


# Proposal for A Green Patent System: Implications for Sustainable Development and Climate Change

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# PROPOSAL FOR A GREEN PATENT SYSTEM:

## IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT AND CLIMATE CHANGE

By Itaru Nitta\*

### INTRODUCTION

The patent system is in a unique position to address environmental issues and promote sustainable development. A society's environmental practices generally depend on its affluence and level of technology, and patents are one of the legal mechanisms involved in increasing wealth and developing technology. The patent system also allows for the invention and production of eco-friendly technologies, which enable a society to increase its wealth while reducing its use of energy and materials. In practice, however, the existing patent system also has negative environmental impacts. It contributes to global environmental degradation by promoting resource consumption in developed countries and poverty in developing countries.

This article proposes specific changes to create a reformed patent system called the green patent system. This new system would internalize environmental externalities by forcing the patent holder to provide compensation for environmental degradation resulting from the new technology. Because the patent system allows fines to be levied against violators, this system simultaneously creates an area of "hard law" in the area of international environmental law while creating a source of funds to assist environmentally friendly projects. In particular, this article will show how a green patent system can help fight climate change.

### PLACING A PRICE ON ENVIRONMENTAL DEGRADATION

Due to lack of regulations, the tendency towards minimizing prices, and the difficulty in measuring actual environmental impacts, the market rarely factors environmental externalities into the market price of a transaction. Every product and service in any market is ultimately derived from natural resources, yet the market price of all technology excludes some environmental externalities. If the market prices of natural resources fully reflected or internalized environmental externalities, developing countries would be able to obtain the same amount of foreign currency by exporting fewer natural resources at higher prices. In this way, internalizing environmental externalities could curb environmental degradation. For example, the "true cost" of gasoline in the U.S. is at least \$5.60 per gallon when all environmental costs, including compensation and treatment fees for global warming and air pollutants, are internalized.<sup>1</sup> Similarly, the prices of timber and electricity do not reflect the true environmental costs, such as the treatment fees for global warming due to coal combustion. However, if resource prices increase to their true values, including hidden and future costs, economists predict that market turmoil would occur. For example, a rise in

gasoline prices to their true cost of \$5.60 per gallon would undoubtedly shock the U.S. economy.

The current patent system also ignores the costs of environmental degradation. While it promotes human welfare through the progress of technology by building wealth for a patentee by protecting products and services, the system generates environmental externalities that cause environmental degradation.

The current patent system encourages further consumption of environmental resources by increasing a patentee's capital intensity, which in turn encourages more investment. There are four ways the patent system increases capital intensity. First, since the patent system prohibits unauthorized people from commercializing a protected product or service, a patentee can monopolize all benefits from that market. Second, a patentee is free to set a favorable price for the protected product or service without risk of competition. Third, a patentee can obtain large license fees or royalties by permitting other people to commercialize the protected product or service. Fourth, a patentee can receive large amounts of compensation by suing for patent infringement and winning.

In addition to increasing capital intensity, a patentee is guaranteed to collect the investment made for developing the new product. This guarantee of financial rewards stimulates further investment to develop further technologies. As a result of the patent system, these further technologies result in further environmental externalities. To internalize these additional environmental externalities, the patent system should demand that a patentee pay for them.

While the market system cannot handle internalizing environmental externalities, the patent system can. A mechanism that requires a patentee to pay the inherent environmental externalities out of the profits gained by protecting their patented invention is a way to internalize inherent environmental externalities. This new mechanism would allow the global community to answer the demands of developing nations to shift the burden of environmental protection onto the developed countries, to allow for harmonization of domestic and international law,

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create a branch of environmental “hard law,” and penalize non-compliance.

#### SHIFTING THE COST BACK TO DEVELOPED COUNTRIES

Developing countries continue to demand exemptions from the efforts to protect the global environment because their priorities are for economic growth rather than environmental protection. These countries argue that developed countries have profited from environmental degradation and therefore have a greater share of the responsibility to protect the global environment. Developing countries further argue that developed countries disproportionately enjoy the benefits resulting from environment degradation and therefore should pay compensation to developing countries. Finally, developing countries contend that developed countries have exploited the global environment for a long time on the path to achieve their wealth, and it is now the developing countries’ turn to follow the same path.

Developing countries can make arguments that the patent system promotes further environmental degradation, yet it is predominately developed countries that benefit from the patent system. Developed countries entirely dominate the patent system. Some nations have had patent systems for over five hundred years, allowing their system to mature with economic growth. Conversely, the economies of many developing countries are still too weak to support a system that encourages invention.

Instead of merely asserting that developed countries should be responsible for all environmental costs, developing countries would be better served by asserting that global environmental protections should be incorporated into the patent system. Developed countries have profited from the patent system and environmental degradation, while developing countries have rarely benefited from the patent system and their growth often hindered by the needs for environmental protection. By tying environmental protection and the patent system together, the burden of responsibility for the environment’s protection will remain with developed countries.

#### INTERNATIONAL HARMONIZATION OF POLICY AND PRACTICE

A green patent system would lead to greater harmonization, which is the incorporation of domestic patent law into an internationally uniform standard of policy and practice. For example, every member country in the Trade Related Aspect of Intellectual Property Rights (“TRIPs”) Agreement grants twenty-year domestic patent terms equally to national and foreign patentees.<sup>2</sup> Further harmonization of the patent system would lend impetus to sustainable development.

The patent system has established its own procedure to create international consensus. This procedure is based on a supranational view focused on worldwide benefits that enables the present patent system to overcome the differences of individual countries. Since the patent system commonly establishes consensus among countries, utilizing the patent system to implement sustainable development would be more effective

than constructing a new treaty for global environmental protection.

The patent system’s ability to harmonize its laws is evidenced through the international application of the Patent Cooperation Treaty (“PCT”).<sup>3</sup> Under the PCT, while individual patent administration offices use country-specific documents, every document must adhere to a uniform format defined by the international bureau of the World Intellectual Property Organization (“WIPO”). Moreover, each patent office must use a standardized Patent Code, called the International Patent Classification (“IPC”), when classifying inventions. The PCT’s use demonstrates that the patent system has the ability to handle technology uniformly and concretely on a global level, a capacity that could be utilized when the patent system encompasses environmental principles. The patent system would have the capacity to address environmental problems by imposing international standardized laws worldwide.<sup>4</sup>

As of January 2005, 125 countries followed the PCT.<sup>5</sup> In 2004, applicants from more than one hundred countries filed one million applications, and all of these applicants were required to obey uniform international standards.<sup>6</sup> Worldwide uniform behavior is the result of over five hundred years of patent history, and the system continues to become more harmonized. Because of its firm foundation, the patent system could provide a powerful methodology for sustainable development.

#### THE DEVELOPMENT OF “HARD” ENVIRONMENTAL LAW

The patent system is suitable for promoting sustainable development, because the system is based on so-called hard law, a law that is made up of legally binding instruments such as laws, treaties, and regulations. The lack of hard international environmental law is a major obstacle to global environmental protection. Most international environmental conferences develop weaker policy guidelines, rather than binding law. This is evidenced by the Stockholm Conference, the Rio Summit, and the Johannesburg Summit, whose resulting treaties do not include binding regulations. Since existing “soft” legal instruments contain no penalty provision for breaches of the treaties, the current system relies solely on a form of environmental ethics as the determining police force of global environmental issues.

In contrast to the treaties produced at these environmental conferences, hard legal instruments contain penalty provisions, such as imprisonment or a substantial fine, if an entity neglects or violates the law. Among the harshest penalties in patent law is the potential loss of a patent right. In the extreme situation where a patent law eliminates a patentee’s rights for failure to adhere to hard laws, other individuals or companies are free to utilize the invention. Were patent law to include provisions regarding environmental protection, the hard law punishment that one’s patent rights could be taken away would force an applicant or patentee to actively protect the environment in exchange for their patent rights. This could be accomplished by requiring the payment of an environmental fee in order to obtain and maintain the patent right.

## HOW GREEN PATENT SYSTEM WOULD WORK

A green patent system would put a portion of patent-related money (e.g., official fees, license royalties, and patent infringement compensations) into an environmental trust fund. This fund would be used to offer technology transfers and financial aid for countries in order to offset the cost of royalties for eco-friendly technologies and to provide low interest loans or grants for the purchase and creation of such technologies.

### COMPATIBILITY OF THE PATENT SYSTEM WITH ENVIRONMENTAL PROTECTION

A green patent system would utilize money gained through a pro-patent policy based on internationally harmonized hard laws. Simply put, if a country or an industry desires eco-friendly technology but either does not have enough money to invest in or create the technology, the green patent system would provide a country or industry the necessary financial support. Such a fund might be used to pay the royalty fee necessary for Chinese automobile makers to create hybrid cars, for example.

This system would create a unique compromise between economics and environmental protection. Investment by the green patent system internalizes environmental externalities without directly increasing resource prices, which encourages technological progress by guaranteeing that a patentee can collect his investment for developing a new product or service, even in developing countries.

### USING THE SYSTEM FOR ENVIRONMENTAL INVESTMENT

The green patent system promotes sustainable development through both revenue and expenditure.

Similar to a tax system, a green patent system would collect environmental fees as compensation for environmental degradation in order to internalize environmental externalities. A patentee who owns one or more patent rights in a certain industrial or economic field is an actual market-monopolizer in that field. Patent applicants would be responsible for paying environmental fees when they submit their application, and a successful patentee would pay environmental fees from their patent royalties and any compensation gained through infringement actions.

The second aspect of the green patent system is the expenditure of financial resources. Once the green patent system collects environmental fees, it would distribute the new financial resources as environmental investments, such as financial aid or technology transfers. Through financial aid, the green patent system would provide loans and grants in order to spread eco-friendly technologies. Financial aid would support countries and industries purchasing existing eco-friendly technologies or

researching new eco-friendly technologies. Through eco-friendly technology transfer aid, the green patent system would pay royalties for patent-protected, eco-friendly inventions for those who cannot afford such royalties. This in turn encourages developed countries to develop such technologies even when users cannot afford to pay royalties. As a result, distribution of patent-protected, eco-friendly technologies is expanded to communities where such technologies do not yet exist.

By offering financial aid and technology transfers, the green patent system would successfully address two root causes of environmental degradation: poverty in developing countries and consumption in developed countries. To curb poverty-induced environmental degradation in developing countries, the green patent system would promote distribution of eco-friendly technologies to these areas. The green patent system would offer loans or grants so that these developing countries could import

**TABLE 1**

### EXPENDITURE AS ENVIRONMENTAL INVESTMENT

#### For developing countries to reduce poverty-induced environmental degradation

Environmental investments	Purpose	Technology in developed countries	Patent right
Financial aid (Soft loans and grants)	To distribute eco-friendly technologies from developed countries to developing countries	Existing and prevailing	Effective or expired
Technology transfer aid (Royalty payment)		Existing and gaining market share	Effective

#### For developed countries to reduce consumption-induced environmental degradation

Environmental investments	Purpose	Technology in developed countries	Patent right
Financial aid (Soft loans and grants)	To create eco-friendly technologies in developed countries	Not existing	Not existing
Technology transfer aid (Royalty payment)	To nurture eco-friendly technologies in developed countries	Existing but no substantial market share	Effective

eco-friendly technologies, such as pollution reduction equipment and hybrid cars, from developed countries.

Just as the green patent system would decrease environmental degradation in developing countries, the system would also curb consumption in developed countries. The green patent system would provide developed countries financial aid and technology transfers in order to support eco-friendly technologies. (See the lower part of Table 1). The process would differ in two respects from that proposed for developing countries. First, financial aid and technology transfers would be provided to developed countries in order that eco-friendly technologies that reduce environmental impact are created or discovered. While some technologies, such as nuclear fusion energy



production and space photolytic power generation, are so immature that their research has not yet reached patentable levels, developed countries will be offered financial aid so that they can be developed. Second, providing financial aid and technology transfers in developed countries nurtures emerging eco-friendly technologies until they are strong enough to occupy a significant share of a market. Generally, these technologies, such as solar and wind power generators, already exist and are patented in developed countries, but their practical usage is limited.

The support of financial aid and technology transfers will effectively promote fledgling eco-friendly technologies in developed and developing countries because the markets for these technologies are not yet fertile and because eco-friendly companies often do not have sufficient capital to invest in them.

### IMPLICATIONS OF THE GREEN PATENT SYSTEM FOR CLIMATE CHANGE

Through financial and technology transfer aid to developing countries, the green patent system can help target climate change. As of 2002 China was the second largest emitter of carbon dioxide at thirteen percent of the world's total emissions.<sup>7</sup> A principle reason for China's emission rate is the use of heavy coal combustion in outdated and inefficient facilities to support the country's rapid economic growth and rush to industrialize.<sup>8</sup> Even though the Chinese government offered initiatives to expand eco-friendly technologies,<sup>9</sup> it lacked the capability and capital necessary to effectively decrease carbon dioxide emission.<sup>10</sup> In order for China to properly introduce eco-friendly technologies, it must rely on financial and technological aid from developed countries, such as Japan, amounting to several hundred million dollars per year.<sup>11</sup>

While foreign aid has achieved progress in China's environmental protection, there are still obstacles for introducing eco-friendly technologies into China.<sup>12</sup> Since 2002, the Japanese International Cooperation Agency ("JICA") has undertaken the Project for Improvement of Environmental Protection Technology for Metallurgical Combustion at Beijing in order to transfer eco-friendly technology to the Chinese steel industry.<sup>13</sup> The program's goal has been to improve China's energy efficiency in coal combustion by constructing a pilot plant in the State Steel Research Institute of China. JICA also has also deployed equipment provisions, conducted joint exercises, invited experts, and held workshops in China in order to improve their existing technologies.<sup>14</sup>

However, several critics predict that applying these eco-friendly technologies on a widespread scale to factories in China will run into difficulties. Since the technologies were developed by the Japanese steel industry, some are protected by patents. This protection means that Chinese industries will be forced to pay higher, patent-protected monopoly prices. Similarly, Chinese industries will pay high royalties when they import or produce these Japanese patent-protected products. Japan is not able to lower its prices or the royalty fees because doing so would not allow it to collect development costs for their technologies.<sup>15</sup>

Patent-related obstacles to the reduction of carbon dioxide emissions are potential targets for the green patent system. The green patent system would encourage the Chinese industry to import the products for high efficiency coal combustion by financing a portion of patent-related prices. If the patent system reduced the burden of royalties on Chinese industries, the system also would encourage the Japanese industry to develop further eco-friendly technologies, which would increase the revenue of the patent system. Increased patent revenues would therefore enable the green patent system to spread more eco-friendly technologies.

### CONCLUSION

Abraham Lincoln once said "[t]he patent system added the fuel of interest to the fire of genius." These words are inscribed in stone at the entrance of the U.S. Department of Commerce, once home to the United States Patent Office. Throughout the five hundred years of patent history, people have focused on the role of the patent system in driving economic growth. This economic growth-oriented policy is based on the traditional economic conviction that continuous development driven by constant economic growth makes a positive contribution to human welfare. However, air pollution, resource depletion, deforestation, overfishing, global warming, ozone depletion, bio-diversity loss, genetically-modified organisms, as well as other forms of environmental degradation, have shown the negative side of economic growth. As a central connection between economic growth and environmental degradation, the patent system should play a significant role in ensuring that future development is sustainable. Utilizing revenue generated from the patent system to create a green patent system trust fund will allow for the invention and development of eco-friendly technologies, even in developing countries. Such inventions will take a successful step toward sustainable development.



# ENDNOTES: PROPOSAL FOR A GREEN PATENT SYSTEM

<sup>1</sup> MICHAEL L. MCKINNEY AND ROBERT M. SCHOCH, ENVIRONMENTAL SCIENCE: SYSTEMS AND SOLUTIONS 21 (3<sup>rd</sup> ed. Jones and Bartlett Publishers, 2003); *see also* Geoffrey Dabelko and David Dabelko, *Environmental Security: Issues of Conflict and Redefinition*, ENVIRONMENTAL CHANGE AND SECURITY PROJECT REPORT, Spring 1995, at 3, *available at* <http://wwics.si.edu/topics/pubs/ECSP1.pdf> (last visited Apr. 8, 2005).

<sup>2</sup> *See* Agreement on Trade-Related Aspects of Intellectual Property Rights (“TRIPs”), *available at* [http://www.wto.org/english/tratop\\_e/trips\\_e/t\\_agm0\\_e.htm](http://www.wto.org/english/tratop_e/trips_e/t_agm0_e.htm) (last visited Apr. 15, 2005). The TRIPs Agreement is an international treaty for intellectual property intended promote free trade. In 1995, this treaty was signed as an annex of the Marrakesh Agreement Establishing the World Trade Organization (“WTO”) at the end of the Uruguay Round of the General Agreement on Tariffs and Trade (“GATT”). The TRIPs agreement contains several remarkable features. Firstly, scholars of intellectual property call the TRIPs agreement the “Paris-plus” agreement because it incorporates the most substantial provisions of the Paris Convention, and the provisions are obligatory for member countries regardless of whether they are members of the Paris Convention or not. Secondly, Article 4 of the TRIPs agreement sets the most-favored-nation treatment which establishes that a member country should equally provide the best benefits to all member countries. Thirdly, the TRIPs agreement created general rules for domestic enforcement of intellectual property rights.

<sup>3</sup> The PCT is administrated by the World Intellectual Property Organization (“WIPO”), a specialized agency of the United Nations. Under the PCT, an inventor must file an application in their country, but there is a single format they must follow. In order to file internationally, an inventor can file an international application with the U.S. Patent and Trademark Office (“USPTO”). The USPTO sends the application to the International Bureau of the WIPO. The application is then subjected to an international search. All these steps, called the “international phase,” are organized by the International Bureau under the centralized and standardized uniform procedures of the PCT. However, after the international phase, an inventor must file the translations of the international application in each country’s language in order to forward the application into that country. This process is called “entering in national phase,” and requires an inventor to file his applications with each country again. Furthermore the application in the national phase is separately ruled by the individual patent office in each member country. In spite of the international search report and the international preliminary examination report, each country’s patent office conducts a search and exams patentability of the invention and makes their own decision pursuant to their patent laws and practice.

<sup>4</sup> Japanese Patent Office, *Information on Foreign Industrial Property Systems*, Table: “List of Laws and Regulations,” *available at* [http://www.jpo.go.jp/shiryou\\_e/s\\_sonota\\_e/aippi\\_e/index.htm](http://www.jpo.go.jp/shiryou_e/s_sonota_e/aippi_e/index.htm) (last visited Apr. 8, 2005).

<sup>5</sup> WORLD INTELLECTUAL PROPERTY ORGANIZATION, PATENT COOPERATION TREATY NEWSLETTER, Jan. 2005, at 16 (Jan. 2005), *available at* [http://wipo.int/edocs/pctndocs/en/2005/pct\\_news\\_2005\\_1.pdf](http://wipo.int/edocs/pctndocs/en/2005/pct_news_2005_1.pdf) (last visited Apr. 8, 2005).

<sup>6</sup> WORLD INTELLECTUAL PROPERTY ORGANIZATION, PATENT COOPERATION TREATY NEWSLETTER, Jan. 2005, at 1, *available at* [http://wipo.int/edocs/pctndocs/en/2005/pct\\_news\\_2005\\_1.pdf](http://wipo.int/edocs/pctndocs/en/2005/pct_news_2005_1.pdf) (last visited Apr. 8, 2005).

<sup>7</sup> ENERGY INFORMATION ADMINISTRATION, ENVIRONMENT, ENERGY RELATED EMISSIONS DATA, *available at* <http://www.eia.doe.gov/env/intlenv.htm> (last visited Apr. 8, 2005).

<sup>8</sup> *The World Factbook* reports that China’s export in 2003 (\$436 billion) was already larger than that of France (\$347 billion), the United Kingdom (\$305 billion), Canada (\$279 billion) and Italy (\$278 billion), all of which are members of the Group of Seven. CENTRAL INTELLIGENCE AGENCY, THE WORLD FACTBOOK (CIA 2004). The Factbook also reports that China in 2003 stood as the second-largest economy (\$6 trillion of GDP) in the world after the U.S. (\$11 trillion) and that the annual growth rate of GDP in China has been nearly 10% since 1978. This suggests that China could overtake the U.S. and become the world’s largest economy in only a few decades if its GDP growth continues at the same or higher rate. *See, e.g.*, Elizabeth Becker, *Guess Who’s Invited to Dinner*, NEW YORK TIMES, Sept. 23, 2004 at C1.

<sup>9</sup> Since the early 1980s, Beijing and Chinese municipal governments have advanced environmental protection policies including the reduction of carbon dioxide emission. These policies have been implemented by amendment of the constitution and the Basic Law on Environmental Protection (“BLEP”), enactment of six subsequent national environmental laws, over twenty national environmental regulations, nearly four hundred pollutant discharge standards, approximately six hundred municipal environmental regulations, and establishment of the State Environmental Protection Administration (“SEPA”) as a governmental pledge of environmental protection. *See, e.g.*, GREGORY FOSTER AND LOUISE WISE, CHINA, THE ENVIRONMENTAL DRAGON: THE ENVIRONMENTAL SECURITY IMPLICATIONS OF CHINA’S RISE TO GREAT-POWER STATUS (Industrial College of The Armed Forces, Fort Lesley J. McNair 2000).

<sup>10</sup> The lack of eco-friendly technologies in China is typically represented by their low number of patent applications; *see, e.g.*, WORLD INTELLECTUAL PROPERTY ORGANIZATION, YEARLY REVIEW OF THE PCT: 2003 (2003), at 3, *available at* [http://www.wipo.int/pct/en/activity/pct\\_2003.pdf](http://www.wipo.int/pct/en/activity/pct_2003.pdf) (last visited Apr. 8, 2005). In terms of capital shortage, while China spent \$14 billion in 2002 for environmental protection, about 1.2% of its annual GDP, several estimations suggest that sufficient prevention and treatment for environmental degradation in China needs around 10% of their GDP. *See also* PlanetSave.Com, *China needs to boost spending on environment* (Mar. 14, 2003), *available at* <http://www.planetsave.com/ViewStory.asp?ID=3796> (last visited Apr. 8, 2005); AIDAN DAVY, ENVIRONMENT MATTERS 12 (World Bank 1996).

<sup>11</sup> *See, e.g.*, THE MINISTRY OF FOREIGN AFFAIRS OF JAPAN, JAPAN’S OFFICIAL DEVELOPMENT ASSISTANCE WHITE PAPER 2002: “STRATEGY” AND “REFORM”, TABLE: JAPAN’S ODA DISBURSEMENTS TO CHINA, *available at* [http://www.mofa.go.jp/policy/oda/white/2002/01ap\\_ea01.html#CHINA](http://www.mofa.go.jp/policy/oda/white/2002/01ap_ea01.html#CHINA) (last visited Apr. 8, 2005).

<sup>12</sup> JAPAN INTERNATIONAL COOPERATION PROJECT, JICA PROJECT REPORT (Japanese), *available at* <http://www.jica.go.jp/china/cooperation/steel/index.html> (last visited Apr. 8, 2005)

<sup>13</sup> *Id.*

<sup>14</sup> *Id.*

<sup>15</sup> *See, e.g.*, JAPAN INTERNATIONAL COOPERATION PROJECT, JICA PROJECT REPORT (Japanese), *available at* [http://www.jica.go.jp/evaluation/end/files/13\\_1\\_60.html](http://www.jica.go.jp/evaluation/end/files/13_1_60.html) (last visited Apr. 8, 2005).