

Green Technologies, Intellectual Property Regime and Climate Change

Sanaz Javadi Farahzadi

Green Technologies, Intellectual Property Regime and Climate Change

Authored by:

Sanaz Javadi Farahzadi

Published by:



CUTS INTERNATIONAL, GENEVA

Rue de Vermont 37-39

1202 Geneva, Switzerland

www.cuts-geneva.org

Also at: Jaipur, New Delhi, Chittorgarh, Kolkata, Hanoi,
Nairobi, Lusaka, Accra, Washington DC

This paper was undertaken by Sanaz Javadi Farahzadi, Intellectual Property Lawyer, Doctoral Researcher, Geneva, Switzerland. It is published under CUTS International Geneva's project "Keeping Pace with Trade Developments", undertaken with funding support from the Ministry of Foreign Affairs, Sweden.

Citation: FARAHZADI, S. J. (2019). *Green Technologies, Intellectual Property Regime and Climate Change*. Geneva: CUTS International, Geneva.

Disclaimer: The views expressed in this publication represent the opinions of the author, and do not necessarily reflect the views of CUTS or its funders.

Cover Photo: Alan Levine

© 2019. CUTS International, Geneva

The material in this publication may be reproduced in whole or in part and in any form for education or non-profit uses, without special permission from the copyright holders, provided acknowledgment of the source is made. The publishers would appreciate receiving a copy of any publication, which uses this publication as a source. No use of this publication may be made for resale or other commercial purposes without prior written permission of the copyright holders.

Table of Contents

Abbreviations	4
Abstract.....	5
Debates on Climate Change, Technology Transfer and Intellectual Property.....	6
Role for the Intellectual Property System	9
IP Carbon Footprint.....	13
Transfer of Green Technologies to Developing Countries.....	14
Some Mechanisms for Promoting Innovation in Green Technologies	18
Way Forward.....	19
References.....	21

Abbreviations

CC	Climate Change
CTCN	Climate Technology Centre and Network
EST	Environmentally Sound Technologies
GI's	Geographical Indications
GHG	Green House Gas
ICHRP	International Council on Human Rights Policy
IP	Intellectual Property
IPCC	Intergovernmental Panel for Climate Change
IPRs	IP Rights
MEAs	Multilateral Environmental Agreements
NDCs	National Determined Contributions
RTAs	Regional Trade Agreements
SDGs	Sustainable Development Goals
TOT	Transfer of Technology
TRIPS	Trade Related Aspects of Intellectual Property
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development

Abstract

International views on climate change are considerably divided on what are the responsibilities of developed and developing countries with regard to the reduction of greenhouse gas emissions and the mitigation of the negative effects of global warming. Evidently, the major part of disagreement in the international diplomatic negotiations relates to the role and impact of Intellectual Property Rights (IPRs), more specifically patents, in the development and dissemination of environmentally-sound technologies (EST) and mitigation of global warming negative impacts.

Intellectual Property Rights (IPRs) have been identified as the major cause for incentivising green innovations and a vital prerequisite for the development and transfer of environmentally sound technologies by developed countries, while developing countries consider IPRs and abusive manner of IP rights holders based in developed countries, as a major barrier to effective access to green technologies to the countries in need.¹

Though, one point is quite clear: climate change has essentially been caused by human made technologies: the significant development and dissemination of technologies that catalysed the industrial revolution, the technologies that cleared much of the world's forests; the new industrial chemicals that were released into the atmosphere, all protected under intellectual property system, unaware of the fact that they would intensify the greenhouse effect on planet.

It follows that reversing the human impact on the atmosphere and climate change mitigation boils down to deploying the right technologies and

adapting to the inevitability of a transformed climate will also need development of new technologies through different mechanisms, adopting existing ones to current climate change concerns and putting in place appropriate policies for efficient exploitation of green technologies in both developed and developing worlds.

To provide a focus for our discussion, we will observe the positive impact of intellectual property system as a whole together with other corresponding alternatives for stimulating environmentally sound technologies (green technologies) to enhance climate change adaptation capacity in developing countries and will analyse the role IPR could play as the very major contributor to development and diffusion of green technologies.

In the end, the paper concludes with some additional recommendations supplementary to mere use of IP system to tackle climate change consequences and threats to developing world.

¹ https://www.wipo.int/policy/en/climate_change/

Debates on Climate Change, Technology Transfer and Intellectual Property

Most multilateral environmental agreements (MEAs), including United Nations Framework Convention on Climate Change 1992 (UNFCCC) and the Kyoto Protocol (1997), are based on preliminary discussions about intellectual property and green (environmentally sound) technologies and have established a foundation for the development, application and diffusion of low-carbon technologies, containing specific provisions on how to promote, facilitate and finance transfer of such technologies to developing and least developed countries.

However, the objectives and obligations undertaken under UNFCCC or Kyoto Protocol by the governments for development and transfer of green technologies to mitigate climate change impact, are substantially difficult to be efficiently implemented as there is still no international consensus on appropriate implementation strategies, which had led to crucial lack of incentive for most nations to contribute to climate change policy.

Article 4.1 (c) of the UNFCCC requires all Contracting Parties to take into account their common but differentiated responsibilities, promote and cooperate in transfer of technologies, practices and processes, while Article 4.5 calls on developed countries to take steps to promote and facilitate the transfer of technologies to developing countries.² Similarly, Article 10 of the Kyoto Protocol states that all Parties must cooperate in

the promotion of effective modalities for the development, application and diffusion of green technologies and take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies, know-how, practices and processes pertinent to climate change, in particular to developing countries.

This includes the formulation of policies and programmes for the effective transfer of environmentally sound technologies that are publicly owned or in the public domain and the creation of an enabling environment for the private sector, to promote and enhance the transfer of, and access to, environmentally sound technologies.³

At present, rather than lack of consensus on appropriate Climate Policies, there seems to be some other debates on what the term “Green Technology” exactly covers. On the one hand, Chapter 24 of Agenda 21 under the UNFCCC refers to Environmentally Sound Technologies (ESTs), which are intended to encompass the following technologies:⁴

- Technologies protecting the environment,
- Less polluting technologies,
- Technologies using resources in a more sustainable manner,
- Technologies aiming at recycling of waste and products, and
- Technologies handling residual wastes, e. g. by purification processes.

On the other hand, the Intergovernmental Panel for Climate Change (IPCC)⁵ makes a classification

² United Nation Framework Convention On Climate Change https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf

³ Kyoto Protocol to the United Nations Framework Convention on Climate Change <https://unfccc.int/resource/docs/convkp/kpeng.pdf>

⁴ Intellectual Property and Green Technology Report, prepared by the members of Special Committee Q198 1, May 2014, Intellectual Property and Green Technology

⁵ For more reading on the function and responsibilities of IPCC please refer to: <https://www.ipcc.ch/>

between “Climate Change Mitigation Technology” and “Climate Change Adaptation Technology”, the former covering technological change and substitution that reduce energy resource inputs and emissions, while the latter cover technologies intended to reduce the harmful effects arising from expected climate change. While there is no commonly accepted definition of the term “green technology”, one may also consider the term “green inventions” which is understood to refer to environmentally friendly inventions that often involve energy efficiency, alternatives to fossil fuel and carbon generation, pollution and toxic remediation, water purification, recycling, safety and health concerns, renewable resources, etc.⁶

The present paper does not deal with the definition and interpretation of “Green Technology” concept or the question of whether mitigation technology or adaptation technology is more important in Climate Change mitigation policies. Subsequently, the present paper does not enter into a debate on what could appropriately be considered as “Green Invention” or “Green Technology”. Instead, for the purpose of this paper, the generic term “Green Technology” will be used all the time. This term is understood as comprising all forms of environmentally sound technologies, climate change mitigation technologies as well as climate change adaptation technologies.

During the last few years and post UNFCCC and the Kyoto Protocol, the topic of how to address climate change was debated as part of the negotiations of the Copenhagen Accord 2009, the Cancun Agreements 2010, the Durban Decisions 2011, the Doha Climate Gateway 2012, the Warsaw Opportunity 2013, and the Lima Call for

Climate Action 2014. The specific matter of intellectual property and climate change was also debated in the Paris climate negotiations which led to Paris Agreement 2015.⁷

The Paris Agreement on Climate Change, adopted during the COP 21 in 2015, has established a new international framework for the parties to the United Nations Framework Convention on Climate Change (“UNFCCC”) to fight against climate change. It is based on countries’ National Determined Contributions (“NDCs”) as key approach to mitigation, adaptation and financial, technological and capacity-building support. At the international level, regular reviews of countries’ NDCs’ every 5 years will strengthen transparency, and drive countries’ NDCs to meet the goal of keeping the global average temperature increase well below 2 degrees Celsius compared to pre-industrial levels by the end of the century. The countries are bound to use efficient national policies and measures such as energy efficiency and reduction of consumption, agriculture and promotion of renewable energy forms to mitigate climate change consequences.

Although several developed countries, most notably the US, don’t see climate change as an issue of global justice and refuse intellectual property (IP) rights to be placed on the agenda of international climate negotiations, integration of climate change into national IP strategies and the contribution of IP rights (IPRs) to a sustainable economy transition and achieving to green economy is mostly agreed among other developed countries.

⁶ See, e. g., http://inventors.about.com/od/greeninventions/p/green_invention.htm.

⁷ Wishart, Kane. 2018. Management of Intellectual Property in Australia’s Clean Technology Sector: Challenges and Opportunities in an Uncertain Regulatory Environment.

In Intellectual Property and Clean Energy: The Paris Agreement and Climate Justice. Edited by Matthew Rimmer. Singapore: Springer, pp. 177–206.

Notably, the new climate change system needs support from all policy regimes in developed and developing countries in order to succeed. Under the Paris Agreement, access to environmentally beneficial and climate-friendly technologies and know-how is a key driver of mitigation, and adaptation activities to climate change. The trade policy agenda under the WTO, which includes IP, is also among the most critical policy regimes to be considered for the sake of sound access to green technologies. Trade liberalisation through the mechanisms provided by WTO can on the one hand support the application of climate-friendly goods and services and foster the deployment of green technologies, while, on the other hand, NDCs can collide with trade rules due to conflicting principles and priorities.

The inclusion of environmental and climate policy provisions in Regional Trade Agreements (“RTAs”) also reveals that there is a demand for policy coordination between the two group of the countries.

The Paris Agreement also relies upon technology networks and alliances in order to promote the diffusion and dissemination of green technologies with no specific text on intellectual property and how to resort to IP system for creation and transfer of environmentally sound technologies (EST).

Under the scheme of Paris agreement and in order to achieve green technology transfer, there has been an effort to rely on a number of co-operative ventures and formal technology networks, alliances, and public–private partnerships, including the UNFCCC Climate Technology Centre and Network (CTCN); the World Intellectual Property Organization’s WIPO GREEN; Mission Innovation; the Breakthrough

Energy Coalition; and the International Solar Alliance.⁸

The International Council on Human Rights Policy (ICHRP) has also stressed that matters of green technology transfer are critical to debates over climate change, human rights, and climate justice. The Council observes that technology transfer has a variety of political, ethical, and practical dimensions. The Council discusses the nexus between intellectual property, technology transfer, human rights, and climate justice.

According to ICHRP, technology transfer is needed both to help more vulnerable countries and communities adapt to the now inevitable consequences of climate change in the short term, and to assist them in moving on to low-carbon development pathways in the long term. Highlighting the human rights benefits of technological interventions may create a space for re-framing and circumventing the unsustainable dynamic that has largely characterized debate on this subject. Human rights offer a strong ethical and legal basis from which technology transfer may be approached.⁹

However, mere mentioning the need to access green technologies to mitigate the impacts of climate change in international agreements is not helpful per se and there is still a huge gap to be filled through defining related intellectual property policies in order to achieve the objectives of climate change related international agreements.

Major controversies still exist on the role intellectual property system can play in transfer of technology, as most developing countries have been criticizing IPRs for allowing monopolies and thus limiting the access to new technologies and innovations in the last few years, while developed

⁸ Ibid

⁹ The International Council on Human Rights Policy. 2016. *Beyond Technology Transfer: Protecting Human Rights in a Climate-Constrained World*. In *Research Handbook on Intellectual Property and Climate Change*. Edited by Joshua

Sarnoff. Cheltenham and Northampton: Edward Elgar, pp. 126–57.

countries have been defending IPRs as allowing for a fair return on investment which has helped trigger business's interest in researching innovative solutions, arguing that IPRs are now more and more acknowledged as part of the solution, rather than as an obstacle to innovation.

In the context of climate change technologies, developing countries have been insisting that the IP system, in particular patents, must serve as tool for transferring critical technologies that will help developing countries mitigate and adapt to climate change realities such as rising water levels, desertification, water shortages, extreme weather, and ocean acidification.¹⁰

The challenge at this stage for climate change as a critically important topic, is to demonstrate that IP can promote (not hinder) the development, commercialization and distribution of technologies for climate change mitigation and adaptation. The success in so doing will all depend upon the capacity to explore how IP can work in practice and be customized based on climate change needs.

A sound and flexible intellectual property mechanism seems necessary to provide for research, development, and deployment of green technologies. There is a need to ensure that the technology mechanism of the Paris Agreement, as the most recent international framework on climate change and access to green technologies, can enable the research, development, and diffusion of clean technologies at a scale to address the global challenges of climate change.

The current challenge is to enhance the environment for innovation, while enabling

efficient transfer of green technologies to all parts of the world through appropriate policies and measures, more specifically into developing and least developed countries.

Role for the Intellectual Property System

There is still uncertainty to the exact role and impact of intellectual property system and whether it is more a facilitator or an obstacle to transfer of technology, particularly to developing countries.

Following the adoption of the Bali Road Map under UNFCCC in 2007, the issue of IP as a potential for accessing climate change technologies has become more controversial.¹¹ Proposals submitted by developing countries, in particular by the G77 and China, addressed

the concerns about IP, suggesting the need to address both IP and climate change issue in a systematic manner as a hindering fact on the way of transfer of technology from developed countries to developing countries.

Accordingly, the UNFCCC Expert Group on Transfer of Technology was formed to engage in assessing whether and to what extent intellectual property might be an obstacle to transfer of technology and have finalized three advanced reports on: performance indicators for technology development and transfer; identification and analysis of existing and new financing resources and relevant vehicles for the development and transfer of technologies; and long-term strategy to

¹⁰ Intellectual Property and Green Technology Report, prepared by the members of Special Committee Q198 1, May 2014, Intellectual Property and Green Technology

¹¹ **The Bali Road Map was adopted at the 13th Conference of the Parties and the 3rd Meeting of the Parties in December 2007 in Bali.** The Road Map is a set of a forward-

looking decisions that represent the work that needs to be done under various negotiating "tracks" that is essential to reaching a secure climate future.

support the development and transfer of technologies.¹²

Consequently, strategic view is that IP system was created not only to stimulate the creation of new technologies, but also to provide an efficient means of widely disseminating this new technological information, and to build structures to transfer the technology and to put it to work. IP system can play a major role in private investment in green technologies and is essential for long-term climate change solutions.

The IP system, particularly the patent system, is closely interconnected with many technologies that could help climate change impact mitigation and, in some scenarios would cast as a problem and barrier to technology diffusion.

Meanwhile the debate on patents has been largely narrowed down to the question whether they facilitate or block technology transfer. Numerous commissioned studies attempt to show that patents are not an obstacle after all but a facilitator for technology transfer, just like in the earlier debate on IPRs and medicines many reports 'proved' that patents are not the main barrier for access to drugs.

However, putting all political debates on the scope of efficiency of intellectual property into climate change impact mitigation aside, it is quite evident that not only patent but also all forms of intellectual property rights can contribute to the fight against global warming. The link between IP and climate change might not be so obvious at first glance, but that there is growing recognition that patents help provide a return on investment

on green innovative solutions, while brands and designs also play a crucial role in marketing and developing these solutions.

Patent law provides exclusive rights in respect of scientific inventions, including in the fields of climate adaptation technology and climate mitigation technology. There have been significant patent disputes over clean technologies, such as climate-ready crops, hybrid vehicles and a range of other subject matters within last few years. Moreover, there has been a significant discussion about the application of patent flexibilities to clean technologies, including public sector licensing, patent pools, compulsory licensing, technology transfer, and parallel importation.¹³

The patent system is closely interwoven with the whole process of creating, refining, developing and delivering the kind of technologies that will be essential to mitigate and adapt to climate change. When the patent system works according to plan, it stimulates the creation of new technologies and creates pathways for their dissemination. But the patent system needs constant management to ensure that it does deliver in practice what it offers in principle.

In addition, utilization and protection of undisclosed data or trade secrets may also actively promote efficient implementation of a patented technology and fine tuning of production techniques and know how, through transfer of technology process.¹⁴

Certification labels and certification marks are other instruments under intellectual property

¹² For more reading please refer to:

Strategy paper for the long-term perspective beyond 2012, including sectorial approaches, to facilitate the development, deployment, diffusion and transfer of technologies under the Convention Report by the Chair of the Expert Group on Technology Transfer, document FCCC/SB/2009/3/, June 2009, United Nations Framework Convention on climate change <https://unfccc.int/resource/docs/2009/sb/eng/03.pdf>

¹³ Sarnoff, Joshua. 2016c. Patents and Climate Change. In Research Handbook on Intellectual Property and Climate Change. Edited by in Joshua Sarnoff. Cheltenham and Northampton: Edward Elgar, pp. 334–51

¹⁴ Sumanadasa, Darshana. 2018. Protecting and Promoting Clean Energy Innovation through the Trade Secrets Regime: Issues and Implications. In Intellectual Property and Clean Energy: The Paris Agreement and Climate Justice. Edited by Matthew Rimmer. Singapore: Springer, pp. 399–424.

system to promote green products. These two new instruments (that are not yet widely used by governments) are useful in certifying eco-friendly goods and services, such as the EU “Eco Label” as a certification mark which provide a recognizable sign certified by an independent and impartial third party, thereby also fostering consumer trust.

Consumers are more and more keen to purchase brands that are environmentally-friendly. Climate change is particularly important to millennials, as stressed by recent studies, so brands must adapt to sustainable development, if they want to remain successful and respond to their consumers’ needs. Some famous brands such as Amazon, Tesla, Microsoft, Google, Apple and General Motors have even gone further and engaged politically in the fight against climate change, by adopting more sustainable practices, investing in renewable energy such as wind and solar, and reducing their global carbon footprints.

Regarding Geographical Indications (GI’s), as one of the most challenging and evolving IP rights, producers can opt for a mitigation strategy (i.e., take action to reduce their environmental impact) and/or adaptation strategy (i.e., take action to adapt to climate change). Identifying the right strategy to fight climate change ultimately poses a challenge for Geographical Indications (GI) producers, who are bound by strict specifications and cannot relocate.

Geographical indications are labels that identify a product on the market. They are specifically used to mark where a product originated, for example in a territory, region, or locality in a country. This indication of the point of origin of a product signifies that the product has special characteristics, qualities, or a reputation linked to its geographical origin.

Geographical indications and its contribution to using eco-friendly agriculture methods and

technologies, plays a major role in climate change mitigation.

Although environmental quality is not the major motivation in GI related strategies, however, GI-protected products can be produced in a way that is more environmentally friendly than production of industrial alternatives and green production methods can be included in the book of specification of GI products which serves as a code of practice and a mandatory instruction to respective producers and farmers.

Maintaining the uniqueness and high quality of GI products also requires preserving the physical and climatic conditions where the crops grow, i.e. using less pesticides.

Again, governments play a major role to define the mandatory strategies for GI right owners to observe the quality level and green methods of production, otherwise their products would not bear the GI label and respective legal and commercial benefits.

In the last few years, more and more developing countries have started implementing GI legislation domestically and seeking protection in international trade agreements, with the goals of promoting natural environment, rural development and mitigating the pesticides usage, as one of the main contributors to climate change, in growing the crops.

In order to keep developing GIs and using them as a tool for sustainability in developing countries the support through a sound policy system is inevitably necessary. Specifically, policies should cover the three aspects of sustainable development, i.e. environmental, social and economic. In terms of environmental sustainability, it is necessary to associate the GI system with biodiversity preservation, or complement it with environmental regulations. In fact, GIs improve the recognition of the relationship among natural conditions such as

biological resources, water, land, cultural heritage and so on. Therefore, in relevant regulations, legislators should take into account the link of GI products with the ecology as one criteria of GI specificity.

While GIs can help in mitigating and adapting to climate change, climate change also poses risks to GI products, for example through drought, pest infestations, fire, or changing the ecology of a region so that a particular product can no longer be produced there.

It is expected that more and more GI rights holders for agricultural products will have to modify their geographical territory or adapt their production, processing or storage methods to evolving climate conditions, with potential consequences to their reputation, quality, price, and location.

Copyright law and database protection also play a role in the regulation of access to environmental information and data. There are also significant connections between intellectual property, plant breeders' rights, access to genetic resources, and Indigenous and traditional knowledge.

Indigenous people are a key source of information and insight in domains such as agroforestry, traditional medicine, biodiversity conservation, customary resource management, impact assessment, and natural disaster preparedness and response. They have their own traditional and very rich experiences and knowledge about climate change in their communities and can have a say in developing global, regional and local policies to address climate change that are supportive of their knowledge, culture and self-determined development.¹⁵

However, as the patents still play the most important role in climate change mitigation among some other intellectual property rights, the real challenge would be with policymakers to identify what are the key technologies now, and what will be the key technologies in the future; and how can rights over those technologies be managed and structured most effectively to deliver them to the public, to disseminate the technologies needed to tackle the climate change challenge.

Building more transparency in patent information system provides policymakers with an overview of emerging green technologies. The system can demonstrate trends over time and the changing geographical profile of innovation, disclose the most active players and new entrants on the scene, and show the split between public and private, developed and developing, multinationals and small firms in those technologies of most interest to policymakers. Patent information can be used to chart the trend of the major energy companies to invest increasingly in renewable energy technologies, and can track what new carbon sequestration methods are under development.¹⁶

Approximately, all countries with patent law, require three major criteria for fulfilment of patentability of inventions, i.e. 1) Novelty, 2) Inventive Step, and 3) Industrial Applicability.

However, in the context of climate change, inclusion of a fourth and most crucial criteria such as conformity with environment standards or beneficial to public health and environment under the patentability scheme seems quite essential.

There is a need to better align intellectual property, innovation policy, climate policies and technology transfer in order to achieve access to

¹⁵ Raygorodetsky, Gleb, 2011, Why Traditional Knowledge Holds the Key to Climate Change, United Nations University,

¹⁶ Climate change and the intellectual property system, what challenges, what options, what solutions, 2008, informal consultation draft, WIPO

clean energy and climate justice under the framework of the Paris Agreement. At a conceptual level, philosophical discussions about climate justice should be grounded in practical considerations about intellectual property and technology transfer. An intellectual property mechanism is necessary to provide for research, development, and deployment of clean technologies. There is a need to ensure that the technology mechanism of the Paris Agreement can enable the research, development, and diffusion of clean technologies at a scale to address the global challenges of climate change.¹⁷

An analysis of potential contribution of TRIPS flexibilities with regard to climate related transfer of technology^{SEP} and precise description of technologies already under public domain and usable by developing countries could provide a practical solution for ease of access to green technologies.

For most clean (green) products, high labour and material costs, and for more complicated products, trade secret technology (not patent protection) are hindering to “force” such transfer and not the IP system itself.

Inability to serve current market needs, inadequate economic incentives for green innovators, inability to adopt new technology, lack of infrastructure, no/low profit from investments, inadequate systems supporting technology transfer, lack of manufacturing capabilities, inadequate laws governing transfer, little ability to punish violators, are the other major hindering factors to transfer of green technologies in developing countries which are not derived or

related to IP system. IP is only one element in a larger innovation ecosystem and not all of it.¹⁸

IP Carbon Footprint

The ever-growing interest of consumers for green products has led an increasing number of companies to develop products focusing on carbon emissions and climate change. In the IP sphere as well, right owners are increasingly conscious of the need to take into account the impacts of their enforcement actions on climate change.

In this context, Rouse developed CLIPMATE™ as the world’s first carbon emissions calculator for Intellectual Property.¹⁹ The invention *inter alia* tracks, collects, compares and offsets GHG emissions incurred in protecting and enforcing industrial property rights, through the selection of specific emission factors and the use of supporting devices. In a 2018 article published in Rouse Magazine, CLIPMATE™ inventor Fabrice Mattei explained the tool’s rationale and approach of calculating the IP Carbon footprint as follows:

“Each country has a cap on the amount of carbon they are allowed to release into the atmosphere. CO2 emissions trading allows countries that have higher carbon emissions to purchase the right to release more CO2 into the atmosphere from countries that have lower carbon emissions. The carbon trade markets which are gradually turning global (China, Europe, Japan, California, Quebec) also provide companies the ability to trade their polluting rights through a regulatory system known as cap and trade. In other words, companies that pollute less can sell their unused pollution rights to companies that pollute

¹⁷ Rimmer, Matthew, 2018, Beyond the Paris Agreement: Intellectual Property, Innovation Policy, and Climate Justice, Singapore: Springer, 33-67.

¹⁸ Laura Diaz Anadon, Gabriel Chan, Alicia G. Harley Kira Matus, b Suerie Moon, Sharmila L. Murthy, William C. Clark, Making technological innovation work for sustainable development, 2016, US National Institute of Health

¹⁹ Rouse SEA (2019). CLIPMATE by Rouse. Available at: <https://www.youtube.com/watch?v=Dyk7J7URXwA> (Accessed: 2 November 2019).

more. The goal is to ensure that companies do not exceed a baseline level of pollution and to provide a financial incentive for companies to pollute less.

The IP Carbon footprint focuses on the CO2 emissions resulting from the acquisition, exploitation or lack of exploitation of IPRs, expressed as CO2 equivalent. The calculation method captures the full life cycle of IPRs ranging from their creation to enforcement. Internal and external, positive and negative climate change effects are calculated.

For example:

- Environmentally friendly technologies having environmental regulations implemented at an appropriate time within the innovation sequence;
- Diffusion of climate-friendly technologies and know-how to countries facing severe climate change issues;
- Environmentally friendly technologies for which a platform is given allowing to demonstrate proof-of-concept to potential users/licensees;
- Carbon footprint incurred in enforcing IPRs (rapid action, destruction of goods etc);
- Efficiency in expediting the examination, publication and grant of environmentally friendly technologies;
- Impactful evaluation of environmentally friendly technologies;
- Financing of IPRs under the Green Fund or other climate change related funds;
- Recourse to litigation vs. settlement assorted with licensing scheme

The IP carbon footprint offers a range of benefits to IPR owners, for example:

- Enhancing transparency in the energy consumed by the acquisition and exploitation of IPRs;
- Increase awareness of IPRs owners' environmental and efficiency credentials among customers, staff and stakeholders;
- Differentiation of IPRs in a crowded marketplace;
- Identify 'hotspots' and opportunities for energy efficiency IP strategies;
- Ensure a verified system that can deliver reliable results risk and compliance, particularly relevant in the context of growth of Climate Change litigation;
- Help meet the requirements of regulatory schemes on Climate Change;
- Identify and manage risks around energy supplies;

The IP carbon footprint should be seen not just as a tool in the fight against climate change but also as a way to boost business performance.”²⁰

Such initiatives respond to the need for an increasing number of companies to have efficient IP strategies to ensure compatibility with climate change.

Transfer of Green Technologies to Developing Countries²¹

Technology transfer and intellectual properties have been key elements of international talks. The UN's 1993 non-binding Agenda 21, a blueprint for sustainable development in the 21st century, included the recommendation of: “the undertaking of measures to prevent the abuse of intellectual property rights, including rules with

²⁰ Mattei, Fabrice, What is your intellectual property carbon print?, 30 April 2018, Rouse Magazine

²¹ Shabalala, Dalindyabo. 2016. Technology Transfer for Climate Change and Developing Country Viewpoints on

Historical Responsibility and Common But Differentiated Responsibilities. In Research Handbook on Intellectual Property and Climate Change. Edited by Joshua Sarnoff. Cheltenham and Northampton: Edward Elgar, pp. 172–99.

respect to their acquisition through compulsory licensing.”

In general, 90 percent of increased carbon emissions and the need to access to green technologies comes from developing countries, but 80 percent of the needed technologies can be found in already developed countries, which highlights the importance of securing fair transfer of technologies.²²

The global transfer of green technologies, particularly from developed to developing countries, is mainly through the intellectual property regime. Many of the technologies are subject to intellectual property rights, particularly privately-held patents, which give the holder exclusive rights in respect of the technology for a specified period (generally 20 years). During that period, third parties wishing to use the technology must obtain the consent of the patent holder, in the form of a license. The license will generally require the user to pay royalties or other fees determined by the patent holder. It may also contain other restrictions on use of the technology.

A 2010 study, led by the United Nations Environment Program (UNEP), found that 80 percent of patent applications for green technologies, such as wind and solar energy systems, were filed in just six countries and the vast majority of research and development work occurs in developed countries. Japan had the largest number of patent filings, followed by the U.S. and then Germany, Korea, the U.K. and France.²³

Introduction of so-called “clean development” technologies, designed to reduce emissions while maintaining living standards has already started in developed countries. Unfortunately however, these technologies, which include large-scale solar, wind and other renewable energy systems, have been widely deployed in few developing countries, where they are essential to charting a sustainable, low-carbon pathway to development.²⁴

According to UNESCO, the top ten countries in research and development funding account for 80% of that funding. Thus, research and development spending is extremely concentrated in a select few regions and states. North America and Western Europe collectively represent about half of all such spending. Of course, innovation is not limited to formally-funded institutional research, but the scale of these enterprises means that much of the necessary industrial innovation required for a pro-climate transformation will likely emerge from a handful of relatively rich countries.²⁵

What would be the effect of this imbalance if equal technology transformation doesn't happen? First of all, it means that new research and development is driven by needs and preferences of developed countries without considering the crucial interests of developing countries. Second, it means that the profit gained from licensing out the green technologies to developing countries reinforces global wealth inequality.

A patent in most countries applies for twenty years, and the inventor must disclose all the invention details in the application. The climate

²² Mattei, Fabrice, What is your intellectual property carbon print?, 30 April 2018 , Rouse Magazine

²³ <https://www.ip-watch.org/2013/10/14/green-innovations-owned-by-developed-countries-tied-up-in-patents-expert-says/>
Final Report ,Patents and clean energy: bridging the gap between evidence and policy Final report, United Nations Environment Programme,2010
<https://unep.ch/etb/events/UNEP%20EPO%20ICTSD%20Event>

<https://www.unep.org/press/2010/09/15/20100915-brussels-study-patents-clean-energy-15.9.10.pdf>

²⁴ **Webb, Romany**, October 2016, Protecting Intellectual Property While Mitigating Climate Change: Can We Do Both? Columbia Center on Sustainable Investment

²⁵ Eldredge, Zachary , September 20,2018 , Intellectual property and Climate Change, Trouble

does not have twenty years. We cannot wait until 2039 for new green technologies to become available and affordable worldwide. Therefore, we must be dynamically working on finding a new balance between the return on investments into research and the exclusionary rights that are granted to encourage that investment.

Climate change is among the largest public “health or safety needs” which could possibly exist, so a legal basis for the measures such as breaking patent exclusivity, opening patents or encouraging more open innovation (open collaboration) could be initiated by the governments where necessary.

Governments could consider the options such as “march-in” rights included in Bayh-Dole Act of United States which gives the federal government the right, for publicly-funded inventions, to “march-in” and license the patent to other producers of its choosing. This legal alternative will be similar to compulsory licenses prescribed under TRIPS agreement. The result of such legal strategy is that the government is directly able to seize the relevant intellectual property and authorize its use by other parties.

The establishment of an organized movement among scientists, engineers, and other technical workers that holds governments responsible for climate inaction and demands immediate progressive action would be another alternative to contribute to more ease of transfer of green technologies.

Such movement should make sure that no country can focus only on its own national climate policy, ignoring the interest of other countries. All developed countries have an obligation to use their scientific capacity for the benefit of the

planet, and that this is almost incompatible with the current operation of the patent system that prioritizes short-term profit over rapid proliferation of green technology.

The movement can encourage an open-source design, forming the basis of a new type of research infrastructure which insists on its efforts benefiting the whole planet, rather than the private IP owners only.

Organizations like Science for the People²⁶ and the Tech Workers Coalition²⁷ have begun to organize the movements around the ethical use of technology, for example, by leading companies like Google, Amazon, and Microsoft to answer for their cooperation with the military in USA.²⁸ Creating a system where research is not done to maximize the market revenues to a private enterprise, but to profit humanity with an emphasis on how a technology can be beneficial rather than what it sells for.

Patent activity in green technologies is increasing in some developing countries, most notably China and India, as the major players in the solar and wind energy sectors. Conversely, entities in other developing countries generally lack the financial resources and institutional capacity to invent patentable clean energy technologies. It has been so challenging for them to obtain the license of the technologies from patent holders from developed countries. A survey of 160 patent holders, conducted as part of the 2010 UNEP study, found that less than half (42 percent) of enterprises based in developed countries had entered into licensing agreements with entities in developing countries in the previous three years. Just 5 percent of those surveyed indicated that they frequently enter into licensing agreements with developing countries, while 17 percent said

²⁶ <http://www.scienceforthepeople.net/>

²⁷ <https://techworkerscoalition.org/>

²⁸ For more reading on the topic, please refer to the link below:

<https://scienceforthepeople.org/2018/10/14/science-for-the-people-in-support-of-microsoft-workers-demand-to-end-contract-with-ice/>

they occasionally do and 25 percent said they rarely do.²⁹

Opinions differ as to why patented clean energy technologies are rarely licensed to entities in developing countries. Some have suggested that patent holders may be reluctant to license their technologies in developing countries due to inadequate protection of intellectual property rights, unfavourable market and investment conditions, and/or a lack of infrastructure and human capital. Others assert that it is because entities in developing countries are unable to afford the royalty payments demanded by patent holders. In this regard, the 2010 UNEP study (cited earlier in the paper) found that available evidences “suggest that companies from developing countries are facing some difficulties in obtaining technologies,” possibly due to “the high cost of licensing.”

Some developing countries have suggested that patent holders should be required to make clean energy technologies available under royalty-free licenses. Others have gone further, suggesting that patent protections for green technologies should be limited, or completely excluded like what happened in the past in terms of access to medicines for the countries in need. The latter proposal would raise issues under international treaties, particularly the World Trade Organization Agreement on Trade Related Aspects of Intellectual Property (TRIPS Agreement), which includes an obligation to grant patents in all fields of technology.³⁰

Developed countries so far have strongly opposed any change to the TRIPS Agreement and/or other treaties, which would weaken patent protections

for clean green technologies, arguing that this would hinder technological innovation. Many developing countries are not convinced however and the debate on how to have the access to green technologies still remains at the international level, as countries have begun to implement the Paris Agreement and develop strategies to achieve the United Nations’ Sustainable Development Goals (SDGs). Both developed and developing countries would likely agree that, to achieve the Paris Agreement’s goals and the SDGs, action should be taken to remove impediments to the diffusion of green technologies arising under the international treaties.

Notably, appropriate and adopted legal and policy measures play an important role in transfer of green technologies, even if technology is largely transferred by the private sector based in developed countries. In the UNFCCC context, the term “enabling environment” is used to address government actions on creating public-private sector transfer of technology mechanism.³¹

The parties to UNFCCC are urged to improve the enabling environment through the identification and removal of legal and policy barriers and establishment of positive mechanisms and incentives for technology transfer. The relevant mechanisms identified to be relevant for transfer of green technologies include sustainable markets, macroeconomic policy frameworks and standards and certification of green products.

Several approaches are being considered at this controversial stage for promotion of green technologies diffusion and establishment of new mechanism for equitable sharing of technologies,

²⁹ Final Report ,Patents and clean energy: bridging the gap between evidence and policy Final report, United NationsEnvironmentProgramme,2010 https://unep.ch/etb/events/UNEP%20EPO%20ICTSD%20Event%2030%20Sept%202010%20Brussels/Study%20Patents%20and%20clean%20energy_15.9.10.pdf

³⁰ Webb, Romany, October 2016, Protecting Intellectual Property While Mitigating Climate Change: Can We Do Both? Columbia Center on Sustainable Investment

³¹ https://www.iisd.org/pdf/2010/matrix_climate_change_tech.pdf

such as the Multilateral Fund for implementation of the Montreal Protocol.

The fund provides financial support to developing countries in the form of grants or concessional loans so that the developing countries are able to comply with their obligations in decreasing the use of ozone depleting substances (ODS), including the intellectual property related costs in having the access to green technologies such as license fees or promotion of innovative activities in the field of green patents.

Some Mechanisms for Promoting Innovation in Green Technologies

Beyond the impact and role of existing intellectual property system, there is increasing understanding among relevant stakeholders about innovation structures and activities that should be increased to promote green technology transfer.

The Clean Energy Group (CEG) a leading non-profit advocacy organization working on innovative policy, technology, and finance strategies in the areas of green technology and climate change is proposing a “Consultative Group on Climate Innovation, an International Distributed Innovation Model and Strategy for Climate Technology.”³²

Clean Energy Group promotes effective clean energy policies, develops low-carbon technology innovation strategies and works on new financial tools to stabilize greenhouse gas (GHG) emissions. CEG concentrates on climate and clean energy issues at the state, national and international levels, as it works with diverse stakeholders from governments as well as the

private and non-profit sectors. CEG assists states to create and implement innovative practices and public funding programs to advance clean energy markets and project deployment; creates networks of U.S. and international policy makers to address climate stabilization; advances effective, 21st century, distributed innovation theories for climate technology; develops new finance and commercialization tools; and works to attract new investors to move clean energy technologies to the market more quickly.

The World Business Council for Sustainable Development (WBCSD) is another exemplary foundation, leading an Eco Patent Commons initiative, a pool of environmentally sound technologies pledged by companies which are available free of charge.

A solution similar to the above can be considered for dealing with environmentally beneficial innovation. This can be a reward fund, like a Climate Impact Fund, sponsored by governments, that would offer to pay innovators on the basis of the ecological benefit of their invention on the condition that they are willing to give up their patent-protected mark-ups to at least offer the innovator the opportunity to sell the innovation at the lowest feasible cost of production, and then be rewarded [by the fund] for the innovative effort.

As highlighted in the previous section, the Multilateral Fund for implementation of the Montreal Protocol could be considered as a useful model for the proposed Multilateral Technology Acquisition Fund in the UNFCCC.

However, it is still required to find new incentives such as appropriate funding for enterprises based in developed countries for transfer of appropriate technologies to developing countries as a

³² For more reading on CEG activities, please refer to the link below:

<https://www.cleangroup.org>

prerequisite to develop and expand markets for clean technologies.

Connecting relevant experts and stakeholders in trade, intellectual property and climate change fields for engagement in defining appropriate strategies and alternatives for promotion of transfer of green technologies is also very important and relevant.

Way Forward

Currently and over the next decades, developing countries are and will be excessively affected by climate change negative impacts and suffer huge costs because of great vulnerability to natural hazards. Over the long term, there is a serious risk that further global warming could have a persistent negative impact on the development prospects of developing countries and intensify the challenges caused by ecosystem fragility.

Hence, in order to mitigate global climate change impact, a rapid technological revolution and establishment of complementary policies is necessary.

It is required to efficiently produce and store cheap, clean energy; to engineer new, efficient machines for both personal use and industrial production; and to discover new modes of agriculture capable of feeding humans without destroying the earth. This needs to be done worldwide.

It is also crucial to create a new mechanism for equitable sharing of technologies between the developed countries where the technology is created and the developing countries where the technology is needed.

Creating an international multifunctional organization or agency which, in consultation with governments of developing countries, classifies technologies with high potential whose

disposition is hindered by intellectual property holders, seems necessary. This agency would scrutinize patents and technologies which are environmentally sound and efficient for public. After such identification, a compulsory license can be issued to appropriate industrial players and capable contractors. These could be private companies which are willing to work on lower profit margins, similar to the pharmaceutical case of generic drug manufacturers.

The governments in developed and developing countries could also consider a strategy with particular focus on promotion and transfer of particular green technologies and potential penalties for technology owners with abusive manner, to discourage abusive patent behaviour. That means reconsidering the monopoly of the patent and considering active measures to distribute effectively the technological capability created by companies and research institutions.

Evidently, the basic legal framework exists for international technological harmony. What is missing is the political will and applying appropriate measures to make this framework work efficiently.

However, in order to address climate concerns what is obvious is that much attention and debate has been focused on IPR (intellectual property rights), and too little on some other alternatives, e.g. open source systems, publicly financed innovation and prizes.

As a whole there should be reforms and customization in the intellectual property regime in both developed and developing countries to incentivize green innovation activities and transfer the respective technologies, and more broadly in the way of financing, organizing and incentivizing such innovations, that would increase the sustainable creation, use and transfer of innovation.

Finding the solution to climate change is a matter of continuous and widespread dialogue and cooperation, within the international community on the policy side, and at a practical level on the part of individual enterprises. The IP system

undoubtedly has the potential, in principle, to deliver the positive results public interest demands for it; the challenge however remains how to utilize IP benefits in practice, resorting to appropriate policies and strategies.

References

Books and Articles

Bovey, Yann, August 2008, The role of decentralized renewable energy technologies in adaptation to climate change in developing countries, South Center, Analytical Note SC/ GGDP/AN/ENV/5

Intellectual Property and Green Technology Report, May 2014, prepared by the members of Special Committee Q198 1, Intellectual Property and Green Technology

Raygorodetsky, Gleb, 2011, Why Traditional Knowledge Holds the Key to Climate Change United Nations University

Sarnoff, Joshua. 2016c. Patents and Climate Change. In Research Handbook on Intellectual Property and Climate Change. Edited by in Joshua Sarnoff. Cheltenham and Northampton: Edward Elgar, pp. 334-51

Shabalala, Dalindyebo. 2016. Technology Transfer for Climate Change and Developing Country Viewpoints on Historical Responsibility and Common But Differentiated Responsibilities. In Research Handbook on Intellectual Property and Climate Change. Edited by Joshua Sarnoff. Cheltenham and Northampton: Edward Elgar, pp. 172-99.

Sumanadasa, Darshana. 2018. Protecting and Promoting Clean Energy Innovation through the Trade Secrets Regime: Issues and Implications. In Intellectual Property and Clean Energy: The Paris Agreement and Climate Justice. Edited by Matthew Rimmer. Singapore: Springer, pp. 399-424.

Webb, Romany, October 2016, Protecting Intellectual Property While Mitigating Climate Change: Can We Do Both? Columbia Center on Sustainable Investment

Wishart, Kane. 2018. Management of Intellectual Property in Australia's Clean Technology Sector: Challenges and Opportunities in an Uncertain Regulatory Environment. In Intellectual Property and Clean Energy: The Paris Agreement and Climate Justice. Edited by Matthew Rimmer. Singapore: Springer, pp. 177-206.

Eldredge, Zachary, September 20, 2018, Intellectual property and Climate Change, Trouble

Zhuang, Wei. 2017. Intellectual Property Rights and Climate Change: Interpreting the TRIPS Agreement for Environmentally Sound Technologies. Cambridge: Cambridge University Press.

Websites

<https://blogs.ei.columbia.edu/2016/10/19/protecting-intellectual-property-while-mitigating-climate-change-can-we-do-both/>

<https://www.cleaneigroup.org>

<https://core.ac.uk/download/pdf/29223533.pdf>

https://www.iisd.org/pdf/2010/matrix_climate_change_tech.pdf

<https://www.ipcc.ch/>

http://inventors.about.com/od/greeninventions/p/green_invention.htm.

https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf

<https://unfccc.int/resource/docs/convkp/kpeng.pdf>

https://www.wipo.int/policy/en/climate_change/

