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The "Green Patent Paradox" and Fair Use: The Intellectual Property Solution to Fight Climate Change

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I. INTRODUCTION

A. The Climate Crisis

It cannot be doubted that climate change is one of the greatest threats to the world and is in part anthropogenic (affected by humans).[1] The scientific consensus on climate change is clear: the rise of industry has contributed to a rise in greenhouse gases (GHGs) that enter Earth's atmosphere, including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_20).[2] The persistent increase of GHGs in the atmosphere raises the global temperature, which in turn creates or accelerates other environmental impacts.[3] The recent forest fires in the Amazon rainforest, Australia, and the United States, for example, are attributed to higher temperatures.[4] These higher temperatures increase evaporation, leading to decreased moisture in vegetation which allows fires to spark more frequently and

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[1] INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE [IPCC], FIFTH ASSESSMENT REPORT, CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS (2013), https://www.ipcc.ch/site/assets/uploads/2017/09/WG1AR5_Chapter01_FINAL.pdf [https://perma.cc/UGE2-DSMF].

[2] INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE [IPCC], SPECIAL REPORT: GLOBAL WARMING OF 1.5°C (2019), https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_Low_Res.pdf [https://perma.cc/YZF4-SHF5] [hereinafter "IPCC SPECIAL REPORT"].

[3] *Id*.

[4] Daisy Dunne, *Explainer: How Climate Change is Affecting Wildfires Around the World*, CARBONBRIEF (July 14, 2020), https://www.carbonbrief.org/explainer-how-climate-change-is-affecting-wildfires-around-the-world [https://perma.cc/2Z42-VH9E].

spread more rapidly.[5] Also, melting polar ice caps will further raise global sea levels, contributing to increased flooding, salinity in coastal groundwater, and damage to infrastructure.[6] Additionally, because Earth's oceans absorb 30% of anthropogenic CO_2, ocean warming, ocean acidification, and changes in the carbonate compositions continue to occur.[7] These changes in ocean environments negatively impact marine organisms and ecosystems, as well as the aquaculture and fishery industries that rely on them.[8]

Undeniably, the effects of climate change disparately impact the Black, Indigenous, and People of Color (BIPOC) community. For example, neighborhoods with higher populations of BIPOC individuals, within the metropolitan areas of Detroit, Michigan; Memphis, Tennessee; Chicago, Illinois; and Kansas City, Missouri, are frequently targeted locations.[9] Likewise, the increasing severity of hurricanes and rising sea levels poses disproportionately higher risks to BIPOC communities in the Bahamas; Kivalina, Alaska; and other areas.[10] With fewer opportunities for advancement as a result of systemic racism and injustice, these communities lack the opportunity to leave these regions.[11] Evidently, racial justice cannot be achieved without climate justice.

A recent report by the Intergovernmental Panel on Climate Change (IPCC) laid out the prospective effects of 1.5°C and 2°C increases in average global temperatures above the preindustrial average, and what is required by global leaders to mitigate those effects.[12] Two years ago, the United Nations warned that the world has twelve years to ensure global temperatures do not exceed 1.5°C, or else the effects from climate change will "significantly worsen."[13] Thus, the current assessment is now ten years. Recognizing that climate change is an existential threat to humanity, the United Nations convened in 2015 for the historical Framework Convention on Climate Change (UNFCCC), better known as the Paris Climate

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[5] *Id*.
[6] IPCC SPECIAL REPORT, *supra* note 2.
[7] *Id*.
[8] *Id*.
[9] Nat'l Ass'n for the Advancement of Colored People, *Environmental and Climate Justice*, NAT'L ASS'N FOR THE ADVANCEMENT OF COLORED PEOPLE, https://www.naacp.org/issues/environmental-justice/ [https://perma.cc/3VZD-5W66] [hereinafter "NAACP"].
[10] NAACP, *supra* note 9; Adelle Thomas & Rueanna Haynes, *Black Lives Matter: The Link Between Climate Change and Racial Justice*, CLIMATE ANALYTICS (June 22, 2020), https://climateanalytics.org/blog/2020/black-lives-matter-the-link-between-climate-change-and-racial-justice/ [https://perma.cc/Z24H-8H4V].
[11] Thomas & Haynes, *supra* note 10.
[12] IPCC SPECIAL REPORT, *supra* note 2.
[13] Jonathan Watts, *We have 12 years to limit climate change catastrophe, warns UN*, GUARDIAN (Oct. 8, 2018, 7:23 AM) https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report [https://perma.cc/F8WP-MUHT].

Agreement.[14] Countries signing onto the agreement pledged to fundamentally transform their economies and energy systems by the year 2030.[15] Although the United States (U.S.) helped lead this effort to combat climate change, President Donald Trump announced on June 1, 2017, that the U.S. would be withdrawing from the agreement.[16] Although the President had served notice to quit the Paris Climate Agreement on November 4, 2019, the U.S. remains part of the UNFCCC today because actual withdrawal cannot occur until 2021.[17] Fortunately, the election of former Vice President Joseph R. Biden signals a reversal of President Trump's decision to leave UNFCCC and makes the Agreement's "goal of limiting global warming to 1.5°C 'within striking distance[.]'"[18] Regardless, climate change–or rather, the climate crisis–still poses a major threat to humanity.[19]

B. A New Patent Regime

Regardless of the current state of U.S. politics, pledges and actions from the federal government are not enough to combat the climate crisis.[20] Although U.S. industry has substantially contributed to the effects of climate change, it can remedy such effects.[21] In particular, the U.S. needs to initiate structural change in innovation that should originate in creating progressive changes to its patent regime. As innovations in green technology catch up to the climate crisis, the U.S. will need to change patent law to allow for more expansions in green technology transfers to secondary users.[22] While several recent proposed policy changes and commercial initiatives have tried to effectively transform the patent regime in the wake

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[14] UNITED NATIONS, FRAMEWORK CONVENTION ON CLIMATE CHANGE (2016), http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf [https://perma.cc/KRP6-NB26] [hereinafter "UNFCCC"].
[15] *Id.*
[16] Lisa Friedman, *Trump Serves Notice to Quit Paris Climate Agreement*, N.Y. TIMES (Nov. 4, 2019), https://www.nytimes.com/2019/11/04/climate/trump-paris-agreement-climate.html [https://perma.cc/3XEV-DFYU].
[17] *Id.*
[18] Helen Regan, *Joe Biden's Climate Plan Could Put Paris Agreement Targets 'Within Striking Distance,' Experts Say*, CNN (Nov. 9, 2020, 1:20 AM), https://www.cnn.com/2020/11/09/politics/biden-climate-plan-election-intl-hnk/index.html [https://perma.cc/S8PH-3BT5].
[19] Although "climate change" and "climate crisis" can be used interchangeably, "climate crisis" more accurately invokes the phenomenon's seriousness as a global health threat. Nick Sobczyk, *How Climate Change Got the Label "Crisis"*, E&E NEWS (July 10, 2019), https://www.eenews.net/stories/1060718493 [https://perma.cc/D4GZ-LUBJ].
[20] Deborah Behles, *The New Race: Speeding Up Climate Change Innovation*, 11 N.C. J. L. & TECH. 1, 2 (2009).
[21] Michael A. Gollin, *Using Intellectual Property to Improve Environmental Protection,* 4 HARV. J. L. & TECH. 193, 193 (1991).
[22] Behles, *supra* note 20, at 33. For purposes of this article, a "secondary user" of a patent refers to a person or entity who infringes upon a patent by using, making, selling, or offering to sell that patent holder's invention without permission.

of the climate crisis, they either lacked the urgency to address this crisis or had the collateral effect of stalling innovation.

Patent law, unlike copyright law and trademark law, does not have a fair use doctrine.[23] While several arguments justify its exclusion, many others support the extension of fair use to patent law.[24] Given that alleviating the climate crisis requires a massive expansion of patented green technologies in the market, fair use as an affirmative defense to patent infringement in this context would provide a strong framework within the patent regime to permit secondary use while still protecting patent holders' rights. This article advocates for fair use's extension into patent law as a solution to fight climate change through mass expansion of green technology, similar to the fair use doctrine codified in copyright law. Specifically, it details a green patent-specific proposal to show how fair use will cure market deficiencies while maintaining the incentives of the inventor, while removing the barriers needed to bring green technology to market in sufficient supply. Although fair use in patent law can benefit many other fields of technology, this article primarily focuses on the necessity for fair use of green technology.

Part II of this article provides commentary on the existence of a "Green Patent Paradox" and demonstrates that the current patent regime in the U.S. includes barriers to effectively combat climate change. In doing so, it provides examples of patent infringement actions in federal court and other types of green patent-related disputes. Part III describes various proposals and ideas to modify the patent system regarding green technology from both the public and private sectors and explains how they are ill-equipped to implement a comprehensive system to fight climate change while protecting patent holders' rights. Part IV evaluates discussions regarding the fair use doctrine's application to patent law while comparing it to its counterpart in copyright law. Finally, Part V proposes a fair use defense against patent infringement on green technologies while considering and then dispelling several anticipated contentions against its extension.

II. PATENT INFRINGEMENT & CLIMATE CHANGE: IS THERE A "GREEN PATENT PARADOX?"

For a prospective patent holder to obtain a patent for their invention, they must file an application with the United States Patent and Trademark Office (USPTO) and demonstrate that their invention is a patentable

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[23] *See* 17 U.S.C. § 107 (codifying the fair use doctrine in copyright law); *see also* 15 U.S.C. § 1115(d)(4) (permitting use of others' trademarks when used descriptively and in good faith); *see also* New Kids on the Block v. News Am. Publ'g, Inc., 971 F.2d 302 (9th Cir. 1992) (recognizing nominative fair use as a defense to trademark infringement).

[24] *See generally* Maureen A. O'Rourke, *Toward a Doctrine of Fair Use in Patent Law*, 100 COLUM. L. REV. 1177, 1179 (2000).

subject matter which is novel, non-obvious, and useful.[25] Once the USPTO issues the patent to the applicant, that inventor has the right to exclude others from making, using, offering to sell, and selling that patent regarding what is prescribed.[26] A patent holder possesses the right for twenty years from the issuance of a patent, after which it becomes part of the public domain.[27] Patent law's fundamental policy tradeoff is that while the inventor has the exclusive right of their invention, the contents of the inventions are disclosed to the public.[28] Moreover, the patent holder does not technically have a monopoly on the patented invention: changes in law can eliminate the validity of a patent, geographical restrictions can reduce the scope of the patent's use, and other equitable doctrines of law may be applicable.[29]

The justification for a patent holder's right to exclude rests on the principle that it promotes innovation by giving the inventor an incentive to use their invention and benefit the public.[30] However, while patent law assumes patent holders will efficiently license their technologies to make the best use of its potential, this notion is not always true.[31] Even with the U.S. antitrust system geared toward preventing an entity's full market control over products, patent grants give the rightsholder the power to exclude others from unauthorized secondary use of that technology.[32] Furthermore, the refusal to license is not a defense against patent infringement in a lawsuit.[33]

If this principle is carried out to its fullest extent, there could be a prohibitive effect on initiatives to combat climate change. Globally, companies have filed numerous green patents at varying rates among specific subsectors.[34] While trends show that green patent applications are declin-

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[25] 35 U.S.C. §§ 101-03.
[26] *Id*. § 154.
[27] *Id*.; Michael Carrier, *Unraveling the Patent-Antitrust Paradox*, 150 U. PA. L. REV. 761, 767 (2002).
[28] Brenda Simon, *Patent Cover-Up*, 47 HOUS. L. REV. 1299, 1318 (2011).
[29] Lorelei De Larena, *What Copyright Law Teaches Patent Law about Fair Use and Why Universities Are Ignoring the Lesson*, 84 OR. L. REV. 779, 780-81 (2005).
[30] Carrier, *supra* note 27, at 766-67.
[31] *Id*. at 769.
[32] *Id*.
[33] 35 U.S.C. § 271(d) ("No patent owner otherwise entitled to relief for infringement … shall be denied relief or deemed guilty of misuse … by reason of … refus[ing] to license or use any rights to the patent").
[34] For example, the world has seen fewer patent filings in solar, wind, and nuclear energy but has seen moderately steady filing rates for smart home and electric vehicle technologies. The U.S. has comprised about 50% of patent filings since 2010. KILPATRICK TOWNSEND, TRENDS IN CLEANTECH (2019), https://www.kilpatricktownsend.com/-/media/Feature/Insights/Publication/2019-Patent-Trends-Study_Cleantech.ashx?la=en&hash=B59BF5C9BC4451138462CF37345F7B7D4F535AB6 [https://perma.cc/92B7-8AFL].

ing in part because of delays in research and development (R&D) and investment,[35] certain technologies such as renewable energy are becoming "more profitable" and "less reliant on government subsidies."[36] Moreover, although the U.S. remains dependent on oil and thus resistant to transforming its energy system,[37] these statistics demonstrate significant innovation within green technology. Although the U.S. is now very likely to rejoin the global efforts to combat climate change, the consensus remains that private sector innovation is needed to effectuate the challenges ahead.[38]

This tension between the rights of the patent holder and the need to use their green technology can be described as the Green Patent Paradox, whereby patented technologies geared toward mitigating the effects of climate change or substituting environmentally hazardous industries may not reach their full potential in part because patentees refrain from licensing their products. Whether a major crisis within the patent regime concerning green technology exists is still too early to determine.[39] However, recent suits in federal court foreshadow the prospect of this issue developing in the years to come.

A. Paice and GE: Green Technology in Federal Court

With regard to patent reform specifically, progress has been made around the world to actively combat the effects of climate change.[40] At the same time, many lawsuits have been filed and argued in federal court concerning secondary and more expansive uses of patented green technology. A patent holder is entitled to relief when a secondary user "makes, uses, offers to sell, or sells" the patented invention regardless of whether the secondary user possesses[41]

However, the degree to which patentees can gain relief was limited by the Supreme Court in *eBay v. MercExchange* whereby permanent

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[35] Natalie Sauer, *Cleantech Patent Applications Plummet, Sparking Fears for Innovation*, CLIMATE HOME NEWS (July 16, 2019, 6:54 PM), https://www.climatechangenews.com/2019/07/16/cleantech-patent-applications-plummet-sparking-fears-innovation/ [https://perma.cc/9BDA-JHWA].
[36] *Global Green Energy Patent Filing Jump 43% compared to 2016*, BIOENERGY INT'L, (Oct. 6, 2018), https://bioenergyinternational.com/research-development/global-green-energy-patent-filings-2017-jump-43-compared-to-2016 [https://perma.cc/K466-9UVL].
[37] KILPATRICK TOWNSEND, *supra* note 34.
[38] *See* Jon P. Santamauro, *Failure is Not an Option: Enhancing the Use of Intellectual Property Tools to Secure Wider and More Equitable Access to Climate Change Technologies,* in ENVIRONMENTAL TECHNOLOGIES, INTELLECTUAL PROPERTY AND CLIMATE CHANGE: ACCESSING, OBTAINING, AND PROTECTING, 84, 88-89 (Abbe E.L. Brown ed., 2013).
[39] *See generally* Navraj Singh Ghaleigh, *The Puzzling Persistence of the Intellectual Property Right/Climate Change Relationship*, in ENVIRONMENTAL TECHNOLOGIES, INTELLECTUAL PROPERTY AND CLIMATE CHANGE: ACCESSING, OBTAINING, AND PROTECTING, 59, 70-72 (Abbe E.L. Brown ed., 2013).
[40] Eric L. Lane, *Keeping the LEDs on and the Electric Motors Running: Clean Tech in Court after eBay*, 2010 DUKE L. & TECH. REV. ¶ 4 (2010).
[41] *See* 35 U.S.C. § 271(a).

injunctive relief in patent infringement suits must meet four basic requirements for an injunction.[42] A heightened standard for plaintiffs means that secondary uses of patented technologies have a better chance of surviving infringement suits. For commentators as well as secondary users, this decision is seen as a partial victory because the patent infringement gravitated from the old standard which automatically gave injunctive relief to the plaintiff.[43] Since *eBay*, many subsequent green patent infringement cases have come before federal courts, providing mixed signals for future developments of green technology.[44]

In 1992, Paice LLC, a startup company in the business of hybrid gas-electric vehicles, filed a patent for its developed hybrid technology.[45] Paice's patent application covered the utilization of an electric motor in conjunction with the standard internal combustion engine (ICE) that supplies additional power and transfers torque to the drive wheels of conventional automobiles.[46] In 1994, the USPTO granted Patent No. 5,343,970 ("the '970 patent") to Paice.[47] One year later, Toyota started developing hybrid gas-electric vehicles in Japan and later launched the Prius in 1997, which was subsequently released to the U.S. in 2000.[48] Paice founder, Dr. Alex Severinsky, met with representatives of Toyota USA to demonstrate Paice's hybrid technology and offer a license agreement; however, Toyota refused because it had "no intention of developing [Paice's] technology."[49] At subsequent meetings between the parties, Toyota acknowledging Paice's strong contributions but still refusing its offer to license the patent.[50] Thereafter, Paice filed suit against Toyota in the Eastern District of Texas for infringement of the '970 patent.[51]

Pursuant to *eBay*, the District Court denied permanent injunctive relief for Paice; however, the Court went on to hold that Toyota infringed on the patent rights of Paice and awarded ongoing royalties of $25 per infringing hybrid Toyota vehicle to Paice.[52] On appeal, the Federal Circuit Court affirmed the denial of the injunction but remanded on the issue of

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[42] eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 391-92 (2006) ("A plaintiff must demonstrate: (1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering a balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.").
[43] Lane, *supra* note 40, ¶ 5.
[44] *Id*. ¶ 6.
[45] *Id*. ¶ 9.
[46] *Id*.
[47] *Id*. ¶ 11; *see also* U.S. Patent No. 5,343,970 (filed Sept. 1, 1992).
[48] Lane, *supra* note 40, ¶ 11.
[49] *Id*.
[50] *Id*.
[51] *Id*.
[52] Paice LLC v. Toyota Motor Corp., 504 F.3d 1293, 1313 (Fed. Cir. 2007).

royalties, holding that the District Court could not allow further use by Toyota without clarifying how to calculate the ongoing royalty.[53] On remand, after providing the parties an opportunity to settle on a rate themselves, the District Court raised the ongoing royalties to $98 per hybrid vehicle.[54]

Paice demonstrates the sheer benefit that *eBay* has toward resolving the Green Patent Paradox. If Dr. Severinsky had his way, Toyota would not have been able to sell the Prius, Highlander, Lexus RH400h, or other hybrid models in the U.S.[55] Given Toyota's success and leadership in the fuel efficiency market, such a result could have imposed a severe impact on the climate.[56] However, given Dr. Severinsky's zealousness to hold dominion over the hybrid motor, this case also reveals the potential threat of a patent holder not fully utilizing their rights on the rights of valuable green patents.

Infringement suits on green patents have also covered alternative energy. In 2002, General Electric (GE) obtained U.S. Patent No. 5,083,039 (the '039 patent),[57] which covered a "wind turbine mechanism operating at variable speed under different wind condition[s]."[58] This advancement was beneficial because U.S. electric companies previously had to adjust wind turbines based on "a standard fixed frequency [of 60Hz]."[59] A few years later, GE and Mitsubishi, a Japanese wind turbine manufacturer, engaged in a patent dispute over the '039 patent. GE brought an infringement action against Mitsubishi.[60] Mitsubishi countered by filing[61] a complaint in the Western District of Arkansas, accusing GE of violating antitrust law by dominating the market of variable speed wind turbines.[62]

These suits illustrate what is considered "the beginning of an arms race for IP in the clean energy industry."[63] While these companies are advocating for what they believe are their rights to use this technology, the

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[53] *Id*. at 1316.
[54] Paice LLC v. Toyota Motor Corp., 609 F. Supp. 2d 620, 623 (E.D. Tex. 2009); Lane, *supra* note 40, ¶ 9 n. 72.
[55] Lane, *supra* note 40, ¶ 82.
[56] *Id*. ¶ 7.
[57] HEE-EUN KIM, THE ROLE OF THE PATENT SYSTEM IN STIMULATING INNOVATION AND TECHNOLOGY TRANSFER FOR CLIMATE CHANGE: INCLUDING ASPECTS OF LICENSING AND COMPETITION LAW 65-66 (Prof. Dr. Christoph Ann, LL.M et al. eds., 2010). The '039 patent was originally issued to a California-based company called Kenentech in 1992. *Id*. However, after filing bankruptcy in the wake of a patent infringement suit with Enron Wind, the patent ended up in the hands of GE. *Id*.
[58] *Id*.; U.S. Patent No. 5,083,039 (filed Feb. 1, 1991).
[59] KIM, *supra* note 57, at 66.
[60] *Id*.; Gen. Elec. Co. v. Mitsubishi Heavy Indus. Ltd., No. 3:10-CV-00276-F, 2013 BL 141580 (N.D. Tex. May 28, 2013).
[61] Mitsubishi Heavy Indus., Ltd. v. Gen. Elec. Co., No. 6:10-CV-00812-JA-KRS (M.D. Fla. Filed May 20, 2010).
[62] Mitsubishi Heavy Indus., Ltd. v. Gen. Elec. Co., 720 F. Supp. 2d 1061 (W.D. Ark. 2010).
[63] KIM, *supra* note 57, at 67.

need to expand this technology in the pursuit of mitigating the effects of climate change is sidelined. The '039 patent is a quality patent that effectively blocked use by other companies wishing to achieve an energy quality standard without proper licensing.[64] If a patent of this nature gets into the hands of an entity that sits on their intellectual property rights,[65] then the benefits of the green technologies covered will not be imputed on society.

While *Paice* and *GE* are two major lawsuits in the area of green technology, other forms of patent infringement actions have reached federal court involving a wide variety of green patents.[66] For example, one technology that has gained success in the realm of alternative energy is energy-efficient lighting such as light-emitting diodes (LEDs). LEDs are an effective substitute for standard incandescent lightbulbs and are more environmentally friendly; producing more light per watt, emitting particular colors of light without utilizing other color filters, and radiating very little heat.[67] Additionally, LEDs are eco-friendly substitutes for technologies such as traffic lights and cell phones.[68] Given the potential widespread use of LEDs, patent infringement disputes are inevitable. In 2019 alone, Technical LED Intellectual Property and Lighting Science Group collectively filed nineteen patent infringement lawsuits against other companies, alleging that certain products infringe on their LED patents.[69] Additionally, numerous infringement lawsuits have arisen in other green technology sectors such as solar power, batteries, and even eco-friendly pet products.[70]

B. The International Trade Commission (ITC)

Outside of federal court, green patent holders have sought extrajudicial methods of asserting their rights. One of these outlets is the International Trade Commission (ITC), an independent federal agency that

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[64] *Id*.
[65] *See infra* Part II.C.
[66] *See generally* Eric Lane, *Clean Tech in Court: Green Patent Complaint Update*, GREEN PATENT BLOG (May 31, 2019), http://www.greenpatentblog.com [https://perma.cc/4UL7-3YXF].
[67] Lane, *supra* note 40, ¶ 55.
[68] *Id*. at ¶¶ 54-55.
[69] *E.g.* Jury Trial Demanded, Lighting Sci. Grp. Corp. v. Acuity Brands, Inc., 1:19-CV-00805 (D. Del. May 1, 2019); Jury Trial Demanded, Lighting Sci. Grp. Corp. v. Lumileds Holdings B.V., 1:19-CV-00809 (D. Del. May 1, 2019); Jury Trial Demanded, Tech. LED Intell. Prop., LLC v. Shenzhen Gosund Tech. Co., Ltd., 1:19-CV-320 (N.D. Cal. Mar. 21, 2019). For a more exhaustive list of lawsuits over LED patents, *see generally* Eric Lane, *supra* note 66.
[70] *E.g.* Demand for Jury Trial, Hanwha Q Cells & Advance Materials Corp. v. Longi Green Energy Tech. Co., 1:19-CV-00450-UNA, (D. Del. Mar. 3, 2019); Demand for Jury Trial, Battery Conservation Innovations, LLC v. InMotion Tech. LLC, 3:19-CV-00794-AJB-BGS (S.D. Cal. Apr. 30, 2019); Jury Trial Demanded, The Green Pet Shop Enter., LLC v. Briggs Healthcare, 1:19-CV-00725 (N.D. Ill. Feb. 5, 2019); *see generally* Lane, *supra* note 66.

Congress created in 1916 to investigate issues in international trade.[71] The ITC has the authority to conduct "quasi-judicial" proceedings involving accusations of intellectual property infringements against imported products that allegedly infringe upon U.S. patent holders' rights.[72] Unlike federal jurisdictions over patent infringement suits, the ITC is not bound by the injunction standard set forth in *eBay;* therefore, if patent holders fail to obtain remedies in federal court, they may use the ITC as an alternative forum.[73]

The parties in *Paice* and *GE* had both resorted to using the ITC in their respective procedural histories. After the Federal Circuit denied Paice's request for a permanent injunction against Toyota's use of the drive trains, Paice looked alternatively to the ITC in 2008 to stop Toyota.[74] Paice's ITC complaint stated that Toyota had previously stipulated to the fact that the drive trains infringed on the '970 patent.[75] During the ITC proceedings, Paice asserted that res judicata and collateral estoppel were inapplicable due to the ongoing infringement.[76] Upon Paice's motion for summary proceedings, the ITC investigative staff agreed that Toyota's products were materially the same as Paice's.[77] Ultimately, Paice's strategy resulted in a settlement with Toyota accepting a license agreement.[78] On the other hand, one year before the parties in *GE* initiated federal suits, they attempted to resolve their '039 patent dispute before the ITC.[79]

Another set of green patent infringement lawsuits comes from Columbia University Professor Emeritus Gertrude Neumark Rothschild's LED patents. Professor Emeritus Rothschild owned two patents prescribing methods of making LEDs emit lights with shorter wavelengths such as blue and green lights.[80] In particular, her patents evaded the issue of "doping" the bandgap semiconductor materials of the LEDs and made them more economically efficient.[81] Starting in 2005, she initiated several patent infringement suits against LED manufacturers in the Southern District of

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[71] *About the USITC,* U.S. INT'L TRADE COMM'N, https://www.usitc.gov/press_room/about_usitc.htm [https://perma.cc/U7FR-NQLK] (last visited Feb. 6, 2020, 8:58 AM).
[72] *Intellectual Property Developments*, U.S. INT'L TRADE COMM'N, https://www.usitc.gov/intellectual_property.htm [https://perma.cc/YHZ5-95FU] (last visited Feb. 6, 2020, 8:58 AM); *see also* Lane, *supra* note 36, ¶ 43 n. 99.
[73] Lane, *supra* note 40 ¶ 43 n. 99.
[74] *Id.* ¶ 44; In the Matter of Certain Hybrid Electric Vehicles and Components Thereof, Inv. No. 337-TA-688, USITC Pub. 2009 WL 10693173 (Oct. 5, 2009) (Closed).
[75] Lane, *supra* note 40, at ¶ 45.
[76] *Id*.
[77] *Id*. ¶¶ 45-46.
[78] *Id*. ¶ 44.
[79] In the Matter of Certain Variable Speed Wind Turbines and Components Thereof, Inv. No. 337-TA-641, USITC Pub. 2009 ITC LEXIS 510 (Mar. 19, 2009) (Closed); KIM, *supra* note 57, at 66.
[80] U.S. Patent No. 5,252,499 (filed Aug. 15, 1988); U.S. Patent No. 4,904,618 (filed Aug. 22, 1988).
[81] "Doping" refers to "a process by which impurities are added to a semiconductor to increase the number of free charge carriers." Lane, *supra* note 40, ¶¶ 57-58.

New York and in 2008 began litigating through the ITC against technology giants such as Nokia, Samsung, Sony, Hitachi, and others.[82] Professor Emeritus Rothschild succeeded in receiving licensing agreements from settlements with the accused infringers.[83]

Evidently, the ITC is a useful alternative dispute resolution forum outside of the federal court system that can effectively pressure settlements in patent disputes. However, its legitimacy within the patent regime and separation from federal precedent make it easier for patent holders to preclude other parties from developing crucial inventions, further threatening the expansion of green technology.

C. Green Patent Trolls and Non-Practicing Patentees (NPPs)

Apart from filing patent infringement suits or utilizing other dispute resolution forums, patent holders can turn to extreme alternate measures to curb development in the green technology space. A non-practicing patentee (NPP)–more commonly referred to as a "patent troll"–is a patent holder that does not commercialize their patent through use and instead relies on licensing to generate revenue, often with the threat of litigation.[84] For instance, even with the reduced threat of injunctions under the *eBay* standard, patent holders like Professor Emeritus Rothschild can still pressure other technology companies into either taking their licensing agreement or halting their innovations without any legal determination on whether that innovation infringes on the patent.[85] Thus, NPPs with overly broad green patents can employ transactional methods to prevent subsequent green technological developments, further threatening the global climate.

Perhaps the most infamous patent troll is Intellectual Ventures (IV), a limited liability company based in Bellevue, Washington, and founded by former Microsoft Chief Technology Officer Nathan Myhrvold.[86] IV has a large patent portfolio covering numerous fields of technology, owning around 1,000 patents from in-house inventions but having acquired over 30,000 from other people.[87] Initially, IV created shell companies to shield its identity as a patent holder but has since became more

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[82] *Id*. ¶¶ 58-59.
[83] *Id*. ¶ 60.
[84] *Id*. ¶ 1.
[85] *Id*. ¶ 60.
[86] Morgan Baskin & Jack Denton, *'The Ultimate Patent Troll'*, PACIFIC STANDARD, https://psmag.com/magazine/a-patent-boogieman-with-the-potential-to-obliterate-aspiring-startups [https://perma.cc/2ENV-KQQT] (Sept. 16, 2018).
[87] *Id*.

transparent by publishing a patent list on its website.[88] IV has a particularly negative reputation in the technology industry as they have the potential to "obliterate startups."[89] In fact, it has been called "the most hated company in tech."[90] IV has, however, played an active role in supporting sustainability and green technology related ventures. Among others, it has supported, spun off, and partnered with companies such as Coffee Flour, TerraPower, Raisio, and Irrigation and Water Technologies (IWT).[91] Within its own patent scheme, the company owns numerous patents in solar energy, wind energy, and other fields.[92] Additionally, IV has a history of filing overly broad patent applications in various fields, including wind energy.[93]

Given IV's history of scaring competitors with lawsuits and using other techniques to curb others' technological development, it is clear the patent system supports individualized patent holder interest rather than specifically promoting innovations to better society. IV and other NPPs have the leverage to thwart others' entrepreneurial efforts despite the lack of their patents' use, which threatens innovation and makes global sustainability particularly vulnerable.

D. Summary of the Green Patent Paradox

Because of the dominion that a patent holder has over the rights to their patented technologies, the threat of valuable green technology not reaching the market on a necessary scale remains imminent. While the *eBay* decision is a step in the right direction for developing innovations in green technology, a gap remains in federal law as it does not establish incentives for entrepreneurs to bring green technology to the market without the fear of infringement actions. Moreover, patent holders can resort to the ITC as another avenue for seeking a permanent injunction, posing an even greater threat to the global climate. Furthermore, patent holders can act as

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[88] Todd Bishop*, Intellectual Ventures Reveals List of 33,000 Patents, in Move Toward (Partial) Transparency*, GEEKWIRE (Dec. 16, 2013), https://www.geekwire.com/2013/intellectual-ventures-reveals-list-33000-patents-move-transparency/ [https://perma.cc/D4W7-6SL3]; *Patent Finder*, INTELL. VENTURES, http://patents.intven.com/finder [https://perma.cc/238C-G439] (last visited Sept. 9, 2020).

[89] Baskin & Denton, *supra* note 86.

[90] Jim Kerstetter & Josh Lowensohn, *Inside Intellectual Ventures, the Most Hated Company in Tech*, CNET (Aug. 21, 2012, 6:57 AM), https://www.cnet.com/news/inside-intellectual-ventures-the-most-hated-company-in-tech/ [https://perma.cc/E6ZN-8L7C].

[91] *Sustainable Innovation*, INTELL. VENTURES (Apr. 24, 2014), https://www.intellectualventures.com/buzz/insights/sustainable-invention/ [https://perma.cc/D3VJ-X68R].

[92] *See e.g.* U.S. Patent No. 7,638,891 (filed Mar. 19, 2007) ("Wind turbine and solar gathering hybrid sheets"); U.S. Patent No. 7,576,444 (filed Apr. 26, 2007) ("Micro turbine sheet design for gathering wind energy"); U.S Patent No. 7,800,036 (filed Jan. 21, 2009) ("System and method for creating a networked infrastructure roadway distribution platform of solar energy gathering devices").

[93] Ros Davidson, *Analysis: Patent Trolls Target Wind Power*, WINDPOWER MONTHLY (Aug. 7, 2014), https://www.windpowermonthly.com/article/1306962/analysis-patent-trolls-target-wind-power [https://perma.cc/8ETG-X84G].

NPPs and refrain from innovating and threaten others with unwanted licensing agreements. Therefore, large structural changes in the U.S. patent regime are needed to remedy this tension.

III. RECENT PATENT-BASED CLIMATE RESPONSES

Although the U.S.'s future role in the fight against climate change is reshaping, it is important to note that there have been several attempts in the U.S. to curb the effects of climate change, including through its own patent system. The Paris Climate Agreement, which the U.S. helped negotiate but ultimately left, calls for countries to utilize technology transfer as a way to mitigate the effects of climate change.[94] This provision can reasonably be construed as an expansion of intellectual property rights in pursuit of public necessity.

The U.S. is still a part of the Agreement on Trade-Relations Aspects of Intellectual Property Rights (TRIPS Agreement), which the World Trade Organization (WTO) initiated.[95] Several authorities have interpreted the TRIPS Agreement to loosen patent protections as a way to stimulate environmental innovation in the developing world.[96] However, its provisions are equally applicable to domestic markets and many authorities have interpreted certain provisions to justify changing patent regimes to accelerate green technology expansions.[97] For example, Article 8(1) allows members to adopt necessary measures to protect public health[98] and Article 30 allows countries to offer limited exceptions to rights exclusion as long as these exceptions do not unreasonably conflict with the rightsholders' interests and consider the perspectives of third parties.[99] This section will detail the policies that both the public and private sectors have developed or implemented, demonstrating that they have not achieved optimal results.

A. Public Sector Responses

A brief overview of recent solutions to combat climate change outside of U.S. patent law is needed to show what private and public industry has already considered. Some of the more prominent proposals

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[94] UNFCCC, *supra* note 14, at 10.
[95] TRIPS: Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 401, 33 I.L.M. 1197 (1994) [hereinafter "TRIPS Agreement"].
[96] *Id.*
[97] *See* KIM, *supra* note 57, at 27-28; *see also* WEI ZHUANG, INTELLECTUAL PROPERTY RIGHTS AND CLIMATE CHANGE: INTERPRETING THE TRIPS AGREEMENT FOR ENVIRONMENTALLY SOUND TECHNOLOGIES 5 (Cambridge Univ. Press eds., 2017).
[98] TRIPS Agreement, *supra* note 95, art. 8(1).
[99] *Id.* art. 30.

from recent history include cap and trade initiatives and carbon taxes.[100] During the Obama Administration, Congress and the Environmental Protection Agency (EPA) considered cap and trade programs as a way to place industry standards on GHG emissions. For example, in 2009, Congress proposed the American Clear Air and Security Act aimed at lowering the cap on GHGs on an incremental basis.[101] However, these proposals have been met with hostility from the affected industries as they allegedly do not encourage innovation.[102] Alternatively, carbon taxes impose a direct tax on businesses based on the tons of carbon emitted, encouraging industry to innovate toward green technology.[103] However, much like cap and trade programs, these taxes are met with equal hostility.[104]

The most recent proposal to gain national attention was the Green New Deal.[105] This resolution, sponsored by Congresswoman Alexandria Ocasio-Cortez (D-NY) and Senator Ed Markey (D-MA), aims to achieve net-zero GHG emissions by transferring American labor into more sustainable sectors of industry while also creating new jobs and investing in infrastructure.[106] However, the Green New Deal was met with backlash over its perceived radical effects,[107] and, while the Bill passed in the House of Representatives, the Senate refused to hold a vote on it.[108]

While federal legislation aimed toward combating climate change is paramount to protecting the environment, the current state of American politics provides uncertainty as to whether any groundbreaking environmental legislation pertaining to GHG standards will manifest from Congress. Therefore, looking to the patent system is an important part of crafting solutions.

1. Specialized Environmental Intellectual Property Processing

Some proposals have called for the U.S. to gear its patent system toward promoting environmental protection. One proposal creates a specific department for green patents that aims to fix certain shortcomings

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[100] Behles, *supra* note 20, at 8.
[101] *See generally* H.R. 2454, 111th Cong. (2009).
[102] Behles, *supra* note 20, at 11.
[103] *Id*. at 10.
[104] For example, voters in Washington state rejected a ballot initiative in 2018 that would have imposed a carbon tax on businesses even while reducing sales and business taxes. *See Initiative 732 Archive*, CARBON WASH. https://carbonwa.org/initiative-732-2/ [https://perma.cc/4TYK-PYZM] (last visited Feb. 6, 2020, 9:05 AM).
[105] H.R. 109, 116th Cong. (2019).
[106] *Id*.
[107] Michael Grunwald, *Trouble with 'Green New Deal*,*'* POLITICO (Jan. 15, 2019), https://www.politico.com/magazine/story/2019/01/15/the-trouble-with-the-green-new-deal-223977 [https://perma.cc/7EMQ-BBK6].
[108] S.J. Res. 8, 116th Cong. (2019).

within the USPTO.[109] As demonstrated in *KRS International Co. v. Teleflex, Inc.*, the non-obvious requirement is strict and may inhibit innovation.[110] Though the USPTO already covers patents for green technology, a specialized department could relax the non-obvious requirement for green patents, shorten the period of exclusivity, include a review from the EPA, and reconsider the requirement for novelty.[111] The categories of patents within this sector may include increasing energy efficiency, replacing fossil fuels, capturing CO_2, and other solutions.[112] However, because such solutions would only impose slight modifications to current patent law, they would only promote incremental changes at best.[113]

Obtaining a patent is a lengthy process and the need to issue patents quickly is critical. In December 2009, the USPTO created a fast-tracking system for green technology patents called the "Green Technology Pilot Program."[114] With this program, an applicant was able to have their patent receive special examination if it pertained to an area of environmental protection such as GHG reduction.[115] Rather than loosening doctrinal requirements for the patent, this proposed programs addresses the urgency to get green patents issued. However, at the end of 2011, the USPTO announced that the program would be eliminated over the next few months.[116] Today, the USPTO's website directs applicants to other fast-tracking programs, although not specifically geared toward green technology.[117] While loosening patent requirements, shortening the length of exclusivity, and speeding up the application process are important steps, these adjustments do not alleviate the Green Patent Paradox; the threat of patent infringement from an NPP would remain and continue to hinder the progress needed to create a high volume of green technology for an environmentally sustainable economy.

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[109] Behles, *supra* note 20, at 34-35.
[110] *See generally* KRS Int'l Co. v. Teleflex, Inc., 550 U.S. 398 (2007).
[111] Behles, *supra* note 20, at 36-39.
[112] *Id*. at 34.
[113] *Id*.
[114] Pilot Program for Green Technologies Including Greenhouse Gas Reduction, 74 Fed. Reg. 64,666 (Dec. 8, 2009); *accord* Press Release, USPTO, USPTO Expands Green Technology Pilot Program to More Inventions (May 21, 2010), https://www.uspto.gov/about-us/news-updates/uspto-expands-green-technology-pilot-program-more-inventions [https://perma.cc/D623-JDKS].
[115] *Id*.
[116] Sunset of the Patent Application Backlog Reduction Stimulus Plan and a Limited Extension of the Green Technology Pilot Program, 76 Fed. Reg. 77,979, 77980 (Dec. 15, 2011).
[117] *Green Technology Pilot Program – CLOSED,* U.S. PAT. & TRADEMARK OFF., https://www.uspto.gov/patent/initiatives/green-technology-pilot-program-closed#heading-2 [https://perma.cc/DQ5J-BVPB] (last visited Feb. 6, 2020, 9:15 AM).

2. Compulsory Licensing

While focuses on environmental intellectual property are viable in theory, such proposals would need compulsory licensing to advance their purpose. *Paice* distinguishes compulsory licensing from ongoing royalties.[118] Whereas ongoing royalties are awarded as equitable remedies in patent litigation from a specific defendant, compulsory licensing gives the general public congressional authority to use a patented invention.[119] In other words, a compulsory license is a governmental grant to use, sell, produce, or import patented technology without the patent holder's consent.[120] Goals around compulsory licensing include protecting public health interests and safeguarding the supply of patented products in the market, all while "preserving healthy competition between firms."[121] Other countries have considered compulsory licensing for pharmaceutical products in the wake of malaria, HIV/AIDS, anthrax, cancer, and other diseases.[122] Therefore, because climate change also threatens public health, expanding patented green technologies through compulsory licensing is conceivable.

One can interpret Article 31(f) of the TRIPS Agreement to permit compulsory licensing because it declares that the "limited exception" from Article 30 "shall be predominantly for the supply of the domestic market."[123] However, some laws in the U.S. have already created licensing schemes similar to compulsory licensing.[124] For example, the Atomic Energy Act provides that the government can license nuclear or atomic patents if the license advances public interest.[125] Also, the Attorney General can certify to a district court under the Clean Air Act that specific statutory requirements are met, which may require a patent holder in that court's jurisdiction to license their patent on reasonable terms.[126]

Compulsory licensing of green patents is seen as solution to "ensur[e] easy access to, and wide dissemination of, [green technologies] throughout the word."[127] However, as previously suggested in this section, certain regulations governing what industries must do may be considered

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[118] Paice LLC v. Toyota Motor Corp., 504 F.3d. 1293, 1313 n. 13.
[119] *Id*.
[120] ZHUANG, *supra* note 97, at 278.
[121] *Id.* at 279.
[122] KIM, *supra* note 57, at 29.
[123] The complexity of Article 31 is beyond the scope of this note. Its application here is only to suggest that compulsory technology transfers of patented green technologies may be justified to supply the market, subject to certain limitations. *See* TRIPS Agreement, *supra* note 95, art. 31(f).
[124] Behles, *supra* note 20, at 31-32.
[125] 42 U.S.C. §§ 2182-83.
[126] *Id*. § 7608(1)-(2) (allowing licensure when: (1) the patent is reasonably necessary for compliance with the Act; (2) no alternatives to compliance exist; and (3) the absence of a license would produce anti-completive results).
[127] ZHUANG, *supra* note 97, at 303.

unpopular from the private sector's perspective. Furthermore, the overarching attitude toward compulsory licensing is that it dilutes the incentives of inventors and prospective patent holders.[128] Therefore, compulsory licensing is unlikely to become a reality in the U.S.

B. Private Sector Responses

Although the public sector should continue to play a role in combating climate change, the private sector plays an equally important role in such an endeavor by actively developing and inventing new green technology. The sustainable technology industry grapples with how to locate sustainable technologies while reducing costs and promoting sharing.[129] Even though the patent system, by default, preserves the right to exclude for the patentee, private sector entities have–as this section will detail–engaged in collaborative and humanitarian initiatives to meet these goals while achieving the highest and best use for their inventions.

1. Patent Pooling

One of these business initiatives aimed at curing market deficiencies is patent pooling. Patent pooling occurs when a group of companies combine their complementary patents under a single license.[130] These voluntary business transactions stem from a patent holder's realizations that they are better off pooling their invention with others' resources rather than solely reaping the benefits of their exclusion rights.[131] Furthermore, if a patent holder needs to implement a change to their invention not covered by their issued right, they will benefit from seeking a joint agreement with another participant.[132] In effect, pieces of green technologies come together, are carried out to their highest and best use, reach the market, and promote a sustainable economy.

While patent pooling can promote market efficiency, it is not without its setbacks. Overall, patent pooling does not consistently increase the volume of green technology in the market or reduce transactional costs for rightsholders.[133] Even if several green patent holders pool their ideas, there is no guarantee that their compiled invention will enter the market at an optimal rate.[134] In other words, the same concerns around the Green Patent

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[128] Behles, *supra* note 20, at 35.
[129] World Intell. Prop. Org., *Special Edition World Intellectual Property Day*, WIPO MAG., Apr. 2009, at 5 [hereinafter "WIPO Sharing Technology"].
[130] Andrew Boynton, Note, *Eco-Patent Commons: A Donation Approach Encouraging Innovation within the Patent System*, 35 WM. & MARY ENVTL. L. & POL'Y REV. 659, 676 (2011).
[131] WIPO Sharing Technology, *supra* note 129, at 4.
[132] *Id*. at 6.
[133] Boynton, *supra* note 130, at 678.
[134] *Id*.

Paradox arise if that group sits on its collective rights and does not adequately license. Also, while patent pooling is a cost-reducer, it may implicate increased costs in areas like R&D during the coordination process.[135] Furthermore, patent pools may be susceptible to price-fixing and other anti-competitive practices, with prospective licensees bearing those costs.[136]

2. Open Patents

Perhaps the most successful private sector initiative to remedy the Green Patent Paradox is demonstrated through companies freeing up their exclusion rights by sharing their patents. An entity that engages in open-sourcing of their patent rights permits other users to use and adapt their idea.[137] Open-sourcing originated in software development, which thrives off of the liberal usage of source code.[138] Its concept has since expanded to include environmental innovation and has permitted second comers to expand on patented green technology without the fear of patent infringement.[139]

Open-sourcing takes several different forms. In 2008, International Business Machines (IBM), Nokia, Pitney Bowes, and Sony banned together and formed the Eco-Patent Commons (EPC).[140] The EPC is a large-scale patent pool but without allocations of cost.[141] The stated purpose of the EPC is to "help the world community to reduce waste, pollution, global warming, and energy demands."[142] A company need only pledge one of its green patents to join the EPC, and, since its formation more companies have contributed, including Xerox and Ricoh.[143] Relatedly, at the 2010 World Economic Forum in Davos, Switzerland, Nike, Yahoo!, Best Buy, and other companies announced a collaborative online innovation platform called GreenXchange, where members can share their intellectual property rights and develop business models together.[144] Unlike the EPC, GreenXchange conditions the use of patent rights whereby improvements on the technology are licensed back to the original rightsholder.[145]

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[135] *Id*. at 677.
[136] *Id*.
[137] WIPO Sharing Technology, *supra* note 129, at 6-7.
[138] *Id*.
[139] *See id.* at 7 ("Some commentators have suggested [open innovation] models may be applied to some of the technology innovation, development and adaptation challenges of climate change.").
[140] Boynton, *supra* note 130, at 679.
[141] *Id*.
[142] *Id*. at 680.
[143] *Id*. at 679.
[144] KIM, *supra* note 57, at 59; *Organizations Call for Greater Open Innovation to Advance Sustainability with GreenXchange,* GOMOXIE, https://www.gomoxie.com/press/organizations-call-for-greater-open-innovation [https://perma.cc/RVY8-JB8P] (last visited Nov. 6, 2020).
[145] KIM, *supra* note 57, at 60.

Some companies have gone the extra mile by taking the initiative to open their own patents to the general public. For example, in 2014, Tesla Motors's founder and chairman Elon Musk announced on behalf of his company that he will be releasing Tesla's patents to anyone who wants to use them.[146] As a legal effect, Tesla made an irrevocable pledge to not initiate lawsuits against anyone who uses its patented technology for electric car development, which covers its patents for battery charging systems, electric motors, thermal management, and other inventions.[147]

Although opening up green patent rights is a breathtakingly progressive response from the private sector, it seems to only come from companies that have already achieved success in the market. It may be that most of these companies were incentivized to free up their patents to bolster their reputation in the age of open innovation or to demonstrate their commitment to environmental sustainability.[148] Conversely, startups and smaller companies are incentivized to secure patents to attract investors, demonstrate high core asset values, and build their patent portfolios.[149] Thus, not all companies can afford to donate their patents to others. To ensure that newly registered green patents get the widespread use they deserve, a fundamental system that balances the demand for secondary use with the interests of the rightsholder is needed.

IV. THE FAIR USE DOCTRINE IN PATENT LAW

While the public and private sectors have developed heroic initiatives to combat climate change, the judicial branch can and should play an important role. As part of this effort, patent law can look to copyright law, its constitutional counterpart,[150] for guidance. Copyright law has a fair use defense against infringement that was originally developed from case law.[151] Due to the historic development of copyright's fair use doctrine under the common law, Title 17 of the U.S. Code now enumerates four factors for the courts to consider when determining whether a person is privileged as a secondary user to incorporate the contents of a copyrighted work into their own fair use:

> (1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes; (2)

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[146] Press Release, Elon Musk, All Our Patent Are Belong to You (June 12, 2014), https://www.tesla.com/blog/all-our-patent-are-belong-you [https://perma.cc/8AAP-VDSK].
[147] *Patent Pledge*, TESLA, https://www.tesla.com/about/legal#patent-pledge [https://perma.cc/KJN2-CLXP] (last visited Feb. 6, 2020, 9:15 AM); *see e.g.* U.S. Patent No. 7,786,704 (filed May 1, 2009); U.S. Patent No. 8,572,837 (filed June 13, 2006); U.S. Patent No. 7,789,176 (filed Apr. 11, 2007).
[148] *See* WIPO Sharing Technology, *supra* note 129; *see also* Boynton, *supra* note 130, at 674.
[149] KIM, *supra* note 57, at 46.
[150] *See* U.S. CONST. art. 1, § 8, cl. 8.
[151] *See generally* Folsom v. Marsh, 9 F.Cas. 342 (C.C.D. Mass 1841).

> the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work.152

The fair use doctrine in copyright law arose in part as an acknowledgment that the copyright system does not efficiently produce optimal results in the market for creativity. Accordingly, Congress acted to fix market deficiencies and create socially desirable outcomes.[153] Additionally, fair use was judicially established in trademark law as a defense against infringement, although its application is more limited than fair use of copyright.[154] Therefore, of the three main bodies of intellectual property, patent law is the only one without a fair use defense. The remainder of this section will compare copyright law to patent law and demonstrate that patent law is equally deserving of a fair use defense against infringement.

A. Patents and Copyrights Compared

While it is evident that patent and copyright have separate domains for intellectual property protection, both have strikingly similar origins and features. Both patent and copyright law are rooted in the Progress Clause of the U.S. Constitution.[155] Since the Constitution's ratification, both bodies of law have been developed through statutes as well as common law principles.[156] Through these developments, copyright and patent law have established similar doctrines such as contributory infringement, licensee estoppel, and the first sale defense, otherwise known as exhaustion.[157] Most importantly, as patent and copyright promote and establish rules in innovation, each grapple with the question of how to protect the incentives of creators while allowing subsequent inventors and users to build off of the works they register.[158] Given these identical policy balances, adjusting the boundaries of patent protection to encourage further innovations through secondary and justifiable use is a conceivable solution to curing market deficiencies.

While patent and copyright have similar roots and characteristics, some justifications do exist as to why patent law has not developed the fair use defense. The most compelling reason is that patent law has higher

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[152] 17 U.S.C. § 107.
[153] O'Rourke, *supra* note 24, at 1180.
[154] 15 U.S.C. § 1115(d)(4); *see also* New Kids on the Block v. News Am. Publ'g, 971 F.2d 302 (1992).
[155] U.S. CONST. art. 1, § 8, cl. 8 ("The Congress shall have power … [t]o promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries").
[156] O'Rourke, *supra* note 24, at 1184.
[157] De Larena, *supra* note 29, at 802.
[158] O'Rourke, *supra* note 24, at 1180.

threshold requirements than copyright law. The degree of originality required for a work of art in copyright is much more lenient than the standards for novelty and non-obviousness in patents.[159] Also, unlike copyrighted works, patents are much more foundational. In other words, whereas patent law covers ideas, copyright covers expressions of ideas; thus, patents evidently grant a much broader scope of protection.[160] Additionally, the USPTO clearly defines the scope of protected use for the patent holder, while the rights for a copyrighted work are only established through litigation.[161] Furthermore, patent law and copyright law have different incentive schemes,[162] whereby an inventor strives for patent protection of their work to gain authority over how that work is used in the marketplace.[163] Given these differences, it would make sense that patent law has not developed a fair use defense as copyright law has done. However, patent law does enumerate other types of affirmative defenses and permitted uses.

B. Experimental Use versus Fair Use

The closest judicially created affirmative defense in patent law that justifies secondary use is experimental use. In patent law, experimental use occurs when a person or entity uses a patented invention that has a non-infringing and non-commercial purpose.[164] However, the doctrine does not protect a user who "reverse engineers the patented invention, invents around it, and offers a new, non-infringing product for sale," or employs any otherwise commercial motive.[165] This doctrine originated in *Whittemore v. Cutter*, an 1813 federal court decision authored by Justice Joseph Story that entertained the defendant's argument that the use of the plaintiff's patented machine for manufacturing playing cards was only for experimentation.[166]

Experimental use is primarily and beneficially used in the context of universities.[167] The academic community enjoys the privilege of using

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[159] *Id*. at 1196.
[160] *Id*. at 1184-85.
[161] Joshua I. Miller, Note, *Toward a Doctrine of Fair Use in Some of Patent Law*, 2 AM. U. INTELL. PROP. BRIEF 59, 126 (2011).
[162] O'Rourke, *supra* note 24, at 1196.
[163] *Id*. at 1179
[164] *Id*. at 1194.
[165] *Id*.
[166] Whittemore v. Cutter, 29 F.Cas. 1120, 1121 (C.C.D. Mass. 1813) ("… [I]t could never have been the intention of the legislature to punish a man, who constructed such a machine merely for philosophical experiments, or for the purpose of ascertaining the sufficiency of the machine to produce its described effects").
[167] *See generally* Simon, *supra* note 28.

patented technology for "amusement, idle curiosity, or philosophical inquiry."[168] However, any use beyond these purposes constitutes unlawful infringement. In *Madey v. Duke University*, the Supreme Court struck down a lower court's decision extending the experimental use defense to Duke University's use of two lab equipment patents because its use was aligned with the university's business purpose and went beyond philosophical industry—its status as a non-profit entity was immaterial.[169] Because of its ruling, this case has been called "the death knell on fair use in patent law."[170]

Given today's jurisprudence regarding secondary use of patents, advancements of patented technology—absent specific licensing agreements—can only take place within institutions such as universities who are still at risk of liability for infringement. Luckily, patentees are usually reluctant to sue researchers at universities and other experimental users for use of their inventions as it may give them a bad reputation.[171] Regardless, experimental use is ill-equipped to remedy the monopolistic issues around patent law. Particularly in the context of green technology, the experimental use defense is insufficient to justify secondary use of patented inventions. Large-scale innovation and commercialization of sustainable technology are needed to effectively mitigate the effects of climate change.[172] Thus, for the judicial branch to play an effective part in curing market deficiencies, an application of the fair use doctrine to patent law will be needed.

C. The Need for Fair Use in Patent Law

Although a fair use defense does not exist in patent law, scholars and others in the legal field have embraced the idea of applying fair use against patent infringement.[173] The fair use doctrine in patent law would provide beneficial results in the market while also preserving the inherent interests of inventors and rightsholders.[174] Furthermore, allowing fair use would reduce economic inefficiencies and avoid anti-competitive outcomes in the market.[175] Article 30 of the TRIPS Agreement remains an international authority that supports fair use's extension into patent law as it provides for "limited exceptions to the [patent holder's] exclusive right."[176] During negotiations, several European countries advocated for

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[168] *Id*. at 1339.
[169] Madey v. Duke Univ., 307 F.3d 1351,1362-36 (Fed. Cir. 2002).
[170] De Larena, *supra* note 29, at 793.
[171] Simon, *supra* note 28, at 1340.
[172] Behles, *supra* note 20, at 13.
[173] *See generally* O'Rourke, *supra* note 24.
[174] *Id.*; s*ee also* De Larena, *supra* note 29.
[175] *See* O'Rourke, *supra* note 24, at 1207.
[176] *Id*. at 1201, citing TRIPS Agreement, *supra* note 95, art. 30.

enumerating privileged uses of intellectual property into the agreement, yet the vague final text of Article 30 became the final compromise.[177]

Dean Emerita Maureen O'Rourke[178] has pioneered a groundbreaking proposal for patent fair use.[179] Like the copyright test for fair use, she has suggested factors for a court to consider in a patent infringement suit. Specifically, to determine whether a secondary user of a patented invention is justified as a fair user, she argues that courts should first weigh the following factors: (i) the nature of the advance by the user's infringement; (ii) the purpose of the infringing use; (iii) the nature and strength of the market failure that prevents a license from being concluded; (iv) the impact of the use on the patentee's incentives; and (v) the nature of the patented work.[180] Second, if the court determines that an infringer is a fair user, the court will use the same factors to determine whether royalties should still be awarded to the patent holder.[181] This two-tiered analysis is designed to resemble the elements of copyright's fair use doctrine while also accounting for the incentives and financial interests of the patent holder.[182] Dean Emerita O'Rourke predominantly discusses applying fair use to software and application program interface (API),[183] which has become a subject of debate for copyright fair use.[184] Nevertheless, she also suggests that the doctrine could be equally applicable to other areas of technology such as the biomedical field.[185]

Subsequent ideas around patent fair use have either expanded upon or critiqued Dean Emerita O'Rourke's proposal. For instance, some argue that an industry-specific application of a fair use defense to patent infringement is a more optimal outcome for the patent regime in the U.S.[186] It is worth noting that not all patented technologies are created equally; for instance, "biotech[nology] patents are more frequently found non-obvious than those from most industries…"[187] Applying fair use broadly to all industries may not be successful for all types of industries and could break

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[177] *Id*.
[178] Since her publication, Maureen O'Rourke's title was elevated from Professor of Law to Dean Emerita of Boston University School of Law.
[179] *See generally* O'Rourke, *supra* note 24.
[180] *Id*. at 1205.
[181] *Id*. at 1209.
[182] *Id*. at 1205.
[183] *Id*. at 1211.
[184] Google and Oracle have been in a decade-long legal dispute over whether Google's use of Java programming language (owned by Oracle) to develop its Android operating system constitutes fair use. The Supreme Court granted Google's petition for writ of certiorari and recently heard oral arguments. *See* Transcript of Oral Argument, Google LLC v. Oracle Am., Inc., No. 18-956 (argued Oct. 7, 2020).
[185] O'Rourke, *supra* note 24, at 1236.
[186] Miller, *supra* note 161, at 57.
[187] *Id*. at 60-61, citing Dan L. Burk & Mark A. Lemley, *Is Patent Law Technology-Specific?*, 17 BERKELEY TECH. L.J. 1115, 1159 (2002).

the incentive schemes of patent law.[188] Hence, fair use in patent law may arguably only work well in industries with "network effect" such as API, which, by their design, foster natural innovation.[189]

Nevertheless, Dean Emerita O'Rourke's proposal aims to remedy the flaws of the U.S. patent regime. Specifically, fair use would reduce the "institutional bias" from the USPTO and reduce the number of "submarine patents," a name for patents that are not utilized in the market.[190] Furthermore, although Congress has the authority to define the parameters of patent protection, the courts can exercise their discretion and provide equally beneficial judgment by allowing secondary use on a case-by-case basis.[191] In effect, the courts will establish precedent and set standards for the private sector, which would include defining instances where ongoing royalties are still available for the patent holder.[192] Most importantly, experimenters and secondary users would remain at a lower risk of infringement suits and would be able to utilize technology that is not used to its full capacity.[193]

The policy balance around extending fair use to patent law is clear and reflects that of copyright: while there is a strong societal need to break the exclusive control over patented products, the incentives of the inventor should not be diminished.[194] This notion holds especially true in the context of green patents because disincentivizing entrepreneurs to further advance green technology is as harmful as a patent holder sitting on the patent rights for that technology. In either scenario, the market will not have an optimal supply of sustainable technology. Therefore, a specialized application of the fair use doctrine can help promote the expansion of green technology while preserving the business interests of patent holders and inventors.

V. A PROPOSAL FOR FAIR USE OF PATENTED GREEN TECHNOLOGY

To effectively adjust patent law to address the climate crisis, a comprehensive proposal is needed. In general, the U.S. patent regime should embrace the fair use doctrine as Dean Emerita O'Rourke makes clear in her argument; however, the standards for its application should be much narrower than its counterpart standard in copyright law. Although green technologies do not operate under a network effect like source code

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[188] *Id*. at 60.
[189] *Id.* at 61.
[190] O'Rourke, *supra* note 24, at 1239.
[191] *Id*. at 1210.
[192] *Id*. at 1244.
[193] *Id*. at 1242.
[194] *Id*. at 1207, citing MCA, Inc. v. Wilson, 677 F.2d 180, 183 (2nd Cir. 1981) (describing the balance in copyright law around fair use involving societal need and the creator's incentives).

or API, the fair use doctrine would provide positive results for both green technology industries, the environment, and public health.

Applying Dean Emerita O'Rourke's general five-factor test would deliver mixed results in a hypothetical patent infringement lawsuit over green technology. The first factor, whether the advancement is a major step, would likely weigh in favor of the secondary user's use of the technology if the nature of the advance is transformative, much like the doctrines in copyright.[195] Analyzing factor two, the purpose of the infringing use, would likely involve additional fact-finding to determine if the secondary user exhibits a good-faith effort to bring the green technology to the market or whether the secondary user claim the invention as their own. Furthermore, the third factor, which assesses market failures, may reach differing results among federal courts depending on whether the threat of the Green Patent Paradox persuades a judge.

In looking at the impact the secondary use might have on incentives and social welfare, factor four would likely weigh in favor of the green patent holder in most cases given that the patent regime favors the incentives of inventors and rightsholders; however, a court may find a reason to believe that a specific patent holder's incentive would not be inhibited by secondary use. Next, because the fifth factor directs the court to consider the nature of the patented invention, varying results would ensue among different sectors of green technology.[196] Lastly, in looking at whether royalties should be awarded, a court might only answer in the affirmative if holding otherwise might have hypothetically dissuaded the patent holder to file for the patent on that particular invention.

Overall, Dean Emerita O'Rourke's test for fair use presents decent prospects for the advancement of green technology. However, while it may benefit secondary users on a case-by-case basis, it does not provide promising results for the environmental sustainability industry as a whole. Furthermore, this test could risk excluding green technology altogether if a judge finds a convincing reason to disallow secondary use. Therefore, a green technology-specific application of fair use would be beneficial for the inventors and patent holders, the secondary users, and the planet. The remainder of this article will outline a proposal for fair use of patented green technology and then address several anticipated concerns.

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[195] *Id*. at 1230.

[196] This factor from O'Rourke's proposal provides mixed results for green technology depending on the route of analysis the judge undergoes. For instance, a judge may find a patent for solar panels to be more socially valuable than a patent for eco-friendly pet products. On the other hand, a judge may decide that green technology as an industry that does benefit from open use like API may not be worthy of a fair use defense. *See Id.* at 1208.

A. Green Patent Fair Use Proposal

1. Step One: Codifying Fair Use into Patent Law

Congress has the constitutional authority to create laws that advance the development of technology through patents.[197] Therefore, the optimal step to promote the use of green patents is to pass a federal law that provides a defense to patent infringement for green technology. While fair use is not codified in any form within Title 35 of the U.S. Code, Congress has enacted patent provisions tailored for specific purposes that involve loosening patent protection for the rightsholder.[198] For instance, the Patent Act permits infringement where secondary use is part of a process to obtain approval of a new drug from the Federal Drug Administration.[199] Additionally, the Act limits a patentee's ability to recover damages when a patented invention is used in a medical or surgical procedure.[200] These statutory exceptions to patent infringement reflect the notion that American society values technologies that provide a public health benefit, even if it is at the expense of a patent holder's right to exclude.[201]

To ensure that the policy motives around green technology in the American industries are captured, Congress should engage in extensive fact-finding through congressional hearings and research. A bill from either chamber should incorporate the international consensus that climate change is a global threat to the planet that also has the potential to jeopardize public health.[202] It should also make clear that climate change is anthropogenic and has accelerated in part due to environmentally hazardous industrialization.[203] Furthermore, the bill should capture factual findings that touch on the following: that technological innovation plays a vital role in mitigating the effects of climate change;[204] that a mass expansion of environmentally sustainable technology is needed to substitute the environmentally hazardous technologies;[205] and that altering the U.S. patent law is a necessary action to promote this expansion.[206] These findings should also qualify that patent holders' incentives are equally important to the development of an environmentally sustainable economy.[207] The elements of fair use in the law should not only be specific enough to guide the courts in their analysis of whether the secondary user is privileged as

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[197] U.S. CONST. art. 1, § 8, cl. 8.
[198] O'Rourke, *supra* note 24, at 1197.
[199] *See* 35 U.S.C. § 271(e)(1).
[200] *See* 35 U.S.C. § 287(c)(1) (Supp. III); O'Rourke, *supra* note 24, at 1197.
[201] O'Rourke, *supra* note 24, at 1198.
[202] IPCC SPECIAL REPORT, *supra* note 2.
[203] *See* Gollin, *supra* note 21.
[204] Behles, *supra* note 20, at 13.
[205] *See* ZHUANG, *supra* note 97, at 11.
[206] Behles, *supra* note 20, at 2.
[207] O'Rourke, *supra* note 24, at 1180.

a fair user of a green patent but also general enough to provide a working template for courts to use in infringement suits.

2. Step Two: Analyzing Fair Use

Even if Congress does not implement a fair use doctrine for green patents–a probable scenario given its current state of dysfunction–the federal court system is also authorized to intervene on its own. Two justifications permit the courts to allow fair use in patent law: first, fair use in copyright law was originally judicially created[208] before Congress codified it,[209] and, second, federal courts have already ruled on patent infringement cases with outcomes that favor continued use by second-comers as seen in *eBay* and *Paice*.[210] Whether or not the primary authority comes from the legislature, courts should undergo the following analysis in its fair use defense:

(1) *Does the patent at issue cover a field of green technology?* The first part of the analysis requires courts to determine whether the patent at issue covers environmental sustainability or protection. To properly guide their analysis, the courts would benefit from having Congress enumerate a non-exhaustive list of industries that can utilize a fair use defense, such as alternative energies, fuel-efficiency, GHG and pollution reductions, and so on. Nevertheless, courts are equally capable of making their own determination.

(2) *If the patent covers green technology, and the second-comer infringes on its use, is that user privileged as a fair user?* Under this prong, the court will assess several considerations regarding the patent regime, much like Dean Emerita O'Rourke's aforementioned proposal. However, the factors for this green patent fair use proposal will be tailored to capture the considerations of green technology industries. Although Congress should enumerate these factors into the law, the court can further develop and define them: (1) the market potential; (2) the patentee's developments; (3) the purpose and nature of the secondary use; and (4) the interests of the patentee and industry.

First, the court should consider the potential market impact of the patented technology at issue. To adequately assess this factor, experts in technological fields can testify in federal infringement suits and make reasonable valuations of the patented technology's capabilities in the market. This judicial assessment can reveal the untapped potential that may justify secondary use.

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[208] *See* Folsom v. Marsh, 9 F.Cas. 342 (C.C.D. Mass. 1841).
[209] 17 U.S.C. § 107.
[210] *See generally* Lane, *supra* note 40.

Second, the court should evaluate the patentee's developments of each patent. This part of the test will determine whether the patentee is sitting on the patent or whether they are capitalizing on its potential found in factor one. This step in the test aims to remedy the concerns around the Green Patent Paradox by determining whether the patent holder is making the best use of the patent. If the patentee has no intention of using their patent to fill the market demand, then this factor would weigh strongly in favor of its fair use.

Third, the court should look at the purpose and nature of the second-comer's advance on the technology. This factor combines two of Dean Emerita O'Rourke's factors[211] and prompts the court to look at the secondary use itself. However, this part of the test is more tailored to the innovations in green technology. Ultimately, the crux of this factor is determining whether the secondary user's use of the technology is meant to provide positive results for the sustainability market. For example, using lucrative solar panel technology that achieves an environmentally beneficial purpose can be deemed fairer than using an eco-friendly pet product that may be in a smaller potential market. Additionally, if the secondary user is mainly striving to achieve a particular sustainability standard for their innovative pursuit, rather than directly compete with the patent holder in the market, then this factor would weigh in favor of secondary use.

Finally, the court should analyze whether permitting secondary use would drastically impact the interests of the patent holder or the green technology industry at large. Here, a court should consider the incentives, resources, and commercial interests of the patentee as well as the interests of the relevant green technology industries. If the patent holder has a legitimate reason to hold onto their patent rights, this factor would weigh strongly in favor of excluding the second-comer from using the technology without a license. Otherwise, this factor should be equally weighed together with the other three factors.

(3) *If the secondary user is a fair user, does justice require compensation for the patent holder?* Because the second part of this proposal imposes a heightened standard against the patentee's incentives, court-ordered royalties should remain an option much like Dean Emerita O'Rourke's proposal.[212] This part of the test recognizes that the fair use assessment is binary: secondary use of the green patent is either allowed or not allowed. Thus, awarding a modest, reasonable amount of royalties can offset any grievances that may arise if the patentee loses their exclusive right over the green patent at issue.

Because the four factors in the second prong of this proposal are more strictly applied against the patent holder, rather than imposing the

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[211] O'Rourke, *supra* note 24, at 1205.
[212] *Id*. at 1209.

same four factors as Dean Emerita O'Rourke proposes, the court should instead determine on its own whether royalties should be awarded. However, depending on the capital and resources of the secondary user, these royalties should be limited so as not to chill the subsequent implementation of the green technology.

B. Further Considerations

This technology-specific proposal is designed to speed the process of implementing green technology in the U.S. while still recognizing that the patent scheme is inherently designed to promote innovation. Once secondary users are permitted to use patented green technology, they can actively work toward bringing the U.S. into a sustainable economy without fear of infringement action. Ultimately, the issues raised by the Green Patent Paradox would be resolved by this proposal, which seeks to streamline and advance outside innovation while ensuring patent holders arer sufficiently compensated. However, with any proposal, several considerations remain to be addressed.

1. The Patentee's Rights

Although this proposal directly addresses concerns surrounding the climate crisis, it must be acknowledged that many scholars are skeptical of both the expansion of patent rights beyond the patentee and the impact it would have on the patent incentive scheme.[213] Patentees in the field of green technology have a particular incentive to hold onto their rights, especially companies with larger carbon footprints.[214] Moreover, fair use of patented green technologies, unlike certain transformative uses of copyrighted works, would almost always be for commercial purposes.

However, the overarching goal of this proposal is to change the dynamics within the green technology industry. As Dean Emerita O'Rourke points out, fair use would promote standard-setting whereby companies can set their own guidelines regarding the allocation of their intellectual property based on reasonable terms.[215] Moreover, it would serve as a bargaining chip for licensing, which can reduce the royalty rate for second-comers.[216] Hence, as this proposal promotes sharing within the private sector, companies can work together toward the common goal of combatting climate change.

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[213] KIM, *supra* note 57, at 47.
[214] Boynton, *supra* note 130, at 674.
[215] O'Rourke, *supra* note 24, at 1244.
[216] *Id*. at 1241.

Another consideration involves whether to allow fair use if the patentee specifically refuses to license their patent to the infringer. In copyright law, a fair user of copyrighted work is still allowed to go forward with their derivative creation, regardless of whether the rightsholder denied that user permission.[217] In recognition of the existential threat posed by the climate crisis, patent law should follow suit and bypass this potential concern. As previously mentioned, a patentee's reasoning behind the refusal to license can be considered in the assessment of fair use or whether ongoing royalties should be awarded.

2. Implementation

Additionally, even with fair use in patent law, the ITC's independence from the federal judiciary remains a concern for expanding green technology to the market. Because of its independence, it is unknown whether it would incorporate fair use into its investigations, and thus, a plaintiff who loses in court may still use this alternate forum to preclude secondary use.[218] To prevent a patent holder from utilizing other avenues to curb secondary use, this proposal will include guidelines on congressional action that would help establish boundaries on what the ITC can investigate regarding green technology. While it conducts its investigations, the ITC should recognize the global threat of climate change.

Furthermore, because patents and trade secrets can protect the same subject matter,[219] a prospective inventor could seek trade secret protection for their intellectual property to avoid the prospect of fair use by others.[220] Thus, rather than apply for a patent, an inventor or company that invents a novel green technology could employ security measures to keep their idea secret and, in effect, the schematics of the invention would never reach public view and society would not benefit. However, trade secrets have their downsides as they can be difficult to enforce and risk losing their protections if others utilize the same idea.[221] Additionally, from an investor's perspective, the value of a patent is more tangible than the value of a trade secret.[222] This realization is an important distinction given that

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[217] *See* Campbell v. Acuff Rose, 510 U.S. 569, 572 (1994) (holding that 2 Live Crew's parody of "Oh, Pretty Woman" was fair use in spite of the fact that Acuff-Rose's agent had previously refused to license the song).
[218] *About the USITC*, *supra* note 71.
[219] PAUL A. SWEGLE, STARTUP LAW AND FUNDRAISING: FOR ENTREPRENEURS AND STARTUP ADVISORS 217 (Business Law Group Seminar, LLC eds., 1st ed. 2020).
[220] *See* Boynton, *supra* note 130, at 674-76.
[221] World Intell. Prop. Org., *World Intellectual Property Organization – Innovation for a Green Future: How Intellectual Property Rights Can Support the Transition to a Sustainable, Low Carbon Economy*, WIPO, https://www.wipo.int/ip-outreach/en/ipday/2020/green_future.html [https://perma.cc/4UEE-YDH5].
[222] *See Id*.

green technology is a capital-intensive industry.[223] Moreover, inventors in green technology industries can benefit from having their works made public because in the long run because public access "can support the diffusion and adaptation of existing green technologies that are in the public domain."[224]

Lastly, concerns around timing need to be addressed. If Congress does not codify this proposal and leaves any developments to the courts, expansions of green technology will not accelerate at a necessary rate. Instead, a judicially created fair use doctrine for patent law may merely provide incremental change to green patents at best as it would only develop case-by-case through individual lawsuits.[225] Regardless of whether federal institutions will initiate this proposal, industries at large should still strive to advance green technology at a rapid pace. Although inventors and entrepreneurs risk becoming defendants to patent infringement suits, *eBay* remains a shield for their technologies' continued development.[226] Eventually, the climate crisis's growing threat will pressure the U.S. to tolerate transfers of patented green technology so that such technologies receive their highest and best use at the lowest cost to the patent holders and other users.

VI. CONCLUSION

The world faces an imminent threat from climate change that requires drastic structural attention. The U.S. has always led the world in promoting and preserving global security, but political gridlock within the nation could stall the massive changes to steer the world in the right direction. Fortunately, the private sector has an equally important role and duty in the pursuit to reform various industries. However, while industry and entrepreneurship can further develop necessary green technology, a comprehensive transformation in the U.S. patent regime must take place in order to fix the inherent issues around secondary innovations. The Green Patent Paradox demonstrates that the patent system impedes innovation by allowing rights' holders to sit on their patent rights further slowing the transition to an environmentally sustainable economy. Although *eBay* is a victory in that it helps encourage continued use of other patent holder's green patents, the ITC functions as a loophole for patent holders who want to halt secondary users or pressure them to take unwanted licensing agreements.

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[223] *Id*.
[224] *Id*.
[225] O'Rourke, *supra* note 24, at 1242.
[226] eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 391-92 (2006).

The public and private sectors have both revealed possible solutions in the wake of the climate crisis. While the public sector can fix the patent regime through various means, these solutions either have substantial barriers to becoming reality or pose implementation issues that inhibit inventor incentives. Even with goodwill gestures from large companies, not all businesses are positioned to donate their intellectual property. The doctrine of fair use does not exist in patent law under conceivable rationales even though many viable justifications support its application. However, the lurking effects of the climate crisis demonstrate the societal need to implement a system that tolerates secondary uses of patented green technologies.

Optimally with the help of Congress, the judicial branch should allow fair use as an affirmative defense against patent infringement. Such a doctrine would allow secondary use of valuable green patented technologies that may not otherwise reach their full potential while still protecting the rightsholders' financial and commercial interests. Although patent fair use may not be implemented at the necessary rate, the valiant efforts to innovate from companies within the green technology industry is a vital starting place to carry the U.S. through the twenty-first century.