

CLIMATE CHANGE, TECHNOLOGY AND INTELLECTUAL PROPERTY RIGHTS: CONTEXT AND RECENT NEGOTIATIONS

Martin Khor



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I. TECHNOLOGY TRANSFER, SUSTAINABLE DEVELOPMENT AND CLIMATE CHANGE

In order to meet their objectives for mitigation and adaptation in climate change, and move more towards a sustainable development pathway, developing countries need access to environmentally-sound technology at affordable prices.

The central role of technology transfer to developing countries as well as the development of endogenous technology in these countries were recognised in the 1992 Rio Summit, as well as in its related conventions including the United Nations Framework Convention on Climate Change (UNFCCC). It was recognised that technology transfer had to be undertaken beyond the commercial arena, and that a pro-active role of public policy at national and international levels is required to enable developing countries' access to technology.

Thus, technology transfer was one of the two key “means of implementation” in Agenda 21, the other being financial resources. Chapter 34 of Agenda 21 defines environmentally sound technologies in a comprehensive way as not just individual technologies but total systems that include know-how, procedures, goods and services, equipment and organisational and managerial procedures. Thus technology transfer should also address human resource development and local capacity-building aspects of technology choices. It states the principle of the need for favourable access to and transfer of environmentally sound technologies to developing countries through technology cooperation enabling transfer of technological know-how and building up of economic, technical and managerial capabilities for the efficient use and further development of transferred technology.

The UNFCCC also recognises technology development and transfer in several provisions, including article 4.3 (developed countries shall provide financial resources including for technology transfer needed by developing countries to meet their agreed full incremental costs of implementing measures), article 4.5 (developed countries shall take all practicable steps to facilitate and finance transfer of and access to environmentally sound technologies and know-how particularly to developing countries; and shall support the development and enhancement of endogenous capacities and technologies of developing countries) and article 4.7 (the extent to which developing countries will implement their commitments will depend on effective implementation of developed countries' commitments on financial resources and technology transfer). (See Annex I).

Despite the recognition of the central role of technology transfer, there has been in fact little transfer of climate-friendly technology under the UNFCCC. This implementation gap is sought to be rectified. It was agreed under the Bali Action Plan (adopted in December 2007) that developed countries would provide technology support to developing countries in a measurable, reportable and verifiable manner. An executive committee on technology has been established under the UNFCCC to address technology transfer issues, and held its inaugural meeting in September 2011.

Technology transfer is not merely the import or purchase of machines and other hardware at commercial rates. A central aspect of technology development and transfer is the building of local capacity so that people and institutions in developing countries can design and make technologies which can be diffused into the domestic economy. As recognised in Agenda 21 (para. 34.12), a “critical mass of research and development capacity is crucial to the effective dissemination and use of environmentally sound technologies and their generation locally”.

In the process of technological development, developing countries can go through three stages: (1) initiation stage, where technology as capital goods are imported; (2) internalisation stage, where local firms learn through imitation under a flexible intellectual property rights (IPRs) regime; (3) generation stage, where local firms and institutions innovate through their own research and development (R & D) (UNCTAD, 2007).

In stage 1, the country is dependent on capital imports, some of which may be extra high in cost (those that are patented) because of the higher prices enabled by monopoly margins. In stage 2, costs may be lowered by versions produced locally. In stage 3, the local firms are able to design and make their own original products. Technology transfer may involve the purchase and acquisition of equipment; the know-how to use, maintain and repair it; the ability to make it through “emulation” or reverse engineering; to adapt it to local conditions; and eventually to design and manufacture original products. The process of technology transfer involves progressively climbing through all these aspects.

Several conditions have to be present for technology transfer and development to take place. The absence of such conditions can form barriers to technology transfer. Among the barriers that are normally listed are poor infrastructure, inadequate laws and regulations, shortage of skilled personnel, lack of finance, ignorance of technology issues, high cost of certain technology agreements, problems created by equipment suppliers, and intellectual property rights.

Intellectual property rights has become an important and often contested issue in the discussion on technology transfer and development. Whether IPRs constitute a barrier or an important barrier depends on several factors, such as whether or not the particular technology is patented, whether there are viable and cost-effective substitutes or alternatives, the degree of competition, the prices at which it is sold, and the degree of reasonableness of terms for licensing, etc.

II. CATEGORIES OF TECHNOLOGIES AND THEIR TREATMENT

In terms of proprietary rights, technologies and related products can be usefully placed under three categories: those that are not patented and are thus in the public domain; those that are patented; and future technologies (which are likely to come under patents unless there are new mechanisms or initiatives).

Technologies in the Public Domain

Some technologies are in the public domain; they are not patented or their patents have expired. According to Agenda 21 (para. 34.9), a large body of technological knowledge lies in the public domain (are not covered by patents) and there is a need for the access of developing countries to such technologies as well as the know how and expertise required to use them. In this case, the main barrier to technology transfer may be lack of financial resources, and international funds should be established to enable developing countries to purchase and to manufacture such technologies.

An important measure to promote sustainable development is to expand the space for technologies in the public domain, and to expand the transfer to developing countries of publicly-funded technologies. Governments in developed countries play an important role in funding R & D programmes, many of which are implemented by the private sector. In addition, governments sponsor a range of R & D that underpins private sector investments in developing environmentally sound technologies (ESTs) (IPCC, 2000, Chapter 3, page 95).

A paper for the UNFCCC surveyed government R & D funding of ESTs in the United States, Canada, United Kingdom and Korea. It found that in most countries, governments allocated their rights (patents, copyrights, trademarks, etc.) to the recipient research institutions to a significant degree. As a result, the diffusion of climate-friendly technology would “typically be along a pathway of licensing or royalty payments rather than use without restriction in the public domain” (Sathaye et al., 2005).

The Intergovernmental Panel on Climate Change (IPCC) study (2000) calls on OECD countries to influence the flow of such technology directly through their influence on the private sector or public institutes that receive funding from government for their R & D to be more active in transferring technologies to developing countries. It cites Agenda 21 (chapter 34, paragraph 34.18a) that “governments and international organisations should promote the formulation of policies and programmes for the effective transfer of environmentally sound technologies that are publicly owned or in the public domain.” Products that emerge from publicly funded R & D should be placed in the public domain. Those that are partially funded should be in the public domain to the extent to which it is publicly funded.

At the international level, there can also be public funding and joint planning of R & D programmes. Products and technologies emerging from such publicly funded programmes should be placed in the public domain.

Patented Technologies

For technologies that are patented, there should be an understanding that patents should not be an obstacle for developing countries to have access to them at affordable prices. Agenda 21 (para. 34.10) states that: “Consideration must be given to the role of patent protection and intellectual property rights along with an examination of their impact on the access to and transfer of environmentally sound technology, in particular to developing countries, as well as to further exploring efficiently the concept of assured access for developing countries to environmentally sound technology in its relation to proprietary rights with a view to developing effective responses to the needs of developing countries in this area.” Agenda 21 (para. 34.18e) also agreed that in the case of privately owned technologies, measures would be adopted particularly for developing countries, including developed countries creating incentives to their companies to transfer technology; purchase of patents and licenses for their transfer to developing countries; prevention of the abuse of IPRs including through compulsory licensing with compensation; providing funds for technology transfer; and developing mechanisms for technology access and transfer.

While the patent system provides incentives for innovation, it can also be a barrier to the transfer of technology to developing countries at affordable prices. There are examples of developing countries and their firms being hampered from adopting climate-friendly technologies or products due to there being patents on these products, and due to the unreasonable demands made by the patent holders on companies in developing countries that requested a voluntary license from the patent holder.

There are also various ways in which the barriers posed by IPRs can be addressed within the framework of the international patent system itself (as characterized by the World Trade Organization’s Trade Related Aspects of Intellectual Property Rights (WTO TRIPS) agreement) and also outside of it. Under the TRIPS Agreement, there is considerable flexibility provided to WTO Member States on grounds for issuing compulsory licenses. These grounds are not restricted, as confirmed by the WTO Ministerial Declaration on TRIPS and Public Health (WTO, 2001). In developed countries, there have been many compulsory licenses granted by the government to facilitate cheaper products and technology in the industrial sector. In many developing countries, compulsory licenses have been issued for the import or local production of generic drugs. Thus, compulsory licensing is an option particularly when the patent-holder is unwilling to provide a voluntary license with reasonable conditions.

Some developing countries have previously proposed at the WTO that countries be allowed not to patent environmentally-sound technology so that its transfer and use can be facilitated. The relaxation of the TRIPS rules in the case of climate-related technologies has also been proposed by developing countries in the UNFCCC; however this was opposed by major developed countries. Governments can also facilitate easier access to voluntary licenses. Measures can also be taken to ensure that royalty and other conditions in voluntary licenses are fair and reasonable.

These two aspects (patents as a barrier, and methods to address this) are discussed in more detail later in this paper.

Future Technologies

For technologies to be developed for future use, the nature of the funding of research and development will exert influence on the proprietary nature of the products and technologies.

In line with the goal of having as many technologies in the public domain as possible, a technology fund (or technology window in the Green Climate Fund) to be set up under the UNFCCC could allocate a part of its resources to research and development for new technologies. The fund can establish priority areas for research, based on the decision of UNFCCC members, and research grants can be provided to successful applicants in line with the priority areas. Since the funding is made available by the fund, the patents for the inventions are to be owned by the fund, and this principle should be one of the conditions for the grants. It can be part of the understanding in this scheme that the fund would make the inventions available to firms in developing countries with licenses at no cost or nominal cost, also on the condition that the users cannot apply to patent the technologies.

The up-front funding of innovation, linked to making the ensuing technologies available at the most affordable prices to developing countries since the latter will obtain the technologies without paying for patent royalties and since there will be free competition in the production, would be more cost effective than the Fund having to purchase the technologies (with patents attached to them) at full cost and distributing them to developing countries.

This scheme would not of course prevent privately funded innovation activities from taking place, and the two could co-exist. However, the larger the resources available for global publicly funded R and D activities, the larger will be the share of future technologies that will be in the public domain.

Agenda 21 also has many useful proposals and decisions, including establishment of a collaborative network of research centres, support for cooperation and assistance programmes, and building capacity for technology assessment, and collaborative arrangements. These should be revisited as part of the Rio Plus 20 process.

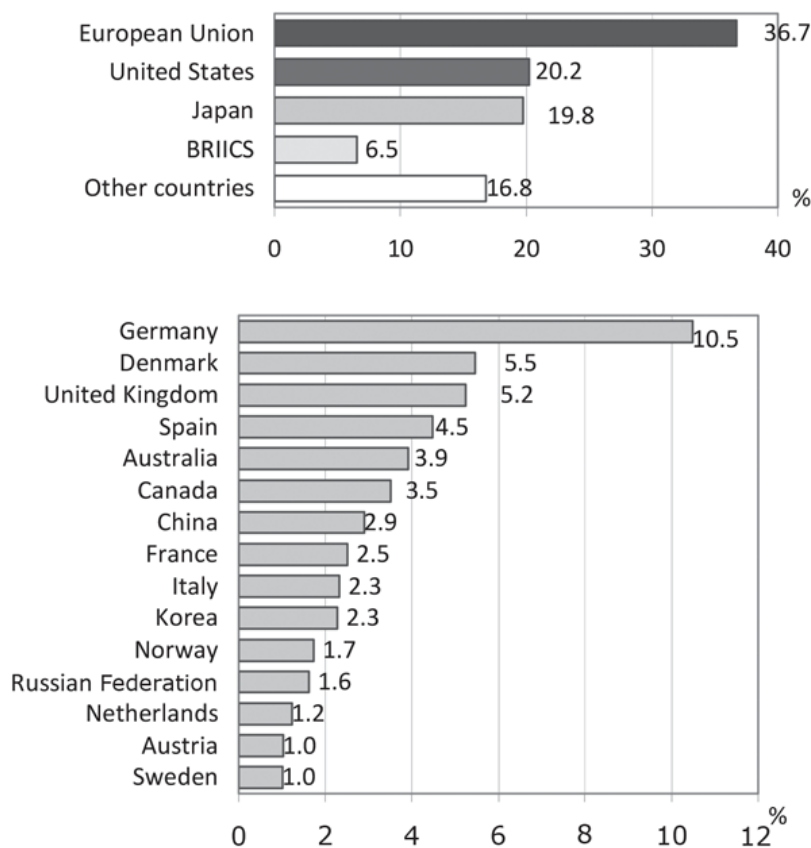
International collaboration for R and D (including arrangements for its financing) is an important possibility that should be explored fully. This can be within the UNFCCC context, where two important mechanisms (Finance and Technology) are now being established and operationalised. Models of collaboration (such as existed or exists in agriculture, health, etc.) should be examined to see if the lessons learnt can be adopted and adapted for the climate area.

III. EFFECTS OF PATENTS ON ACCESS TO CLIMATE-RELATED TECHNOLOGIES

In relation to environmentally-sound technologies, there is a strong case that IPRs hinder the ability of developing countries to attain EST as well as new technologies in general. The great majority of patents worldwide are held by companies based in North America, Western Europe or Japan. In climate-related technologies, the developed countries also have an overwhelming share of patents worldwide. In 2005, the European Union countries held 36.7% of patents linked to renewable energy, with the US holding 20.2% and Japan 19.8%, while China held 2.9% and Korea 2.3% (OECD, 2008).

A study by Lee et al. (2009) examined patent ownership of six energy technologies (wind, solar, photovoltaic, concentrated solar power, biomass-to-electricity, cleaner coal and carbon capture) and found that the US, Japan and Germany are clear leaders in energy innovations. The leading emerging countries such as China, Brazil and India have no companies or organisations in the top 10 position in these sectors. The study concluded that companies and institutions in the Organisation for Economic Co-operation and Development (OECD) countries will determine the speed of diffusion of the most advanced energy technologies in the next decade.

Share of countries in renewable energy patents, 2005



Source: OECD (2008) as reproduced in Shashikant (2009b).

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.

In agriculture, one particular concern over IPRs is the filing of patent applications by large agrochemical and seed companies to pursue exclusive monopoly over plant gene sequences. Hundreds of patents have been applied for in relation to genes of what they term as “climate-friendly” crops that are genetically engineered to withstand environmental stress such as drought, heat, cold and floods.¹ For example, at least 261 families of patents (subsuming 1663 patent documents) published between June 2008 to June 2010 make specific claims to confer “abiotic stress tolerance” (from drought, heat, flood, cold, salt) in plants. These patent application rush could lead to a few mega corporations monopolizing genes, seeds and crops that contain them. Just six gene-related companies and their two biotech partners control 201 or 77% of the 261 patent families referred to. The group ETC has raised concern that this would restrict the access to germplasm and to seeds, and has called for a review of the social and environmental implications of these new varieties, and a review also of IPR laws regarding approval of “climate-related genes” (ETC Group, 2010).

There are several ways in which a strong IPRs regime can hinder access of developing countries to technology, and transfer to developing countries of technology (including EST).

- Firstly, a strict IPRs regime can discourage research and innovation by locals in a developing country. Where most patents in the country are held by foreign inventors or corporations, local R&D can be stifled since the monopoly rights conferred by patents could restrict the research by local researchers.
- Secondly, a strict IPRs regime makes it difficult for local firms or individual researchers to develop or make use of patented technology, as this could be prohibited or expensive.
- Thirdly, should a local firm wish to make use of patented technology, it would usually have to pay significant amounts in royalty or licence fees. TRIPS increases the leverage of technology suppliers to charge a higher price for their technology. Many firms in developing countries may not be able to afford the cost. Even if they could, the additional high cost could make their products unviable.
- Fourthly, even if a local firm is willing to pay the commercial rate for the use of patented technology, the patent holder can withhold permission to the firm (refusal to deal) or impose onerous conditions, thus making it impossible or extremely difficult for the technology to be used by the firm.

¹ ETC Group (2010), Capturing climate genes.

- Fifthly, the royalties to be paid by developing countries can be a drain on national resources and foreign exchange. For countries facing balance-of-payments constraints, this may be an acute problem. For India, net royalties and license fees paid in 2010 totalled \$2,309 million compared to \$325 million in 2002 and \$997 million in 2007, according to International Monetary Fund (IMF) balance-of-payments data. For developing countries as a whole (including South Korea), the payments have increased from \$6.8 billion in 1995 to \$50.6 billion in 2009.

South Centre (2009) has pointed out that since most of the IPRs on environmentally-sound technologies are held by firms in developed countries, this can impede the ability of developing countries to have meaningful and affordable access to these technologies. The barriers examined by this study includes (a) high royalty fees; (b) refusal to license by the patent holder; (c) “ever-greening of patents”; (d) increasing patent litigation and (e) impediments to innovation.

A well-documented case of IPRs being a barrier to transfer of climate technology is the difficulties of firms in India and Korea to obtain the rights to producing substitutes for chlorofluorocarbons (CFCs), chemicals used in industrial processes as a coolant, which damage the atmosphere’s ozone layer. This hinders their ability to meet commitments under the Montreal Protocol which tackles ozone-layer loss by phasing out the use of CFCs and other ozone-damaging substances by certain target dates.

In a study of the effect of IPRs on technology transfer in the case of India in the context of the Montreal Protocol, Watal (1998) pointed out that technology-transfer provisions in the Montreal Protocol are particularly relevant for developing countries which are producers of ozone-depleting substances (ODS), such as India, Brazil, China, South Korea and Mexico. In India, Korea and China, such production is dominated by local-owned firms, for which the access to ozone-friendly technology on affordable terms has become a central issue of concern. The study concludes 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.”

Another study that also reviewed transfer of technologies for substitutes for ozone-damaging chemicals under the Montreal Protocol has provided details for some cases in which technology transfer to developing countries’ firms was hindered by either high prices or other unacceptable conditions imposed by companies holding patents on the chemical substitutes onto companies in developing countries that wanted a license to manufacture the substitutes². Examples include:

(a) The case of HFC-134a, a chemical used to replace harmful CFC in refrigeration. When Indian companies requested a license from a US company owning the patent for HFC-134a, in order to manufacture the chemical, they were asked to pay a very high sum (US\$25 million) which was far above the normal level, or to allow the US company to own a majority equity

² Reference to these cases are in Martin Khor (2008c), Note on access to technology, IPR and climate change.

stake in a joint venture and with export restrictions on the chemical produced in India; both options were unacceptable to the Indian producers.

(b) Korean firms also faced difficulties when they wanted to replace CFCs with acceptable substitutes HFC-134a and HCFC-141b, which had been patented by foreign companies in Korea. “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” (Andersen et al., 2007, pp. 262-265).

(c) The case of HFC-227ea: This chemical (known also as FM-200) is a substitute for halon-1301 for fire protection applications. The US owner of FM-200 patent requires that licensed fire protection systems satisfy certain design and inspection requirements and only 3 enterprises (in US, UK, Australia) have satisfied the approvals. The patent owner offered joint ventures with majority share holding but do not want to license the technology to wholly locally owned firms, and thus Indian firms are unable to avail themselves of this product (Andersen et al., 2007, p. 265).

(d) Many of the technology agreements between Korean firms and their partners in Japan and the US contain restrictions such as they are not allowed to consign to a third party, to export, and that the improved technologies should be shared (Andersen et al., 2007).

Some recent studies that analysed specific sectors of climate related technologies have also pointed out the potential for IPR protection for becoming a barrier to technology transfer. The IP holder can prevent access to the protected technology and know-how and thus prevent other firms from imitating the technology or innovating on the basis of new technologies (Ockwell et al., 2007, p. 40).³

Ockwell *et al.* (2007) looked at Light Emitting Diode (LED) lighting⁴ 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.”

The study also indicates significant IPR issues faced by Indian manufacturers in biomass technology and in manufacturing hybrid vehicles since there are many patents associated with the equipment and technologies. On “biomass technology” the study found that IPRs, 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 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

³ This and the following survey of recent literature on climate technology and IPRs is largely based on Shashikant 2009b (pp. 29-31).

⁴ 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.

pellets 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”.⁵

On hybrid vehicles⁶, Ockwell *et al.* (2007), found that commercially viable technologies for hybrid vehicles are held by companies in developed countries⁷. The study also found that “there may be IPR issues associated with imitating patented hybrid drive-trains” since “companies such as Toyota, General Motors 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”.

A study by Barton (2007) on three sectors (solar photovoltaic, biofuels and wind technology) found that despite patents being prevalent in these sectors, competition between the various types of energy kept prices and costs relatively low. However his study did not rule out IPRs being a possible barrier, and he warns of “serious plausible patent issues likely to arise from the new technologies” and the risk of broad patents which may complicate the development of new, more efficient or less expensive technologies, as well as anti-competitive practices if the small number of suppliers cooperate to violate competition-law principles. 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 photovoltaic⁸ 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.⁹ 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 in developed countries which are likely to gain more from licensing and lose less from competition are willing to sell licenses for use of their technologies.¹⁰ In support, Ockwell refers to a study by Lewis on how leading wind technology manufacturers in developing countries like Suzlon (India) and Goldwin (China) acquired access to wind technology by license purchases but from second-tier developed country firms which had less to lose in terms of competition and more to gain in license fees. Leading firms in developed countries have been reluctant to license their technologies to potential developing country competitors. Lewis argued that it was a disincentive

⁵ Ockwell *et al.* (2007), p. 82.

⁶ 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.

⁷ Ockwell *et al.* (2007), p. 90.

⁸ A panel that produces electricity when exposed to sunlight.

⁹ Ockwell (2008).

¹⁰ This case is cited by Shashikant (2010) and South Centre (2009).

for leading companies to license to potential developing country competitors that have cheaper labour and materials available.¹¹

The Indian institute TERI (The Energy and Resources Institute) led a study on technology transfer and climate change issues in which research institutes from five Asian countries (China, India, Indonesia, Malaysia and Thailand) participated. The study 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). A case is cited of the Chinese Yantai Integrated Gasification Combined Cycle (IGCC) demonstration power plants, in which 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 was stopped.

TERI (2009) also points out that the IPRs 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 “do not get reflected as a part of IPR costs, since these are not royalties or licence fees, but are nevertheless associated with them” (TERI, 2009).

A recent study (Zhuang, 2011) on whether patented wind technologies have been transferred to developing countries shows how wind companies in China have faced problems relating to IPRs.¹² Citing data from Lee (2009), the study points out that Germany, US and Japan owned around 60% of wind technology patents approved in 1998-2007, while Denmark, Spain, UK, France and the Netherlands together accounted for another 23%. China may be the largest owner of patents in emerging economies for wind technology but its share of claimed priority patents was only 1.5%.

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) 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.

¹¹ Lewis, J. (2007), quoted in Ockwell (2008).

¹² Zhuang, Wei (2011), *Intellectual Property Rights and Transfer of Clean Energy Technologies*.

Most importantly, Chinese innovation is discouraged because R&D activities relating to the patent are commonly only possible after the agreement of the licensor.¹³

- **Technologies transferred are not the most advanced.** Because the ‘unlikeliness’ of leading manufactures in the industry to license to potential competitors, studies show 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.¹⁴
- **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.¹⁵ 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.

Shashikant (2010)¹⁶ also points out that opportunistic & anti-competitive lawsuits taken by patent owners can hamper 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. Syam (2010) also mentions cases where a large company that hold patents in wind energy technology prevented a European firm from entering the US market through patent litigation, until finally the European firm was acquired by the US firm. Similarly a US firm filed a patent infringement lawsuit against a UK firm claiming infringement of 5 patents over seminal quantum dot technology, used in the solar power sector.

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

¹³ Zhou, Yuanchuan, Zou, Ji and Wang, Ke (2010). How to conquer the IPR barriers in the low carbon technologies?, in Chinese, *Environmental Protection*, Vol 2.

¹⁴ Lewis, J. (2008). Leapfrogging in China and India, China Dialogue, <http://www.chinadialogue.net/article/show/single/en/1784>, visited on May 27 2011.

¹⁵ UNDP China (2010). China Human Development Report 2009/10: China and a Sustainable Future: Towards a Low Carbon Economy and Society, p.41.

¹⁶ Shashikant, S. (2010), IPRs and technology transfer issues in the context of climate change.

investing in mitigation and adaptation technologies. Protracted lawsuits would also slow the diffusion of technologies.

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”.¹⁷ Thus, an outcome of extensive litigation could be a disincentive to invest in innovation.

Proponents of a strong IP regime have argued that patents boost technology transfer because the patent applicants have to disclose information on their claimed invention when submitting their application. However in reality, there are many problems with this, such as that the patent agents usually avoid including information that enable competitors to exploit the invention on patent expiry; the applicant also often omits information that allow reproduction of all embodiments; and technicians in developing countries are often without the experience needed to work the disclosed patent specifications. Moreover, during the term of the patent, the patented invention cannot be exploited by others (unless permission is obtained from the patent holder) even if the information is available (Shashikant, 2009b, p. 33).

¹⁷ See Ockwell et al. (2007), p. 69.

IV. POSSIBLE TREATMENT OF PATENTED TECHNOLOGIES

There are a number of measures that can be taken to address problems arising should patents become a barrier to the transfer of climate related technologies.

Regulation of Voluntary Licenses

One option for facilitating the lowering of barriers posed by IPRs is to have better regulation over voluntary licenses and the terms attached to them. This could be part of national legislation. It should also be facilitated by international standards. 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). Regulation of the conditions for voluntary licenses is necessary to remedy the kinds of problems which companies in developing countries faced when trying to get a license from patent holders to produce substitutes to ozone-harmful chemicals.

Compulsory Licenses

An important measure is the exercise by governments of their right to provide compulsory licenses (CL). Under the TRIPS agreement, there is considerable flexibility provided to WTO Member States on the grounds for issuing compulsory licenses. These grounds are not restricted, as confirmed by the WTO Ministerial Declaration on TRIPS and Public Health (WTO, 2001). For example, and contrary to a quite widespread notion, it is not necessary for a government to declare its country is in a state of health emergency in order for it to issue a compulsory license for a pharmaceutical drug. Certainly the fact that a country requires a product or technology in order to meet its objectives or responsibilities to mitigate climate change or to adapt to climate change is a valid ground for compulsory licensing.

Compulsory licensing is not a unique or exceptional policy. In developed countries like the US and the UK, there have been many compulsory licenses granted by the government to facilitate cheaper products and technology in the industrial sector. According to Reichman (2003), "the United States government has broad powers to seize and use any invention protected by privately owned patents, subject to the payment of reasonable and entire compensation, and it makes extensive use of this power".¹⁸ In fact in the US, compulsory license provisions are incorporated into specific legislation.¹⁸ For example the US Clean Air Act provides for CL of patented technologies needed to meet agreed standards¹⁹.

¹⁸ *The Atomic Energy Act (42 USC Sec 2183)* allows for such licensing when the patented innovation is "[u]seful in the production or utilization of special nuclear material or atomic energy." The Atomic Energy Commission can determine whether a compulsory patent license should be granted and the reasonable royalty owed by the licensee. *The Bayh-Dole Act (42 USC Sec 7608)* permits compulsory patent licensing when a recipient of federal grants and contracts "has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical

In many developing countries, compulsory licenses have been issued for the import or local production of generic drugs. A particular type of compulsory license, “government use”, has been made use of by an increasing number of developing countries in the area of pharmaceutical drugs. In such cases, prior negotiation with the patent holder is not necessary although remuneration or royalty to the patent holder is required.

Compulsory licensing is thus an option that developing countries can consider using for those patented climate-friendly technologies for which they have need, which are expensive, and when negotiations with the patent holder are unable to result in a sufficiently affordable price either for the original product or for a license for an intended generic product.

Use of other TRIPS Flexibilities

Besides compulsory licensing, the TRIPS Agreement has several other flexibilities, which can be used to promote transfer of climate-related technologies. These include parallel importation, exemptions to patentability, exceptions to patent rights, and measures to address anti-competitive behaviour. The possible use of these flexibilities is detailed in South Centre (2009).

WTO Declaration on Patents and Climate Technology

The Brazilian Foreign Minister Mr. Celso Amorim in his speech at the plenary session of the UNFCCC Bali climate conference in December 2007 stated that inspiration should be drawn from the case of TRIPS and access to medicines (which resulted in a WTO Ministerial Declaration on TRIPS and Public Health), and that a move should be considered to have a similar Declaration on TRIPS and climate friendly technologies. Strictly speaking, it is not necessary for such a statement to be made by Ministers before a country exercises rights that are already provided for in the TRIPS Agreement to issue compulsory licenses for climate-related technologies. However some developing countries may not be familiar enough with these rights, or they may fear that the exercise of such rights may lead to an outcry from the companies holding the patents or to penalties from the developed countries. Therefore developing countries may find it useful that an international declaration is made, so that they would have greater confidence to issue compulsory licenses.

An important feature of the TRIPS and Public Health Declaration is that it created new rights for countries to waive a provision in the TRIPS Agreement that limits the supply of a generic product (under compulsory license) to “predominantly” in the domestic market. This restricts

application of the subject invention.” The federal government can also exercise its “march-in rights” by showing that a compulsory patent license is necessary “to alleviate health or safety needs,” or “to meet requirements for public use specified by Federal regulations.”

¹⁹ *The Clean Air Act (35 USC 203)* provides for compulsory patent licenses when the patented innovation is necessary to comply with the 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 license should be granted and set the reasonable terms.

the volume of exports of a firm producing generics, and it also affects the adequacy of supply of generic products that a country with no or limited manufacturing capacity can import. A Declaration on TRIPS and Climate Change could establish a similar waiver to the restrictive TRIPS provision for climate-related technologies. This will enable an increase of supply of “generic” technologies and products to countries that lack productive capacity to produce their own products.

Details on elements of a possible Declaration are contained in South Centre (2009).

Legislation to Facilitate Easier Compulsory Licensing

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. For example, the Clean Air Act of the United States provides for compulsory licenses to be given when the patented innovation is necessary to comply with the emission requirements, when no reasonable alternative is available, and where non-use of the patented invention would lead to a “lessening of competition or a tendency to create a monopoly.” Under the Act, a district court, with the Attorney General’s assistance, can determine whether a compulsory license should be granted and set reasonable terms.

Shashikant (2010) also points out two other US laws that mention compulsory licensing. *The Atomic Energy Act (42 USC Sec 2183)* allows for compulsory licensing when the patented innovation is “[u]seful in the production or utilization of special nuclear material or atomic energy.” The Atomic Energy Commission can determine whether a compulsory patent license should be granted and the reasonable royalty owed by the licensee. *The Bayh-Dole Act (42 USC Sec 7608)* permits compulsory patent licensing when a recipient of federal grants and contracts “has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention.” The federal government can also exercise its “march-in rights” by showing that a compulsory patent license is necessary “to alleviate health or safety needs,” or “to meet requirements for public use specified by Federal regulations.”

Exemption from Patentability

Another set of proposals that are more fundamental has to do with exemptions or partial exemptions for climate friendly technologies from patentability. Proposals along this line have already been made at the WTO since many years.

An exemption from patentability for environmentally sound technology was proposed by India at the WTO’s Committee on Trade and Environment in 1996.

More recently, the Indian delegation at a climate change meeting as part of the G8-plus-5 Summit in Gleneagles, proposed as an option the redefinition of the extent of patent protection

for climate friendly technologies, so that the protection “could exclude the use of such technologies in developing countries.”²⁰

The above provides two options in exclusion of patents, the first is a blanket exclusion of patentability for environmentally sound technologies and the second being an exclusion applied only to developing countries. In the second option, patent holders that funded their own research and development could recoup their innovation costs through a monopoly (for the specified period in the TRIPS agreement) of their products in the developed countries, while in the developing countries, competition to such technologies is allowed through an exemption from patentability. An appropriate amendment of the TRIPS Agreement would be required in either case, to the effect that WTO Members (or WTO developing country Members) can exempt such technologies from patentability.

Such a proposal should not be considered unrealistic. Before the adoption of the TRIPS Agreement, many countries exempted food and pharmaceutical drugs from patentability. Although the TRIPS Agreement does not allow patent exclusion on a sectoral basis, it recognises circumstances in which IPRs can be suspended. For example, Article 73 states that in situations of war or other emergency in international relations, nothing in TRIPS will be construed as preventing a Member from taking any action which it considers necessary for the protection of its essential security interests. There is a strong case for equating the climate crisis with a global emergency situation. Since climate change is an extremely serious crisis threatening human survival, and there are only a few years left for strong action to be effective in preventing catastrophic effects on human life and the environment, the situation is similar to a global emergency with war-like conditions. In such conditions, individual commercial interests such as patents can be suspended so that there can be concerted global and national actions in the most effective way, to face the common threat. Developing countries require technologies at the cheapest possible prices. If they obtain the needed technology at one third the price, they can increase the rate of change to put into effect mitigation and adaptation measures many times more rapidly and effectively.

This can be considered a justifiable demand if climate change is considered a serious challenge. Developed countries cannot justify business as usual in the old system while also demanding a radical departure by developing countries from business as usual in their emissions pathways.²¹ Least Developed Countries (LDCs) already have some flexibility in this regard. LDCs that are members of WTO have a special transitional period for the implementation of the TRIPS Agreement.

Technology pooling through a collective global approach

A “Global Technology Pool for Climate Change” could be developed in which owners of ESTs are required to place their IPRs in a pool, and make them available to developing country firms on payment of a low compensation (in some circumstance royalty free) and on standard terms

²⁰ India paper at Gleneagles Summit, “Dealing with the threat of climate change”.

²¹ TWN (2008b).

(that are to be negotiated)²². This approach has the potential (if fair and reasonable terms that take into account development needs are negotiated) to manage the patent system, prevent abusive practices by the IP holder and makes it administratively and financially easier for access to take place. Similar approaches have also been advocated by various experts.²³

The nature of the pool should be mandatory in that either through law or policy (e.g. a condition for receiving public funding for R&D) the protected subject matter is given to the pool for licensing to developing country firms. Patent holders would still be able to extract high commercial royalties from the far richer developed markets.

Global System to Share Know-How and Trade Secrets

Another measure requiring international cooperation is the establishment of a global system for sharing know-how and trade secrets linked to climate-friendly technologies. The withholding of “trade secrets”, or the knowledge on how to make the technology, can be a major barrier to technology transfer, even for technologies that are not patented, as it can prevent the development of technology in developing countries. Thus, there is a case for an international cooperation mechanism to make trade secrets and know-how that are linked to climate-related technologies more accessible to developing countries.

Understanding or Initiatives on Publicly funded technologies

OECD countries which hold ownership of most of the ESTs for mitigation and abatement are in a strategic position to influence technology flows directly through their influence on the private sector or on public institutes which receive funding for R&D. That would require them to be more active in transferring technologies to developing countries.²⁴

Fully-owned government technologies and related know-how can be transferred at no cost and on favorable terms. Where governments partially fund R&D, they should have partial ownership of any resulting patent.²⁵ When a license is issued to a developing country firm, a corresponding proportion of the cost of the license should be waived, thus reducing the overall cost to the country. 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, developed country governments should compile a “Publicly-Owned Technology Inventory”²⁶. As noted above, governments can also use their leverage as a funder of R&D to place conditions on recipients to ensure licensing to firms in developing countries on fair terms that take into account their development priorities and needs.

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)²⁷ which requires all

²² TWN (2008a).

²³ See European Patent Office (2007), p. 95; See also Reichman (2005).

²⁴ IPCC (2000).

²⁵ TWN (2008a).

²⁶ TWN (2008a).

²⁷ See Consolidated Appropriations Act of 2007 (H.R. 2764), see also <http://publicaccess.nih.gov/policy.htm>.

investigators funded by the NIH to make publicly available their publications through the National Library of Medicine's PubMed Central no later than 12 months after the official date of publication, thus improving the sharing of scientific findings, the pace of medical advances, and the rate of return on benefits to the taxpayer. A similar concept could also be envisaged to address prompt availability of publicly funded technologies to developing countries.

At the UNFCCC meeting in Accra, the Group of 77 (G77) and China put forward a proposal for the establishment of a Multilateral Climate Technology Fund²⁸. The expectation is for the fund to finance enhanced action on technology development and transfer. 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 ESTs.

Financing of R&D of new technologies by any future fund should be subject to conditions concerning IPRs. IPRs of any technology resulting from R&D financed from the fund should belong to the fund under the UNFCCC. The technology with its know-how should be made available royalty free 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 Technology 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 that there is no impediment to equitable and affordable access to the products of the research or follow-on research by others.

Conclusion

Any WTO member state is already allowed by the TRIPS agreement to make use of "flexibilities" and take measures such as compulsory licenses and parallel importation to obtain technologies or products (that are patented) at more affordable prices. But the processes of negotiating with the patent holder and of issuing compulsory licenses etc can be quite cumbersome to countries not familiar with the procedures. Consideration should thus be given to facilitating the easier use of compulsory licensing and other TRIPS flexibilities, and also the possible exemption by developing countries of at least the critical technologies required for climate adaptation and mitigation. Innovating firms could recover their research costs through patenting in developed countries. Intellectual property should not be treated as something sacred that has to be upheld at all costs. That would send a signal that climate change is not a serious threat, as commercial profits from monopoly would be seen as being on a higher scale of values and priorities than are the human lives that are at stake due to global warming. Technology transfer to developing countries to enable them to combat climate change should be the far higher priority. The UNFCCC process should therefore adopt the principle that developing countries can exempt climate-friendly technologies from patents. This should be supplemented with global measures to enable the sharing of trade secrets. As second-best alternatives, other

²⁸ Stillwell (2008a).

measures can be considered, such as automatic granting of voluntary licenses and regulation of such licenses, and patent pools.

V. PROPOSALS OF DEVELOPING COUNTRIES IN THE UNFCCC

In the UNFCCC negotiations since the Bali conference of December 2007, many developing countries and their groupings have presented proposals on technology development and transfer. The most important of these is the proposal by the G77 and China submitted in September 2008. Its main feature is the establishment of a new technology mechanism under the UNFCCC to accelerate the development and transfer of technology and to support the effective implementation of the UNFCCC's provisions relating to technology and finance. The proposal sets out the rationale, criteria and institutional arrangements for a new technology mechanism, which include a new Executive Body on Technology²⁹, a Multilateral Climate Technology Fund, a Technology Action Plan and eligible activities. Barriers to transfer also inhibit the adoption of technologies in developing countries. Consequently, access must be urgently provided to these technologies while balancing rewards for innovators with the common good of humankind, including through jointly developed technology and intellectual property rights (IPR) sharing.

The Plan will also define specific policies, actions and funding requirements for all relevant technologies, classified as follows: (1) In relation to *public domain technologies*, it will establish a system for international cooperation to ensure that the needs of developing countries are met through the lowest-cost technology options, and to transfer know-how about how to use and maintain technologies and adapt them to local conditions, thereby contributing to the development of endogenous technologies.

(2) In relation to *patented technologies*, the Technology Action Plan will ensure that privately owned technologies are available on an affordable basis including through measures to resolve barriers posed by intellectual property rights, and through compulsory licensing of patented technologies. Technologies with shared ownership (government and private) will be made available on an affordable basis by facilitating transfer of the government proportion on a reduced or no-cost basis. Technologies that are government owned will be made available on an affordable basis by facilitating transfer on a reduced or no-cost basis.

(3) In relation to *future technologies* the Plan will support the establishment of national and regional technology excellence centers and will reinforce north-south, south-south and triangular cooperation, including in the area of joint research and development.

Besides this G77 and China proposal, many developing countries have also spoken up individually at the UNFCCC on the technology issue. Specifically on the issue of IPRs, several countries including Cuba, India, Tanzania, Indonesia and China have stressed the need to address the IPR issue within context of technology transfer.

At the UNFCCC meeting in Bonn in July 2008, Brazil called for the establishment of a “coherent and comprehensive” instrument for technology development and transfer i.e. a “Technology Protocol” under the UNFCCC. In relation to patented technologies, Brazil proposed a public multilateral fund for purchasing licenses with a view to facilitate transfer. In this context it also

²⁹ This proposal has been effected with the decision at the Conference of the Parties (COP) in Cancun to establish a technology mechanism with a technology executive board as one of its components.

stressed the need to consider using compulsory licensing as well as emerge with a Declaration similar to the Doha Declaration on TRIPS Agreement and Public Health.

India was of the view that the full potential of technology will require mechanisms across all stages of technology cycle which is not just a question of transfer alone, but also of generating new technologies as well as research, development and deployment.³⁰ It stated that in the area of new technologies, the transfer of technology and know-how should be aided by a suitable IPR regime. Technologies owned by the private sector in developed countries could be compensated by their governments for their transfer and deployment in developing countries. On accelerating technology development, India proposed joint development with IPR sharing, adding that global financing arrangements require global public procurement of IPRs to ensure the affordability of the products and services.

Pakistan stated that the IPR regime facilitates technology development by rewarding the inventor, but at the same time it provides monopoly pricing power which acts as a barrier to its diffusion.³¹ Consequently, measures are vitally needed to remove these barriers to technology transfer. It proposed: (1) An international system or agreement on compulsory licensing for climate-friendly technologies along the lines of what was undertaken in the health sector; (2) Joint technological or patent pools, transferring technologies to developing countries at low cost; (3) Reduction of the period for patents on climate-friendly technologies; (4) Provision of incentives (tax exemption, subsidies, etc) for technology owners so that they can put in place a system of differential pricing, in which developing countries are charged lower prices.

At the UNFCCC talks in Poznan³² in December 2008, South Korea said that there was a need for fundamental change in policies on IPRs and R&D. “The present regime does not integrate climate change as a goal. IPR is purely to protect the private interest of companies. How can IPR work for climate change? IPR currently is working for the profit of the private sector,” South Korea said. It further added that government intervention was necessary for change in public policies in this regard.

China stressed the need for change and for a new ideal institution that removes barriers and other negative market forces so as to enable technology transfer, adding that there was a need to find a way to share IPRs in technology development and research. It reiterated its proposal for a Multilateral Technology Acquisition Fund to support regional and national R&D in developing countries.

In sessions of the UNFCCC in Bonn in June 2009, the G77 and China submitted a proposal specifically on IPRs, which was included in the compilation of the texts proposed by various Members. The G77 and China proposals are that:

Specific measures shall be established to remove barriers to development and transfer of technologies from the developed Parties that have commitments under the Convention to

³⁰ Raman (2008).

³¹ Raman (2008).

³² For reports on statements in Poznan, see TWN (2009b).

transfer environmentally sound technologies to developing country Parties arising from intellectual property rights (IPR) protection, including:

- (a) All necessary steps shall be immediately taken in all relevant fora to mandatorily exclude from patenting climate-friendly technologies held by Annex II countries which can be used to adapt to or mitigate climate change;³³
- (b) Creation of a “Global Technology Pool for Climate Change” that promotes and ensures access to technologies that can be used to adapt to or mitigate climate change and associated know-how and trade secrets to developing countries including on non-exclusive royalty-free terms in order to provide better information service and reduce transaction costs.³⁴

The Philippines submitted the following proposal:

- All necessary steps shall be immediately taken in all relevant fora to mandatorily exclude from patenting environmentally sound technologies which can be used to adapt to or mitigate climate change.
 - Biological resources including microorganisms, plant and animal species and varieties, and parts thereof that are used for adaptation and mitigation of climate change shall not be patented.
 - Specific measures shall be taken and mechanisms developed to remove existing barriers to development and transfer of technologies from developed to developing country Parties arising from intellectual property rights (IPR) protection, including:
 - (i) to use to the full flexibilities contained in the Trade Related Aspects of Intellectual Property Rights (TRIPS) including Compulsory licensing to access intellectual property protected technologies;
 - (ii) take steps to ensure sharing of publicly funded technologies and related know-how, including by making the technologies available in the public domain at an affordable price and on terms and conditions that promotes access for developing countries;
 - (iii) creation of a “Global Technology Pool for Climate Change” that promotes and ensures access to intellectual property protected technologies and associated know-how to developing countries including on non-exclusive royalty-free terms;
 - (iv) adoption of a Declaration on IPRs and Environmentally Sound Technologies in relevant fora to, inter alia, reaffirm the flexibilities in the TRIPS Agreement and enhance the enabling environment for implementing these flexibilities.³⁵
4. All necessary measures and actions shall be immediately taken to facilitate technology pools that include associated trade secrets and know-how on environmentally sound technologies and enable them to be accessed, including on royalty-free terms for developing countries.³⁶

³³ As reflected in UNFCCC document 'Notes on sources for FCCC/AWGLCA/2009/INF.1, Parts I and II', page 184.

³⁴ Ibid, page 184.

³⁵ Ibid, page 185.

³⁶ Ibid, page 185.

Bolivia also submitted a similar proposal as follows:

Specific measures shall be taken and mechanisms developed to remove barriers to development and transfer of technologies from developed to developing country Parties arising from intellectual property rights (IPR) protection, in particular:

- (a) Parties agree that nothing in any international agreement on intellectual property shall be interpreted or implemented in a manner that limits or prevents any Party from taking any measures to address adaptation or mitigation of climate change, in particular the development and transfer of, and access to technologies;
- (b) Immediately to take all steps necessary in all fora to mandatorily exclude from patenting in developing countries environmentally sound technologies to adapt to or mitigate climate change, including those developed through funding by governments or international agencies;
- (c) Immediately to take all steps necessary in all fora to revoke in developing countries all existing patents on essential/urgent environmentally sound technologies to adapt to or mitigate climate change;
- (d) Immediately to take all necessary measures to facilitate technology pools that includes trade secrets and associated know-how on environmentally sound technologies and enable them to be accessed on royalty-free terms, for developing countries;
- (e) Immediately to create and provide new and additional financing that is adequate, predictable and sustainable for joint technology excellence centres in developing countries, to enable entities in these countries to do research and development especially on adaptation as well as mitigation technologies;
- (f) Immediately to ensure that any technology transfer to developing countries is appropriate for the developing countries concerned in order to enable its effective utilization.³⁷

During the Barcelona Climate talks in November 2009, Bolivia, Bangladesh and India jointly submitted textual proposals on IPRs to the Chairs of the informal drafting group on technology for inclusion into the negotiating draft text on technology. The proposals include a call for Parties to take the necessary steps in all relevant forum to exclude from IPR protection and to revoke existing IPR protection in developing countries and LDCs on ESTs; setting up a Global Technology IPR pool for Climate Change, taking steps to ensure sharing of publicly funded technologies and related know-how, reaffirming developing countries' right to make use of the full flexibilities contained in the TRIPS Agreement.³⁸

Repeated attempts were made during the Copenhagen climate negotiations in December 2009 to eliminate these proposals from the text. However the same proposals are contained in the draft

³⁷ Ibid, pages 185-186.

³⁸ See Non-paper No. 47 (paragraphs 9bis, 10bis, 10bis1, 10bis2 & 10bis3) containing the draft text on Enhanced Action on Development & Transfer of Technology produced at the Barcelona Climate Talks, available also at http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/awglcattnp47061109.pdf .

decision on technology, Annex D of the Report of the Ad Hoc Working Group on Long Term Cooperative Action under the Convention.³⁹

In Copenhagen, the G77 & China also included “Address issues related to intellectual property rights as they arise” as one of the functions of the Executive Body that it proposed to set up.

In contrast, developed countries insist on maintenance of status quo with regard to IPRs. In Copenhagen and in the negotiations prior to that, developed countries taking the cue from the US, took the position that IPRs simply cannot be mentioned in any outcome on technology.

While the developing countries have advocated new technology mechanisms in the UNFCCC framework and called on “thinking outside the box” on IPRs, the developed countries inside the UNFCCC by contrast have generally continued to maintain that respect for a strong IPR regime is necessary for innovation and for the transfer of technology to developing countries. The proposals above have not been acceptable to the US or EU, which deny that IPRs constitute a barrier to technology transfer. For the developed countries, which own most of the patents on climate-related technologies, maintaining the normal situation regarding IPRs is a matter of having advantage in economic competitiveness. Business associations in developed countries have demanded that their governments do not make concessions on IPRs in the climate negotiations. The US House of Representatives has adopted three bills that contain provisions that condition US participation in any global climate deal and any provision of funding for climate-related purposes to robust compliance and enforcement of existing international legal requirements for the protection of IPRs (Shashikant, 2009a). This could be one reason why the US delegation had been asking that IPR issues be taken off the table in the UNFCCC climate talks.⁴⁰

³⁹ See FCCC/AWGLCA/2009/17.

⁴⁰ The US position was presented at the climate talks in Bonn in August 2009 and reported in TWN 2009a.

VI. THE IPR ISSUE AT THE CANCUN CONFERENCE OF PARTIES (2010) AND AFTER

At the UNFCCC meeting in Cancun in December 2010, a significant setback was suffered by developing countries, due to drawing up of a final text of the decision of the Ad hoc Working Group on Long-term Cooperative Action (AWG-LCA), that excluded even the mention of the term “intellectual property”. Till today, it is not publicly known who drafted the final COP text, nor through which process. The text was gaveled as adopted by the President of the COP, the Minister of Environment of Mexico, overriding the objection of the Bolivian delegation. The total exclusion of the IP issue was a surprise to developing country delegations. When the Cancun conference began, the options placed by the G77 and China as well as some individual developing countries were still in the drafts on the technology issue. In the final days, negotiations led by facilitators produced an informal document that was circulated and discussed in which a range of text options was given, including that the IPR issue would continue to be discussed in the AWG-LCA; that the issue would be referred to other organizations (understood to be such as the World Intellectual Property Organization (WIPO)) for their opinion; and that it would not be mentioned at all in the final text. Some developing country delegations advocated stronger language that would refer to IP in the context of affordable access to technology when the discussion on the issue resumed, and fought against the issue having to be referred to other organizations. They did not expect the issue to be dropped altogether from the text, a demand that had been led by the United States.

Following the Cancun conference, some developing countries, led by India, sought to place the IPR issue back onto the UNFCCC’s AWG-LCA negotiating agenda. In June 2011 during the session of the UNFCCC’s AWG-LCA in Bonn, the Indian government submitted a proposal to the Secretariat to include IPRs and two other issues (unilateral trade measures and equitable access to sustainable development) for inclusion in the provisional agenda of the 17th COP to be held in Durban in November-December 2011.⁴¹ These issues had not been properly addressed in the 2010 Cancun decision on the outcome of the Ad-hoc Working Group on Long-term Cooperative Action under the Convention (decision 1/CP 16) despite being raised by India and a large number of developing countries prior to and in Cancun.

Developed countries, especially the United States, are of the view that these issues have been settled in Cancun. However, most developing countries are of the view that not all the issues were addressed in Cancun and are still unresolved, and therefore it is legitimate to be brought up as they are part of the Bali Action Plan elements.

Regarding the IP issue, the Indian proposal is for the inclusion under the agenda item ‘Development and transfer of technologies’, of a sub-item on ‘Mitigation and adaptation actions and technology related Intellectual Property Rights’.

On the intellectual property rights (IPRs) issue, the Indian explanatory note states: “At Cancun, Parties to UNFCCC agreed to set up a Technology Mechanism and Networks of Climate

⁴¹ Meena Raman, “India proposal on neglected issues for Durban discussions raises controversy”, *TWN Bonn News Update* (22 June 2011).

Technology Centres with a view to promote cooperation amongst Parties for development and transfer of technologies. While the Technology Mechanism will help build capacity for deployment of existing technologies and dissemination of environmentally sound technologies, there is a need to augment this arrangement in form of removal of constraints at the global level on the development and availability of climate friendly technologies. An effective and efficient global regime for management of (IPRs) of climate friendly technologies is critical to the global efforts for development, deployment, dissemination and transfer of such technologies. In the absence of such an arrangement, the objective of advancing the nationally appropriate mitigation and adaptation actions at the scale and speed warranted by the Convention cannot be met effectively and adequately. Such a regime should promote access to (IPRs) as global public good while rewarding the innovator and enhance the capacity of developing countries to take effective mitigation and adaptation actions at the national level. Conference of Parties should urgently decide on addressing the issue of treating and delivering climate technologies and their IPRs as public good in the interest of the global goal of early stabilization of climate and advancing developing country efforts aimed at social and economic development and poverty eradication.”

Developing countries in general supported the Indian proposal, and resisted an attempt by developed countries to delegate the issue whether it should be on the agenda of the COP17 to a subsidiary body.

However, several developed countries including Australia, the US, the European Union, Canada and Mexico appeared to be opposed to the issues raised by India to be included in the Durban agenda. The US said it was opposed to the issues on the agenda, which “have been contentious in the process” and had been discussed in Copenhagen and Cancun and there has been no agreement, and no prospects for any agreement on these issues. On the issue of intellectual property rights (IPRs), the US said that there was a mistaken impression that strong IPRs are a barrier for clean technologies when IPRs are a foundation for technology transfer.

The three issues were included among a list of possible elements of the provisional agenda for the COP 17, that was in an addendum to a background note by the UNFCCC Executive Secretary on arrangements for intergovernmental meetings. However there was a battle to keep these issues on the agenda. Developed countries strongly supported a footnote that stated that these elements will be amended as appropriate. Following strong reactions from developing countries, the footnote was deleted and the possible elements of the provisional agenda for COP 17 (which included the issues from the Indian proposal) were put in an addendum to the background note by the UNFCCC Executive Secretary on arrangements for intergovernmental meetings without the footnote. This means that the issues will be on the provisional agenda of the COP in Durban, but another fight to retain or remove these issues could take place when the agenda is put up for adoption at the COP.

VII. ESTABLISHMENT OF A TECHNOLOGY MECHANISM: CANCUN AND AFTER

The Cancun decision on Technology Mechanism

At Cancun (December 2010), the UNFCCC's AWG-LCA in Cancun decided to establish a Technology Mechanism under the guidance of the COP which will consist of two components: (a) a Technology Executive Committee (TEC); and (b) a Climate Technology Centre and Network (CTCN).

Having two components to the Technology Mechanism came about as a compromise during the negotiations. The developing countries had initially only advocated a technology policy council. The United States had reservations about this, and proposed instead the establishment of a technology centre and network. As a result of negotiations, it was agreed that the two would become components of a Technology Mechanism. The negotiations continue as to the relationship between the two components, with the developing countries preferring that the Centre and Network be under the guidance or authority of the policy committee. The implication is that the Committee would make decisions on policy matters, including on the operations of the Centre/Network. The US however preferred that the two components be autonomous (in terms of lines of authority) from each other.

The COP also decided that the TEC shall further implement the framework for meaningful and effective actions to enhance the implementation of the Convention's Article 4.5 (which addresses technology transfer and development of endogenous capacities and technologies of developing countries).

The COP decision stated that the priority areas that could be considered under the Convention may include: development and enhancement of the endogenous capacities and technologies of developing country Parties; deployment and diffusion of environmentally sound technologies and knowhow; increased public and private investment for technology; employment of soft and hard technologies for adaptation and mitigation actions; improved climate change observation systems and related information management; and strengthening of national systems of innovation and technology innovation centres; and development and implementation of national technology plans for mitigation and adaptation.

The COP agreed on the TEC's functions, including to provide an overview of technological needs and analysis of policy and technical issues related to the development and transfer of technologies for mitigation and adaptation; recommend actions to promote technology development and transfer; recommend guidance on policies and programme priorities related to technology development and transfer; promote collaboration between governments, the private sector, nonprofit organizations and academic and research communities; recommend actions to address the barriers to technology development and transfer; cooperate with relevant international technology initiatives, stakeholders and organizations; and catalyse technology road maps or action plans at the international, regional and national levels.

On the Climate Technology Centre, it was decided it shall facilitate a network of national, regional, sectoral and international technology networks, organizations and initiatives, and network in functions including:

- At the request of a developing country, to provide advice and support to identifying technology needs and implementing environmentally sound technologies, practices and processes; to strengthen capacity of developing countries to identify technology options, make technology choices and operate, maintain and adapt technology; and facilitate prompt action on the deployment of existing technology in developing countries.
- Stimulating and encouraging the development and transfer of existing and emerging environmentally sound technologies, as well as opportunities for North–South, South–South and triangular technology cooperation.
- Facilitating a network of national, regional, sectoral and international technology centres, networks, organization and initiatives with a view to enhancing cooperation with technology centres and relevant national institutions; facilitating international partnerships among public and private stakeholders; providing in-country technical assistance and training to support technology actions; stimulating twinning centre arrangement to encourage cooperative research and development; developing analytical tools, policies and best practices for country-driven technology dissemination planning.

The COP also mandated further work by the AWG-LCA to make the Technology Mechanism fully operational in 2012. The work includes dialogue on (a) The relationship between the Technology Executive Committee and the Climate Technology Centre and Network, and their reporting lines; (b) The governance structure of and terms of reference for the Climate Technology Centre and Network and how the Climate Technology Centre will relate to the Network, (c) The procedure for calls for proposals and the criteria to be used to evaluate and select the host of the Climate Technology Centre and Network; (d) The potential links between the Technology Mechanism and the financial mechanism; (e) Consideration of additional functions for the Technology Executive Committee and the Climate Technology Centre and Network.

Developments on the Technology Mechanism after Cancun

Technology Executive Committee

The Technology Executive Committee held its inaugural meeting on 1-3 Sept. 2011 in Bonn.⁴² The Committee was mandated by the COP in Cancun to have 20 members, 9 from Annex I countries and 11 from developing countries (3 members each from the 3 developing regions, 1 member from a small island state and 1 member from the LDCs). The countries represented at the Committee are the United States, Germany, Finland, Japan, Poland, Ireland, Australia, Ukraine, Turkey, Sudan, Algeria, Kenya, China, Kazakhstan, Argentina, Ecuador, Bahamas,

⁴² The information on this TEC meeting comes from Meena Raman, “Technology committee concludes meeting with compromise”, *TWN Climate Info* (6 Sept. 2011).

Jamaica and Haiti. It was announced by the Secretariat that the nomination of one representative from Asia was still pending with Iran and the United Arab Emirates still in consultations to determine which one of them would be a member of the Committee.

Much of the time of the first meeting was spent on deciding the Chair and Co-Chair. Eventually a compromise was reached between developed and developing countries that the chair and vice-chair of the Committee "will collaborate in chairing the meetings and in executing the work of the Committee so as to ensure coherence between the meetings." It was then agreed that Mr. Gabriel Blanco of Argentina would be the TEC's first chair and Mr. Antonio Pfluger of Germany the vice-chair. This compromise was reached following an intense exchange on whether the chair should be from a developed or developing country. It was also agreed that after the completion of the term of the chair (for 1 year), the chair will be nominated as vice-chair and vice-versa and after the two year cycle is complete, the TEC will put forward two new nominees, unless otherwise decided.

The meeting also made progress on elaborating the modalities and procedures of the Committee, which will be subject to final review by TEC members. Six main elements of the modalities were agreed to for elaboration based on the functions of the TEC: (1) analysis and synthesis; (2) policy recommendations; (3) facilitation and catalyzing; (4) linkage with institutional arrangements under the Convention; (5) engagement with stakeholders; and (6) information and knowledge sharing.

Among the main issues that saw an intense exchange were the intellectual property rights (IPRs) and the relationship of the TEC to the Climate Technology Centre and Network (CTCN).

On the issue of IPRs, Kazakhstan wanted this issue included so that the Committee could perform its function of providing an overview of the technological needs and analysis of policy and technical issues. This was supported by China, Ecuador, Kenya and Algeria. China said that the issue of IPRs in addressing technology development and transfer could not be avoided. IPRs could be seen as an incentive for technology innovation but it could also be a barrier for developing countries especially in relation to new technologies. It added that no one could say that IPRs are not a barrier. It was an issue that needed to be addressed by the TEC, as this was the body to discuss policy recommendations.

Japan, Germany and the United States raised strong objections to having any reference to the issue of IPRs in the document elaborating the modalities of the TEC. Japan said that "the talking of IPRs by the TEC is not mandated and is under heavy negotiation". He said that neither the TEC nor the UNFCCC was the right body for setting rules on IPRs and it was for other bodies like WIPO (World Intellectual Property Organization) to do so. The US said that IPRs are not a barrier to technology diffusion and transfer and supported Japan. Germany said that a lot of technology transfer takes place without IPRs and where this was an issue, arrangements could be found to deal with it. He also said that the TEC had no mandate to address the issue. He proposed that there was no need to have specific mention of IPRs in the modalities document but when members dealt with a specific technology, this issue could be addressed.

In response, Sudan suggested that instead of directly mentioning IPRs, this issue could be discussed in relation to addressing the barriers to technology transfer. This compromise was eventually agreed to.

On the issue of the CTCN, Japan raised concerns that the modalities document frequently mentioned the CTCN although the role of the CTCN had yet to be clarified and was pending negotiations. Turkey also said that the relationship between the TEC and CTCN was still not clear, questioning if the TEC was going to be purely advisory, having no implementation role. He said that if the TEC was purely advisory, it would not have real effect. Australia was of the view that the relationship between the TEC and the CTCN should be one of information exchange.

According to Finland, the Cancun decision makes clear the functions, mandate and separate roles of the CTCN and the TEC. The TEC is serving the Conference of Parties and is a strategic body, while the CTCN will be serving countries and is the operative arm of the Technology Mechanism. It said that TEC members should be able to talk about policy, finance and the CTCN. The TEC should be looking at what the CTCN is doing and what money is going to technology, as it was the role of the TEC to provide guidance and advice. It added that the TEC has no money, while he expects the CTCN to have money and dedicated experts to respond to the requests of countries for advice.

Jamaica, representing the Small Island Developing States (SIDS), raised the issue of technology assessment and wanted the modalities to include the production of technical papers on this matter. There was no objection to this.

A draft report of the Committee also listed elements of a “rolling work plan” for 2012-2013. This would include (a) conducting a periodic technology outlook to collect information and examining policy implications and opportunities to advance international support for technology development and transfer; (b) to identify and establish collaboration with international technology initiatives and organizations; and (c) to initiate work on technology road maps and action plans. However this report was not yet adopted and will be further discussed by the members.

It was agreed that the document on the modalities and procedures of the TEC will be reviewed by members via electronic means and that there would be no further meetings this year.

Climate Technology Centre and Network (CTCN)

A workshop was held just prior to the AWG-LCA meeting in Bangkok on 4-5 April 2011 to discuss how to operationalise the Technology Mechanism (TM). Several issues raised were focused on the Technology Centre and Network.⁴³ There appeared to be convergence at the workshop that the CTCN has to operate on the basis of a country-driven process.

⁴³ Information on the workshop is from Meena Raman, “Country-driven approach key in technology transfer mechanism”, *TWN Climate Info Service* (9 May 2011).

The Chair of the workshop, Mr. Uosukainen of Finland, in his report on the workshop, said the Parties in 2011 would have to define the following:

- (i) the terms of reference and governance structure for the CTC&N;
- (ii) the criteria and selection procedure for the host of the CTC&N;
- (iii) the relationship between the TEC and the CTC&N to ensure coherence, and the reporting lines of these two bodies within the Convention;
- (iv) how Parties are going to finance the TM; and
- (v) how the TM is going to interact with other parts of the international climate change architecture in the most efficient and effective way.

According to Uosukainen, many participants emphasised the need for a prompt start to the TM and suggested that the CTC&N could start small and be flexible so that it can grow over time in response to the needs from developing countries.

On the governance and Terms of Reference (TOR) of the CTC&N, Uosukainen said that participants generated many ideas on how to achieve both accountability and a flexible and innovative CTC&N that is responsive to the needs of Parties and is responsible to the Convention.

Another key point he noted was the role of national institutions in relation to the CTC&N to ensure a country-driven approach and to build in-country capacity over the long term.

On the procedures for the selection process for the host of the CTC&N, he said that participants emphasised the need for transparency and for a well defined set of criteria. He added that participants suggested specific ideas for a list of criteria that will be useful to discussions in the more formal setting of the AWG-LCA.

On the relationship between the TEC and the CTC&N, Uosukainen said that there were different views on the role of the TEC in guiding or governing the CTC&N. He said that participants emphasised the importance of achieving a coherent TM.

On the issue of financing the TM, he said that all participants emphasised the need to ensure adequate and stable financial support for the operations of the TM, including for the services that would be provided by the CTC&N. There was a need to identify sources of finance in the short term for the prompt start of the TM, as well as long-term sources that will allow it to grow and develop in response to the needs of Parties, he said further. The question of whether there should be a specific funding window for technology development and transfer was also discussed, he said.

On the links between the TM and other parts of the UNFCCC climate change architecture, Uosukainen said that participants were of the view that the TM would be an important part of the international climate change architecture that would need to interact with all other components, particularly the bodies supporting adaptation, mitigation and finance.

India, in reflecting on the various presentations from Parties said that it saw convergence emerging on the following matters: (i) the need for a country-driven process with developing

countries setting out their own needs; (ii) the CTC being an enabling centre which receives requests from Parties and is in touch with a team of experts, and be located in an existing institution and there is a group who will be in it, with a CEO; (iv) when services are provided, these are provided by teams of service providers in the Network who can be drawn from a certain number of organizations which can put together a team. India said that there was a good discussion on some issues although there was no convergence and identified 3 such issues: (i) the size of the CTC; (ii) governance of the CTC and attention is needed on the issue of transparency of the governance process and its responsibility to the COP; and (iii) the vexed issue of intellectual property rights (IPRs) and how to address this. It said that there was need to establish a process on how to move on the IPR issue.

A brief account of the presentations by various Parties is in Annex 3.

On the closing day of the UNFCCC Bonn session, on 16 June 2011, a Note on Technology development and transfer was issued by the Facilitator of this issue, Mr. Jukka Uosukainen, of Finland.

The Note, issued under his own responsibility, contains draft elements of possible arrangements to make the Technology Mechanism fully operational in 2012. It is not a negotiated text nor does it represent the views of the members. Its stated aim is to facilitate further discussion, starting at the UNFCCC session in Panama in October 2011.

The note contains (1) elements of the governance structure and terms of reference for the Climate Technology Centre and Network; (2) procedures for call for proposals and criteria to be used to evaluate and select the host of the CTCN; (3) relation between the TEC and the CTCN and reporting lines; and (4) links between the Technology Mechanism and the financial mechanism and other institutions under the Convention.

Of significance is the proposal by the facilitator for the procedure to select the host institution for the Climate Technology Centre and Network. Among the proposed criteria for selecting the host, are (1) suitability and strength of the proposed governance and organizational arrangements and delivery mechanisms to carry out the mandate of the CTCN; (2) demonstration of long-term commitment to host the CTCN; (3) strong institutional capability; (4) institutional characteristics (including ability to operate the CTCN in line with the norms and values of the UN); (5) task performance capability; and (6) value for money.

Regarding relation between the TEC and CTCN, the Note states that Parties agree on the need for both components of the Technology Mechanism to work together and have synergy, and that the two bodies can interact regularly. However it also notes that Parties have differing views on the role of the TEC in governing the CTCN. Some Parties see no governing role for the CTC. Others are of the view that the TEC can undertake governance tasks for the CTCN by providing policy and strategic guidance and by reviewing the performance of the CTCN, and that other governance tasks could be undertaken by the host institution or by a separate governing body. Not mentioned in the Note, but mentioned by several developing countries in the Bangkok workshop, was that the TEC should be the governing body of the CTCN.

These issues will continue to be discussed at the UNFCCC session in Panama (October 2011) and at Durban. It is expected that several reports will be presented and several decisions will be taken at the COP in Durban (December 2011).

VIII. THE TREATMENT OF SUBSIDIES

Another concern of many developing countries is that some developed countries have been providing their companies with major subsidies for the research and development (R&D) of environmentally sound technologies. This puts developing countries at a disadvantage, especially since they lack the financial resources to match the developed countries' subsidies.

Developing countries have also been concerned that government subsidies for research and development had been designated as “non-actionable subsidies” (meaning they are permitted) in the WTO's subsidies agreement, thus enabling countries with the resources to provide enormous subsidies to their enterprises and to give them a competitive advantage, while most developing countries do not have the resources to provide R&D in significant amounts. This designation expired in 2000. However, while R&D subsidies are no longer allowed when limited to specific enterprises, they are allowed if given to industries across the board.

Developing countries have been unable to compete with regards to R&D grants because of their lack of funds, and are also constrained due to the WTO rules from using many other types of subsidies that were used by developed countries when they were in their development phase. An even bigger imbalance is that agricultural subsidies are exempted from the strict rules of the subsidies agreement, and much more lenient treatment is provided to this sector, allowing developed countries to continue to maintain hundreds of billions of dollars of agricultural subsidies each year.

However a complaint has been taken at the WTO by the USA against a developing country (China) for subsidies provided to resident companies producing wind energy. This demonstrates how the subsidies agreement has considerably reduced the policy space of developing countries on the types of subsidies they are able to provide. The complaint taken against China may create an atmosphere of uncertainty to developing countries seeking to promote climate friendly industries and technologies. Meanwhile, many developed countries provide research and development grants to their companies, the total running into billions of dollars. It is not so clear to many developing countries what kinds of subsidies are permitted and what are prohibited and “actionable”. It appears that many types of subsidies used by developed countries during their development phase are now unable to be used by developing countries in the industrial sector. However, many subsidies are still allowed in agriculture, and these are used mainly by developed countries, which is another imbalance.

In fact, developing countries have proposed that they be given an exemption on some of the prohibited subsidies, including on environmental grounds. As part of the documents that launched the current Doha negotiations, the proposal of developing countries to expand the list of non-actionable subsidies for them was included for consideration.⁴⁴ The decision taken by the WTO's 2001 Doha Ministerial Conference was to “take note of the proposal to treat measures implemented by developing countries with a view to achieving legitimate development goals, such as regional growth, technology research and development funding, production diversification and development and implementation of environmentally sound methods of production as non-actionable subsidies.” It agreed that the issue be addressed as an outstanding

⁴⁴ This decision is contained as para. 10.2 in WTO (2001b).

implementation issue, and added: “During the course of the negotiations, Members are urged to exercise due restraint with respect to challenging such measures.” As the Doha negotiations are still proceeding, the “due restraint” clause is still in place. This proposal should be taken seriously.

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ANNEX I

SOME KEY UNFCCC PROVISIONS RELEVANT TO TECHNOLOGY TRANSFER

Article 4.1: “All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall:”

Article 4.1 (c): “Promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol in all relevant sectors, including the energy, transport, industry, agriculture, forestry and waste management sectors.”

Article 4.1 (h): “Promote and cooperate in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to the climate system and climate change, and to the economic and social consequences of various response strategies.”

Article 4.3: “The developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12, paragraph 1.....including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of implementing measures that are covered by paragraph 1 of this Article and that are agreed between a developing country Party and the international entity or entities referred to in Article 11, in accordance with that Article. The implementation of these commitments shall take into account the need for adequacy and predictability in the flow of funds and the importance of appropriate burden sharing among the developed country Parties”.

Article 4.5: “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 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.”

Article 4.7: “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.”

ANNEX 2

TECHNOLOGY TRANSFER IN THE BALI ACTION PLAN⁴⁵

The Bali Action Plan launched “a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action,” by addressing, inter alia:

“(d) Enhanced action on technology development and transfer to support action on mitigation and adaptation, including, inter alia, consideration of:

(i) Effective mechanisms and enhanced means for the removal of obstacles to, and provision of financial and other incentives for scaling up of the development and transfer of technology to developing country Parties in order to promote access to affordable environmentally sound technologies;

(ii) Ways to accelerate deployment, diffusion and transfer of affordable environmentally sound technologies;

(iii) Cooperation on research and development of current, new and innovative technology, including win-win solutions;

(iv) The effectiveness of mechanisms and tools for technology cooperation in specific sectors;”

⁴⁵ See UNFCCC Decision 1/CP.13 available at http://unfccc.int/documentation/decisions/items/3597.php?such=j&volltext=/CP.13#beg_.

ANNEX 3: VIEWS OF SOME UNFCCC PARTIES ON THE STRUCTURE AND OPERATION OF THE TECHNOLOGY MECHANISM (AS REPORTED AT THE UNFCCC WORKSHOP ON THE TECHNOLOGY MECHANISM IN APRIL 2011 IN BANGKOK)⁴⁶

The United States (represented by Jonathan Pershing) said the CTC&N could help developing countries identify and implement technology projects strategies to enhance low emission climate-resilient development. It was not to do basic research or provide money or allocate intellectual property but to draw from others.

The CTC&N could be a significant new avenue for technical assistance in identifying and securing appropriate technologies. In this regard, it could be the first stop for technology information, analysis tools, best practices and ideas on financing options. It can help in identifying technology needs and options as well as policy barriers based on country requests. It could also provide access to a global network of regional and sector experts for knowledge sharing to build capacity and knowledge.

On the tools to deliver results, the US said that there could be expert team responders drawn from the Network of institutions both in developed and developing countries and support in-country visits and provide capacity building for project or policy proposals for example on feed-in tariffs or solar panels. There could be trainings which could be country, region or issue specific.

There could also be identification of funding through the use of the CTC&N financial and business planning expertise to advise on how to structure project finance or programmes. The eventual goal is for the CTC&N “stamp” to enable funders to know that the project/programme has been vetted.

It said that they were many models for the structure to work but it should be results-oriented, cost-effective and efficient. Among the considerations could be: (i) for the centre to play a coordinating role, matching requests to right parts of the Network; (ii) a single centre or regional but should not be too many; (iii) for the Network to undertake most of the substantive work; (iv) the Network is arranged in sectoral areas such as in renewable (energy), efficiency, water, agriculture, etc. and (v) the private sector and academia could have an important role in the Network.

The US gave an example of the CTC&N in action. A country contacts the CTC with request for assistance in securing a type of project or policy. If accepted, a case manager is assigned to help ensure transparency and responsiveness. The CTC works with the country to develop a work-plan and timeline; define the project scope; identify the Network team and consult with stakeholders.

Dr. Ajay Mathur (India) said that the CTC has 3 functions viz. to stimulate technical development and transfer; provide technical assistance and facilitate and establish networks. A developing country makes a request to the CTC for e.g. to develop a project for installation of

⁴⁶ This Annex is based on a report on the workshop in Meena Raman (2011a), “Country-driven approach key in technology transfer mechanism”, *TWN Climate Info Service* (9 May 2011).

renewable energy. This could involve project preparation, capacity building or innovation or encompass all 3 aspects.

The Centre will ask a group of experts to respond to the request which is a Network to provide services. The Network is self-organised and could be at the country, regional or international level. The Network needs a hub or a coordinator which draws on various experts including regional experts, sectoral experts, industry experts and financial experts.

Initially, no networks exist. The CTC will need to facilitate the establishment of networks that respond to country requests. The developing country partners need to provide early intimation of the kinds of requests and of the volume of requests. The CTC may assess the feasibility of the requests and prioritise requests. The CTC may, through a transparent process, invite, evaluate and select a consortia/network that meets the requests. Future requests may be directed to the appropriate network.

In the selection of the CTC, India said that there was need to ensure experience in technology development and transfer, innovation in technology and business models, collaborative actions and project management. It must have the capability to host the CTC in terms of office space, expatriate staff and logistic support and provide access to technical, human and financial resources. There must be willingness for long-term commitment as well as financial, infrastructural and human resource support. There must be ease of travel and connectivity and should preferably be in a developing country.

On the activities of the CTC, India said that it should receive developing country requests for technology development and transfer, and identify the appropriate network to respond to the requests. It must stimulate collaboration with a range of institutions for technology development and transfer. It must enable learning and transfer of experience and knowledge as well as manage the request-response process and facilitate the necessary funding to enable timely implementation by the appropriate network.

On the governance structure, the CTC should have a governing body of senior technical experts drawn from various countries (both developed and developing), elected by Parties. The governing body will provide policy on issues such as prioritization, operational criteria and guidelines, human resource policies, response to requests, timelines and appropriateness of response and budget, resources, audit etc. The TEC could be the governing body of the CTC.

In relation to the financing of the CTC&N activities, the core funding could come from the Green Climate Fund, the host country/institution and other donors. The activity funding could also come from the Climate Fund as well as from donors, host country and the private sector.

Tomasz Chruszczow for the **European Union** said that it envisioned the CTC as being light with a small team with a clear and effective structure and is cost efficient and able to undertake administrative support. CTC is to be small compared to the Network and should only play the facilitator role, with a country-driven approach being assured.

The Network should be as flexible as possible, facilitating a project/country driven approach based on ‘national circumstances and priorities’.

For the EU, the terms of reference (TOR) of the CTC should focus on how to facilitate the Network and manage information; collect and maintain information on the Network members; collect and receive nominations; set up and maintain database, web-based networking and registration tools; seek memberships amongst relevant existing organizations; promote and stimulate cooperation between the members of the Network; information and reporting on activities; engagement with Network members and disseminate information on Network members.

The key role of the Network is to advice and provide support for identifying technology needs and implementing technologies on the ground; support networking and capacity building for developing countries; stimulate technology development and transfer e.g. through public and private collaboration at all levels; disseminate good policies and best practices for technology planning and diffusion. The Network should be open to applications and draw from existing public and private institutions; help improve the quality of projects to make them more fundable; and make information available for the identification of potential funding sources, as appropriate.

The EU stressed the need for a country-driven action based on national circumstances and priorities. It said that the CTC catalyzes action in developing countries by facilitating information and access to a network of organizations and initiatives; connects institutions and makes information available on them.

On the selection process of a host for the CTC, the EU said that the process should be open, transparent, fair and neutral and the host should inter alia demonstrate expertise and knowledge of technological processes. The EU expressed the preference of the CTC as an intergovernmental institution within the UN system.

As regards the link between the TEC and the CTC, the EU said that both these institutions are to promote coherence and synergies in relation to technology transfer. The CTC facilitates access to a Network and shall operate independently within its TOR and take into account the strategic guidance provided by the TEC. The CTC and the TEC will report on an interim basis to the subsidiary bodies of the UNFCCC and the TEC recommendations are to be provided directly to the COP, which decides which recommendations it will take into account.

In reference to some developing countries calling for the CTC to be under the TEC, the EU said that the TEC and CTC are in “different worlds” and there is no hierarchy between them.

In relation to the TEC’s relationship with other institutional arrangements, the EU said that there should be a clear separation between the strategic policy level advice from the TEC and operational aspects related to the work of the entities entrusted with the financial mechanism.

There was need to ensure that the Technology Mechanism is not a stand-alone arrangement but should enhance synergies with other institutional arrangements.



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