

Evergreening Through Trade Secrets as an Impediment to Green Technology Transfer to the Developing World

L E S L Y N L E W I S *

TABLE OF CONTENTS

I. INTRODUCTION	25
II. LITERATURE REVIEW OF TRADE SECRETS AND EVERGREENING	27
A. THE STATUTORY TREATMENT OF TRADE SECRETS IN INTERNATIONAL LAW	28
1. <i>Evergreening in International IP Law and its Impact on Global Climate Change Goals</i>	30
2. <i>TRIPS and Technology Transfer</i>	32
3. <i>The GATT and Technology Transfer</i>	37
B. COMMON LAW TREATMENT OF TRADE SECRETS (CANADA AND THE U.S.)	38
1. <i>Unlimited Term Protection for Trade Secrets</i>	41
2. <i>Trade Secret & Evergreening in the Caselaw</i>	47
III. TRADE SECRETS AS AN IMPEDIMENT TO GREEN TECHNOLOGY TRANSFER TO THE DEVELOPING WORLD UNDER INTERNATIONAL AGREEMENTS	50
A. EVERGREENING THROUGH PATENT THICKETS AND LICENSING REFUSALS	54
B. THE IMPACT OF EVERGREENING ON GREEN TECHNOLOGY TRANSFER TO DEVELOPING COUNTRIES	60
C. TRADE SECRETS IN PERPETUITY ON ENHANCEMENTS AND KNOW-HOW	66
IV. CONCLUSION	68

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ABSTRACT

Intellectual property law was constructed to facilitate innovation and development by granting a limited monopoly in exchange for the public's right to use an invention after the period of exclusivity expires. The trade-off of granting intellectual property protections in reward for the investment in an invention is intended to be a temporary benefit. Trade secrets have been thought of as the weakest form of intellectual property, because non-disclosure is the only form of protection. In other words, infringement of a trade secret occurs upon the unauthorized disclosure of the secret. However, absent reverse engineering and/or legitimate disclosure, protection over trade secrets may arguably extend the exclusivity rights in perpetuity. The debate on "evergreening" has focussed largely on extending the life cycle of pharmaceutical patents to the omission of other forms of intellectual property, like trade secrets. The concept has also been widely ignored in relation to climate change abatement technologies. In this regard, considerations around evergreening and trade secrets have been substantially neglected. Loopholes in international intellectual property treaties, like *Trade Related Aspects of Intellectual Property Rights* ("TRIPS"), may lead to inequalities between industrial nations and developing ones, especially for products like photovoltaic solar panels that rely heavily on trade-secret protection. In addition, this non-disclosure may also impact on green technology transfer and may impede climate change abatement strategies in the developing world. This paper will explore the practice of evergreening as it relates to the prospect that trade secret protection may extend beyond the 20-year limit, as prescribed in TRIPS, and the implications of this practice for developing countries that seek to meet climate change commitments as outlined in the 2016 *Paris Climate Change Agreement* (the "Paris Agreement"). Arguably, the absence of a fixed statutory period for trade secrets may enable patent owners to participate in creative ways to "evergreen" their products or processes, with the result of extending the life-cycle. The practice of evergreening through trade secrets may have a negative impact on the ability of developing nations to meet their national climate change objectives. Specifically, international treaties like TRIPS, the *General Agreement on Tariffs and Trade, 1994* ("GATT"), the United Nations Framework Convention on Climate Change (the "UNFCCC"), and the *Paris Agreement*, have attempted to incorporate climate change flexibilities that assist developing countries in meeting their climate change goals. The efficacy of technology transfer provisions in international law will be examined within the context of how the lack of a fixed term for trade secrets impacts on actual green technology transfer. It will canvass whether trade secret protection of off-patent green

technologies acts as an inadvertent barrier to technology transfer within the developing world.

I. INTRODUCTION

Climate change is a global phenomenon that creates new legal and practical challenges. One such issue is the costliness of climate abatement technologies and the problems that intellectual property protection poses in exacerbating inequities between industrialized and developing nations. It has been argued that these intellectual property systems often prefer the interests of industrialized nations over developing ones.¹ Specifically, developing nations have been asked to adopt stricter environmental standards than were present during industrial growth of western nations, such as the United Kingdom, the United States and Japan. Some scholars have referenced this environmental “burden” as a form of environmental imperialism that aims to further impoverish nations where the inhabitants are predominantly people of colour.² The imposition of strict environmental standards have been said to be a means of imperialistic control over these countries’ development path.³ One instrument of control that has been used, and has arguably increased the cost of development, is intellectual property protection. While a number of studies have focussed on the role that patents play in development, the concentration on trade secrets has been sparing. The question of whether trade secrets should be given a fixed term of protection like other forms of intellectual property still remains unanswered. Essentially, while other forms of intellectual property such as patents enjoy a 20-year exclusivity period, trade secrets are not subject to any such fixed terms. Instead, a trade secret is lost through disclosure, reverse engineering, and appropriation (usually from a breach of a commercial or employment contract, or misappropriation). Absent these elements a trade secret can remain protected intellectual property in perpetuity. This paper will explore trade secrets within the context of “evergreening” and query whether the lack of fixed-term periods for trade secrets is justifiable in light of global climate change mitigation and adaptation goals.

This paper is divided into three parts. The first portion of the paper addresses the absence of a fixed statutory period for trade secrets both in the international law and under Canadian and American common law. The

¹ Cameron Hutchinson, “Does TRIPS Facilitate or Impede Climate Change Technology Transfer into Developing Countries” (2006) 3 U Ottawa L & Tech J 517.

² Paul Driessen, *Eco-Imperialism: Green Power, Black Death* (Bellevue, WA: Free Press, 2004).

³ *Ibid.*

second portion of the paper addresses the impact of the lack of a fixed statutory period for trade secrets on commercial practices and argues that the practice of “evergreening” is enabled by the lack of a fixed term. The final section of this paper addresses the impact of the practice of evergreening through trade secrets on the developing world’s ability to choose a sustainable path of development. Arguably, the potential to maintain a trade secret for an indefinite period may have a negative impact on the transfer of green technologies like solar panels to the developing world. Furthermore, the absence of a fixed statutory period in trade secrets may have a chilling effect on national climate change abatement strategies, especially in emerging economies. In this regard, this paper queries whether trade secrets of green technologies can be interpreted as “evergreening” through product life-extension strategies. It recognizes the importance of intellectual property rights and explores whether the current state of the law on trade secrets (i.e. the lack of fixed terms) is justifiable within the context of *TRIPS*.

The paper draws upon the example of photovoltaic (PV) solar panel technology and examines the practice of enhancements used by industries after a patent has already been granted. It queries whether the practice of technology owners legally modifying their products through trade secret enhancements, which extend beyond the 20-year limitation period, is a form of evergreening negatively impacting green technology transfer to the developing world. If trade secrets are maintained beyond the standard 20-year period, this may have a negative impact on innovation and development, especially in developing regions.

There are three main ways that a trade secret can be lost: disclosure (direct or inadvertent), reverse engineering, or misappropriation. In the latter case, the court has ruled that misappropriation is prohibited and the violator is forever enjoined from benefitting from the misappropriated information. The rights to a trade secret may be statutorily based or arise from a contractual right to keep the particular secret. However, cases involving employee disclosure, or breaches of contract, may see to the general prohibition of using trade secrets for a fixed utility period, unlike those secrets based on a statutory right of secrecy. Therefore, if there is no disclosure, reverse engineering or misappropriation (by breach of contract), then a trade secret has the potential of remaining a secret in perpetuity. Cases where injunctions have been ordered to remedy misappropriation that is achieved through some aspect of criminality (as distinguished from mere breach of contract) are especially instructive in highlighting the possibility for a trade secret to last for an indefinite period of time. Consequently, this paper is primarily concerned with the inability to legislate a 20-year fixed statutory term for a trade secret and the courts

treatment of trade secret cases involving criminality (where a permanent injunction is granted). In this regard, the claim of perpetuity does not relate to situations involving a mere civil breach of contract, voluntary or involuntary disclosure, or other breach of contract situations. Therefore, absent a breach of contract, should trade secrets be subject to fixed statutory periods similar to other intellectual property rights? Additionally, does the absence of a fixed statutory period for trade secrets impact the ability of developing nations to meet their global climate change obligations under international agreements, like the *Paris Agreement*? In this regard, the utility of trade secrets are inherently recognized, however, it will be argued in this paper that the current system of not having statutory fixed terms for trade secrets is arguably unjustifiable, especially in light of universal intellectual property regimes like *TRIPS* and global climate change commitments like the *Paris Agreement*.

II. LITERATURE REVIEW OF TRADE SECRETS AND EVERGREENING

Balancing intellectual property rights and issues of public interest gives rise to complex legal, financial, and regulatory arrangements, often involving local and international agreements.⁴ Similarly, while much debate has been raised over the impact of environmental standards and intellectual property rights (like patents) on the developing world, very little scholarly debate has surfaced around the impact of practices that extend a technology's intellectual property life cycle. When one explores the commitments concerning technology transfer and its importance to the developing world, made in international treaties like *TRIPS*, *GATT*, and the *Kyoto Protocol*, questions arise about whether there are impediments to achieving these goals within international intellectual property rights treaties.⁵ Specifically, the practice of evergreening and its impact on environmental protection has not received wide scholarly attention. When one considers the balance that is often struck between the disclosure of a patent in

⁴ Adam B Jaffe et al, "Energy-efficient Technologies and Climate Change Policies: Issues and Evidence" (1999) 19 *Resources for the Future, Climate Issue Brief 3*, online: <rff.org/files/sharepoint/WorkImages/Download/RFF-CCIB-19.pdf>.

⁵ See *Agreement on Trade-Related Aspects of Intellectual Property Rights*, 15 April 1994, Annex 1C of the Marrakesh Agreement Establishing the World Trade Organization, 1869 UNTS 299, arts 27.2, 66.2, online: <wto.org/english/docs_e/legal_e/27-trips_01_e.htm> [*TRIPS*]; *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, 11 December 1997, 2303 UNTS 148, art 10, (entered into force 16 February 2005), online: <unfccc.int/sites/default/files/kpeng.pdf> [*Kyoto Protocol*]; *General Agreement on Tariffs and Trade*, 30 October 1947, 58 UNTS 187 (first entered into force on 1 January 1948) [*GATT*].

exchange for a fixed period of exclusive rights, it confounds why more scholarly debate is not focused on the social impact of practices that extend these rights, especially in the context of public goods and climate change abatement.

Patents, copyrights, trademarks and trade secrets are the four main areas of intellectual property.⁶ The domain of trade secrets is unique, as it is the only area that does not have fixed statutory terms. In addition, the case law on trade secrets does not stipulate a minimum or maximum amount of time that a trade secret may last, that is, if the owner continues to maintain its secrecy. Cases where injunctions have been ordered to remedy misappropriation are especially instructive in highlighting the possibility for a trade secret to last for an indefinite period of time.

A. THE STATUTORY TREATMENT OF TRADE SECRETS IN INTERNATIONAL LAW

Prior to the United States advocating for international intellectual property laws that mirror their jurisdictional rights, there was “no mention of trade secrets in any multilateral or bilateral agreements.”⁷ In fact, any attempt to regulate trade secrets would negate the very essence of the practice which relies on keeping information confidential as the only means of protection. With the Uruguay Round of negotiations *TRIPS* enshrined traded secrets in Article 39, with a specific focus on commercial practices under Article 39.2. Article 39 of *TRIPS* attempts to balance intellectual property rights and prevent against unfair competition. Article 39.2 of *TRIPS* recognizes a trade secret within the realm of “honest commercial practices”, so long as the information:

- (a) is secret...
- (b) has commercial value because it is secret; and
- (c) has been subject to reasonable steps under the circumstances, by the person lawfully in control of the information, to keep it secret.⁸

Consequently, information that has already been disclosed (“prior art”) is not subject to any form of intellectual property protection under trade secrets or patents.

⁶ Robert A Choate & William H Francis, *Cases and Materials on Patent Law; Also Including Trade Secrets, Copyrights, Trademarks*, 2nd ed (St. Paul, Minn: West Publishing Company, 1981) at 5.

⁷ Sharon K Sandeen, “The Limits of Trade Secret Law: Article 39 of the TRIPS Agreement and the Uniform Trade Secret Act on which it is Based” in R C Dreyfuss & K J Strandburg, eds, *The Law and Theory of Trade Secrecy: A Handbook of Contemporary Research* (Cheltenham, UK: Edward Elgar Publishing, 2011) 537 at 539.

⁸ *TRIPS*, *supra* note 5, art 39.2.

Scholars like Sharon Sandeen have argued that the enshrinement of Article 39.2 in *TRIPS* is “modeled after the definition of “trade secret” that is contained in the Uniform Trade Secrets Act (UTSA)”.⁹ Sandeen argues that U.S. industrial leaders “advocated for an international system for the protection of international property rights (“IPRs”) that was based upon the laws of the United States.”¹⁰

The traditional grant of a limited monopoly for intellectual property does not apply to trade secrets. In fact, the law aids and abets the holder of a trade secret to keep it secret for as long as possible and disclosure nullifies its protection. In other words, an obligation to utilize trade secret protection requires non-disclosure and secrecy, and laws in various jurisdictions reference the rights that a holder of a secret have under the law.

In international law, a requirement of a trade secret under Article 39(c) of *TRIPS* is that it must be shown that the owner of the secret took “reasonable steps under the circumstances, by the person lawfully in control of the information, to keep it secret.”¹¹ Moreover, unlike all other forms of intellectual property including trademarks, copyrights and patents, no one common law jurisdiction or American jurisprudence sets limits to how long the holder of a trade secret has before that knowledge must be placed in the public domain. The ability to hold a trade secret in perpetuity has not been statutorily or judicially prohibited. The argument may exist that trade secrets are then counterintuitive to the public policy principle adopted in patents that requires eventual disclosure to foster innovation. However, in the US, the courts have ruled that limitless trade secret protection and fixed term patent protection are not incompatible.¹²

Some scholars have identified that patent terms could correspond with research and development expenditures, thus giving short terms to enhancements.¹³ In “The Role of Patent Protection in (Clean/Green) Technology Transfer”, Bronwyn Hall and Christian Helmer highlight the problem of enhancements, which are often protected as trade-secrets:

⁹ *Supra* note 7 at 538.

¹⁰ *Ibid* at 539.

¹¹ *TRIPS*, *supra* note 5, art 39(c).

¹² *Kewanee Oil Co v Bicorn Corp*, 478 F (2d) 1074 (6th Cir 1973) [*Kewanee Oil*], rev'd 416 US 470 (1974); *Aronson v Quick Point Pencil Co*, 440 US 257 (1979), aff'g 416 US 470 (1974).

¹³ Carlos M Correa, “Managing the Provision of Knowledge: The Design of Intellectual Property Laws” in Inge Kaul, ed, *Providing Global Public Goods: Managing Globalization* (Oxford: Oxford University Press, 2003).

A large range of different technologies can achieve emission reductions, and for a significant share of these technologies, the underlying technology is mature and in the public domain. Most technological progress is expected to come from incremental improvements of existing off-patent technologies. While such incremental innovation may be patentable, it leaves ample scope for competing technologies and therefore limits the role specific patents may play for technological progress in this area.¹⁴

This issue of limiting or fixing terms has not been substantially explored within the context of international agreements on technology transfer, and more specifically, the impact on the evergreening of intellectual property that affects global environmental abatement initiatives.

1. Evergreening in International IP Law and its Impact on Global Climate Change Goals

Evergreening is technically, but not expressly, prohibited under several World Trade Organization (“WTO”) treaties. The general understanding is that industrialized nations should not erect any impediments to economic growth for developing nations. This affirmation includes an obligation to assist through transferring technologies to these growing regions. The role of international treaties like *TRIPS*, *GATT*, the *Kyoto Protocol*, and the *Paris Agreement*, in facilitating fair trade practices that encourage economic growth of all WTO Members, cannot be understated. A number of international agreements contemplate the necessity of developed nations to assist developing nations in meeting their environmental goals. Specifically, Article 4.5 of the *Kyoto Protocol* highlights the need for developed countries to “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.”¹⁵ Articles 10(c) and 12 of the *Protocol* encourage technology transfer by focussing on creating an “enabling environment”¹⁶ that assists developing nations in their goal of sustainable development while “achieving compliance with their quantified emission limitation and reduction commitments.”¹⁷ Even with the support of the

¹⁴ Bronwyn H Hall & Christian Helmers, “The Role of Patent Protection in (Clean/Green) Technology Transfer” (2009) 26:4 *Santa Clara Comp & High Tech LJ* 487 at 493; see also Daniel K N Johnson & Kristina M Lybecker, “Innovating for an Uncertain Market: A Literature Review of the Constraints on Environmental Innovation” (2009) Colorado College Working Paper No 2009-06.

¹⁵ *Kyoto Protocol*, *supra* note 5, art 10(c).

¹⁶ *Ibid*, arts 10(c)-12.

¹⁷ *Ibid*, arts 4, 12, 17.

UNFCCC, programs are sometimes implemented with disparate outcomes. For example, the well-intended Clean Development Mechanisms (“CDM”)s under the Protocol allow polluters in developed countries to claim certified emissions reduction credits from green investments in developing countries, resulting in only a few developing nations being beneficiaries of this initiative (Brazil, India, China and Mexico). To demonstrate this, of the 7,828 CDM projects in 2015, only 2.51% were in Africa.¹⁸ The *Paris Agreement* attempts to balance mitigation and adaptation measures with the local development needs by its commitment to reduce “vulnerability to climate change”,¹⁹ particularly the conditions experienced by developing nations who are facing “the adverse effects of climate change.”²⁰ Commitments in the *Paris Agreement* also recognize “a country-driven, gender-responsive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems”²¹ that include “traditional knowledge, knowledge of indigenous peoples and local knowledge systems” in the decision making process.²²

The main body that regulates trade and intellectual property is the WTO which was created in 1995 after eight years of negotiations, beginning in September of 1986 in Punta del Este, Uruguay, and ending in Marrakesh, Morocco on April 15, 1994. On January 1, 1995 the *TRIPS* Agreement came into effect with the aim of harmonizing global intellectual property protection. *TRIPS* is administered through the WTO *TRIPS* Council which holds annual Members’ meetings. In 2001 the WTO Doha Ministerial Conference created the Working Group on Trade and Transfer of Technology (“WGTTT”).²³ Since its creation, the Working Group meets on average 4 times per year and submits annual reports to the General Council on the success of technology transfer under Article 66.2 of *TRIPS*.²⁴ UNFCCC was created in 1994 and the Kyoto Protocol enshrined in 2005.²⁵ Article 4.1(c) of the Convention

¹⁸ *Clean Development Mechanism*, UNFCCC, Executive Board Annual Report (2014), online: <unfccc.int/resource/docs/publications/unfccc_cdm-eb_annual_report2014.pdf> at 7, 17.

¹⁹ *Adoption of the Paris Agreement*, Dec 1/CP.21, UNFCCCOR, Sess 21, UN Doc FCCC/CP/2015/10/Add.1 (2016), art 7.1.

²⁰ *Ibid*, art 7.2.

²¹ *Ibid*, art 7.5.

²² *Ibid*.

²³ *Doha Ministerial Declaration*, WTO Doc WT/MIN(01)/DEC/1 (2001), 4th Sess, online: <wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.pdf> at para 37.

²⁴ WTO, Doha Ministerial Conference, *Implementation-Related Issues and Concerns* (14 November 2001), WTO Doc WT/MIN(01)/17, 4th Sess, s 11.1, online: <wto.org/english/thewto_e/minist_e/min01_e/mindecl_implementation_e.pdf>.

²⁵ Kyoto Protocol, *supra* note 5, art 3.2.

underscores the importance of environmentally sound technology transfer and Article 4.5 references the diffusion of environmentally sound technologies and the goals of climate change mitigation. Specifically, Article 4.5 encourages developed countries to “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.”²⁶ The UNFCCC report identified a number of barriers to the transfer of green technology to the developing world, including institutional, political, technological, economic and informational.²⁷

The role of the private sector in facilitating technology transfer is also captured in Article 10(c) of the Kyoto Protocol which promotes removing any legal, administrative and regulatory barriers to “create an environment conducive to private and public sector technology transfer.”²⁸ Despite the perceived failure of Kyoto, the Protocol was a signal from the international community that the issue of increasing carbon dioxide emissions would be compounded with the growth of developing economies. Three years after adoption, a conference was held in Bali, Indonesia, with the aim of creating a climate change treaty.²⁹

While the Kyoto Protocol creates a mechanism for technology transfer, there are no affirmative, prescriptive measures that a developing country could rely on in order to access environmentally sound technology.

2. *TRIPS and Technology Transfer*

In 2003 the WGTTC reaffirmed the positive obligation of developed nations to assist in technology transfer by incorporating the requirement under Article 66.2 to submit detailed annual reports.³⁰ This reporting requirement, while creating positive obligations under Article 66.2, the mechanisms to facilitate and monitor its successful implementation have not been put into effect. Unlike *TRIPS* and the minimum standards for intellectual property, the

²⁶ *Ibid*, art 4.5.

²⁷ UNFCCC, Technical Paper on Terms of Transfer of Technology and Know-How: Barriers and Opportunities Related to the Transfer of Technology, UN Doc FCCC/TP/1998/1, 13 October 1998, online: <unfccc.int/resource/docs/tp/tp0198.pdf>.

²⁸ *Kyoto Protocol*, *supra* note 5, art 10(c).

²⁹ Report of the Conference of the Parties on its thirteenth session, held in Bali from 3 to 15 December 2007, UNFCCCOR, 2008, UN Doc FCC/CP/2007/6/Add.1.

³⁰ It should be noted that this “requirement” was not enforced; many countries failed to submit reports. See e.g. Commission on Intellectual Property Rights, “Integrating Intellectual Property Rights and Development Policy” (September 2002) at 25–27, online: <iprcommission.org/papers/pdfs/final_report/CIPRfullfinal.pdf>.

technology transfer provision sets no fixed level that WTO Members must implement or engage in order to comply with Article 66.2. The “public good” associated with climate change abatement increases the obligation for technology transfer. The problem arises because Article 66.2 is obligatory and would require mechanisms to support and monitor its effective implementation. Another problem with international treaties relating to technology transfer is that these agreements, while they address minimum standards, they fail to set enforceable practice directions for patent abuses like evergreening that may hinder technological progress and advancement.

Economic development and the commitment to transfer technology must consider green technologies as a tool to abate climate change while simultaneously assisting with the development of a nation. *TRIPS* also attempts to balance the inequality that would result from least developed countries requirement to adhere to patents where their economies were technologically delayed. The concessionary Article 66.2 attempted to create a legal obligation for developed countries to assist in the technological development of LDC through technology transfer. Article 66.2 reads as follows:

Developed country members shall provide incentives to enterprises and institutions in their territories for the purpose of promoting and encouraging technology transfer to least developed country members in order to enable them to create a sound and viable technological base.³¹

Recognizing the disadvantage that costly patents may render to developing and least-developed countries, *TRIPS* attempts to address this inequality by creating a legal obligation for developed countries to engage in technology transfer with least-developed countries. Accordingly, Article 66.2 recognizes that developed countries need to provide incentives for technology transfer to developing nations.³² Technically, Member States can also label certain practices including evergreening as anti-competitive under Article 40 of *TRIPS* as a means to “prevent and control” such activities that may have an “adverse effect on competition in the relevant market.”³³ Article 40.2 has been criticized for being too general and not explicitly addressing how to minimize such abuses. Correa addresses shortcomings within Article 40 by highlighting the fact that “[i]nstead, while expressly allowing Members to adopt measures to control or prevent such practices, it takes pains to establish limits to national

³¹ *Ibid.*

³² *TRIPS*, *supra* note 5, art 66.2.

³³ *Ibid.*

action in this field.”³⁴ Thus, the issue of whether term extensions should even apply to clean technologies in the area of patents is still unsettled. The issue is even more complex when one considers that trade secrets have no fixed IP term and as such, there is limited discussion about trade secrets that extend beyond 20 years. Even without this clarification, however, developing nations still call for the temporary removal of licenses on environmentally-sound technologies to abate the effects of climate change.³⁵ Other measures proposed by developing countries include patent pooling, royalty-free compulsory licensing of green technology, and the revoking of patent rights on existing green patents.³⁶ It should be noted that even if developing nations succeed in labelling such practices as anti-competitive, there is still no mechanism for imposing penalties on Member States engaging in such practices.

The issue of technology transfer is addressed under Article XX of the GATT, as well as Articles 7, 8, 40 and 66.2 of TRIPS. The WTO’s Dispute Settlement Body (“DSB”) has heard five cases pertaining to the General Exceptions provision under Article XX of the GATT, one case under Article 7 and a companion case under Article 8 of TRIPS, while no cases have been brought forth under Articles 40 or 66.2 of TRIPS.³⁷ While Article 66.2 of TRIPS is most directly related to the issue of technology transfer, the absence of request for consultations hinders any meaningful assessment of how this provision could be implemented in international law. The issue of whether a generic manufacturer can stockpile a product prior to the expiry of a patent was considered by the DSB in DS114. The decision may be instructive in assessing the scope of TRIPS exceptions under Article 30 as they relate to various aspects of evergreening. The DSU case of *Canada – Patent Protection of Pharmaceutical*

³⁴ Carlos M Correa, “Can TRIPS Agreement Foster Technology Transfer to Developing Countries?” in Keith E Maskus & Jerome H Reichman, eds, *International Public Goods and Transfer of Technology: Under A Globalized Intellectual Property Regime* (New York: Cambridge University Press, 2005) at 237.

³⁵ Jason R Weiner, “Sharing Potential and the Potential for Sharing: Open Source Licensing as a Legal and Economic Modality for the Dissemination of Renewable Energy Technology” (2006) 18:2 *Geo Intl Envtl L Rev* 277.

³⁶ Report of the Ad Hoc Working Group on Long-term Cooperation Action under the Convention on its eighth session, held in Copenhagen from 7 to 15 December 2009, UNFCCCOR, 2010, UN Doc FCCC/AWGLCA/2009/17, online: <unfccc.int/sites/default/files/resource/docs/2009/awglca8/eng/17.pdf>.

³⁷ See “Dispute Settlement Rules: Understanding on Rules and Procedures Governing the Settlement of Disputes” (1994), Marrakesh Agreement Establishing the World Trade Organization, Annex 2, 1869 UNTS 401, online:

<wto.org/english/tratop_e/dispu_e/dispu_agreements_index_e.htm?id=A26>.

Products (DS114) (“Canada Pharmaceutical Case”)³⁸ addressed the prospect of generic manufacturers stockpiling products six months prior to patent expiry.

The *Canada Pharmaceutical Case* differs from the subject matter herein, because it related to the challenge of Article 28 (during the life of a patent), which is not relevant to the issue of evergreening (which deals with the extension of the product’s exclusivity period). In addition, Canada is an industrialized nation and its invocation of the Article 30 exception would be on entirely different grounds than that of a developing nation. The challenge in the *Canada Pharmaceutical Case* pertained to section 55.2(2) of the Canadian *Patent Act*, specifically, the regulatory review process that allowed generic manufacturers to stockpile products in contravention of Article 28 of *TRIPS* which conferred exclusive rights on patent holders. While Canada agreed that the stockpiling provision violated Article 28.1 of *TRIPS*, it argued that the measure could be justified under the Article 30 exception. The Panel found that the measure could not be justified because there were no limits on the quantity of product produced for stockpiling and as such constituted a “substantial curtailment of the exclusionary rights” granted by Article 28.1.³⁹

While this case addresses the issue of how an exception to the non-discrimination provision in *TRIPS* arose, it is not entirely analogous to the issue of trade secrets addressed herein, which is primarily concerned with the intellectual property protection conferred without a fixed period regarding when those exclusive rights will expire. In the *Canadian Pharmaceutical Case*, the issue pertained to the infringement of rights, via stockpiling, during the period of exclusivity (prior to patent expiry). While the fact that there is no fixed expiry term for trade secrets makes the application of this case difficult within a general context, the Panel’s decision that the European Union failed to demonstrate that the Canadian regulatory review provision was discriminatory under Article 27.1, is somewhat supportive of the principle that Member States may enact laws that promote the development of their local economies once they are non-discriminatory pursuant to Article 30. In this regard, the *Canada Pharmaceutical Case* decision supports the principle of Article 8 once the measure or exception meets the minimum tripartite requirements of 1) being

³⁸ *Canada – Patent Protection of Pharmaceutical Products (Complaint by the European Communities)* (2000), WTO Doc WT/DS114/R (17 March, 2000), online: docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=29169&CurrentCatalogueIdIndex=0&FullTextHash=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True.

³⁹ *Ibid*, s 7.36.

limited, 2) it does not “unreasonably conflict with the normal exploitation of the patent”, and 3) it does not “unreasonably prejudice the legitimate interests of the patent owner”.⁴⁰ These requirements also take into consideration the “legitimate interests” of third parties. Article 7 (promotion of technological innovation and transfer) and Article 8 (promotion of public health and unreasonable restraint on trade) were not invoked by Canada, which is an industrialized nation, but could potentially be relied upon in future disputes involving developing nations within the context of the Article 30 exception.

The issue of technology transfer is also directly linked to the promotion of social and economic welfare as contained in Article 7 of *TRIPS*. This provision recognizes that the promotion of intellectual rights “should contribute to the promotion of technological innovation and to the transfer and dissemination of technology.”⁴¹ Article 8 of *TRIPS* also upholds each Member State’s right to protect the public’s interests and this would arguably include alleged intellectual property abuses such as evergreening. Article 8 recognizes the right of Member States to “adopt measures necessary to protect and promote the public interest in sectors of vital importance to their socio-economic and technological development”. In addition, Members are encouraged to adopt measures that are “consistent” with *TRIPS* and to “prevent the abuse of intellectual property rights by right holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology”.⁴² Thus, practices such as evergreening may be viewed by some Member States as not being in the public interest and consequently inconsistent “with the provisions” of *TRIPS*. Article 8 could therefore be used to challenge practices such as evergreening that could negatively impact on green technology transfer. A total of two related cases (DS408 and DS409) have been brought before the WTO Dispute Settlement Body under Articles 7 and 8 of *TRIPS*. In DS408 “European Union and a Member State - Seizure of Generic Drugs in Transit”, India initiated a request for consultation with the European Union and the Netherlands, alleging that the two countries were repeatedly seizing their generic drugs that were on route to third party countries through ports and airports in the Netherlands. On May 28, 2010, Brazil, Canada and Ecuador requested to join the consultations and were followed on

⁴⁰ *TRIPS*, *supra* note 5, art 30.

⁴¹ *Ibid*, art 7.

⁴² *Ibid*, art 8.

May 31, 2010 by China, Japan and Turkey.⁴³ The consultations have not been concluded to date and no determination has been reached. It is unclear whether aspects of Article 7 referencing the “mutual advantage of producers and users of technological knowledge” will be advanced, or if the consultations will focus more on Article 8 and the right of members to “adopt measures necessary to protect public health.”⁴⁴

3. *The GATT and Technology Transfer*

The GATT contains perhaps one of the strongest provisions for implementing trade exceptions relating to environmental protection. Article XX of the GATT contains a chapeau provision that could potentially facilitate the transfer of environmentally sound technology to the developing world. A total of five Requests of Consultations were considered under Article XX of the GATT by the WTO Dispute Settlement Body.⁴⁵ These five cases largely addressed food issues related to livestock and shrimp importation. Moreover, these cases did not consider patents or more specifically, trade secrets. Despite the lack of direct connection to the subject matter of trade secrets, these cases may be instructive in understanding how exceptions that pertain to the environment and technological advancement may be addressed by the WTO.

On October 8, 1996, a request for consultation was initiated by India, Malaysia, Pakistan and China against the United States regarding the US’ ban on the importation of shrimp products from these countries. The complainants alleged that the shrimp ban was inconsistent with Article XI:1 of the GATT. It was also alleged that the chapeau of Article XX of the GATT could not be used to justify this inconsistency. The panel found that the shrimp ban was inconsistent with Article XI:1 of the GATT and could not be justified under Article XX of the GATT. The Appellate Body reversed the panel’s decision and essentially concluded that the shrimp ban was within the scope of measures permitted by the chapeau of Article XX of the GATT, but that the US measures did not meet the requirements of the chapeau of Article XX. The Appellate Body found that in spite of this failure, the US qualified for provisional justifications under Article XX(g) of the GATT. Consequently, Article XX(g) of the GATT may be used to justify conservation measures, even where those

⁴³ European Union and a Member State – Seizure of Generic Drugs in Transit (Complaint by India) (2010), WTO Doc WT/DS408/1–8, online: <wto.org/english/tratop_e/dispu_e/cases_e/ds408_e.htm>; European Union and a Member State – Seizure of Generic Drugs in Transit (Complaint by Brazil) (2010), WTO Doc WT/DS409/1–8, online: <wto.org/english/tratop_e/dispu_e/cases_e/ds409_e.htm>.

⁴⁴ TRIPS, *supra* note 5, arts 7–8.

⁴⁵ GATT, *supra* note 5, art XX.

practices conflict with a Member's obligations under the GATT. This decision raises concerns about whether Article XX(g) could be used to support climate change abatement strategies that may be initially deemed inconsistent with international trade obligations.

B. COMMON LAW TREATMENT OF TRADE SECRETS (CANADA AND THE U.S.)

It has long been established in Anglo-American jurisprudence that the main quality of a trade secret is the confidence that one party holds about the particular secret that enhances trade or provides a competitive advantage.⁴⁶ As such, the proprietary nature is not contained in the main feature of this intellectual property *per se*, but is instead the non-disclosure of the trade secret.⁴⁷ Therefore, the protection of a trade secret traditionally only lasts as long as the trade remains a secret.⁴⁸ The problem of secrecy is inherently connected to the uncertainty that exists regarding how long trade secret protection lasts. While all forms of intellectual property other than trade secrets provide for fixed statutory term limits, trade secrets have no such provision and have been determined largely by case law involving injunctions. In cases where the trade secret remains secret, an injunction may protect the duration of the secret, which may persist in perpetuity.⁴⁹ Most countries indirectly provide protection for trade secrets in their federal or state/provincial laws by combining a number of areas of law including tort law (trespass)⁵⁰ and contract law (theories of

⁴⁶ *E I Du Pont de Nemours Power Co v Massland*, 244 US 100 (1917).

⁴⁷ *Ibid* at 102 (where Holmes J commented, in obiter, that the fact that something may be property is separate from whether it may be protected as in the case with a "valuable secret" or where facts are obtained "through a special confidence").

⁴⁸ US Restatement of Torts §757 (1939).

⁴⁹ E J Khan, *The Big Drink: The Story of Coca-Cola* (New York: Random House, 1960).

⁵⁰ The Supreme Court of Canada has ruled that negligence claims must be derived from independent and actionable wrongs, separate from contractual relationships; see *J Nunes Diamonds Ltd v Dominion Electric Protection Co*, [1972] SCR 769 at 777-778, 26 DLR (3d) 699 at 727-728.

breach of confidence⁵¹ that are founded in equity,⁵² unfair competition⁵³, which has been classified also as a tort of conversion,⁵⁴ and unjust enrichment),⁵⁵ criminal law,⁵⁶ and the most robustly litigated area of employee/employer law and fiduciary obligations emanating there from.⁵⁷ In this regard, the accidental loss of a trade secret (absent misappropriation or breach of contract) will not

⁵¹ Canadian and American case law has generally followed the decision in *Coco v A N Clark (Engineers) Ltd*, [1968] FSR 415 at 415, [1969] RPC 41 (Ch). For a general overview of the principle of breach of confidence in *Coco*, see page 425, whereat it was concluded that courts “...must be ready to make those implications upon which the sane and fair conduct of business is likely to depend”); see also P North, “Breach of Confidence: Is There a New Tort?” (1972) 12 *J Soc’y Pub Teachers L* 149.

⁵² Woodhouse J found that claims, in equity, of breach of confidence can be pursued independently from contract and tort claims; see *Consolidated Ltd v European Strength Food Co Pty Ltd*, [1978] 2 NZLR 515 (CA) at 520; see also *Consolidated Textiles Ltd v Central Dynamics Ltd* (1974), 18 CPR (2d) 1 at 11–13, [1974] 2 FC 814 at 827–829 (TD).

⁵³ This cause of action is usually attached to nondisclosure agreements (“NDA”), non-compete agreements (“NCA”), non-solicitation or non-circumvention agreements, or breach of licensing agreements; see *Atlantic Business Interiors Ltd v Hipson et al*, 2005 NSCA 16 at para 38, 230 NSR (2d). See e.g. South African cases on unfair competition: *Prok Africa (Pty) Ltd. v NTH (Pty) Ltd*, [1980] 3 SALR 687 at 697.

⁵⁴ *MacDonald v Vapor Canada Ltd*, [1977] 2 SCR 134, 22 CPR (2d) 1, 66 DLR (3d) 1 at 13.

⁵⁵ There is a general principle at common law, articulated by Lord Denning in *Seager v Copydex Ltd*, [1967] 1 WLR 923 (CA) at 931, that “...he who received information in confidence shall not take unfair advantage of it.” See e.g. the predecessor cases of Canada and the US: *Fibrosa Spolka Akcyjna v Fairbairn Lawson Combe Barbour Ltd*, [1943] AC 32 HL at 61; *Degelman v Guaranty Trust Co of Canada*, [1954] 3 DLR 785 at 788, [1954] SCR 725.

⁵⁶ F Kaufman, “Industrial Espionage and the Criminal Law: in *Studies in Criminal Law Procedure* (Toronto: Canada Law Book Ltd, 1972) 101.

⁵⁷ Jennifer Brant & Sebastian Lohse, “Trade Secrets: Tools for Innovation and Collaboration” (2014), International Chamber of Commerce, Innovation and Intellectual Property Series, at 7; see also Mark A Lemley, “The Surprising Virtues of Treating Trade Secrets as IP Rights” (2008) 61:2 *Stan L Rev* 311; Griffin M Barnett, “Combatting Trade Secret Theft By Foreign State-Owned Entities: An International Law Approach” (2015) 5:2 *J Intl and Comparative L* 46; World Intellectual Property Organization, “What is a Trade Secret?”, online: <wipo.int/sme/en/ip_business/trade_secrets/trade_secrets.htm> [WIPO, *Trade Secret?*]; for fiduciary-employee relations, see P Y Atkinson and R A Spence, “Fiduciary Duties Owed by Departing Employees – The Emerging ‘Unfairness Principle’” (1984) 8:4 *Can Bus LJ* 501; *Faccenda Chicken Ltd v Fowler*, [1986] 3 WLR 288, [1986] 1 All ER 617 at 731 (for the principle that all information of a confidential nature can bind employees in post-employment covenants); see *Gates Rubber Company v Bando Chemical Industries Ltd et al*, 9 F (3d) 823 at 848 (10th Cir 1993), for the principle that a breach of confidentiality in trade secret cases provides an additional element over copyrights which “qualitatively distinguishes such trade secret causes of action from claims for copyright infringement that are based solely on copying.”

be protected.⁵⁸ Similarly, trade secrets that are lost by reverse engineering are also not protected.⁵⁹

The lack of uniformity in trade secret law has led to disaccorded judicial outcomes,⁶⁰ not only in commonwealth nations,⁶¹ but also under American jurisprudence. The main jurisprudence in trade secret law has been concentrated in the area of breach of confidentiality arising from employment obligations.⁶² In the United States, the divergent theories and legal outcomes on trade secret litigation that arose from the application of the *US Restatement of Torts* §757.⁶³ The *US Restatement of Torts* §757 (1939) defines trade secrets in the following way:

A trade secret may consist of any formula, pattern, device or compilation of information which is used in one's business and which gives him an opportunity to obtain an advantage over competitors who do not know or use it.⁶⁴

The judicial definitions of trade secrets and its legal applications have led to immense disagreement in the area of trade secret law and has been said to

⁵⁸ Uniform Law Conference of Canada, *Uniform Trade Secret Act* (1989), online: <ulcc.ca/en/home/537-josetta-1-en-gb/uniform-actsa/trade-secrets-act/730-uniform-trade-secrets-act-1989> [*Uniform Trade Secret Act*].

⁵⁹ *Ibid*, s 6.2.

⁶⁰ See *Greenberg v Croydon Plastics Co*, 378 F Supp 806 (ED Pa 1974) at 812, where it was admitted that the “concept of a trade secret is extraordinarily difficult to define.” Note that prior to 1989 in Canada, there was no precise definition of a trade secret, and Canadian courts largely relied upon the now repealed section 7(e) of the *Trade Marks Act* by applying a standard which prohibited conduct “contrary to honest industrial or commercial usage in Canada.” See *Trade-Mark Act*, RSC 1985, c T-13, s 7(e), which was repealed in 2014. For an analogous statute which is similar to the current treatment of trade secrets in Canada, see *Uniform Trade Secrets Act* § 1, 14 ULA 537, 541 (1985).

⁶¹ HG Fox, *The Canadian Law of Trade Marks and Unfair Competition*, 3rd ed (Toronto: Carswell, 1972); S Ricketson “Confidential Information – A New Proprietary Interest? Part I” (1977) 11 *Melbourne UL Rev* 223; W R Cornish “Protection of Confidential Information in English Law” (1975) 6 *Intl Rev Industrial Property and Copyright L* 43; David Vaver “Civil Liabilities for Taking or Using Trade Secrets in Canada” (1981) 5 *Can Bus LJ* 253.

⁶² The common law has, on public policy ground, frowned upon contracts that restrict employee mobility; see *Nordenfelt v Maxim Nordenfelt Guns and Ammunition Co Ltd* (1984), [1894] AC 535 (HL).

⁶³ *US Restatement of Torts*, *supra* note 48; see also a number of secondary sources: R M Milgrim, *Trade Secrets* (New York: Matthew Bender, 1978); Aaron N Wise, *Trade Secrets & Know-How Throughout the World* (New York: Clark Boardman, 1974); R Callmann, *The Law of Unfair Competition, Trademarks and Monopolies*, 3rd ed (Illinois: Callaghan, 1969).

⁶⁴ *US Restatement of Torts*, *supra* note 48 at §757. Note: Comment B of the Restatement of Torts admits to the difficulty that arises in defining a trade secret and adds that an “exact definition of a trade secret is not possible.”

raise “more questions than it answers.”⁶⁵ It has also been found that the operational definition is also unclear and consists “of little more than an enumeration of the factors which courts utilize in deciding what kinds of information are protectable trade secrets.”⁶⁶ The uncertainty that arose from a common-law interpretation of the *US Restatement of Torts* eventually led to a codification of federal and state level common-law trade secret decisions into the *Uniform Trade Secrets Act*.⁶⁷ The reality of trade secret law around the globe is no different than in Canada where there is also no singular statutory protection for undisclosed commercial information.⁶⁸

1. *Unlimited Term Protection for Trade Secrets*

Unlike other forms of intellectual property like patents, trademarks, and copyrights that have fixed terms prescribed by statutory limits, trade secret protection can be unlimited.⁶⁹ While patents protect information filed in a patent, the only protection for trade secrets is non-disclosure. Thus, the protection exists until the rights holder voluntarily discloses that information. Similarly, while patents grant an exclusive right for a limited period, trade secrets contain no requirement to eventually make an invention or know-how public. The Supreme Court in *Kewanee Oil Co* recognized that there may be overlaps in patent and trade secret protection, with trade secret enjoying an extended protection which does not require eventual public disclosure.⁷⁰ Thus, it is not inconceivable for many firms to forego patenting enhancements achieved after the expiry of a patent, and instead, choose to retain protection of these enhancements as trade secrets in perpetuity. Thus, while trade secrets may have infinite protection under the law (especially for undisclosed information), the protection is more closely tied with the length of time that a

⁶⁵ Robert A Spanner, *Who Owns Innovation*, 1st ed (Illinois: Dow Jones-Irwin, 1984) at 7.

⁶⁶ *Ibid.*

⁶⁷ *Uniform Trade Secret Act*, *supra* note 58; Richard F Dole Jr, “Permanent Injunctive Relief for Trade Secret Misappropriation Without an Express Limit upon Its Duration: The Uniform Trade Secret Act Reconsidered” (2011) 17 *BUJ Sci & Tech L* 173.

⁶⁸ Alberta Law Reform Institute, “Trade Secrets Report No 46” (1986), online: <alri.ualberta.ca/docs/fr046.pdf>; John T Ramsay and François Grenier, *Trade Secrets Throughout the World, Canada* (Toronto: Thomson/West, 2005); James D Kokonis, “Confidential Information” in Gordon F Henderson et al, eds, *Copyright and Confidential Information Law of Canada* (Scarborough: Carswell, 1994) 325 at 327.

⁶⁹ Lemley, *supra* note 57; Karl F Jorda, “The Rights of the First Inventor—Trade Secret User as Against Those of the Second Inventor Patentee (Part II)” (1979), 61 *J Pat Trademark Off Soc’y* 593.

⁷⁰ *Kewanee Oil*, *supra* note 12.

trade secret has utility,⁷¹ which has been estimated by one scholar as “a mere three years.”⁷² While this argument appears to contradict the within thesis which maintains that absent a fixed statutory period for trade secrets, the holder of this IP has a perpetual right to operate (absent a legitimate disclosure), it does not consider the issue of enhancements. For example, as will be argued below, PV solar panels and other environmental products are often improved through enhancements based on the original IP. Therefore, the estimated utility of a trade secret that has been subject to an enhancement can extend well beyond three years as putatively projected by certain scholars.

Contrary to the above argument that the utility of a trade secret is three years, case law in the area of trade secrets has granted permanent injunctions, which suggests that the duration of a trade secret can be infinite, or else there would be no need to permanently enjoin the infringer.⁷³ In *Allen-Qualley Co v Shellmar* (“*Shellmar*”),⁷⁴ the plaintiff Allen-Qualley was negotiating a license from Shellmar for a candy-wrapping machine. Shellmar obtained confidential information and used it to conduct a patent search that revealed much of the secret candy-making machine. Shellmar purchased the patent and the issue was whether it breached the oral agreement to hold the confidential information in trust until the licensing contract was duly executed. A perpetual injunction was issued against Shellmar, which prohibited the use of the candy-machine; a reassignment of the patent, to Allen-Qualley, was also ordered. The issue of perpetual injunctions raised in *Shellmar* goes beyond protecting trade secrets (which remains secret), to contemplating the length of punishment an infringer ought to face. In the companion case of *Shellmar Products Co v Allen-Qualley Co*,⁷⁵ several third parties were granted patents on the candy-machine which divulged the secret that was in dispute in the initial *Shellmar* case. Shellmar sought to set aside the earlier injunction on the basis that the trade secret was disclosed in patents that were filed subsequent to the order. The court found that Shellmar’s breach of confidence prohibits it from benefiting from the use of

⁷¹ *Nelson Burns & Co Ltd et al v Gratham Industries Ltd et al* (1983), 150 DLR (3d) 692 (H Ct J), aff’d (1986), 55 OR (2d) 426 (CA), leave to appeal to SCC refused (1986), 56 OR (2d) 604.

⁷² P W Leuzzi, *Process Inventions: Trade Secrets or Patents Protection* (1984) 66 J Pat Trademark Off Soc’y 159 at 168.

⁷³ The term “perpetual” injunction has been used in the case law to suggest a permanent or ongoing injunction with no fixed duration; see *Shellmar Products Co v Allen-Qualley Co* 87 F (2d) 104 (7th Cir 1936); see also *Shellmar Products Co v Allen-Qualley Co* 301 US 695 (1937).

⁷⁴ *Allen-Qualley Co v Shellmar Prods Co*, 31 F (2d) 293 (ND Ill 1929), aff’d 36 F (2d) 623 (7th Cir 1929).

⁷⁵ *Ibid* (cited to 36 F (2d) 623 (7th Cir 1929)).

the candy-machine and that by its conduct it "...had taken itself outside the pale of the general public to which the disclosure of that patent was made."⁷⁶ The logic of the court rests on the fact that should a trade secret be misused, the abuser should never benefit from the breach once it has gone public. This prevents the deliberate breach that would thereafter result in public knowledge, and the abuser subsequently claiming the right to use the public information that he pillaged. The breach of confidence forever enjoins the abuser from using the information that was gained in confidence. Thus, *Shellmar* stands for the proposition that an infringer who has received knowledge and has acted to breach confidence shall not benefit from his/her actions. However, where the information has not been disclosed through unscrupulous means, then an injunction should only be granted up until the time where that information legitimately becomes public.⁷⁷

There are essentially two lines of reasoning in trade secret injunction cases: that of *Shellmar*, which champions the protection of undisclosed trade secrets in perpetuity, but only against violators; and that of *Conmar Products Corp v Universal Slide Fastener Co*, which recognizes, where trade secrets have already been legitimately disclosed, with only limited protection. In *Conmar*, trade secrets were disclosed through a zipper patent that was later deemed invalid. Judge Learned Hand found that since the secret had already been disclosed through the issuance of a patent, Universal Slide Fastener could not rely on trade secret doctrine. It was clearly stipulated that the intellectual property is not the confidential information, but is instead the trade secret. As such, if no secret exists because of legitimate disclosure, then there is no legal protection extended to the confidential relationship.⁷⁸ The line of cases that follow *Conmar* focus on freedom of employment where the trade secret had already been divulged.⁷⁹ Thus, *Comar* does not undermine the reasoning in *Shellmar* which continues to protect trade secrets that have not been divulged or that have been disclosed through breach of confidence. The perpetual protection of trade secrets offered under *Shellmar* gives rise to the potential that companies may use this form of intellectual property to evergreen their products.

⁷⁶ *Ibid* at 107.

⁷⁷ *Conmar Products Corp v Universal Slide Fastener Co*, 172 F (2d) 150, 156 (2d Cir 1949) [*Conmar*].

⁷⁸ *Ibid*.

⁷⁹ *Ibid*; see also *Winston Research Corp v Minnesota Mining & Manufacturing Co*, 350 F (2d) 134 (9th Cir 1965) [*Winston*].

Another seminal American case considered a particular factual situation, which traditionally gives rise to questions of evergreening, wherein – after the expiry of a patent – a patent-holder improves on the product through an enhancement kept as a trade secret.⁸⁰ In *Franke v Wiltschek*, the defendant argued that the enhancement should not be subject to protection, as it was based on an expired patent. The court made a clear distinction between cases involving enhancements protected as trade secrets, and those based on expired patents:

Plaintiffs do not assert, indeed cannot assert, a property right in their development such as would entitle them to exclusive enjoyment against world. There is not a patent, but a trade secret. The essence of their action is not infringement, but breach of faith. It matters not that defendants could have gained their knowledge from a study of the expired patent and the plaintiffs' publicly marketed product. The fact is that they did not. Instead they gained it from plaintiffs via their confidential relationship, and in so doing incurred a duty not to use it to plaintiffs' detriment. This duty they have breached.⁸¹

The notion that enhancements of a patent can be protected via trade secrets, as advanced in *Franke*, coupled with case law and statutory principles that fail to limit the duration of a trade secret, is the current basis for a doctrine of evergreening in trade secrets. However, the court in *Franke* found that if the defendant had gained knowledge of the trade secret through an expired patent, then the plaintiffs could not assert “a property right in their development such as would entitle them to exclusive enjoyment against the world.”⁸² This statement clearly supports the proposition that legitimate disclosure, reverse engineering or ingenuity can lead to the loss of trade secret protection, however, a breach of a “confidential relationship” will enjoin the infringer from benefitting from the illicit disclosure.

The issue of how long an infringer will be prohibited from putting to use a trade secret will likely be clarified in the recent case involving a Chinese company (*Sinovel*) and an American company (*American Superconductor*). The *Sinovel* case addresses the issue of economic espionage and international misappropriation of trade secrets. An engineer of *American Superconductor* was convicted of stealing source codes for wind turbine software and selling it to *Sinovel* (a state-owned company in China). *Sinovel* was a loyal customer of

⁸⁰ *Franke et al v Wiltschek*, 209 F (2d) 493 (2d Cir 1953), 99 USPQ (BNA) 431 [*Franke*]. For a more comprehensive discussion of this case, see Charles T Graves, “Trade Secrets as Property: Theory and Consequences” (2007) 15 Ga J IPL 39.

⁸¹ *Franke*, *ibid* at 495-496.

⁸² *Ibid* at para 8.

American Superconductor and it is alleged that they began to find fault with the product and eventually stopped paying for its use. At the time of the breach it is alleged that Sinovel owed American Superconductor 100 million in already delivered services and future contracts totaling \$700 million.⁸³ At the time Sinovel had provided 70% of American Superconductors annual revenues, and its stock plunged 80% in six months.⁸⁴ After discovering that Sinovel had found a way to use its technology without a license, American Superconductor commenced three lawsuits (two against the company and its two executives in federal court and the other against the former employee Dejan Karabasevic) in an attempt to prevent Sinovel from using the pirated software. The case is set to be heard on December 5, 2016. The ruling of this case will likely expand the law on the duration of an injunction for trade secret breaches involving impropriety. On July 6, 2018 US District Judge James Paterson convicted Sinovel of stealing trade secrets and ordered it to pay 1.5 million dollars in fines.⁸⁵ Sinovel was also sentenced to one year probation and payment of the \$57.5 million settlement with AMSC.⁸⁶

Cases prior to *Sinovel* largely dealt with the length of an injunction within the context of the employment sector. The area of law grew to encompass concerns relating to balancing an employer's right to maintain proprietary secrets, while simultaneously not limiting an employee's freedom of mobility and right to earn a living.⁸⁷ For example, courts have relaxed the disclosure rule in cases where it is necessary for an employee to reveal a trade secret in order to perform their job.⁸⁸ It is this burden upon employees that has led the courts to question how long a trade secret should enjoy protection under the law. The notion that trade secrets could be divided into two classes, a property class and

⁸³ United States Department of Justice, News Release, 13-730, "Sinovel Corporation and Three Individuals Charged in Wisconsin with Theft of AMSC Trade Secret" (27 June 2013), online: <justice.gov/opa/pr/sinovel-corporation-and-three-individuals-charged-wisconsin-theft-amsc-trade-secrets>.

⁸⁴ Jonathan Weisman, "U.S. to Share Cautionary Tale of Trade Secret Theft with Chinese Official", *The New York Times* (14 February 2012), online: <nytimes.com/2012/02/15/world/asia/chinese-official-to-hear-trade-theft-tale.html>.

⁸⁵ Todd Richmond, "Federal Judge Fines Chinese Wind Turbine Maker \$1.5 Million" *AP News* (6 July 2018), online: <apnews.com/578e4452fffc4ac2b0744b1b56c925ef>; Christie Smythe, "Sinovel Must Pay \$59 Million as Punishment in Trade Secret Case" *Bloomberg* (6 July 2018), online: <bloomberg.com/news/articles/2018-07-06/sinovel-must-pay-59-million-as-punishment-in-trade-secrets-case>.

⁸⁶ *Ibid.*

⁸⁷ *Conmar*, *supra* note 77; *Winston*, *supra* note 79.

⁸⁸ *PepsiCo Inc v Redmond*, 54 F (3d) 1262 (7th Cir 1995) at 1269-1271.

a non-property class, has been advanced.⁸⁹ According to Bruce Kugler, this distinction could arguably be implemented as follows:

All jurisdictions agree that as long as the employer holds an item secret, the law grants protection for an unlimited amount of time. However, holding an employee to an obligation to a past employer for an unlimited amount of time can reduce his employment mobility. Accordingly, the current unlimited protection should only apply where a “property quality” trade secret is found to exist.⁹⁰

It is further argued that where the trade secret is shown to have “non-property qualities” it should not be extended unlimited protection.⁹¹ In the *Sinovel* case an employee plead guilty of fraud and economic espionage for misappropriating his employer’s confidential information and revealing it to the detriment of his former employer. This case could be distinguished from cases that attempt to balance the freedom of employment (that is an employee’s obligation to retain the secret against his/her right to be employed) from cases involving impropriety of this nature. This analysis has largely been dedicated to the courts’ balancing of the rights of the employee with the employer’s rights,⁹² in cases unlike *Sinovel* where there is no impropriety.

Teva, one of the world’s largest generic manufacturers of pharmaceutical products, filed a Complaint against Apotex Inc and Apotex Corp (“Apotex”). Canadian generic manufacturer under the *Defend Trade Secrets Act* (“DTSA”).⁹³ The Complaint alleges that a former Teva employee (Barinder Sandhu) provided confidential trade secret information to her boyfriend (Jeremy Desai, CEO of Apotex), with whom she resided in Pennsylvania at the time of the complaint.⁹⁴ Sandhu allegedly synchronised confidential Teva information with a cloud account and uploaded 900 Teva files, as well as saved files on at least 10 USB drives. In addition to claims under the *DTSA*, Teva also alleged that Apotex violated the *Computer Fraud and Abuse Act* (“CFAA”)⁹⁵ and committed various tort and contract violations. In August of 2017, Apotex brought a motion to dismiss the Complaint on the following grounds:

⁸⁹ Bruce A Kugler, “Limiting Trade Secret Protection” (1988) 22:3 Val U L Rev 725.

⁹⁰ *Ibid.*

⁹¹ *Ibid.*; *A B Consolidated Ltd v Europe Strength Food Co Pty Ltd*, [1978] 2 NZLR 515 (CA), wherein a perpetual injunction was granted; this decision was upheld on appeal.

⁹² Michael Barclay, “Trade Secrets: How Long Should an Injunction Last?” (1978) 26 UCLA L Rev 203, wherein it was stated that trade secret protections can be infinite.

⁹³ *Defend Trade Secrets Act* of 2016, Pub L No 114–153.

⁹⁴ *Teva Pharmaceuticals USA Inc v Barinder Sandhu, Jeremy Desai, Apotex Inc and Apotex Corp*, No 2:2017-3031 (ED Pa 2017).

⁹⁵ *Computer Fraud and Abuse Act*, 18 USC § 1030.

The specific acts of alleged misappropriation occurred prior to the enactment of the *DTSA* and as such the Act does not apply;

Teva failed to provide sufficient facts to identify the specific trade secret that was infringed and the complaint is therefore not tenable under the *Pennsylvania Uniform Trade Secret Act* (“*PUTSA*”);

Teva failed to state a specific loss under the *CFPA*;

The *PUTSA* is not applicable as it would preempt the common law conversion claims and such claims should fall under the uniform system;

The state contract and tort claims made under the *PUTSA* do not allege sufficient facts to disclose a cause of action and should be barred at law.⁹⁶

On January 30, 2018 Justice Savage delivered a decision on a motion for dismissal which was partially granted.⁹⁷ While the Judge agreed that Teva’s former employee may have transmitted confidential information gained from her employment, it failed to plea that Sandhu’s did not have the authorization to access the computer for this purpose, as outlined in the *Computer Fraud and Abuse Act*. The balance of the Complaint is still pending and will be instructive on the issue of injunctive relief for former employees under the new *DTSA* and state law.

The above-mentioned employment cases do not consider the impact of the unlimited trade secret protection on development and technology transfer because they do not address issues beyond employment that permit a trade secret to be protected even beyond the 20-years afforded to other IP. In addition, the extraterritorial considerations as revealed by the *Sinovel* case need to be further explored by the literature. Other suggestions of refining trade secret protection advocate for a trade secret registry, but this solution also does not resolve issues around how to limit the duration of trade secrets and potential abuses. The concerns arising over extending monopoly periods beyond the term granted for the intellectual property have traditionally given rise to the doctrine of “evergreening”. This principle has been primarily focused on the practice as it relates to patents, but it has been parsimonious in the area of trade secrets.

2. Trade Secret & Evergreening in the Caselaw

The principle of “evergreening” has not been widely canvassed in the literature or case law on trade secrets. The scholarly focus on evergreening is largely concentrated in the pharmaceutical sector and closely tied to North

⁹⁶ *Teva*, *supra* note 94.

⁹⁷ *Teva Pharmaceuticals USA Inc v Barinder Sandhu, Jeremy Desai, Apotex Inc and Apotex Corp*, No 17-3031 in the United States District Court For The Eastern District of Pennsylvania, “Memorandum Opinion” (30 January, 2018), per Savage J.

American cases.⁹⁸ Evergreening traditionally refers to the practice in which patent owners use legal and regulatory means to extend their intellectual property monopoly privileges over a product or a process. While the concept of evergreening has been popularized within the pharmaceutical context, the example is not entirely analogous to the green technology sector, primarily because evergreening often commences early in the inventive stage with pharma products (for example data that is kept secret in the market clearance stage). Unlike pharmaceutical products, green technology products like solar panels do not require market clearance from a pharmacological perspective, as such, improvements and confidential information exists largely in the form of product enhancements after the patent has expired, rendering the old technology inefficient and non-competitive from a market and profit perspective. Generally, evergreening practices can fit into two categories, those that extend the life of tangible products and processes, and those that deal with intangibles such as information and know-how. From the perspective of tangible assets, evergreening often adopts industry practice that extends the life-cycle of a product, while intangible forms include practices like trade secrets. Patents grant a temporary monopoly to an inventor as a balance between rewarding the efforts of innovation and fostering disclosure of new inventions. This disclosure is expected to facilitate and encourage further innovation and be of benefit to society's progress at large. In most jurisdictions the limited monopoly is granted for 20-years, thereafter, the patent expires and the monopoly period ends. It is just prior to the expiry of the patent that evergreening practices are initiated. The product that is evergreened continues

⁹⁸ The Canadian process is regulated by the Patented Medicines (Notice of Compliance) Regulations, SOR/93-133, while the US process is filed through the Drug Price Competition and Patent Term Restoration Act of 1984, Pub L No 98-417, 98 Stat 1585 [Hatch-Waxman Act], an amendment to the Federal Food, Drug, and Cosmetic Act § 505(j); 21 USC § 355(j), which allows a generic product to be approved on bioequivalency to an expired brand's product via an abbreviated new drug application ("ANDA"); see *Bristol-Myers Squibb Canada Co v Apotex Inc*, [2009] FC 137 [*Bristol-Myers*]; *Whirlpool Corp v Camco Inc*, [2000] 2 SCR 1067 [*Whirlpool*]; *Apotex Inc v Sanofi-Synthelabo Canada Inc*, 2008 SCC 61, [2008] 3 SCR 265, (also referred to as PLAVIX) [*Sanofi-Synthelabo*]; *Apotex Inc v Pfizer Canada Inc et al*, 2009 FCA 8 [*Pfizer*]; *Windsurfing International Inc v Tabur Marine Ltd*, [1985] RPC 59 (UK); see also *Windsurfing International Inc v Tabur Marine Ltd*, [1985] RPC 59 (UK); *Pozzoli SPA v BOSO SA*, [2007] FSR 37, [2007] ENCA Civ 588; *Angiotech Pharmaceuticals Inc v Conor Medsystems Inc*, [2008] UKHL 49; *KSR International Co v Teleflex Inc*, 550 US 398 (2007); *Beloit Canada Ltd v Valmet OY* (1986), 8 CPR (3d) 289 (FCA); *Saint-Gobain Pam SA v Fusion Provia Ltd*, [2005] EWCA Civ 177; *Graham v John Deere*, 383 US 1 (1966); *Re O'Farrell* 853 F (2d) 894, 7 USPQ (2d) 1673.

to be sold at brand-name prices as it remains protected under law. This strategy has a direct effect of extending the legal period of the brand patent and therefore delaying the entry of cheaper off-patent substitutes. The problem arises when patent holders attempt to extend the 20-year monopoly period, especially on items that are critical to societal development like green technologies used in climate change abatement or patents on life-saving drugs.

The literature on evergreening within the pharmaceutical context is rich and provides an extensive background to the practice. The concept of “evergreening” in Canadian case law is essentially the prohibition against double-patenting, as was explained by Mr. Justice Hughes in *Bristol-Myers Squibb Canada Co v Apotex Inc*:

Double patenting, put simply, involves the concept that a person cannot get a second patent for the same thing for which they already have received a patent. A patent is a monopoly for a limited period of time and that period should not be extended by the expedient of getting a subsequent patent for the same thing.⁹⁹

The principle against monopoly extension is clearly elucidated in the prohibition against “evergreening.”¹⁰⁰ There are also a number of obvious life cycle management strategies adopted in this practice, many of which have been popularized by the pharmaceutical sector, including the slight modification of drug compositions,¹⁰¹ as well as brand migration.¹⁰² Other less obvious practices include pricing pressures,¹⁰³ the refusal to grant licenses associated with

⁹⁹ *Bristol-Myers, ibid* at 173–174.

¹⁰⁰ See generally *Whirlpool, supra* note 98 at para 63; *Sanofi-Synthelabo, supra* note 98; *Pfizer, supra* note 98.

¹⁰¹ Slightly modifying the composition of a product by way of utilizing its derivatives, such as polymorphs or enantiomers, is one example of such a practice.

¹⁰² This practice attempts to phase out an existing drug prior to the expiry of the patent and to redirect the consumer to the replacement product. For example, Prilosec consumers were migrated to Nexium. AstraZeneca and Prilosec which was succeeded by Nexium. AstraZeneca spent over \$300 million in advertising to promote Nexium and to move consumers away from Prilosec to Nexium.

¹⁰³ This is often achieved by creating patent thickets, the use of multiple licenses and patents to obtain a single product.

products,¹⁰⁴ the combining of existing drugs,¹⁰⁵ and outright litigation.¹⁰⁶ While the general rule against evergreening is that the same product cannot be patented twice, there is no prohibition against utilizing a trade secret to protect improvements or enhancements that would otherwise not be patentable. This omission may pose serious concerns for the implementation of green technology transfer to (or within) the developing world. Such concerns include the inability of developing countries to utilize green technologies that are protected by trade secrets even after patents have expired.

III. TRADE SECRETS AS AN IMPEDIMENT TO GREEN TECHNOLOGY TRANSFER TO THE DEVELOPING WORLD UNDER INTERNATIONAL AGREEMENTS

Evergreening through trade secrets is not directly contemplated in *TRIPS*, the *GATT* or the Kyoto Protocol, and consequently there is no prohibition against withholding information in perpetuity. Article 44 of the *TRIPS* Agreement does recognize that judicial authorities will grant infringement remedies, however, the duration of these rulings are specifically omitted from *TRIPS*. Injunctive relief under *TRIPS* is addressed in Article 44 which sets out that:

1. The judicial authorities shall have the authority to order a party to desist from an infringement, *inter alia* to prevent the entry into the channels of commerce in their jurisdiction of imported goods that involve the infringement of an intellectual property right, immediately after customs clearance of such goods...
2. ...the remedies under this Part shall apply or, where these remedies are inconsistent with a Member's law, declaratory judgments and adequate compensation shall be available.¹⁰⁷

Thus, while Article 44 recognizes the rights of WTO Members to access injunctive relief in national courts, it does not set time limits on the duration

¹⁰⁴ Korean Trade Promotion Agency, "Case Study 4: The Republic of Korea and the Montreal Protocol" in Veena Jha & Ulrich Hoffmann, eds, *Achieving Objectives of Multilateral Environmental Agreements: A Package of Trade Measures and Positive Measures*, UN Doc UNCTAD/ITCD/TED/6, online: <unctad.org/en/docs/itcdted6_en.pdf>.

¹⁰⁵ This process sees to the combination of two or more drugs or patented compounds. For example, Caduet is a combination of Lipitor (Atorvastatin) and Norvasc (Amlodipine), once used to treat liver dysfunction.

¹⁰⁶ The commencement of litigation in jurisdictions like Canada grants a 30-month stay of a generic manufacturer's production, thereby extending the monopoly period by 2.5 years.

¹⁰⁷ *TRIPS*, *supra* note 5, art 44.

of that relief. The fact that these treaties do not contain a time limit on trade secrets and there is essentially no mechanism to determine how long a trade secret has been in practice, brings into question the efficacy of Articles 7 and 8 of *TRIPS* which attempts to balance intellectual property abuses so that technology could be mutually advantageous to “producers and users”,¹⁰⁸ and also Article XX(b) and XX(g) of the *GATT* which recognizes exceptions that facilitate the development of Member States on human development and environmental grounds. If these provisions cannot be operationalized, then they cannot represent a viable challenge to the prospect that green products may be evergreened through utilizing trade secrets.

Evergreening may have a negative social impact on developing nations that are heavily reliant upon technology transfer to address climate change abatement needs. The impact on developing countries is most felt when evergreening practices result in barriers to the entry of technologies that will help in assisting these markets down a green development path. This barrier may have a global impact on climate change abatement strategies. The dilemma arising from the evergreening through trade secrets is particularly evident in the solar panel industry which has many off-patent alternatives that have been enhanced and are protected by trade secret know-how. In this regard, eliminating impediments to obtaining a license to utilize the enhanced technology must be addressed. Article 39 of *TRIPS* permits a Member to protect a trade secret except in situations “where necessary to protect the public, or unless steps are taken to ensure that the data are protected against unfair commercial use.”¹⁰⁹ For example, pharmaceutical products disclose a step-by-step process of reproducing the medicine. Therefore, green technologies like those in the renewable energy sector are often off-patent and improvements are in the form of trade secrets. The speed at which technology increases in the solar industry would render the filing of new patents useless and as such the more pragmatic option of containing enhancements in the form of trade secrets is adopted. In addition, the technical know-how that is required to assemble some green technologies like solar panels may not be within the public domain. These processes are often protected by trade-secrets. The issue of whether there should be a time limit on those secrets in a similar manner as patents, raises concerns about fair commercial practices. Some scholars have argued that this

¹⁰⁸ *Ibid.*, arts 7–8.

¹⁰⁹ *TRIPS*, *supra* note 5, art 39.

non-disclosure curtails innovation and technological diffusion.¹¹⁰ Since many environmental technology patents are enhancements on existing technology and know-how, the reduced research and development investment may not justify a new patent for a 20-year term. Thus, while the off-patent product can be copied, in the case with solar PV panels, enhancements often render the old product economically inefficient to utilize. The competition from other producers that can generate the energy at a cheaper cost by using superior panels will push any user of an off-patent panel out of the market. In addition, purchasing solar panels or operating a photovoltaic solar plant does not require the disclosure of trade secrets to the purchaser/operator because panels are often manufactured abroad and shipped to the receiving country. As such, the enhancement on this technology can be protected by a trade secret in perpetuity.

A problem arises in the area of transferring green technology as designed by international treaties because companies need to be financially compensated for licensing those technologies. When fossil fuels represent a cheaper alternative to green technologies, developing countries require an incentive to choose the costlier, environmentally friendly choice. Patents on the renewable energy sector are less important to the rights holder as are trade secrets. This is because many technologies in the renewable energy sector, and specifically photovoltaic solar panels, are off-patent and have expired. The value of these technologies is often found in the improvements,¹¹¹ which require a license to access. Another problem with viewing relaxed patent requirements as a solution to green technology transfer is that many developing countries do not have the finances or the manufacturing capacity to take advantage of the technology. With reference to the solar energy industry, the construction of photovoltaic solar plants requires capital infusion of tens of millions of dollars, and collaboration with foreign companies and financiers.

¹¹⁰ John H Barton & Keith E Maskus, "Economic Perspectives on a Multilateral Agreement on Open Access to Basic Science and Technology", in Simon J Evenett & Bernard M Hoekman, eds, *Economic Development & Multilateral Trade Cooperation* (Washington, DC: World Bank and Palgrave MacMillan, 2006); Michael Heller, *The Gridlock Economy: How Too Much Ownership Wrecks Market, Stops Innovation, and Cost Lives* (New York: Basic Books, 2008); D S Levine "Secrecy & Unaccountability: Trade Secrets in Our Public Infrastructure" (2006) 59 Fla L Rev 135.

¹¹¹ Michael Hasper, "Green Technology in Developing Countries: Creating Accessibility Through a Global Exchange Forum" (2009) 7:1 Duke L & Tech Rev; John H Barton, "Patenting and Access to Clean Energy Technologies in Developing Countries", *WIPO Magazine*, February 2008, online: <wipo.int/wipo_magazine/en/2008/01/article_0003.html>.

In light of the public good argument, questions are raised about whether there should be reasonable limits to such protection.¹¹² The outcome is that the technological know-how as contained in trade secrets are intangible and controlled by the bearer of that particular secret. Even if that trade secret were disclosed, it would be of no assistance to a country that did not have the financial means to acquire, produce or assemble products like solar panels. In Levine and Boldrin's *Against Intellectual Monopoly*, they argue that Article 7 of TRIPS states that patents and limited monopolies are an ineffective method of promoting innovation.¹¹³ Trade secrets can also limit the freedom to use green patents that are in the public domain,¹¹⁴ because of the ability to maintain intellectual property protection over enhancements and know-how that are a necessary precondition to properly utilizing these products. Thus, the theoretical models that tout strong intellectual property laws like trade secrets as a requisite to foreign direct investment infusion are simply inapplicable to many developing countries. The inapplicability arises because many developing nations do not have the requisite local capacity to mimic the technology without knowledge transfer assistance. Essentially, the scenario that arose from the US-Chinese case law on misappropriation may not be present in sub-Saharan Africa, and specifically in relation to renewable energy projects. Hence, the extension of trade secrets in perpetuity serves merely to increase the costs of production for southern nations that may already be discouraged from utilizing costly green technologies.

A number of provisions in the *Paris Agreement* address the hardship that developing nations may experience in meeting their commitments, and consequently have built in financial and technological mechanisms into the Agreement to address this concern. The six main provisions in the *Paris Agreement* directly address hardship concerns faced by developing nations: a mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development" (Article 6), a finance mechanism (Article 9),

¹¹² R Bone, "A New Look at Trade Secret Law: Doctrine in Search of Justification" (1998) 86:2 Cal L Rev 241; Elizabeth A Rowe, "Striking a Balance, When Should Trade-Secret Law Shield Disclosures to Government?" (2011) 96 Iowa L Rev 791.

¹¹³ Michele Boldrin & David K Levine, *Against Intellectual Monopoly*, 1st ed (New York: Cambridge University Press, 2008); see also Claude Henry & Joseph E Stiglitz, "Intellectual Property, Dissemination of Innovation and Sustainable Development" (2010) 1:3 Global Policy 237.

¹¹⁴ Paul J Heald, "Mowing the Playing Field: Addressing Information Distortion and Asymmetry in the TRIPS Game" (2002) Vanderbilt University Law School Law & Economic Working Paper No 02-21; Surinder K Verma, "Protection of Trade Secrets Under the TRIPS Agreement, and Developing Countries" (1998) 1:5 J World Intellectual Property 723.

a technology transfer mechanism (Article 10), a capacity building mechanism (Article 11), an education and knowledge transfer provision (Article 12), and an enhanced transparency provision (Article 13). The new requirement in the *Paris Agreement* that developing countries report the “financial, technology transfer and capacity-building support needed and received under Article 9, 10, and 11” of the *Agreement*, could also bring to light the impact that trade secrets have on green technology transfer. This non-obligatory requirement creates a platform for developing countries to open the discussion on areas of intellectual property (such as no fixed terms for trade secrets) that are negatively impacting on technology transfer.

A. EVERGREENING THROUGH PATENT THICKETS AND LICENSING REFUSALS

Arguably, the absence of a fixed statutory period for trade secrets could encourage perpetual secrets if a product is improved through an enhancement and a license may be required to obtain that improved knowledge. It is clear that aside from intellectual property constraints, obtaining various licenses and finances to build renewable energy plants will require foreign capital. The cost of patenting a simple product may be prohibitive when one considers the filing fees in local and multiple jurisdictions along with the prospect of litigation. Practices such as “patent thickets” are arguably used to compel inventors to apply for multiple licenses in order to obtain a single invention, with the outcome of thwarting development.¹¹⁵ In 1993 the Korean government alleged that companies that held green patents refused to grant a license for use of the technology. The withholding of licenses has been identified by the IPCC as occurring in “cases where the private firms and even public institutions of industrialized countries refused to license such green technologies like HFC-134a, fuel cell and IGCC (Integrated Gasification Combined Cycle)”.¹¹⁶ The IPCC found the following:

Firms may choose to withhold technological information from particular countries for competitive reasons, a strategy that is facilitated by globalized IPRs. The spectre of anticompetitive deployment of patents and patent pools in order to discourage local firms from learning technologies through imitation and reverse engineering

¹¹⁵ Carl Shapiro, “Navigating the patent thicket: Cross licenses, patent pools, and standard setting” in Adam Jaffe, Josh Lerner, & Scott Stern, eds, *Innovation Policy and the Economy* (Cambridge, MA: MIT Press, 2001) 119.

¹¹⁶ Intergovernmental Panel on Climate Change, IPCC Working Group III, *Summary for Policy Makers: Methodological and Technological Issues in Technology Transfer in Technology Transfer* (2000) at s 3.5.2, online: <ipcc.ch/ipccreports/sres/tectran/index.php?idp=47>.

surely looms large in the context of weak competition enforcement in most developing economies.¹¹⁷

In the Korean case, the country and economy were inundated with non-ozone depleting technologies dumped in the country by a foreign company that filed 40 patents. This practice occurred at the time when Korea, which was refused a license on HFC technology, decided to develop its own local capacity in the area. The filing of multiple patents on the technology was interpreted as an attempt to stifle Korean growth in the technology by increasing the cost of development. The effect of such broad property rights on development has been found to stagnate innovation because of the costly nature of obtaining a licence from the patent holder.¹¹⁸

The lack of a fixed statutory period for trade secrets may also have impacted on patent thickets, or withholding licenses or enhancements via trade secrets, which has been commonly associated with the refusal to license technology. India also raised concerns about evergreening and the application of the Montreal Protocol. Indian firms claimed that evergreening had occurred because they were deemed to be a “potential competitor,” while other companies contributed to ozone-depleting technologies, refusing to license the product to Indian companies.¹¹⁹ India further alleged that these technologies were necessary to meet environmental targets under the Kyoto Protocol, and that the refusal to grant a license is a demonstration of corporate monopoly over the industry. The fact that a small group of technology companies hold these patents leads to the conclusion that these companies may be “operating as a cartel to control production.”¹²⁰

¹¹⁷ Keith E Maskus, Kamal Saggi & Thitima Puttitanun, “Patent Rights and International Technology Transfer through Direct Investment and Licensing” in Keith E Maskus & Jerome H Reichman, eds, *International Public Goods and the Transfer of Technology under a Globalized Intellectual Property Regime* (Cambridge University Press, 2005) 265.

¹¹⁸ Carlos A Primo Braga, Carsten Fink & Claudia Paz Sepulveda, “Intellectual Property Rights and Economic Development” in Keith E Maskus, ed, *The WTO, Intellectual Property Rights and the Knowledge Economy* (Cheltenham, UK: Edward Elgar, 2004) 245; See also Hutchinson, *supra* note 1, n 42.

¹¹⁹ Jayashree Watal, “Case Study 3: India - The Issue of Technology Transfer in the Context of the Montreal Protocol” in Veena Jha & Ulrich Hoffman, eds, *Achieving Objectives of Multilateral Environmental Agreements: A Package of Trade Measures and Positive Measures* (United Nations Conference on Trade and Development UNCTAD/ITCD/TED/6) 45 at 49; Jayashree Watal, *Intellectual Property Rights in the WTO and Developing Countries* (The Hague: Kluwer Law International, 2001).

¹²⁰ *Ibid.*

Technology transfer in the energy sector is largely connected with the effective licensing of the technology. In light of concerns that expired patents could still not be utilized in the renewable energy sector due to the inability to secure licenses for technology, a joint United Nation Energy Programme, European Patent Office and International Centre for Trade and Sustainable Development's study was commissioned to examine licensing practices in the clean energy sector. The global licensing survey concluded that intellectual property protection in the host country was an important factor in entering a license agreement. The respondents also cited other local infrastructural factors as also affecting the decision to enter into a licensing agreement.¹²¹

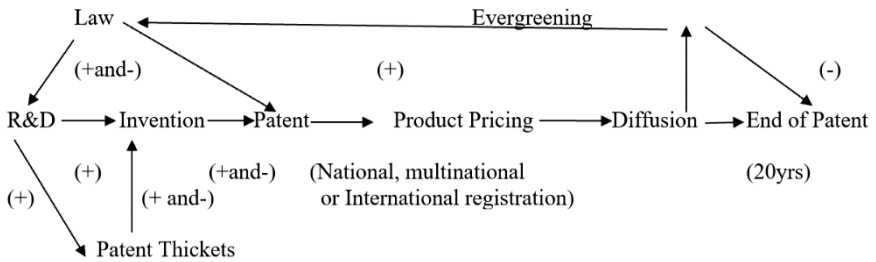
Evergreening has also taken the form of patenting many small steps in an invention, or separately patenting compounds and technological processes that make it difficult for small inventors to file a patent without paying licensing fees. This practice increases the cost of filing a patent to include fees payable to the owners that already have a patent on the process or product. For example, multiple patents can be obtained as a form of a "picket fence," which involves obtaining a series of patents around a single product or drug that makes it difficult to produce the product without paying royalties for the various patents. The result is that the need to obtain multiple patents may block the innovator from using the patent.

The practice of "picket fencing" also occurs when firms take out patents that may not be used immediately, but can guarantee a strategic edge in the future by forcing the user to obtain multiple licenses, thereby increasing the cost of production. The practice of using "patent thickets" is said to thwart innovation by creating multiple patents within a patent, thereby increasing the cost of copying the invention, requiring that numerous patent rights are acquired to reproduce one invention. This means that a person wishing to utilize the patent may have to pay multiple licensing fees for the various patents required to reproduce the product.

These practices increase the cost of invention, which may pose a hindrance to cost-sensitive developing nations. *Figure 1*, below, captures from different perspectives the practice of evergreening, which forces users to obtain licenses:

¹²¹ United Nations Environment Program (UNEP), European Patent Office (EPO) & International Centre for Trade and Sustainable Development (ICTSD), *Patents and clean energy: bridging the gap between evidence and policy: Final Report* (2010), online at: http://ictsd.org/sites/default/files/research/Patents%20and%20clean%20energy%20bridging%20the%20gap%20between%20evidence%20and%20policy_0.pdf [UNEP et al, *Patents*].

Figure 1: Corporate Evergreening Patent Strategy



A strategy aimed at protecting tangible assets like patents may utilize the life extension approach, which would extend the patent beyond the stipulated expiry period. In addition, protecting intangible assets like “know-how” is most often achieved through trade secrets. Many trade secrets are revealed under confidentiality or licensing agreements. Disclosure in this manner does not extinguish the rights to the trade secret. The problem arises with the withholding of a license containing a trade secret, or an outright refusal to grant such licenses. These evergreening practices have been referred to as patent thickets or patent fencing and these activities apply equally to patents as well as trade secrets.

The World Intellectual Property Organization (“WIPO”) has summarized the costliness of patent thickets affecting intellectual property rights as follows:

...patent thickets - may forego research activity... whereby patent rights are distributed over a fragmented base of IP holders, and those who wish to introduce products using such technologies face the high cost of negotiating with multiple parties. If each technology is essential, a negotiation failure with any of the IP holders is equivalent to a failure with all. New products are blocked, all IP holders lose an opportunity to commercialize and society misses out on new technology. Even in the case where an enterprising entrepreneur could strike a deal with each separate IP right holder, he or she is likely to overpay if the number of IP holders that could claim infringement is sufficiently large.¹²²

Thus, patent thickets represent an indirect form of evergreening by making innovation financially impractical because of the requirement to obtain multiple licenses from multiple rights holders.¹²³ In addition, some scholars have claimed that weak patent laws that permit “multiple and overlapping” patents also contribute to the patent thicket problem. Maskus and Okediji argue the following:

¹²² WIPO, *Trade Secret?*, *supra* note 57.

¹²³ UK Intellectual Property Office (UKIPO), “Patent Thickets: An Overview” (2011), online: <ipo.gov.uk/informatic-thickets.pdf>.

[P]atent thickets substantially heighten transaction costs associated with licensing and extract additional rents from would-be licensees in the event that one patent owner chooses to hold out. Further, fragmentation of patent ownership increases the costs of the patent system from public users. Another problem is that patent documents may not require sufficient disclosure to be useful as sources of cutting-edge technical information for less sophisticated users, including firms in DCs and LDCs.¹²⁴

Thus, according to Maskus and Okediji, the requirement that a user obtain multiple licenses may act as an impediment to innovation. Moreover, if one patent holder refuses to grant a license this could prevent use of the patent. In this regard, the financial burdens imposed by patent thickets represent a form of evergreening.

The advantage of patent thickets to the patent holder does not end with the expiry of the patent. In fact, this practice may be extended through trade secrets. Many PV panels are constructed and assembled through trade secrets and there is no guarantee that technical know-how will be transferred to the public once the patent has expired. Technical know-how is an essential ingredient in transferring green technology. The costs associated with such transfers are expected to be borne by the recipient of the technology. Trade secret coverage can broadly apply to a number of business practices and strategies, including technical, financial, or even strategic information that are proprietary and are of a secretive nature, including formulae, processes,¹²⁵ patterns, compilations, programs, devices, methods, or techniques.¹²⁶ It is well accepted that trade secret law has also been extended to protect “know-how,” which is defined as follows:

[K]now-how is defined as a body of unpatented technology useful in making a product to be sold commercially. It includes a complete body of manufacturing information

¹²⁴ ICTSD, Keith E Maskus & Ruth L Okediji, *Intellectual Property Rights and International Technology Transfer to Address Climate Change: Risks, Opportunities and Policy Options* (2010), Issue Paper No 32 at 16.

¹²⁵ See *C&F Packing Co v IBP Inc et al*, 224 F (3d) 1296 (Fed Cir 2000), wherein C&F sued IBP and Pizza Hut for misappropriation of trade secrets under the Illinois Trade Secrets Act. It was alleged that a process for enhanced packaging and freezing of precooked meats and pizza toppings was misappropriated from C&F. The court found a misappropriation of trade secrets.

¹²⁶ See also D W Quinto & S H Singer, *Trade Secret: Law and Practice*, 2nd ed (Oxford University Press, 2012), wherein it is described that trade secrets have been extended to include formulae, contracts, consumer lists, know-how, contractual terms, software and even business plans.

needed by an industrial organization to satisfy design, develop, fabricate or produce goods.¹²⁷

The issue of development and the transfer of technology in green energy projects is largely concerned with the “know-how” aspect of trade secrets, and as such, the analysis herein will largely focus on trade secret “know how”.

Trade secrets can be used to protect information that enhances expired patents.¹²⁸ While contracts involving technology transfer usually require a license for patents, the trade secret aspect may be protected by having the company import its employees to the domestic project destination. In that vein, the company can maintain its trade secrets by transporting their employees to work on foreign projects, rather than reveal the proprietary information or “know-how.” In energy projects, patent licenses alone may not be sufficient to commence the project and the “know-how” which is protected by trade secrets may be of more value since, in many cases, the patents on solar panels have expired and are readily accessible in the public domain.¹²⁹

The fact that many climate change technologies are subject to multiple patents and processes makes the cost of accessing them quite prohibitive.¹³⁰ Unlike other forms of patenting products such as those in the pharmaceutical sector, it has been argued that no singular technology “will be necessary or sufficient on its own to solve climate change.”¹³¹ It is indisputable that once a patent expires (usually after the 20-year exclusivity period), the utility of the patent must be opened to the public for social benefit. However, where the patent is improved on by an enhancement through trade secrets, this may indirectly extend the life of the patent in perpetuity. Consequently, trade secrets represent a more onerous form of intellectual property than patents as the latter has time limits on the monopoly period. The consequences of an intellectual property mechanism that has no time limits can have a severe

¹²⁷ L M Rosenbluth, *The Trade Secret Quagmire in Pennsylvania: A Mandate for Statutory Clarification* (1981) 86 Dick L Rev 137 at 150; see also D L Worthing, “Know-How Misuse: A Potential Weapon for Licensees” (1971) 53 J Pat Off Soc’y 177.

¹²⁸ K F Jorda (2007), “Trade Secrets and Trade-Secret Licensing” in Anatole Krattiger et al, eds, *Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices*, (Oxford, UK: MIHR), online: <ipHandbook.org>.

¹²⁹ Melvin F Jager, *Trade Secrets Law* (St. Paul, Minnesota: Thomson/West, 2002).

¹³⁰ Matthew Littleton, “The TRIPS Agreement and Transfer of Climate-Change-Related Technologies to Developing Countries” (2008) DESA Working Paper No 71, online: <un.org/esa/desa/papers/2008/wp71_2008.pdf>.

¹³¹ Sidney A Rosenzweig, “Inside Views: PFF on Cooling the World By Misappropriating Patent Rights”, *Intellectual Property Watch* (1 April 2009), online: <ipwatch.org/weblog/2009/04/01/cooling-the-world-by-misappropriating-patent-rights/>.

impact on technology transfer which will directly affect how the developing world addresses costly issues like climate change abatement.

The concerns raised by developing and least-developed Member States in the *TRIPS* Council meetings on technology transfer and climate change abatement highlight the need to set tangible targets for technology transfer especially in the area of green technology. In addition, cases like the Korean and Indian licensing cases demonstrate the power of trade secrets and impact that withholding licenses can have on development. It further highlights the fact that there are a number of commercial strategies that can be adopted beyond patents that can extend the life cycle of product and processes. The tolerance for these strategies may wane given the impact that these practices may have on the ability of nations to meet climate change objectives. New mechanisms need to be developed that will address some of the problems posed by the application of trade secrets and patent thickets to green technology transfer. With the lag in technology being a reality in many developing countries, the developing world's ability to technologically catch-up and compete in the world of inventions and innovations is severely hindered. Arguably, the practice of evergreening exacerbates already existing problems by further thwarting innovation, with the most profound effect being on the developing world. This is because the patent rules are so technical, that large companies may hide behind the technical complexities of energy production and products. Innovation then becomes directly associated with the level of technological advancement and the ability of companies in the developing world to imitate existing inventions. Where such inventions are only accessible through costly patents or licensing fees, this poses a financial burden for developing countries that can only be remedied through some aspect of foreign investments. Without external investments, innovation remains curtailed and reduced to "technical evergreening."

B. THE IMPACT OF EVERGREENING ON GREEN TECHNOLOGY TRANSFER TO DEVELOPING COUNTRIES

This practice of evergreening concentrates patents and compounds in the hands of fewer owner corporations and brings to light concerns arising from the "anti-commons". A theoretical framework for assessing the impact of overuse, or underuse, was initially contemplated in 1968, when Garrett Hardin adopted a metaphor of overuse and the overexploitation of common pastures by cattle leading to a "tragedy of the commons".¹³² Hardin postulated that unfettered use of the commons would eventually lead to overuse and ruins:

¹³² Garrett Hardin, "The Tragedy of the Commons" (1968) 162 *Science* 1243.

Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.¹³³

Some thirty years later, Michael Heller and Rebecca Eisenberg modified the “tragedy of the commons” theory by focusing on the opposite consequence that could arise from too many people being given the “rights to exclude others”.¹³⁴ Heller and Eisenberg explain the distinction between the tragedy that arises from “commons” and “anti-commons”:

Anticommons property can best be understood as the mirror image of commons property. A resource is prone to overuse in a tragedy of the commons when too many owners each have a privilege to use a given resource and no one has a right to exclude another.¹³⁵

By contrast, a resource is prone to underuse in a:

[t]ragedy of the anticommons: when multiple owners each have a right to exclude others from a scarce resource and no one has an effective privilege to use. [...] Once an anticommons emerges, collecting rights into usable private property is often brutal and slow.¹³⁶

The anti-commons is the reverse situation, where a small number of users have the rights to exclude others from resources. This results in a situation of underuse. In the intellectual property context, this is similar to a patent thicket, in that multiple exclusive rights can be used to impose very high taxes on a person who wishes to use a product. This tends to discourage use of products. The theoretical principle underlying evergreening recognizes that when the exclusivity period is extended beyond the 20-year patent protection period, society’s ability to benefit from the invention is diminished. This results in knowledge and innovative capacities being concentrated in the hands of fewer inventors. This extension of monopoly period for intellectual property may actually thwart innovation by blocking entry into the common market. The impact of these evergreening practices on the market is well known and documented in the patent sector as it relates to the pharmaceutical industry. However, these same practices are also adopted in other intellectual property sectors like trade secrets and other industries including renewable energy products.

¹³³ *Ibid.*

¹³⁴ Michael A Heller & Rebecca S Eisenberg, “Can Patents Deter Innovation? The Anticommons in Biomedical Research” (1998) 280 *Science* 698.

¹³⁵ *Ibid.*

¹³⁶ *Ibid.*

Rebecca Eisenberg also highlights the problem of evergreening as it relates to “new uses”, especially within the pharmaceutical sector. She argues that inventing products or identifying new compounds is easy, but the difficulty lies in the efficacy of the product.¹³⁷ The process of ascertaining the safety of the product may involve “secrets” that may not be divulged even after the product hits the market. She argues that trade secrets have an unfair advantage in almost circumventing the regulatory process. Eisenberg highlights the impact of trade secrets in the pharmaceutical sector and notes that:

Trade secrecy mitigates this risk by allowing firms to suppress data from clinical trials, withholding its value not only from competitors but also from consumers who might otherwise demand less of the product. But trade secrecy greatly compromises the social value of the information as a resource for improving public health and for promoting further R&D. It also exposes drug companies and regulators to charges of bad faith and incompetence, compromising the signaling function of regulatory approval as a maker of safety and efficacy.¹³⁸

The compromised social value raised by Eisenberg is not confined solely to the pharmaceutical sector but would encompass other public goods, such as the environment. In addition, the exercise of trade secrets have been found to sometimes have a very detrimental impact on society and the public good.¹³⁹ Eisenberg’s recognition of trade secrets and the harm that may emerge from the suppression of data from clinical trials raises an important question about the impact of this form of intellectual property on technological innovation and development.

The impact of expired patents and trade secrets on competition was addressed by W N Price II, in the article “Expired Patents, Trade Secrets, and Stymied Competition”.¹⁴⁰ Price acknowledges that patents and trade secrets are often used in a complementary manner whereby the latter is adopted as an enhancement for the patent or where the patentee claims “a broad group of inventions, but keep secret the precise member of that group she has determined will work best and be most commercially successful.”¹⁴¹ While the

¹³⁷ Rebecca S Eisenberg “The Problem of New Uses” (2005) 5 Yale J Health Pol’y L & Ethics 717.

¹³⁸ *Ibid* at 720.

¹³⁹ *Ibid* at 736. See the argument relating to revealing trade secret data on clinical studies to patients. It has been argued that drug companies only reveal what they want to about the clinic trials.

¹⁴⁰ W Nicholson Price II, “Expired Patents, Trade Secrets, and Stymied Competition” (2017) 92:4 NDLR 1611, online: <scholarship.law.nd.edu/cgi/viewcontent.cgi?article=4713&context=ndlr>.

¹⁴¹ *Ibid* at 9.

best mode requirement is referenced in the paper, Price acknowledges that it can be circumvented by updating the patent after filing (and perhaps not filing) the update as an enhancement but maintaining it as a trade secret. Price notes that the best mode requirement “has many limitations” primarily because a “licensee or assignee” do not need to be disclosed.¹⁴² The ability to update a patent after filing via a trade secret and to keep that enhancement a secret is at the heart of the debate on evergreening and trade secrets. The practice of evergreening a patent goes beyond mere extension of the patent life through new product filings, but also includes more covert practices such as patent thickets and license refusals.

Evergreening has traditionally been viewed from the perspective of pharmaceutical companies extending the life of a drug through various practices. Little attention has been paid to other areas like climate change and also other forms of intellectual property beyond patents like trade secrets. The issue of evergreening is particularly relevant to the application of international treaties that contemplate the ability of developing countries to grow their economies by transferring technologies to these areas. If this objective is thwarted by a technicality that permits enhancements on green technologies to be protected beyond the tradition 20-year period, this may have grave effects on the ability of developing nations to meet their climate change abatement goals. The global problem of climate change is being addressed by setting universal abatement targets. The 2014 Intergovernmental Panel on Climate Change (“IPCC”) report set the goal of keeping climate change within a 2% of pre-industrial levels.¹⁴³ Achieving this goal will require a migration away from high polluting fossil fuels to clean solutions like solar energy. The technological solutions that would assist developing countries in making clean choices are largely concentrated in the hands of companies and governments within industrialized nations. The International Centre for Trade and Sustainable Development reported a total of 2, 310, 472 clean patents by 2007.¹⁴⁴ *Figure 2* highlights this global disparity in worldwide clean energy patents.¹⁴⁵

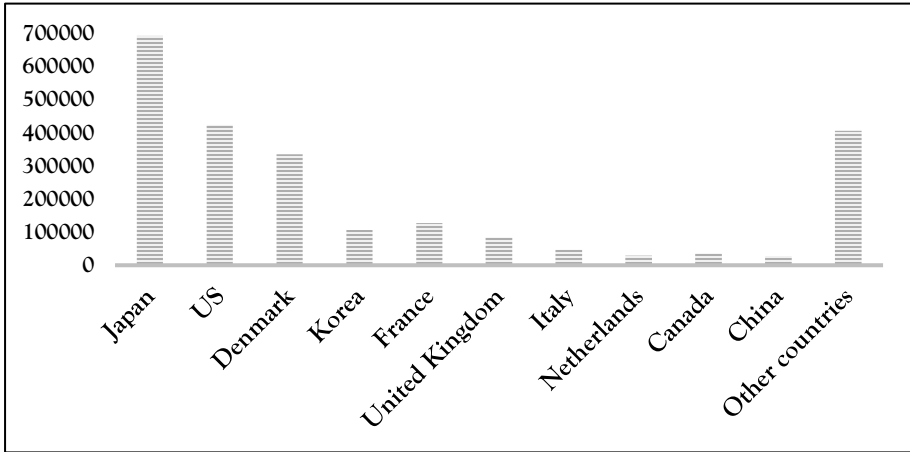
¹⁴² *Ibid.*

¹⁴³ Intergovernmental Panel on Climate Change, IPCC Working Group III, *Climate Change 2014: Mitigation of Climate Change* (New York: Cambridge University Press, 2014), online: <ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_full.pdf>.

¹⁴⁴ UNEP et al, *Patents*, *supra* note 121 (the categories of clean patents that were reported are in the area of solar PV, solar thermal, geothermal, hydro-marine, biofuels, carbon capture, IGCC, selected CETs, and fossil and nuclear energy).

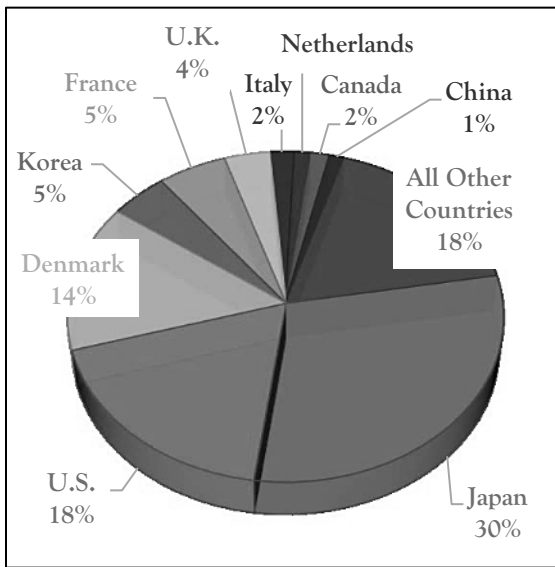
¹⁴⁵ *Ibid.*

Figure 2: Top 10 Clean Patent-Holding Countries Compared to Others¹⁴⁶



The disparity of proprietary interests over green patents is starkly contrasted in the following figure - *Figure 3* - which highlights that, of the 2,310,472 clean patents, 1,905,154 (or 82%) were concentrated in the hands of ten countries, while the rest of the world held 405,318 (or 17.5%) thereof.

Figure 3: Disproportionate Concentration of Patents Across the Globe¹⁴⁷



The problems of climate change abatement and technology transfer are complicated by the fact that the patents and intellectual property that facilitate green energy alternatives are primarily concentrated in the hands of industrialized nations. Consequently, developing nations that wish to utilize green technologies may encounter financial difficulties in regard to acquiring the needed licenses and patents.

¹⁴⁶ *Ibid.*

¹⁴⁷ UNEP et al, *Patents*, *supra* note 121.

Patent statistics clearly demonstrate the dominance of certain developed countries in holding patents on specific technologies. According to the WIPO World Patent Report, the number of patents filed on environmental technologies have increased over the past 30 years.¹⁴⁸ The number of patents filed on clean technology is predicted to increase in the future.¹⁴⁹ With specific reference to solar technology, it is anticipated that this form of renewable energy will increase by 35 per cent by 2020.¹⁵⁰

Figure 4, below, captures this increase in green patents:¹⁵¹

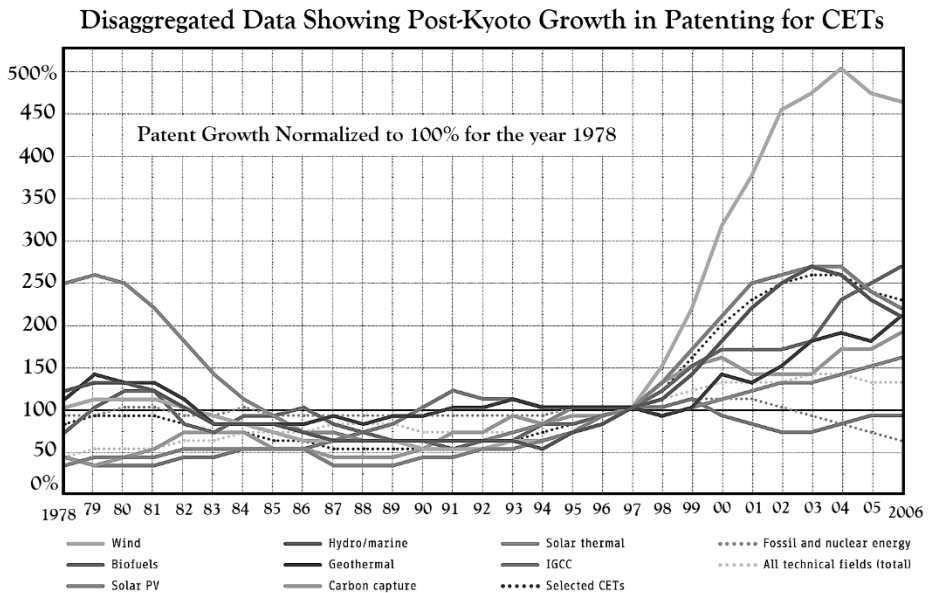


Figure 4 also shows the drastic increase in patents among OECD nations over the past 28 years. A collaborative study encompassing various green technologies including solar PV, wind, geothermal, fossil and nuclear identified 2310472 patents worldwide.¹⁵² Of these worldwide patents, 2,071 are related to solar PV technologies from industrial nations like Japan, United States, Denmark, United

¹⁴⁸ WIPO, *World Intellectual Property Report: The Changing Face of Innovation* (2011), online: <wipo.int/edocs/pubdocs/en/intproperty/944/wipo_pub_944_2011.pdf> at 120.

¹⁴⁹ Todd R Miller et al, "Patent Trends in the Cleantech Industry" (2008) 20:7 IP & Tech LJ.

¹⁵⁰ Peter Lorenz et al, "The Economics of Solar Power" (2008) *The McKinsey Quarterly*, online: <sites.middlebury.edu/ec465/files/2011/02/Economics-of-solar-power.pdf>.

¹⁵¹ UNEP et al, *Patents*, *supra* note 121 at 77.

¹⁵² *Ibid* at 77.

Kingdom and France.¹⁵³ The aforementioned countries own 96% of these patents.¹⁵⁴ The proliferation of green energy technologies and for a perpetual monopoly through trade secrets over them, may have tremendous cost effects on the developing world.

C. TRADE SECRETS IN PERPETUITY ON ENHANCEMENTS AND KNOW-HOW

The connection between access to this knowledge and economic development cannot be understated and has been identified as one of the most important aspects of economic growth.¹⁵⁵ Endogenous growth models acknowledge that companies continue to monopolize information that are in the public domain by keeping secret critical information that could further innovation of the expired product or process that is no longer protected by a patent.¹⁵⁶ Scholars like Mark Lemley see the competitive advantage that is gained from trade secrets as an incentive for firms to invest in developing trade secrets over other forms of intellectual property.¹⁵⁷ In this regard, trade secrets may displace patents as a desired form of intellectual property, especially in the early stages of development¹⁵⁸ or inventions that occur after the expiry of the patent.¹⁵⁹ Cost factors may also influence the gravitation towards trade secrets over patents.¹⁶⁰ The role that trade secrets play in the international diffusion of technology would differ depending on the development stage of the recipient country and also the nature of the technology that is subject to the trade secret. It has been postulated that firms' foreign direct investments may be tied to the strength of trade secret protection in a country.¹⁶¹ It has been argued that firms

¹⁵³ See generally UNEP et al, *Patents*, *supra* note 121.

¹⁵⁴ *Ibid.*

¹⁵⁵ Paul Romer, "The Origins of Endogenous Growth" (1994) 8:1 J Econ Perspectives 3 at 18.

¹⁵⁶ *Ibid.*

¹⁵⁷ Lemley, *supra* note 57.

¹⁵⁸ IPL Png, "Law and Innovation: Evidence from State Trade Secrets Laws" (2017) 99:1 Rev Econ and Statistics 167.

¹⁵⁹ David D Friedman, William M Landes & Richard A Posner, "Some Economics of Trade Secret Law" (1991) 5:1 J Econ Perspectives 61, online: <aeaweb.org/articles?id=10.1257/jep.5.1.61>.

¹⁶⁰ A Arundel, "The Relative Effectiveness of Patents and Secrecy for Appropriation" (2001) 30 Research Policy 611; W Cohen, R Nelson & J Walsh, "Protecting their Intellectual Assets: Appropriability Conditions and Why US Manufacturing Firms Patent (Or Not)" (2000) NBER Working Paper No W7552, online: <nber.org/papers/w7552.pdf>.

¹⁶¹ W G Park & D Lippoldt, "Technology Transfer and the Economic Implications of the Strengthening of Intellectual Property Rights in Developing Countries" (2008) OECD Trade Policy Working Paper No 62, online: <sourceoecd.org/10.1787/244764462745>.

may be more likely “to invest or trade in a country that protects trade secrets, particularly where that investment requires the business to reveal or develop trade secrets.”¹⁶² However, this analysis may only hold true in cases where the recipient country has the local capacity to mimic the technology and convert the misappropriated technology into a commercial opportunity. This scenario has taken place in a number of disputes between US and Chinese companies, but this reality may not unfold where the foreign company retains the secret by transplanting its own employees to the overseas development which is often the case in green energy projects in sub-Saharan Africa.

In the area of solar panels and other green energy products, the patents are often expired, and the knowledge associated with enhancing these products is protected by trade secrets. This protection limits the new creation of second generation products,¹⁶³ and most importantly, inhibits the ability to transfer knowledge in ways that would encourage growth and development in underdeveloped regions. The issue becomes whether the social value of primary inventions and the infinite protection of these undisclosed enhancements through trade secrets, has more social value than secondary inventions.¹⁶⁴

Evergreening adopts multiple forms of life-extension strategies. Within the green technology sector, evergreening is practiced by maintaining technological knowledge via trade secrets, thereby creating an “anti-commons” effect. This non-disclosure is said to curtail innovation and technological diffusion.¹⁶⁵ The result is that the cheaper product (in this case solar panels) becomes inferior and falls into disuse because of the higher costs associated with using an inefficient product. Access to the superior product can only be gained through acquiring a license to use the enhancement. The fact that this enhancement is often protected through trade secrets means that developing countries may never have access to the know-how contained in the technology. Moreover, the cost of acquiring licenses may render this aspect of technology transfer

¹⁶² D Lippoldt & M F Schultz, “Uncovering Trade Secrets – An Empirical Assessment of Economic Implications of Protection for Undisclosed Data” (2014) OECD Trade Policy Paper No 167 at 9.

¹⁶³ Brett M Frischmann & Mark A Lemley, “Spillovers” (2007) 107:1 Colum L Rev 257; Suzanne Scotchmer, “Standing on the Shoulders of Giants: Cumulative Research and the Patent Law” (1991) 5:1 J Econ Perspectives 29 at 32, online: <aeaweb.org/articles?id=10.1257/jep.5.1.29>.

¹⁶⁴ Scotchmer, *ibid* (wherein she argues that the social value of secondary inventions is greater than its primary counterpart; this practice of extending the term of an intellectual property has been adopted in the high tech industry which sees a trade secret as a stronger form of protection because of the non-disclosure and the ability to keep the technology secret in perpetuity); see Friedman, Landes & Posner, *supra* note 159 at 62–64.

¹⁶⁵ Barton & Maskus, *supra* note 107; see generally Heller, *supra* note 110.

unattainable on the African continent if all means of financing are not contemplated from the outset. The reality is that despite the concentration of technology in the hands of the procurer of the trade secret, the inability to finance renewable energy projects is probably a more profound barrier on the African continent than any form of intellectual property protection.

IV. CONCLUSION

The implications of trade secrets on international law, as related to climate change, is intrinsically tied to a legislative and judicial climate that recognizes the rights of trade secret holders to maintain their intellectual property in perpetuity or at least beyond the traditional 20-year period. This paper has explored both the statutory expiry periods of trade secrets along with its treatment under Canadian and U.S. common law. It found that absent reverse engineering, disclosure by a patent holder or through either criminal or civil misappropriation, trade secrets have the potential of having perpetual intellectual property protection. This practice is contrary to the principle of granting limited fixed term monopoly rights in exchange for disclosure. The absence of a statutory fixed term for trade secrets enables the practice of evergreening as a legitimate business practice. The impact on developing nations is that the ability to utilize green technology to aid development may be hindered by practices like undisclosed product enhancements, patent thickets or licensing withholding practices that are based on trade secrets. If this is not the direct goal of trade secret law, then further scholarly work needs to be devoted to understanding the current state of trade secret law and its impact on the social, economic and legal implications affecting a nation's ability to meet its environmental and climate change abatement objectives. It is clear that the developing world, and in particular sub-Saharan African countries, are engaging in development projects in the green energy sector that could lead to economic growth in green industries through knowledge transfers and technology diffusion. This calls for a greater analysis of the role of trade secrets, in fostering or impeding economic growth in green energy and other environmental/climate change abatement projects and strategies. A debate needs to occur regarding how confidential commercial information is going to be balanced against global climate change abatement objectives, and primarily whether a fixed monopoly period needs to be created for trade secrets, especially those containing public utility features of climate change abatement.

The issue of trade secrets and climate change must balance the dual societal need of encouraging innovations through limited intellectual property protections with the public good of accessing needed technologies designed to

solve environmental problems. The practice of evergreening is contradictory to the international agreements ratified by WTO Members in that the practice results in the circumvention of the technology transfer obligations as outlined in agreements like *TRIPS*. While *TRIPS* does set minimum intellectual property standards for nations to uphold, it does not enforce the non-compliance of directives, such as those of technology transfer. Article 39.2 of *TRIPS* recognizes the rights to intellectual property protection in the form of trade secrets but sets no limits or conditions on the duration of that protection and exceptions or flexibilities that may be adopted in addressing global issues such as climate change abatement.

While evergreening is arguably anti-competitive, the study of this practice has not extended far beyond the pharmaceutical sector. The debate that emerged around evergreening often addressed equitable issues such as the impact of this practice on the affordability of life-saving medicines in the developing world. The subject of evergreening rarely considers issues of global concern like the environment. In addition, throughout the practice of evergreening, the scholarly focus dedicated to the practice of evergreening has not adequately considered other intellectual property areas like trade secrets, especially within the framework of climate change. Specifically, consideration of the practice of not having fixed intellectual property terms for trade secrets have been minimally considered within scholarly debate. Instead, the focus on trade secret infringement or loss of protection primarily addresses issues of reverse engineering, employee disclosure and voluntary disclosure through patents. The concept that trade secrets can extend even beyond a 20-year period that is prescribed for other forms of intellectual property has received very little scholarly attention. This omission has led to the consequence of having an intellectual property category (trade secret) that fails to limit the exclusivity period, thereby neglecting the public social benefit of inventions or innovation. This shortcoming may render technological transfer-provisions in an international treaty, like *TRIPS*, completely inoperable, and may also impact the ability of developing nations to utilize green technology in their developmental paths.

While technology transfer as well as the economic, technical and industrial barriers to the technology transfer has been raised in international trade discussions on numerous occasions, the discussion has often focussed on the impediments that *TRIPS* poses from a patent perspective. Consequently, solutions and discussions have centred on the compulsory licensing of green

technologies.¹⁶⁶ Little focus has been given to potentially anti-competitive practices like evergreening as it relates to trade secrets. Virtually absent from the debate are discussions of practices like trade secrets on the dissemination of green technology to the developing world.

In technologically intensive industries like those of renewable energy, evergreening can also impact on development. For example, the solar panel industry requires extensive know-how and financial outlay. If such paths to development are impeded by anti-competitive practices then developing countries may choose a cheaper, less complicated and less green development path, like intensive burning of inexpensive fossil fuels for energy. The applicability of evergreening to environmentally sound technologies has been an area of neglect in the scholarly debate of the subject. The fact that many environmental products like solar panels use enhancements that are maintained through trade secrets also renders these improvements an area of intellectual property worth studying. An even greater omission is that very little connection has been identified in the literature between the practice of evergreening and its impact on climate change abatement strategies like green technology transfer. International treaties, including *TRIPS*, the UNFCCC Conventions, and the *Paris Agreement*, all contain technology transfer provisions, yet if industry practices, such as evergreening, block the operationalization of these provisions, then such treaties become essentially toothless in their capacity to encourage commitments related to technology transfer and climate change abatement.

¹⁶⁶ Robert Fair, "Does Climate Change Justify Compulsory Licensing of Green Technology?" (2009) 6:1 Intl L & Management Rev 21.