CLIMATE CHANGE & TECHNOLOGY TRANSFER: ADDRESSING INTELLECTUAL PROPERTY ISSUES

Submission by Third World Network

This contribution has been prepared by the Third World Network in response to the call by the Technology Executive Committee (TEC) for inputs on ways to promote enabling environments and to address barriers to technology development and transfer, including the role that the TEC could possibly play in this area of work.

I. INTRODUCTION

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) concluded that for the rise in average global temperatures to keep within 2°C above pre-industrial levels, global emissions must peak before 2020 and be reduced to 50-85% below 2000 levels by 2050. The task at hand is massive and it is widely acknowledged that to achieve stabilization targets of GHG there needs to be urgent worldwide deployment of climate friendly technologies in very short-time frames. Unfortunately evidence suggests a mismatch between the urgency of climate challenges as set out by the IPCC and the time taken historically for technology systems to evolve under business-as-usual practices.[1] Thus continuing to promote and advocate such approaches to facilitate technology development and transfer is essentially a recipe for a worldwide climate disaster.

According to Article 4.5 of the UNFCCC, developed countries have undertaken a commitment to "take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to environmentally sound technologies and knowledge to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention" and "In this process, the developed country Parties shall support the development and enhancement of endogenous capacities and technologies of developing country Parties".

Clearly under the UNFCCC legal framework, transfer of technology does not refer merely to transactions involving the mere sale or mere lease of goods but requires the transfer of know-how and the right to use and further develop these technologies in support of the development and enhancement of endogenous capacities and technologies of developing countries.

Thus a comprehensive definition of technology transfer involves not only the purchase and acquisition of equipment but also the transfer of skills and know- how to use, operate, maintain as well as to understand the technology hardware so that further independent innovation is possible by recipient firms. It also includes the ability to make the technology through "imitation" or reverse engineering; to adapt it to local conditions; and eventually to design and manufacture original products. [2] The process of technology transfer involves progressively climbing through all these aspects.

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[1] Lee *et al* (2009)

[2] The Intergovernmental Panel on Climate Change (IPCC) (2000) defines "technology transfer" 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, NGOs [non-governmental organizations] and research/education institutions It comprises the process of learning to understand, utilize and replicate the technology, including the capacity to choose it and adapt it to local conditions and integrate it with indigenous technologies." The UNCTAD draft International Code on the Transfer of technology defines transfer

Further according to Article 4.7 of the UNFCCC, the extent to which developing countries effectively implement their commitments under the Convention depends on the extent of the fulfillment by developed country Parties of their commitments on finance and transfer of technology.

Thus the Technology Executive Committee (TEC) has a critical role to play in particular to explore and recommend bold solutions that depart from "business as usual" approaches to accelerate technology development and transfer. The challenge is massive particularly in view of the fact that the technologies are developed and owned by developed countries using intellectual property but widespread diffusion of ESTs is urgently required worldwide to accelerate mitigation. In this context it is imperative for the TEC to emerge with measures and mechanisms to address barriers to effective technology development and transfer and to facilitate full implementation of the UNFCCC commitments, particularly to accelerate technology transfer so that developing countries can migrate to lower carbon pathways without compromising on their socio-economic development.

There are many barriers to technology development and effective transfer of technology to developing countries. This submission focuses on the issue intellectual property rights (IP), particularly patents and trade secrets.

In Part II, the submission highlights patenting and ownership trends in climate technologies. In Part III, the submission examines the impact of IP on the transfer of climate technologies and know-how to developing countries, in particular highlighting that IP has been and can be a barrier to the rapid development and diffusion of climate technologies. Finally in Part IV, the submission suggests several initiatives that should be pursued at the international level to promote an enabling environment for the development and transfer of technology and the role of the Technology Executive Committee (TEC) to address intellectual property issues.

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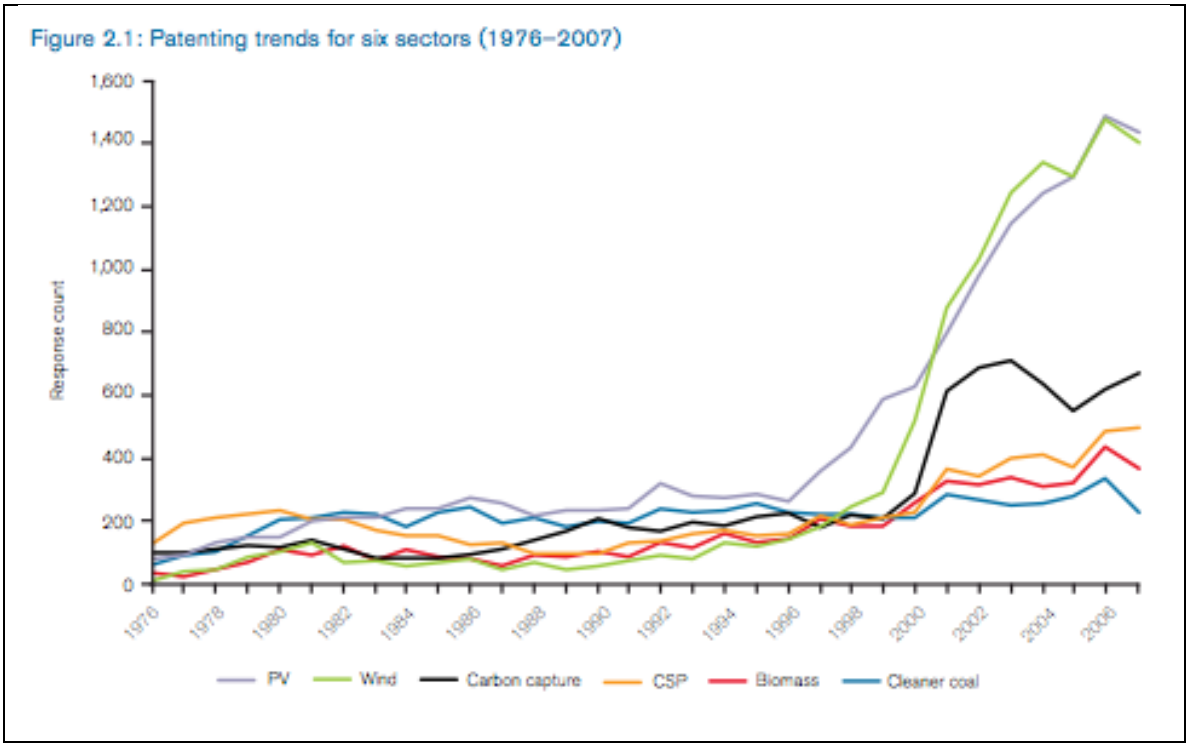
of technology as the "systematic knowledge for the manufacture of a product, for the application of a process or for the rendering of a service and does not extend to the transactions involving the mere sale or mere lease of goods." (Draft International Code of Conduct on the Transfer of Technology, 1985)

II. PATENTING TRENDS IN CLIMATE RELATED TECHNOLOGIES

Patenting of climate technologies has grown significantly since the mid-1990s and OECD countries largely dominate ownership of these technologies. Table 1 sourced from Lee *et al* (2009) shows steep increases in patenting from the mid-1990s.

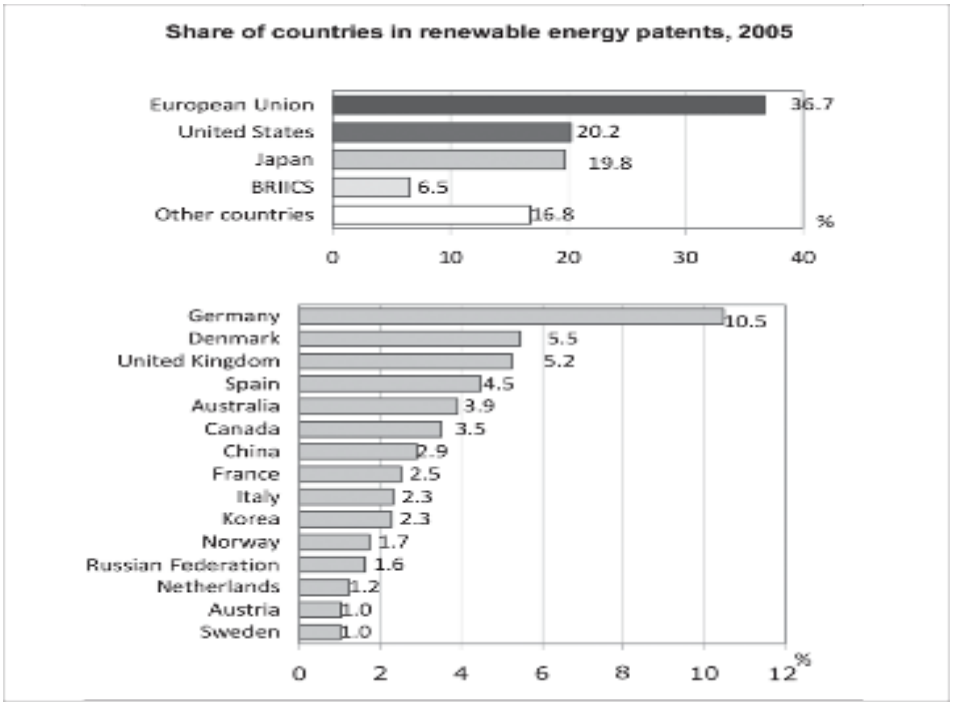
Table 1



Lee *et al* (2009) also notes that across the six sectors featured in Table 1, the patent owners are primarily from OECD economies, with US, Japan, Germany leading the way. The study adds that much has been made of the fast growth in innovation capacities in emerging economies such as Brazil, China and India, but these countries have no companies or organizations in the top 10 positions in any of the sectors analysed.

Data in the area of renewable energy patents show that the EU, US and Japan hold the highest number of patents. Within the EU, Germany, Denmark, UK and Spain have the highest share of patents in renewable energy. Denmark had 161 patents taken between 2003 and 2005, focusing on wind energy (OECD 2008). See Table 2.

Table 2

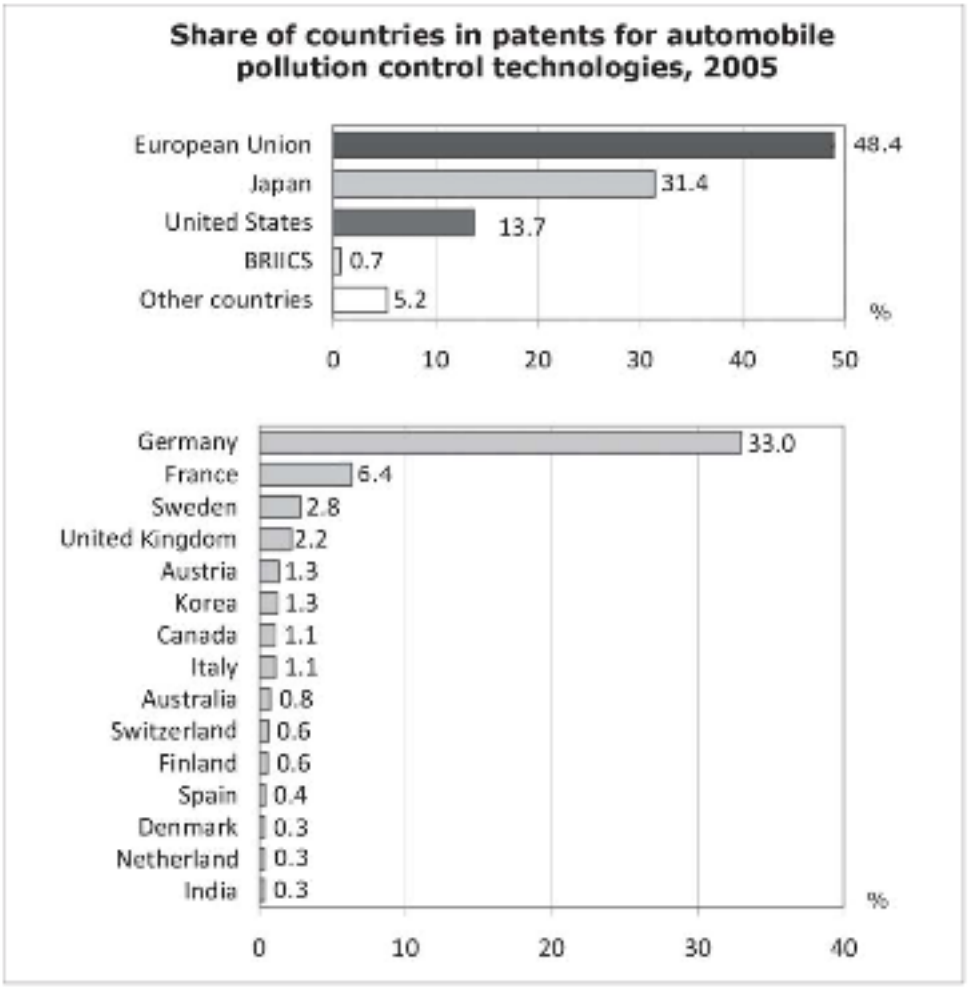


Source: OECD (2008)

Another sector dominated by major developed countries is automobile pollution control technologies, which comprise technologies used to reduce pollutants produced and released into the atmosphere by automobiles. In 2005, the EU (49% with Germany having 33%), Japan (31%) and the US (14%) held the highest share in patents for these technologies. Brazil, Russian Federation, India, Indonesia, China, and South Africa (BRIICS) held only 0.7% of the patents while other countries held 5.2% of the share of patents.[3] See Table 3.

[3] OECD (2008)

Table 3



In the field of agriculture, ETC (2010)[4] found that 6 largest agrochemical and seed corporations based in US, Germany and Switzerland are filing sweeping, multi-genome patents in pursuit of exclusive monopoly over plant gene sequences that could lead to control of most of the world's plant biomass – whether it is used for food, feed, fiber, fuel or plastics. 262 patent families (subsuming 1663 patent documents worldwide) published between June 2008 - June 2010 make specific claims to abiotic stress tolerance (such as drought, heat, flood, cold and salt-tolerance) in plants. The claims extend in many cases to multiple traits in scores of genetically modified crops and even to the harvested food and feed products. Just six corporations (DuPont (USA), BASF (Germany), Monsanto (USA), Syngenta (Switzerland), Bayer (Germany) and Dow (US) and their biotech partners (Mendel Biotechnology and Evogene) control 201 or 77% of the 262 patent families (both issued patents and applications). Three companies – DuPont, BASF, Monsanto – account for 173 or 66%. The public sector has only 9%.

[4] ETC group (2010).

III. EFFECTS OF INTELLECTUAL PROPERTY ON THE DEVELOPMENT AND TRANSFER OF CLIMATE TECHNOLOGIES

It is apparent from Part II that there is an increasing number of patents on climate related technologies. This trend is likely to continue even more robustly as climate change concerns further heighten, funding for R&D increases, and governments adopt legislative and regulatory frameworks for a greener economy. In addition, it is clear that the distribution of patent ownership is very heavily skewed in favour of developed countries.

Such a trend raises fundamental questions for developing countries, in particular, (i) whether developing countries will be hampered in their ability to gain, on reasonable terms, timely access to mitigation and adaptation technologies as well as associated know-how for purposes of R&D, especially to adapt these technologies to suit local conditions and for production; (ii) whether developing countries will have access to affordable climate technologies.

Where technologies are not patent protected, the key supply side issues are the costs of technology and the transfer of know-how to use, maintain and adapt to local conditions for developing countries. In such a scenario it is important to facilitate mechanisms to enable cheapest prices being offered to developing countries, as well as to finance the purchase of technology or the R&D that is needed to adapt and manufacture the technology. It is also important to consider mechanisms to make available the know-how (which may in some circumstances be protected as trade secrets) that is needed.

The situation is more complex when technologies are patented. Patents grant exclusive rights, which enable the patent holder, to prohibit third parties from utilizing the protected invention in countries where the invention is patented, to dictate licensing terms and to charge monopoly prices. The patent holder may also impose unreasonable conditions for use of the protected technologies or simply refuse to license the product to any other entity for fear of competition from the licensee.[5]

The Intergovernmental Panel on Climate Change (IPCC) (2000) itself notes that: "Several studies have been done that verify this strategy of using intellectual property rights as a market advantage and as a strategy to control markets as well as dominate innovation within industrial sectors." The same report elaborates on how scholars had noted problems at company level, and how companies have prevented the introduction of new technologies in the marketplace in order to advance and retain their own technological advantages. For example, in 1994 when Korea was in the process of industrialization, technologies introduced by the Japanese and the US came with a variety of restrictions, such as prohibition of consignment to a third party and sharing of improved technologies, as well as export prohibition and denial of permission to the licensee to deal in competitive products or technologies.[6]

[5] Khor (2008a).
[6] IPCC (2000)

This and other examples (literature is rife with problems of "access" as a result of patent thickets[7], patent trolls[8], high royalty fees, licensing restrictions, onerous conditions and other anti-competitive behavior), seen against the backdrop of an increasing number of patents does raise in the context of developing countries the concern of intellectual property barriers to the development and transfer of climate-friendly technologies to developing countries.

Evidence of intellectual property as a barrier to the development and transfer of climate technologies & related know-how.

Several cases concretely identify IP as an obstacle to accessing climate technologies, while studies on this matter raise IP not only as a possible barrier to transfer of technology but also as a concern that needs action on the part of UNFCCC.

Watal (1998) provides two specific cases in the context of the Montreal Protocol of the acute problems faced by Indian firms in their attempts to access technology from suppliers holding patents[9].

One case concerned an Indian company seeking access to HFC 134a (a substitute for chlorofluorocarbon (CFC), an ozone-depleting substance used in refrigerators and air-conditioners). The patent holder, a transnational company producing HFC 134a quoted US$25 million for allowing access to the technology and proposed that the Indian firm either allow the supplier to take majority ownership in a joint venture that would be set up, or that the Indian firm agrees to export restrictions on HFC 134a produced in India. Both options were unacceptable to the Indian firm. The price was also unrealistically high as the technology fee was estimated to be between US$2 and $8 million.

In another case Indian firms that tried to acquire technology to substitute ozone-depleting substance halon (used in fire extinguishers and other products) found that the patent owner was not interested in licensing the technology to wholly owned companies. The patent holder was interested only in joint ventures where it could hold a majority share.

Watal (1998) concluded that "Efforts at acquiring substitute technology have not been successful as the technologies are covered by IPRs and are inaccessible either on account of the high price quoted by the technology suppliers and/or due to the conditions laid down by the suppliers. This would require domestically owned firms to give up their majority equity holding through joint ventures or to agree to export restrictions in order to gain access to the alternative technology."

[7] A patent thicket is a dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology.
[8] Patent troll is a pejorative term used for a person or company that enforces its patents against one or more alleged infringers in a manner considered unduly aggressive or opportunistic, often with no intention to manufacture or market the patented invention.
[9] Watal, Jayashree, (1998), "The issue of technology transfer in the context of the Montreal Protocol: Case Study of India.", as reproduced in Khor (2002).

IPCC (2000) in its analysis on IP and restrictive business practices found that various types of restrictive business practices are used ranging from refusal to license to attaching restrictive or even prohibitive conditions for royalty and equipment sales to maximise the monopolistic rent. IPCC (2000) also noted that according to Korean firms and R&D institutions, there were cases where the private firms and even public institutions of industrialised countries refused to license climate technologies such as HFC-134a, fuel cell and IGCC (Integrated Gasification Combined Cycle), adding that some private firms sell their equipment under the condition that the buyer cannot disassemble the equipment.

IPCC (2000) also documents the experience of Korean firms that faced difficulties when they wanted to replace CFCs with acceptable substitutes HFC-134a and which were patented by foreign companies in Korea. It further found that the experience was not confined to CFC technology and that many of the technology agreements between Korean firms and their partners in Japan and the US contained restrictions such as not being allowed to consign to a third party, or to export, and that the improved technologies should be shared.

Andersen et. al. also points out in their study that: "South Korean firms are of the opinion that the concession fees demanded by technology owners represent a lack of intention to transfer the alternative technology."[10]

The IPCC (2000) report notes that the case of Korea is "only one among many".

Zhuang (2011) in its study highlights some of the IP related problems that were faced by wind companies in China. The study makes the following findings:

- There has been a major boom in China in companies that manufacture wind power equipment. However, to produce a piece of complete wind power equipment, China has to buy foreign design and technologies related to core components, such as gear boxes, which generally contribute to the largest part of the price.

- The requirements for China to access patented wind-energy technologies are also very strict. Zhuang (2011) cites a survey by Zhou et al. (2010)[11] that on average Chinese companies have to pay high licensing fees for the technology and 5 per cent royalties per piece of equipment when the final product is sold domestically; however, higher royalty fees usually apply when the final product incorporating foreign patent(s) is exported. Most importantly, Chinese innovation is discouraged because R&D activities relating to the patent are commonly only possible after the agreement of the licensor.

- Technologies transferred are not the most advanced. Because the 'unlikeliness" of leading manufactures in the industry to license to potential competitors, studies show

[10] Anderson, S.O., K.M. Sarma, et al., 2007. Technology transfer for the ozone layer – lessons for climate change. Earthscan, London, as reproduced in Khor (2008b)
[11] Zhou, Yuanchuan, Zou, Ji and Wang, Ke (2010). How to conquer the IPR barriers in the low carbon technologies?. Environmental Protection, Vol 2 (in Chinese) reproduced in Zhuang, (2011).

that developing countries manufacturers in China and India often have to obtain technology from second or third tier wind power companies who had less to lose in terms of international competition, and more to gain with regard to license fees.[12]

- China has not acquired the corresponding technological capacities. Much wind power equipment is produced by Chinese enterprises, however, the real owners of the technologies are foreign companies and China has not acquired corresponding technological capabilities.[13] Most applicants for renewable energy-related patents have been foreign enterprise subsidiaries in China; China's top three applicants for wind power patents are all developed country enterprises. During the past twenty years, the gap in wind turbine technology between China and developed countries has not been narrowed.

- To sum up, in the wind energy sector, the innovation is still concentrated in a few developed countries and the technologies have been generally transferred to other industrialized countries. Such technologies are rarely licensed to developing nations, and then mainly to emerging countries like China. The licensees do not have the freedom to use and improve the technologies acquired. Developed country companies often refuse to transfer the advanced or key technologies. The technologies from industrialized countries are strongly protected and it is difficult for developing countries to build their own technological base.

TERI (2009) that looked at technology transfer issue pertaining to climate change in 5 Asian countries, namely China, India, Indonesia, Malaysia and Thailand concluded that where important patents are in the hands of a few dominant players, this creates a monopolistic situation where dissemination of knowledge is restricted on account of limited access and higher prices of climate friendly technologies. TERI (2009) mentions the case of Chinese Yantai IGCC demonstration power plants, where Chinese companies failed to get technology from foreign companies "due to high cost and reluctances to transfer the key technologies on the part of patent holders". After prolonged negotiations, the project had to be finally stopped.

TERI (2009) also points out that the IP create a barrier not only in terms of direct costs (i.e. royalties or license fees) but also increased spending by the recipient company, either due to refusal of technology transfer or unreasonable conditions put in the technology transfer agreements. For instance a Malaysian company Solartif managed to get access to foreign technology only on condition of buying machines from the technology holder. The costs of acquiring technology through imports as a result of conditions in technology transfer agreements, according to TERI (2009) "do not get reflected as a part of IPR costs, since these are not royalties or licence fees, but are nevertheless associated with them".

[12] Lewis, J., (2008), "Leapfrogging in China and India". China Dialogue. Available at http://www.chinadialogue.net/article/show/single/en/1784, reproduced in Zhuang (2011)
[13] UNDP China (2010). China Human Development Report 2009/10: China and a Sustainable Future: Towards a Low Carbon Economy and Society, p.41., reproduced in Zhuang (2011)

Several other recent studies that have analysed specific climate technology sectors have also pointed out that IPRs can be a barrier to transfer of technology.

Ockwell *et al* (2007) looked at Light Emitting Diode (LED) lighting[14] technology and the main barriers that India faced in the transfer of such technology. On IPRs, the study concludes: "Another barrier relates to the IPR issue associated with LED manufacturing. It is a highly protected technology. As there are various processes involved in manufacturing LED chips, each process is patented and requires huge investment. At present, the cost of investing in both chip manufacturing and resolving IPR issues is substantially high compared to importing the chips."

On "biomass technology" the study found that IP, though it is "not a very important issue" in this sector in the context of India, has created "some friction between the European and Indian manufacturers of briquetting[15] machines" as "small-scale industries such as briquetting machine manufacturers are typically 'copycat' businesses based on reverse engineering…". The study also recognises that Europe is dominant in biomass fuel of pellets[16] and not briquettes, thus it concludes that "The growth of the pellet market in Europe has some implications for technology transfer to developing countries like India".[17]

On hybrid vehicles[18], Ockwell et. al (2007), found that commercially viable technologies for hybrid vehicles are held by companies in developed countries[19]. The study also found that "there may be IPR issues associated with imitating patented hybrid drive-trains" since companies such as Toyota, GM and BAE have strict patents relating to their hybrid drive-trains".

Ockwell (2008) also reviewed 3 studies on the issue of IPRs in the context of low carbon technology transfer and concluded: "Developing country firms were generally not observed to have access to the most cutting edge technologies within the sectors examined".

Barton (2007) looked at 3 sectors i.e. solar photovoltaic, biofuels and wind, largely in the context of bigger emerging economies of Brazil, China and India. Despite the overall optimistic tone of Barton's analysis, the study did not rule out the possibility of IPRs being a barrier for developing countries in the sectors examined. In fact, Barton raised

[14] LED is a semiconductor diode that emits light when an electric current is applied in the forward direction of the device. LEDs are widely used as indicator lights on electronic devices and increasingly in higher power applications such as flashlights and area lighting

[15] A briquette is a block of flammable matter which is used as fuel to start and maintain a fire. Biomass briquettes are made from agricultural waste and are a replacement for fossil fuels such as oil or coal, and can be used to heat boilers in manufacturing plants, and also have applications in developing countries. Biomass briquettes are a renewable source of energy and avoid adding fossil carbon to the atmosphere.

[16] Pellets are shorter and narrower compared to briquettes. Pellets can be made from various biomass materials like sawdust, wood, crop residues, or straw.

[17] Ockwell, et al (2007), pp. 82

[18] Hybrid vehicles are viewed by many as having a significant role to play in reduction of carbon emissions related to transport, for example buses and private vehicles. These vehicles combine a conventional internal combustion engine with battery-driven electric motors to achieve a significant reduction in fuel consumption and thus carbon emissions.

[19] Ockwell, et al (2007), pp. 90

concerns of "serious plausible patent issues…likely to arise from the new technologies"; the "risk of broad patents" which may complicate the development of new more efficient or less expensive technologies" and the issue of anti-competitive practices if the "relative small number of suppliers cooperate in a way to violate competition-law principles".[20]

Barton also pointed out other technologies that may be needed to effectively operationalise climate technologies. For example in the photovoltaic and wind sector, "inverters"[21] would be needed to connect to the electricity grid but such technology is continuously evolving, pertains to a more concentrated industry and is an important area of patent activity.[22]

On Barton's study, Ockwell (2008) states: "It is notable that for all of the case studies he examines, uncertainty is expressed as to the likelihood of developing country firms gaining access to the most advanced technologies in these industries".

In the case of photovoltaic[23] technology, Barton suggests that access to the newer thin-film technologies (which is subject to much more extensive patenting than the older silicon-slice technology) is likely to be difficult. Similarly patent holders of new methods, enzymes or micro-organisms important in the case of biofuels may be hesitant to make these technologies available to developing country firms.[24] Barton also identifies wind technologies as an area where existing industrial leaders are hesitant to share their leading technology for fear of creating competitors.

On wind technologies, Ockwell (2008) argues that only smaller companies, which are likely to gain more from licensing and lose less from competition, are willing to sell licenses for use of their technologies. In support, Ockwell refers to a study by Lewis on how leading wind technology manufacturers in India (Suzlon) and China (Goldwind) acquired access to wind technology by license purchases from second tier developed country firms. Lewis argued that it was a disincentive for leading companies to license to potential developing country competitors that have cheaper labour and materials available and while the technology received was not necessarily inferior, it had less operational experience.[25]

Opportunistic & Anti-competitive lawsuits: Hampering access to climate technologies

IP holders are known to use legal suits to preserve their market monopoly, or to place themselves in a position to be able to extract significant royalties from the opposing entity that has used or intends to use the protected technology.

[20] Barton (2007) pp. 20
[21] For converting direct current to alternating current and could also include mechanisms to ensure that solar panels operate under efficient conditions and satisfy the requirements for connecting to the grid
[22] Barton (2007), pp. 11 & 15
[23] A panel that produces electricity when exposed to sunlight
[24] Ockwell (2008)
[25] Lewis, J., (2007), reproduced in Ockwell (2008)

For example, GE successfully used litigation over patent infringement to block foreign access to the US market, thus some firms have had to design around the patent in order to market in the US.[26] In June 2009, GE called on the US International Trade Commission (ITC) (a procedure under which a firm's imports to the US can be barred if it is shown that the firm's product violates a US patent) to block Mitsubishi turbine imports. The ITC ruled in favor of GE in August 2009.[27]

Toyota, well-known for its successful hybrid vehicle Toyota Prius was also engaged in a patent infringement battle related to their Hybrid Synergy Drive brought by Paice LLC in 2004. The trial court found that Toyota's hybrid vehicles infringed Paice's patents, and awarded Paice to be paid $25 per vehicle. In its appeal to the Supreme Court, Toyota said Paice was a "patent litigation company" attempting to "impose a royalty toll on the Prius and similar Toyota hybrid vehicles based on an obscure patent".[28] However the U.S. Supreme Court let stand a $4.3 million award against Toyota Motor Corp. for using another company's patented technology in gasoline-electric hybrid vehicles, including the top-selling Prius. What is interesting in this case is that Paice extended Toyota an offer to license its technology throughout its motion for a permanent injunction, which in itself became one of the grounds for the court rejecting a request for injunction.

The above examples show how litigation or the threat of litigation is used to engage in anti-competitive behavior, in an attempt either to preserve their market share or opportunistically in an attempt to extract benefits such as high royalties.

In the context of developing countries that are likely to be a focus of such litigation in the future, patent litigation or the threat of litigation may result in deterring developing country firms from investing in mitigation and adaptation technologies. Protracted lawsuits can slow the diffusion of technologies by decades.[29]

Ockwell et al., (2007) refers to a discussion with Prof. N Narendran, Director of Research, Lighting research center in New York, which highlighted that "As there are a number of patents associated with each process and almost all manufacturers sue each other over patents it is really difficult to resolve IPR issues".[30] Thus, an outcome of extensive litigation could be a disincentive to invest in innovation.

[26] Ockwell (2008); Barton (2007) pp. 16.
[27] Lee, et al (2009), pp 54-55
[28] Rizo (2008),
[29] Lee, et al (2009)
[30] See Ockwell et al (2007), pp. 69

PART IV: WAYS TO PROMOTE ENABLING ENVIRONMENTS AND TO ADDRESS BARRIERS TO TECHNOLOGY DEVELOPMENT AND TRANSFER

This part proposes several initiatives that can be pursued at the international level to create an enabling environment and to address intellectual property barrier to technology development and transfer. It also outlines the role of the Technology Executive Committee in addressing this issue.

A. SUGGESTIONS FOR INTERNATIONAL COOPERATION

1. Technology pooling through a collective global approach

Parties to the UNFCCC should consider a collective or global approach to enhance access to and affordability of climate technologies. In this context, it is proposed that a "Global Technology Pool for Climate Change", be developed in which intellectual property owners of climate technologies are required to place their intellectual property as well as know-how (e.g. patents and associated trade secrets) in a pool and make them available to developing country firms. Access to the technologies and associated trade secrets and know-how would be conditioned on payment of a low compensation (in some circumstances royalty free) and on standard terms (that are to be negotiated)[31]. This approach has the potential to manage the intellectual property system (if fair and reasonable terms that take into account development needs are negotiated), prevent abusive practices by the IP holder that prevents access to developing countries and make it administratively and financially easier for access to take place.

Various prominent experts and academics have also advocated similar approaches.[32] One proposal is a compulsory licensing framework that could ensure that licenses to patent are available as a matter of right to third parties[33]. Kingston on a similar license of right model states: "Of all types of industry and business which use intellectual property rights, the proposed change (to a license of rights regime) would be most beneficial in complex technologies which are rapidly increasing in importance"[34]

Another proposal by Reichman (2005) has promoted the idea of a "compensatory liability regime", i.e. a liability rule which is an option for one to use another party's innovation, under specified conditions which include (i) how the innovation may be employed; (ii) the period for which it may be employed; (iii) the compensation the innovator should receive (or at least a method for determining it); (iv) provisions for revising the terms of use upon mutual agreement.

In all the above ideas, the basic theme is to allow a third party access and use of the protected subject matter for specified purposes, without permission but subject to

[31] TWN, (2008)
[32] European Patent Office, (2007), p. 95
[33] European Patent Office, (2007), p. 95
[34] Prof William Kingston from the School of Business Studies at Trinity College in Dublin, quoted in European Patent Office (2007), p. 95

payment of some compensation to the IP holder for these uses. Payment of remuneration for patent infringement is found even in the US law[35].

US courts have also commonly applied a similar principle in court decisions. For example in the Paice LLC vs Toyota case mentioned above, injunctive relief was denied to Paice LLC and instead the court allowed Toyota to continue patent infringement, although subject to payment of royalties[36]. The main case in the US on the issue of payment of compensation in lieu of granting injunctive relief is eBay v. MercExchange[37]. The TRIPS Agreement also recognizes the possibility of WTO member states limiting remedies for infringement to payment of compensation.[38]

From the above it is apparent that the idea of allowing the use of a patent for payment of compensation is a concept that has been around for a while. The nature of the pool should be mandatory in that developed and developing countries both have to ensure, either through law or policy (e.g. a condition for receiving public funding for R&D), that the protected subject matter is given to the global technology pool for climate change for licensing to developing country firms as envisaged above.

2. International cooperation to regulate restrictive practices in licensing agreements and anti-competitive uses of intellectual property

There is little in terms of international rules to regulate restrictive practices in licensing agreements and anti-competitive uses of intellectual property.[39]

Noting the need to prevent restrictive and anti-competitive practices that can have an adverse impact on the development and diffusion of technologies, it is proposed that parties to the UNFCCC cooperate to develop norms/standards to regulate restrictive practices in licensing agreements and anti-competitive uses of intellectual property. The issues to be addressed could include a limit to the patent holders' refusal to grant a license, a reasonable rate of royalty payment (or possible exemption for developing country firms), conditions on other costs imposed on the licensee, and regulation on other conditions to be imposed on the licensee (such as limitations on the licensee's market including exports, and the ownership or rights over the innovations or modifications made by the licensee on the licensed technology).[40]

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[35] Reichman (2005), pp. 350

[36] CAFC: 2006-1610-1631; See also www.ipfrontline.com/printtemplate.asp?id=16410

[37] Love (2007): "In May 2006, the US Supreme Court issued an opinion in eBay v. MercExchange which set the standard under which a court should evaluate requests for injunctions to enforce a patent owners' exclusive right to authorize the use of a patented invention. To get an injunction, a patent owner must show the court: (1) that is has suffered irreparable injury; (2) that other possible legal remedies, including the payment of royalties, are inadequate to compensate for that injury; (3) that considering the balance of hardships between the plaintiff and defendant a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction. Under this standard, a court can choose to issue a compulsory license to use the patent rather than enforce the exclusive right, a path that has been taken several times since May 2006".

[38] Article 44.2 of the TRIPS Agreement.

[39] See Article 40 and 31 of the TRIPS Agreement.

[40] Khor, M., (2012)

3. Financing R&D and Promoting Access to Climate Friendly Technologies

The Group of 77 (G77) and China put forward a proposal for the establishment of a Multilateral Climate Technology Fund, with the expectation that the fund will finance enhanced action on technology development and transfer.[41] More specifically, it is proposed that the fund will finance *inter alia* support for research, development, manufacture, commercialization, deployment and diffusion of technologies for adaptation and mitigation and the creation of manufacturing facilities for climate friendly technologies.

However financing of R&D by any future fund should be subject to conditions concerning IP.[42] The IP on any technology resulting from R&D financed from the fund should belong to the fund under the UNFCCC. The technology with its associated know-how should be made available royalty-free and on fair and reasonable terms to firms in developing countries that would like to produce or do further R&D (e.g., to adapt the technology to local conditions). Where countries are more interested in purchasing the technology (that has been developed through financing under the fund), rather than manufacturing or conducting R&D, the technology should be made available at prices affordable to the population of the said developing country. In short, provision of financing for R&D of new technologies should be subject to certain conditions that ensure there is no impediment to equitable and affordable access to the products of the research or follow-on research by others.

4. International Declaration on IP and Climate Technologies.

Developing countries have the right to use flexibilities available in the TRIPS Agreement to facilitate access to climate friendly technologies. However whenever developing countries have used or attempted to use flexibilities available in the TRIPS Agreement, (e.g. compulsory licenses, parallel importation), patent holders and the developed countries have used various tactics to intimidate those countries. Several such incidents have been noted in the context of access to medicines, thus leading to the Doha Declaration on TRIPS and Public Health in 2001.

It is proposed that that a similar declaration be adopted on IP and Climate technologies. The idea of a Declaration on IP and climate change technologies similar to the one on public health was proposed by the Brazilian Foreign Minister in his speech to the UNFCCC Conference of the Parties in Bali. Strictly speaking, such a declaration is not required for a country to exercise rights that are already provided for in the TRIPS Agreement, (e.g. the right to issue compulsory licenses for climate-related technologies). However with an international declaration, developing countries may be more confident to make full use of the flexibilities available.

Such a declaration could also address the issue of export to countries with inadequate manufacturing capacity. The issue of export to countries with inadequate manufacturing

[41] Stilwell (2008)
[42] Shashikant, S., et al (2010)

capacity in the pharmaceutical sector was an important point raised in the Doha Declaration on TRIPS and Public Health and resolved through subsequent decisions of the WTO.[43] This issue arose as a result of restrictions placed on compulsory licenses. Under Article 31 (f) of the TRIPS Agreement a compulsory license shall be predominantly for the supply of the domestic market of the Member authorizing such use. This means that the amount that can be exported to another country is limited.

B. ROLE OF THE TECHNOLOGY EXECUTIVE COMMITTEE

1. Promote the use of TRIPS flexibilities to facilitate access to climate related technologies.

There are several options within the framework of the TRIPS Agreements that could assist in facilitating access to climate related technologies. This includes exceptions to patent rights[44], strict application of patentability criteria[45] and compulsory licensing[46]. Thus TEC should promote the use of these flexibilities.

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[43] Following the Doha Declaration a solution was eventually found in the form of a temporary solution in a WTO General Council Decision of 30 August 2003. On 6 December 2005, WTO Members agreed to convert this temporary solution into an amendment of the TRIPS Agreement. As yet, however, the amendment has not entered into force. It is also worth noting that both these decisions have been criticized for failing to facilitate access to medicines to countries with inadequate or no manufacturing capacity.

[44] Article 30 of the TRIPS Agreement allows "limited exceptions" to exclusive patent rights provided that the exceptions satisfy the three-fold test of: (1) not unreasonably conflicting with the normal exploitation of the patent; (2) not unreasonably prejudicing the legitimate interests of the patent owner; and (3) taking into account the legitimate interests of third parties. Thus, under Article 30 countries may, under certain circumstances, automatically allow the use of the patented invention by a third party without the consent of the patent holder. The TRIPS Agreement does not define these circumstances. It is up to each country to define these circumstances depending on national policies as long as the three-fold test can be satisfied. Some exceptions to patent rights that should be provided in national patent laws as they could be relevant to dealing with climate technologies, are: (1) acts done privately and on a non-commercial scale or for a non-commercial purpose; (2) uses for scientific research; (3) uses for teaching purposes; and (4) experimentation on the invention for commercial purposes, for instance to test it or improve on it.

[45] The TRIPS Agreement allows WTO Members to determine on a case-by-case basis whether to grant a patent for an invention. An invention needs to fulfill three criteria for it to be granted patent protection. The TRIPS Agreement refers to these criteria in Article 27.1, i.e., novelty, inventive step and industrial application, but does not define them. Thus, countries have the right to define the criteria in any manner they deem fit. The flexibility provided by the TRIPS Agreement allows developing countries to adopt a much stricter approach to the definition and application of the patentability criteria, thus limiting the number of patents granted on climate technologies. Without a patent, a country with some technological capacity would be able to innovate on the basis of climate technology (which is not patented) through reverse engineering. However, patent issues would still arise in the case of exports where the technology is patent-protected in the importing country.

[46] Compulsory licences are licences that are granted by a government to use patents, other types of intellectual property without the consent of the IP holder. In the context of patents, Article 31 of the TRIPS Agreement provides WTO Member states the right to grant compulsory licences, although no specific reference to the term compulsory licence is made in the said Article. The TRIPS Agreement gives examples of some grounds for granting compulsory licences but does not restrict the possible grounds to those actually cited. Thus WTO Members have not only the right to issue compulsory licences but also the freedom to determine the grounds upon which such licences are to be granted. Grounds for issuing compulsory licences could include: refusal to deal (when the patent holder refuses to grant a voluntary licence which was requested on reasonable commercial terms and conditions within a reasonable period of time); national emergency or other circumstances of extreme urgency; to remedy against anti-competitive practices; lack or insufficiency of local working of the patent; public interest; public non-commercial use (also known as government-use licence); public health; security reasons; environmental reasons; interdependent patents. The TRIPS Agreement also lists a number of conditions for issuing compulsory licences.

For example, to further facilitate compulsory licensing of climate technology, developing countries can be encouraged to introduce legislation that makes it easier to obtain compulsory licenses for certain purposes or category of products. On this it is worth noting that the US in its Clean Air Act provides for compulsory licensing when the patented innovation is necessary to comply with emission requirements, no reasonable alternative is available, and where non-use of the patented innovation would lead to a "lessening of competition or a tendency to create a monopoly". A district court can, with the Attorney General's assistance, determine whether a compulsory patent licence should be granted and set the reasonable terms.[47]

2. **Compile information on government/public spending on R&D of climate technologies and identify technologies that are publicly owned (wholly or partially). Further promote measures/mechanisms to make publicly funded R&D and technologies accessible to developing countries.**

The public sector plays a critical role in the provision of R&D funding and the amounts spent are significant. For example, in 2001 EU governments spent more than half of the total expenditure for R&D in renewable energy. The public sector spent 349.3 million euros while other sectors spent 340 million euros.[48] Public sector spending is equally important in the US. For example for the wind, biofuels and photovoltaic sectors, the US Department of Energy spent approximately 356 USD million.[49]

However governments particularly in OECD countries allow the inventor (usually public research institutions, universities and other governmental bodies) to claim patents over publicly funded technologies and to license them to the private sector. As a result, even technologies, which are wholly or partially funded by the public sector, are not easily available to firms in developing countries.

It is thus proposed that the TEC promotes measures and mechanisms to make publicly funded R&D, accessible to developing countries. For example, fully owned government technologies should be transferred at no cost. Where governments partially fund R&D, they should have partial ownership of any resulting patent. When a licence is issued to a developing-country firm, a corresponding proportion of the cost of the licence should be waived, thus reducing the overall cost to developing countries. Incentives can also be given to entities (that are publicly funded) to make the patented technology, with its know-how, available to developing countries. It has also been proposed that to support no- and low-cost transfer, a "Publicly Owned Technology Inventory" should be compiled.[50] Governments can also use their leverage as a funder of R&D to place conditions on recipients of the grants as to licensing to firms in developing countries.

[47] 42 USC Sec 7608. See also http://www.law.cornell.edu/uscode/text/42/7608
[48] European Commission (2004)
[49] Barton (2007), pp. 8
[50] TWN (2008)

One example of publicly funded research being made available to the public is the mandatory Public Access Policy of the US National Institutes of Health (NIH). According to the law[51], the Director of NIH shall require all investigators funded by the NIH to submit, or have submitted for them, to the National Library of Medicines's PubMed Central upon acceptance for publication, to be made publicly available no later than 12 months after the official date of publication.[52] Compliance with this Policy is a statutory requirement and a term and condition of the grant award and cooperative agreement, in accordance with the NIH Grants Policy Statement.[53]

More recently the European Commission announced that it would make open access to scientific publications a general principle of Horizon 2020, the EU's Research & Innovation funding programme for 2014-2020.[54] The Commission has also recommended that its Member States take a similar approach to the results of research funded under their own domestic programmes with the goal that 60% of European publicly-funded research articles be available under open access by 2016.

Clearly open access is rapidly becoming the default mode to translate ideas into products and services, thus the TEC must consider application of a similar concept to address prompt availability of publicly funded technologies to developing countries.

3. **Compile and maintain updated information on intellectual property and restrictive business practices (e.g. refusal to deal, restrictive licensing practices) and promote measures/mechanisms to regulate/prevent restrictive practices in licensing agreements and anti-competitive uses of intellectual property, for example through the development of norms/standards.** [See also above Part IV, paragraph A2].

4. **Promote R&D incentive models and funding mechanisms including under the UNFCCC that ensure that R&D outcomes including products/technologies emerging from R&D are not monopolised, but are available to others to engage in follow-on R&D and that such outcomes are affordable.** [See also above Part IV, paragraph A3].

5. **Identify technologies relevant to mitigation of and adaptation to climate change. Conduct a mapping of intellectual property (patents, designs, know-how) in relation to these technologies and the ownership of the intellectual property, and identify aspects which may block innovation and technology transfer.**

6. **Compile and maintain updated information on legal disputes pertaining to intellectual property and climate related technologies.**

[51] Consolidated Appropriations Act of 2007 (H.R. 2764)
[52] See http://publicaccess.nih.gov/policy.htm
[53] See http://grants.nih.gov/grants/guide/notice-files/NOT-OD-08-033.html
[54] See http://europa.eu/rapid/pressReleasesAction.do?reference=IP/12/790

7. **Promote and implement suggestions for international cooperation described above in Part IV, Section A.**

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