5. Countries are free to allow exhaustion of intellectual property rights upon first sale, thus if a country allows parallel imports, and another country does not, that country cannot raise this issue in a dispute in the WTO.

59. See TRIPS Agreement, *supra* note 46, art. 8.2 (“Appropriate measures, provided that they are consistent with the provisions of this Agreement, may be needed to prevent the abuse of intellectual property rights by right holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology.”).

60. See TRIPS Agreement, *supra* note 46, art. 27.1 (providing that patents may be granted to products and processes that are “new, involve an inventive step and are capable of industrial application” without setting thresholds for these criteria).

61. See TRIPS Agreement, *supra* note 46, art. 27.2 (“Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect public order or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law.”) (emphasis added).

62. See TRIPS Agreement, *supra* note 46, art. 30. Governments can make limited exceptions to patent rights, e.g., for research purposes or to use a patented drug to obtain regulatory approval, provided, among other things, that the “exceptions do not unreasonably conflict with the normal exploitation of the patent.” *Id.* See also *WTO Fact Sheet*, *supra* note 47, at 3.

63. See *infra* Part II.B.b (discussing the Doha Declaration and compulsory licensing).

64. See TRIPS Agreement, *supra* note 46, art. 40. Governments can enact legislation to prevent rights holders from abusing intellectual property rights through licensing practices that restrain competition. *Id.*

65. *WTO Fact Sheet*, *supra* note 47, at 2.

66. *WTO Fact Sheet*, *supra* note 47, at 2. See generally Pedro Roffe, Christoph Spennemann & Johanna von Braun, *From Paris to Doha: The WTO Doha Declaration on the TRIPS Agreement and Public Health*, in *NEGOTIATING HEALTH: INTELLECTUAL PROPERTY AND ACCESS TO MEDICINES 9* (Pedro Roffe, Geoff Tansey & David Vivas-Eugui eds., 2006).



patent owner, or permits a third party to do the same.<sup>67</sup> The TRIPS Agreement does not explicitly mention “compulsory licensing,” but Article 31 governs “other use without authorization of the right holder.”<sup>68</sup> Article 31 provides several safeguards against compulsory licensing, including a requirement that governments or third parties first attempt to obtain a voluntary license from the patentee.<sup>69</sup> However, in cases of “national emergencies” or “other circumstances of extreme urgency,” this requirement is waived.<sup>70</sup> The Doha Declaration interpreted Article 31 to mean that each country has the right and discretion to grant compulsory licenses and the right to determine what constitutes a national emergency or other circumstances of extreme urgency.<sup>71</sup> On August 30, 2003, the WTO members agreed to waive the Article 31(f) requirement that production under a compulsory license has to be for the domestic market of the country authorizing such use.<sup>72</sup> Thus, “any member country can export generic pharmaceutical products made under compulsory licenses to meet the needs of importing countries.”<sup>73</sup> While the public discussion of compulsory licensing has primarily been associated with pharmaceuticals, it could apply in principle to patents in any field.<sup>74</sup>

### C. The Role of Technology Transfer in Addressing Climate Change

#### a. Definition of Technology Transfer

“Technology transfer” refers to the diffusion and adoption of technology and know-how between parties, typically private companies, universities, financial institutions, governments and non-governmental organizations (“NGOs”).<sup>75</sup>

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67. See *WTO Fact Sheet*, *supra* note 47, at 4.

68. TRIPS Agreement, *supra* note 46, art. 31.

69. See TRIPS Agreement, *supra* note 46, art. 31(b).

70. See TRIPS Agreement, *supra* note 46, art. 31(b).

71. See *WTO Fact Sheet*, *supra* note 47, at 5. See also WTO, *Declaration on the TRIPS Agreement and Public Health*, Nov. 14, 2001, ¶ 5, WT/MIN(01)/DEC/2, 41 I.L.M. 755 (2002), archived at <http://www.webcitation.org/5aw7Q4QDy>. Paragraph five of the Doha Declaration on TRIPS and Public Health states in relevant part:

(b) Each Member has the *right to grant compulsory licences* and the freedom to determine the grounds upon which such licences are granted.

(c) Each Member has the *right to determine what constitutes a national emergency or other circumstances of extreme urgency*, it being understood that public health crises, including those relating to HIV/AIDS, tuberculosis, malaria and other epidemics, can represent a national emergency or other circumstances of extreme urgency.

*Id.* (emphasis added).

72. General Council, *Implementation of Paragraph 6 of the Doha Declaration on the TRIPS Agreement and Public Health*, ¶ 2, WT/L/540 (Aug. 30, 2003) [hereinafter *WTO Public Health Decision*], archived at <http://www.webcitation.org/5at3THIEu>.

73. *WTO Fact Sheet*, *supra* note 47, at 6.

74. *WTO Fact Sheet*, *supra* note 47, at 4.

75. James Shepard, *The Future of Technology Transfer Under Multilateral Environmental Agreements*, 37 ELR 10547, 10548 (2007).

Basically, it involves the transfer from one party, an organization or institution that developed the technology, to another that adopts, adapts, and uses it.<sup>76</sup> In the international context, such transfer can be complex, involving several parties and stakeholders.<sup>77</sup> The IPCC broadly defines the term “technology transfer” in the context of the UNFCCC as:

[A] broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to climate change amongst different stakeholders such as governments, private sector entities, financial institutions, non-governmental organizations (NGOs), and research/education institutions.<sup>78</sup>

While technology transfer includes transfer of patented, so-called “hard” technology, it also includes transfer of unprotected, or “soft” technology, such as know-how.<sup>79</sup>

#### b. Geography of Technological Innovation

Based on a study of technology hubs and on an index of technology achievement, a 2001 UNDP report classified countries into four categories: (1) leaders, (2) potential leaders, (3) dynamic adaptors, and (4) marginalized.<sup>80</sup> Among the leaders were countries from North America, Europe, Japan, and Australia, while the ranks of dynamic adopters included China, India, Brazil, and South Africa.<sup>81</sup> The majority of technology hubs are concentrated in a few regions, including North America, Europe, Australia, and parts of Asia (Japan

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76. *Id.* at 10549.

77. *Id.*

78. IPCC REPORT, *supra* note 4, at 3.

79. See Hutchison, *supra* note 48, at 520 (distinguishing between patented “hard” technologies, such as equipment and products to control, reduce or prevent anthropogenic emissions of GHG in the energy, transportation, and industry sectors; and “soft” technologies, such as capacity building, information networks, training and research).

80. UNITED NATIONS DEVELOPMENT PROGRAMME [“UNDP”], Human Development Report, *Making New Technologies Work for Human Development* 45 (2001), archived at <http://www.webcitation.org/5at3VEC5E> [hereinafter Human Development Report]. The technology achievement index is composed of information gathered from various sources in these four categories: (1) creation of technology (number of patents granted, receipt of royalties and license fees), (2) diffusion of recent innovation (number of internet hosts, technology exports), (3) diffusion of old innovation (number of telephones, electricity consumption) and (4) human skills (mean years of schooling, gross tertiary science enrollment). *Id.* at 46-47. The data on technology hubs were culled from a 2000 study by WIRED magazine. *Id.* at 45. See Jennifer Hillner, *Venture Capitals*, WIRED, July 2000 archived at <http://www.webcitation.org/5at3XcV80>. Hillner interviewed representatives from local industry and media to identify technological hot spots and rated forty-six locations based on four criteria:

“the ability of area universities and research facilities to train skilled workers or develop new technologies; the presence of established companies and multinationals to provide expertise and economic stability; the population's entrepreneurial drive to start new ventures; and the availability of venture capital to ensure that the ideas make it to market.”

*Id.*

81. Human Development Report, *supra* note 80, at 45.

and Korea) that have countries with a high technology achievement index.<sup>82</sup> Notable exceptions to the general trend are technology hubs in China, Taiwan, India, and Brazil. Because most of the research and development is concentrated in industrialized countries, developing countries are generally net-importers of technology.<sup>83</sup>

#### c. Definition of Environmentally Sound Technologies (“ESTs”)

Agenda 21<sup>84</sup> of the UN provides the following definition for environmentally sound technologies:

Environmentally sound technologies protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes.<sup>85</sup>

In the context of pollution prevention, ESTs include products and processes that generate low or no waste and technologies that treat pollution after it has been generated.<sup>86</sup> Furthermore, ESTs are “not just individual technologies, but total systems which include know-how, procedures, goods and services, and equipment as well as organizational and managerial procedures.”<sup>87</sup>

#### d. The Technology Transfer Mandate: UNFCCC and Kyoto

Achieving the objectives of the UNFCCC requires rapid and widespread transfer of ESTs, including transfer of information and know-how.<sup>88</sup> Articles 4.5 and 4.7 of the Convention contain specific provisions on transfer of ESTs.<sup>89</sup>

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82. Human Development Report, *supra* note 80, at 45.

83. See Carlos M. Correa, *Can the TRIPS Agreement Foster Technology Transfer to Developing Countries?*, in INTERNATIONAL PUBLIC GOODS AND TRANSFER OF TECHNOLOGY UNDER A GLOBALIZED INTELLECTUAL PROPERTY REGIME 227, 232 (Keith Maskus & Jerome Reichman, eds., Cambridge University Press 2005) (“10 [developed] countries account for 84% global R&D, 94% of patents granted in [the] USA, [and] 91% of receipts of cross-border technology [licensing] payments”).

84. See UN Department of Economic and Social Affairs, Division for Sustainable Development, Documents, *archived at* <http://www.webcitation.org/5at3iTeT3>. Agenda 21 was adopted at the UN Conference on Environment and Development held in Rio de Janeiro in 1992.

85. Agenda 21, Chapter 34, Transfer of Environmentally Sound Technology, Cooperation and Capacity-Building, 34.1 *archived at* <http://www.webcitation.org/5at3jiGC2>.

86. *Id.* at 34.2.

87. *Id.* at 34.3.

88. See Shepard, *supra* note 75, at 10554.

89. UNFCCC TREATY, *supra* note 24, arts. 4.5 & 4.7. Article 4.5 provides:

The developed country Parties and other developed Parties included in Annex II *shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties*, to enable them to implement the provisions of the Convention. In this process, the developed country Parties shall support the development and

Developed countries are to “promote, facilitate, and finance, as appropriate, the transfer of, or access to,” ESTs and related know-how to other countries, in particular to developing countries.<sup>90</sup> The goal of such transfer is to enable non-developed countries to implement the provisions of the convention.<sup>91</sup> Article 4.7 makes it clear that, given the focus on economic and social development and eradication of poverty, developing countries depend on the financial resources and technology transfer commitments of the developed countries in order to effectively implement their GHG emission reduction commitments.<sup>92</sup>

Building on the UNFCCC legal framework, the Kyoto Protocol reaffirms the need for countries to cooperate in order to increase the development and diffusion of ESTs with particular emphasis on the transfer of technology to developing countries.<sup>93</sup> In addition, Article 10(c) explicitly calls on the member states to enlist the help of the private sector to promote technology transfer by creating an enabling environment.<sup>94</sup> The Conference of the Parties, the governing body of the UNFCCC, defined the enabling environments component to include removing “technical, legal and administrative barriers to technology transfer” and providing “regulatory frameworks and transparency,” as government actions which create an environment suitable to private and public sector technology transfer.<sup>95</sup> Protection of intellectual property rights

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enhancement of endogenous capacities and technologies of developing country Parties. Other Parties and organizations in a position to do so may also assist in facilitating the transfer of such technologies.

*Id.* (emphasis added);

Article 4.7 provides:

The extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and *transfer of technology* and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties.

*Id.* art. 4.7 (emphasis added).

90. UNFCCC Treaty, *supra* note 24, art. 4.5.

91. UNFCCC Treaty, *supra* note 24, art. 4.5.

92. UNFCCC TREATY, *supra* note 24, art. 4.7.

93. Article 10(c) states that all parties to the protocol shall:

[C]ooperate in the promotion of effective modalities for the development, application and diffusion of, and take all practicable steps to promote, facilitate and finance, as appropriate, *the transfer of, or access to, environmentally sound technologies*, know-how, practices and processes pertinent to climate change, in particular to developing countries, including the formulation of policies and programmes for the *effective transfer of environmentally sound technologies that are publicly owned or in the public domain* and the creation of an *enabling environment for the private sector*, to promote and enhance the transfer of, and access to, environmentally sound technologies.

Kyoto Protocol, *supra* note 29, art. 10(c) (emphasis added).

94. Kyoto Protocol, *supra* note 29, art. 10(c).

95. UNFCCC, Report of the Conference of the Parties on its Seventh Session, held at Marrakesh from 29 October to 10 November 2001: Addendum (Jan. 21, 2002), at 26, U.N. Doc. FCCC/CP/2001/13/Add.1, archived at <http://www.webcitation.org/5at3rkVEH>.

was specifically identified as one of the means of creating such an enabling environment as well as providing access to publicly funded technologies.<sup>96</sup> Article 10(c) also specifically includes transfer of ESTs that are publicly owned or in the public domain.<sup>97</sup>

#### e. Technology Transfer and TRIPS

The objective of the TRIPS Agreement is not only to protect intellectual property rights, but also to promote the transfer and dissemination of technology to the mutual benefit of producers and users of technological knowledge.<sup>98</sup> Given that industrialized countries are the producers of the majority of the technological innovation, developing countries in theory should then make use of the flexibilities of the TRIPS agreement in setting up legal regimes that foster technology transfer and also encourage technology development within their own industry.<sup>99</sup>

Article 66 of the TRIPS Agreement requires developed countries to create incentives for technology transfer to least developed countries, albeit without making specific reference to ESTs.<sup>100</sup> So far, states have retained considerable discretion in complying with the obligations of Article 66.2, which may explain the lack of concrete action.<sup>101</sup> Developed countries are required to submit annual reports on their technology transfer activities.<sup>102</sup>

### III. Analysis

#### A. Does the TRIPS Agreement Pose a Barrier to the Transfer of ESTs?

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96. *Id.*

97. Kyoto Protocol, *supra* note 29, art. 10(c).

98. Article 7 provides:

The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the *transfer and dissemination of technology*, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.

TRIPS Agreement, *supra* note 46, art. 7 (emphasis added).

99. See *supra* notes 55 - 64 and accompanying text for a discussion of the flexibilities in the TRIPS Agreement. See also Hutchison, *supra* note 48, at 16.

100. Article 66 of the TRIPS agreement provides in relevant part:

Developed country Members shall provide incentives to enterprises and institutions in their territories for the purpose of *promoting and encouraging technology transfer* to least-developed country Members in order to enable them to create a sound and viable technological base.

TRIPS Agreement, *supra* note 46, art. 66.2 (emphasis added).

101. Hutchison, *supra* note 48, at 8.

102. See Council for Trade-Related Aspects of Intellectual Property Rights, *Decision: Implementation of Article 66.2 of the TRIPS Agreement*, IP/C/28 (Feb. 20, 2003) (stating that developed countries are to submit annual reports on their technology transfer activities under Article 66.2).

The TRIPS Agreement requires all WTO member states to have in place national laws that comply with strong, minimum standards of intellectual property protection.<sup>103</sup> Potential social and economic benefits derived from legal systems that provide strong intellectual property protections include: (1) increased innovation as a result of incentives and rewards; (2) fair treatment of innovators who are allowed to own the fruits of their creative labor and influence how their technology is used; (3) public disclosure as a requirement for granting exclusive rights; and (4) assurance for investors that they will be able to recapture their investment in a protected technology.<sup>104</sup>

Strong patent and copyright laws may facilitate foreign direct investment in developing countries because such private capital investment typically involves transfer of technology, including know-how, from the parent company to the foreign subsidiary or a joint venture. Evidence shows that strong intellectual property rights foster international technology transfer within multinational enterprises.<sup>105</sup> However, multinational enterprises base their decision to invest on many factors, and a lack of strong intellectual property rights is not necessarily a deterrent.<sup>106</sup> Still, fear that intellectual property rights may not be protected has been cited as a major barrier to transfer of ESTs.<sup>107</sup>

Scholars speculate that proprietary licensing schemes (as one consequence of strong intellectual property rights) are preventing developing countries from taking advantage of currently available renewable energy technology because proprietary licensing only works in areas where capital is concentrated and profit margins are abundant.<sup>108</sup> As discussed above, the use of renewable energy technology is considered vital to meet the growing energy demands of developing countries in a sustainable fashion.<sup>109</sup> Thus, the use of non-proprietary licensing of renewable energy technology, drawing on analogies to the open source software movement, has been suggested as one solution to the need for increased dissemination of ESTs.<sup>110</sup>

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103. See *supra* Part II.B.a.

104. IPCC REPORT, *supra* note 4, § I, at 3.5.2.

105. Lee G. Branstetter, Raymond Fisman, & C. Fritz Foley, *Do Stronger Intellectual Property Rights Increase International Technology Transfer? Empirical Evidence From U.S. Firm-Level Panel Data 2* (World Bank, Policy Research Working Paper No. 3305, 2004) (presenting evidence that U.S. multinational enterprises significantly increased technology transfer to subsidiaries in reforming countries in response to changes in intellectual property regimes abroad during the period 1982-1999).

106. Hutchison, *supra* note 48, at 15. For example, Argentina, Brazil and China have received some of the most significant inflows of foreign direct investment and yet appeared on the USTR watch list for worst violators of intellectual property rights. *Id.* at 46. See also IPCC REPORT, *supra* note 4, § I, at 3.5.2 (cautioning that stronger intellectual property rights in developing countries may not always result in greater investments from industrialized countries because at least one study of foreign investors revealed that protection of intellectual property rights ranked lowest among five investment criteria affecting investments in Thailand).

107. Shepard, *supra* note 75, at 10558.

108. Wiener, *supra* note 14, at 278.

109. See Ferrey, *supra* note 9.

110. Wiener, *supra* note 14, at 279 (arguing that non-proprietary licensing “would promote more regional and national renewable energy economies of scale, effectively divert the use of unsustainable and non-

Given the complexity of international technology transfer and the flexibility with which nations can meet their legal obligations under TRIPS, the overall effect of strong intellectual property rights protection on the transfer of technology into developing countries may not be clear.<sup>111</sup> There is no one-size-fits-all degree of intellectual property rights protection, as intellectual property rights are inherently territorial and countries differ with respect to their socio-economic circumstances, national objectives, and regional trade agreements.<sup>112</sup> With respect to ESTs, many of the climate change technologies may not be protected and other barriers to technology transfer, such as lack of know-how and expertise required to adopt the technology, will likely dominate.<sup>113</sup>

B. Can Developing Countries Compel a Transfer of ESTs via Compulsory Licensing Under TRIPS?

a. Compulsory Licensing of Pharmaceuticals

The TRIPS Agreement does not list specific reasons that a member country might use to justify imposing a compulsory license.<sup>114</sup> Such grounds are left for national legislation to be drafted in compliance with Article 31.<sup>115</sup> Article 31(b) mentions “national emergency or other circumstance of extreme urgency” or “public non-commercial use,” but only as grounds for waiving the normal requirement that members need to try to obtain a voluntary license first.<sup>116</sup> The Doha Declaration on TRIPS and Public Health clarified Article 31, stating that each member has the right to grant compulsory licenses and the freedom to determine the grounds for any such action.<sup>117</sup> Furthermore, each member is free to determine what constitutes a national emergency or other circumstance of extreme urgency.<sup>118</sup> While compulsory licensing so far has been associated mainly with pharmaceuticals, it could apply to patented technology in any field.<sup>119</sup>

Several safeguards to compulsory licensing are built into the TRIPS Agreement, three of which pose important prohibitions on compulsory licensing for export purposes.<sup>120</sup> First, compulsory licensing shall be granted

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environmentally friendly energy sources, and equitably and efficiently disseminate renewable energy technology, thus maximizing its utility”).

111. Hutchison, *supra* note 48, at 16; *see also* IPCC REPORT, *supra* note 4, § I, at 3.5.2.

112. IPCC REPORT, *supra* note 4, § I, at 3.5.2.

113. IPCC REPORT, *supra* note 4, at 3.5.2.

114. *WTO Fact Sheet*, *supra* note 47, at 4.

115. TRIPS Agreement, *supra* note 46, Preamble to art. 31.

116. TRIPS Agreement, *supra* note 46, art. 31(b).

117. *WTO Fact Sheet*, *supra* note 47, at 5.

118. *WTO Fact Sheet*, *supra* note 47, at 5.

119. *WTO Fact Sheet*, *supra* note 47, at 4.

120. Hutchison, *supra* note 48, at 23 (listing seven safeguards to compulsory licensing and identifying three as particularly affecting export).

mainly to supply the domestic market.<sup>121</sup> Thus, states cannot grant compulsory licenses to produce for export markets, unless they can waive the requirements of Article 31(f).<sup>122</sup> In August 2003, WTO members agreed to waive obligations under Article 31(f) for countries exporting generic pharmaceuticals made under compulsory licenses to meet the needs of importing countries that lack the capacity to manufacture drugs themselves.<sup>123</sup> Since there is no such waiver for any other products and no overlap between ESTs and pharmaceutical products, a country trying to set up a compulsory license to export an environmental good or service to a developing country currently cannot do without violating WTO rules.

Second, the scope and duration of the compulsory license under the TRIPS agreement is limited to the purpose for which that government granted it and terminates upon cessation of the circumstance that led to the license.<sup>124</sup> This may discourage a potential licensee from pursuing a venture under a compulsory license because the license is time-limited and nonexclusive, so it may prevent the licensee from recouping its investment.<sup>125</sup> Essentially, a non-exclusive license presents an economic disincentive, because the patent holder may directly compete with the compulsory licensee, leveraging its brand name and technological know-how, and may also voluntarily license the technology to other parties in the market.<sup>126</sup>

Third, under the TRIPS regime, generic drug manufacturers may not be able to use economies of scale because the 2003 WTO Public Health Decision follows a country-by-country approach to compulsory licensing for export purposes.<sup>127</sup> Under the system, a compulsory license can only be granted for export to a particular beneficiary country, with the exception of regional trade agreement members.<sup>128</sup> Both the exporting and the importing country must give a notification to the WTO members of their intention to use the compulsory license system, including the names and expected quantities of products.<sup>129</sup> So far, only two countries have made a notification: Canada, as the exporter, and Rwanda, as the importer of a drug for the treatment of HIV-

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121. TRIPS Agreement, *supra* note 46, art. 31(f) (“[compulsory licensing] shall be authorized predominantly for the domestic market”).

122. Hutchison, *supra* note 48, at 23-24.

123. WTO Public Health Decision, *supra* note 72, ¶ 2.

124. TRIPS Agreement, *supra* note 46, art. 31(c).

125. Hutchison, *supra* note 48, at 24.

126. Correa, *supra* note 83, at 248-49.

127. Hutchison, *supra* note 48, at 24; *see also* Sloane Pearson, *Will the August 20, 2003 Decision of the WTO Provide Adequate Protection for Patent Holders Rights and is Diversion Still a Threat to the Pharmaceutical Industry?* 5 J. HIGH TECH. L. 381, 402 (2005) (expressing skepticism about the effectiveness of the WTO compulsory licensing system in addressing critical public health issues and warning about a potential reduction in research and development of essential medicines).

128. WTO Fact Sheet, *supra* note 47, at 6.

129. WTO Public Health Decision, *supra* note 72, at 2(a), (c).



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b. How Different are ESTs from Pharmaceutical Products?

In comparing ESTs and pharmaceutical drugs, one should take into account the nature of the problem solved by the technology, the specific technologies at issue, and the stakeholders. The incidence of epidemic diseases in developing countries revealed that a large portion of the world's population lacked access to pharmaceuticals.<sup>131</sup> In particular, the spread of HIV/AIDS in sub-Saharan Africa prompted a public outcry over the lack of affordable vaccines for those who needed them the most.<sup>132</sup> Undisputedly, access to medicines was of extreme urgency to the population in developing countries because of the high mortality rate associated with such diseases as HIV/AIDS, malaria, and tuberculosis.<sup>133</sup> In contrast, global warming may not be of high concern in developing countries relative to pressing national environmental issues such as accommodating a growing population and access to safe drinking water.<sup>134</sup> However, the bulk of scientific evidence suggests that threat of climate change requires immediate and broad action now in order to avoid detrimental effects later.<sup>135</sup>

The public debate concerning access to pharmaceuticals resulted from the scarcity of effective drugs to treat HIV/AIDS, all of which are protected by patents and sold by a few multinational pharmaceutical companies at high prices in developed countries.<sup>136</sup> Drug manufacturers have justified the high cost with the need to offset the cost of research and development.<sup>137</sup> In an effort to protect markets in developed countries from parallel or gray-market imports,<sup>138</sup> pharmaceutical companies reluctantly exported to countries that lacked strong export regulations, refused to grant licenses to manufacturers in countries that lacked strong intellectual property rights, and proceeded legally against a government after it had allowed parallel imports and compulsory

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130. See WTO, TRIPS and public health: dedicated webpage for notifications, *archived at* <http://www.webcitation.org/5at3ts9Ox>.

131. See Roffe, *supra* note 66, at 16.

132. See Roffe, *supra* note 66, at 16.

133. See Roffe, *supra* note 66, at 13.

134. See Shepard, *supra* note 75, at 10556.

135. See Max, *supra* note 3.

136. See Roffe, *supra* note 66, at 10.

137. One study estimates the cost of research and development at \$802 Million for each new pharmaceutical product brought to market. See Press Release, Tufts Center for the Study of Drug Development, Tufts Center for the Study of Drug Development Pegs Cost of a New Prescription Medicine at \$802 Million, (Nov. 30, 2001), *archived at* <http://www.webcitation.org/5at4ATjHY>.

138. Parallel or gray-market imports are products marketed with permission by the intellectual property rights holder in one country and then imported into another country without authorization. *WTO Fact Sheet*, *supra* note 47, at 5.

licensing.<sup>139</sup>

In contrast to the few multinational companies that produced HIV/AIDS vaccines, many different companies have developed technologies to reduce GHG emissions and offer their products and services on the open market.<sup>140</sup> Furthermore, the cost of research and development for ESTs is not universally high. While some technologies, such as photovoltaic and fuel cells, require many years of development and concomitant capital investments, other technologies, such as energy efficient appliances and landfill-gas flaring, may carry little extra research and development costs. This is due to the fact that the latter benefit from technologies developed for other industrial applications.<sup>141</sup> Because of the inherent differences between ESTs and pharmaceutical products, the WTO's past treatment of the latter sheds little light on its potential treatment of EST products in the future.

### C. Denial of Patent Rights for ESTs: Public Goods For the Good of the Public

The rise of average global temperature serves as a measure of the magnitude of climate change, but predicted impacts depend on a variety of factors, including regional temperature variations, climate extremes, socio-economic situations, and the extent of adaptation to environmental change.<sup>142</sup> Rising sea levels and flooding due to climate change directly threaten human life.<sup>143</sup> The risk to developing nations is far reaching. Global warming could potentially disrupt economies, jeopardize water supplies, and displace millions of people in low – lying coastal regions.<sup>144</sup> One could make an argument that in light of the detrimental effect of global warming, ESTs, in particular those that reduce GHG emissions, should not receive patent protection but instead be placed in

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139. Roffe, *supra* note 66, at 16-17. The legal action against the South African Government was later withdrawn, as was a later complaint by the U.S. Government against Brazil in the WTO dispute settlement system that challenged Brazilian legislation implementing compulsory licensing under the TRIPS Agreement. *Id.*

140. For example, energy efficient appliances indirectly cut GHG emissions by reducing energy consumption. Among its worldwide industry partners the EPA Energy Star website lists twenty-one manufacturers of energy efficient central air conditioning systems, sixteen manufacturers (with 451 products) of geothermal heat pumps, and 152 manufacturers of compact fluorescent light bulbs. ENERGY STAR, ENERGY STAR Qualified Products, *archived at* <http://www.webcitation.org/5at4Z0843>. The EPA lists fourteen developers of fuel cells that had either commercial products or demonstration systems available for performance testing. U.S. EPA Combined Heat and Power Partnership, Catalog of CHP Technologies, Technology Characterization: Fuel Cells, n. 7 (Aug. 2002), *archived at* <http://www.webcitation.org/5at43yBPd>.

141. In landfill-gas flaring, a technology used in many CDM projects, methane is converted to CO<sub>2</sub>. *See* GreenGas, Landfill Gas Technology, *archived at* <http://www.webcitation.org/5at4lLs2>. Because the global warming potential of methane is 21 times higher than that of CO<sub>2</sub>, landfill-gas flaring effectively reduces GHG emissions. *Id.* *See also* Ferrey, *supra* note 9, at tbl. 1.

142. Ferrey, *supra* note 9, at 120.

143. Ferrey, *supra* note 9, at 120.

144. Ferrey, *supra* note 9, at 120.

the public domain. One way of keeping technology in the public domain is to deny patent rights to a category of inventions by statutorily excluding subject matter from patent eligibility.<sup>145</sup> Article 27.2 of the TRIPS Agreement allows for the exclusion of patent rights to inventions whose commercial exploitation needs to be prevented to “protect human, animal or plant life or health or to avoid serious prejudice to the environment.”<sup>146</sup> It is not clear how the terms of Article 27.2 are to be interpreted and to what extent, if at all, the provision has been used by WTO members to deny patent rights to protect the environment.<sup>147</sup>

In a recent development, perhaps in a preemptive move by industry stakeholders, some companies have made patented technology with environmental benefits available to the public, free of charge. In early 2008, several leading global businesses, including IBM, Sony, and Nokia, in association with the World Business Council for Sustainable Development (WBCSD), announced the Eco-Patent Commons.<sup>148</sup> The stated goal of the initiative is “to create a collection of patents that directly or indirectly protect the environment.”<sup>149</sup> Companies pledge patents to the Commons, thereby

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145. For example, many countries traditionally excluded the area of medicine from patentability. Roffe, *supra* note 66, at 9. A 1975 study by the United Nations reported that most of the developing world and many developed countries, including Austria, Canada, Italy, Japan, Spain and Switzerland, excluded pharmaceutical products from patent protection. *Id.* at 13. The reasons for the exclusion were to ensure lower-cost access to medicines or to protect local pharmaceutical and chemical industry. *Id.* The trend among countries was only to extend patent protection to pharmaceutical processes. *Id.* The TRIPS Agreement reversed this trend by generally requiring that patents shall be available for any invention, whether product or process, in any field of technology. Roffe, *supra* note 66, at 12. India, a major supplier of generic drugs to the developing world, only recently (2005) introduced patent protection for medicines and still denies patentability to surgical procedures. *Id.* See also The Patents Act, No. 15 of 1970; INDIA CODE (2005), v. 4 (repealing Section 5 of the principal Act, which excluded product patents for medicines). Under U.S. law, pharmaceutical products and processes have long been patentable, as have been surgical methods. The Patent Act of 1952, § 101, codified patent eligible subject matter as “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.” 35 U.S.C.A. §101 (West 2008); Medicines fall under the category ‘composition of matter’ and the term ‘process’ encompasses pharmaceutical processes and surgical procedures. In *Diamond v. Chakrabarty*, the U.S. Supreme Court acknowledged the broad scope of § 101 by stating, “Congress intended statutory subject matter to ‘include almost anything under the sun that is made by man.’” 447 U.S. 303, 309 (1980) (quoting the Senate and House Committee Reports accompanying the Patent Act of 1952). The Court indicated, however, that patent eligibility under § 101 is not without limits in that the “laws of nature, physical phenomena, and abstract ideas” are not patentable. *Id.*

146. TRIPS Agreement, *supra* note 46, art. 27.2.

147. See Council for Trade-Related Aspects of Intellectual Property Rights, *Review of Legislation: Questions posed by the European Communities and their member States*, WT/DER/P/65, ¶ 29 (Jul. 11, 2002) (requesting clarification on “Article 5 of China’s Patent Law [which] stipulates that inventions that violate laws of China or social morality or prejudice public interest would not be entitled to patent protection.”). *But see id.* ¶ 26 (“Under Article 14(b) of Patent Law No. 17.164 of 2 September 1999, in accordance with Article 27.2 of the TRIPS Agreement, inventions contrary to public order, morality, public health, the national food supply, security or the environment are not patentable. There are no instances of this provision having been applied in practice.”).

148. Press Release, World Business Council for Sustainable Development [WBCSD], Corporations Go Public with Eco-Friendly Patents, 14 January 2008, *archived at* <http://www.webcitation.org/5at4Oegiz>.

149. Brochure, The Eco-Patents Commons, WBCSD, January 2008, *archived at*

making them freely available for use by all, subject only to defensive termination.<sup>150</sup> As part of the initiative to share patented technology, the WBCSD hosts the website for the Eco-Patent Commons that features a searchable database of available patents.<sup>151</sup> Most of the available patents relate to manufacturing processes in the electronics and computer industry.<sup>152</sup> Whether the Commons will attract wider industry participation remains to be seen. Equally uncertain is whether purported environmental benefits of the technology disclosed in the pledged patents will be put to use in a manner that in fact benefits the environment.

#### IV. Conclusion

The legal obligations of developed countries to transfer technology to developing countries under the UNFCCC/Kyoto framework are presently both non-binding and vague. The UNFCCC regulates the environmental output, i.e., the GHG emissions, but leaves the choice of means to achieve the emissions targets largely to the member countries. The CDM of the Kyoto Protocol is not a mechanism for technology transfer but for investing in sustainable development projects to generate emission reduction credits in developing countries. As a side effect, developing countries should benefit through financing and technology transfer associated with CDM projects. Currently, however, CDM projects are not accountable for actual technology transfer.

The WTO TRIPS Agreement imposes minimum standards of IP rights that may impede the transfer of EST to developing countries, in particular to those countries that do not attract foreign direct investment and cannot benefit from technology transfer within multinational enterprises. The likelihood that developing countries will be able to exploit compulsory licensing under the TRIPS Agreement to gain access to EST is low, given the multiple safeguards against such practice, in particular the limit of such practice to domestic use. Even when export restrictions under the TRIPS Agreement were waived, as they are for compulsory licensing of pharmaceuticals, the hurdles of the system apparently outweigh its benefits, since only one compulsory license for export manufacture of a drug has been notified to the WTO so far.

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<http://www.webcitation.org/5at4uZBcf>.

150. *Id.* at 3. Members of the Commons pledge to share the patent without a royalty fee, i.e. not to assert their patent rights against others who use the patent to achieve environmentally beneficial results. *Id.* Should a company, however, be sued for infringement, it may terminate the nonassert. *Id.* at 7 (“The defensive termination clause outlines instances in which a pledger may terminate its nonassert if another company brings an infringement action against the pledger. It is further noted that the nonassert applies to uses of the patent that provide an environmental benefit.”).

151. WBCSD, *archived at* <http://www.webcitation.org/5at4wXwRA>. The database lists sixty-nine patents, up from the initial thirty-one patents.

152. *Id.* This is not surprising given the business focus on information technology of the founding companies.