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ENCOURAGING SUSTAINABLE INNOVATION: IS THERE ROOM FOR A POST-GRANT ENVIRONMENTAL CHALLENGE IN AMERICAN PATENT LAW?

SAMUEL HABEIN*

INTRODUCTION

In a 2019 NPR interview, Bill McKibben, author of *Falter: Has the Human Game Begun to Play Itself Out?*, argued that a great “architecture of deceit[,] denial and disinformation [has] kept us locked for 30 years in a sterile debate about whether or not global warming [is] real.”¹ McKibben goes on to insist that the great, misinforming debate has been the linchpin preventing a swift response to the “greatest challenge humans have ever faced”—man-made climate change.²

Private industry and actors within the government have been allowed to ignore and exacerbate climate change due to a lack of consensus amongst the American populous. With a meager fifty-nine percent of Americans believing that climate change is a major threat to humanity,³ companies fear that making financial and logistical sacrifices to decrease the environmental impact of their products will make them less competitive.⁴ But, the universality of climate change requires participation from

* JD Candidate, William & Mary Law School, 2022. I would like to just list the people that have gotten me where I am and will be with me wherever I go: Peter and Theresa Habein, Gerald and Joanne Morgan, Harold and Jeanne Habein, Claire Habein, Abby Finlay, Laura Habein, Emerson Luke, Ryan Lynch, Tom Merchant, Calvin Borges, Olivia Swant-Johnson, Joe Donovan, Edward DeLuca, Alex Young, William Byrne, Derrick Jones, Jason Grand, and finally Fiona Carroll, Thatcher & Holly.

¹ Fresh Air, *Climate Change Is ‘Greatest Challenge Humans Have Ever Faced,’ Author Says*, NPR (Apr. 16, 2019, 1:59 PM), <https://www.npr.org/2019/04/16/713829853/climate-change-is-greatest-challenge-humans-have-ever-faced-author-says> [<https://perma.cc/MN9M-6ALY>].

² *Id.*

³ Moira Fagan & Christine Huang, *A Look at How People Around the World View Climate Change*, PEW RSCH. CTR. (Apr. 18, 2019), <https://www.pewresearch.org/fact-tank/2019/04/18/a-look-at-how-people-around-the-world-view-climate-change/> [<https://perma.cc/53SM-MDYZ>].

⁴ Ram Nidumolu et al., *Why Sustainability Is Now the Key Driver of Innovation*, HARV. BUS. REV. (Sept. 2009), <https://hbr.org/2009/09/why-sustainability-is-now-the-key-driver-of-innovation#:~:text=Our%20research%20shows%20that%20sustainability,reduce%20the%20inputs%20they%20use.> [<https://perma.cc/MQ6C-NXJS>].

all populations, industries, and sovereigns. Economists argue that the maintenance of a healthy global economy requires true integration of economic, social, and environmental well-being.⁵

This Note examines potential changes within the American patenting system that might renew the U.S. Patent and Trademark Office's ("USPTO") dedication to the promotion of progress through a post-grant environmental challenge to patents. There are many ways to encourage "green" innovation by challenging practices that harm the environment, but the patent system has a unique ability to discourage environmentally harmful innovation by refusing to grant exclusionary rights—rights that many industries require to thrive.⁶ However, a post-grant environmental challenge would undoubtedly disrupt the American patent system in severe ways that this Note does not address. Therefore, this Note is not arguing that such a challenge should be implemented, but serves the purpose of starting a discussion. Where can we find the tools to combat climate change? Here, this Note discusses how the existing incentives within the patent system could be manipulated to encourage sustainable innovation within industry.

First, Part I outlines the importance of green innovation in the battle against climate change. Part I continues to address the impact that the patent system has on fostering green innovation and discusses where dirty innovation remains prevalent. Part II takes a closer look at how patent laws influence industry. In particular, the shape of India's pharmaceutical industry demonstrates the power that patent law has on the path industry takes within a nation. Part III demonstrates how the structure and key attributes of the *inter partes* review ("IPR") and post-grant review ("PGR") can act as a blueprint for the creation of a workable post-grant environmental challenge process that is both cost effective and timely. Part IV demonstrates Congress's power to create an environmental challenge while maintaining its international obligations and staying within the bounds of the Constitution. Lastly, Part V concludes by addressing some critics of the seldomly discussed idea of an environmental challenge.

⁵ Richard A. Clarke et al., *The Challenge of Going Green*, HARV. BUS. REV. (Jul.–Aug. 1994), <https://hbr.org/1994/07/the-challenge-of-going-green> [<https://perma.cc/UM9P-9ZPG>].

⁶ The patent system has historically directed the nature of industry. An illustrative example of patent law's ability to shift the foundations of industry is India's pharmaceutical industry following changes to Intellectual Property ("IP") protection. See generally Janice Mueller, *The Tiger Awakens: The Tumultuous Transformation of India's Patent System and the Rise of Indian Pharmaceutical Innovation*, 68 U. PITT. L. REV. 491 (2007).

I. GREEN INNOVATION IN THE UNITED STATES

Climate change began with innovation in the industrial world, so it is fitting that industrial innovation is crucial to a lasting solution.⁷ The predominant measure for calculating global warming contribution is the emission of greenhouse gasses, of which industry creates a significant market share.⁸ Industry represents the processes that produce the goods and raw materials that Americans consume and export and can account for roughly twenty-three percent of greenhouse gas emissions in the United States.⁹ Calculated through a combination of direct and indirect emissions from electricity, industrial greenhouse gas emissions have generally decreased since the late nineties.¹⁰ The marginal reduction in industrial pollution during this time can be attributed to a number of efforts: there has been a general movement towards clean energy; the use of recycled materials has proven to be both economical and sustainable; and some companies have made efforts to reduce their footprint for ethical or public relations capital.¹¹ While much of the progress towards net zero carbon emissions can be traced to grassroot movements, one of the most important forces reducing industrial emissions has been the EPA's promulgation of technology standards that spurred green innovation as a necessity to the growth of American industry.¹²

The Clean Air Act ("CAA") contains both voluntary and forced technology provisions.¹³ Section 103(g) of the CAA created one of the many

⁷ The beginning of human's harmful impact on the climate can be traced to the industrial revolution and the explosion of these effects occurred during the innovative and economic boom following the Second World War. See Roz Pidcock, *Scientists Clarify Starting Point for Human-Caused Climate Change*, CARBON BRIEF (Aug. 24, 2016, 6:00 PM), <https://www.carbonbrief.org/scientists-clarify-starting-point-for-human-caused-climate-change> [<https://perma.cc/F225-MXYW>].

⁸ See *Greenhouse Gas Emissions*, EPA, [https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#:~:text=Industry%20\(22.0%20percent%20of%202018,produce%20goods%20from%20raw%20materials](https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#:~:text=Industry%20(22.0%20percent%20of%202018,produce%20goods%20from%20raw%20materials) [<https://perma.cc/KD7T-XBDJ>] (last updated July 27, 2021).

⁹ *Id.*

¹⁰ There was a slight increase while recovering from a significant drop in industrial pollution during the 2008 recession, and a general increase in industrial pollution under the Trump administration. *Id.*

¹¹ *Id.*

¹² Judy Foster & Rob Brenner, *Clean Air and Technology Innovation: Working Concepts for Promoting Clean Technology Innovation Under the Clean Air Act*, NICHOLAS INST. ENV'T POLY SOLUTIONS, at ii–iv (June 2013), https://nicholasinstitute.duke.edu/sites/default/files/publications/ni_r_13-05.pdf [<https://perma.cc/SE68-PML9>].

¹³ See, e.g., *Progress Cleaning the Air: Voluntary Partnership Program Accomplishments*, EPA, <https://www.epa.gov/clean-air-act-overview/progress-cleaning-air-voluntary-partner>

environmental success stories, the ENERGY STAR program.¹⁴ ENERGY STAR spans various sectors, and each have been successful for different reasons. For industrial plants, ENERGY STAR encourages sustainability with resources that demonstrate how best to lower emissions while remaining affordable.¹⁵ ENERGY STAR annually certifies industrial plants performing within the top quarter of their sector.¹⁶ In 2018, ENERGY STAR's committed plant technology improvements reduced electricity usage by thirty-six billion kilowatt-hours, cut energy costs by three billion dollars, and reduced their greenhouse gas footprint by forty million metric tons.¹⁷

However, despite both voluntary and forced improvements in the efficiency and footprint of industrial technology, the American industry sector still emitted almost 2,000 million metric tons of CO₂ equivalent—far too much.¹⁸ Brad Plumer, a climate reporter specializing in policy and technology efforts to cut carbon emissions wrote: “[t]o stop global warming, we’ll need to zero out greenhouse gas emissions from billions of different sources worldwide: every coal plant in China, every steel mill in Europe, every car and truck on American highways.”¹⁹ These are lofty, many have argued impossible, benchmarks to achieve.²⁰ However, with the longevity of our planet and all of its inhabitants suspended in the balance, there is one thing that is certain: we must build on the progress that we have made.

ship-program-accomplishments [https://perma.cc/2XJA-N2DB] (last updated Aug. 12, 2021) (demonstrating a number of voluntary programs and their successes).

¹⁴ *Statutory Authority for ENERGY STAR*, EPA, https://www.energystar.gov/about/origins_mission/epas_role_energy_star/epa%E2%80%99s_statutory_authority_energy_star [https://perma.cc/JNG5-LTCR] (last visited Mar. 11, 2022).

¹⁵ *Overview*, ENERGY STAR, https://www.energystar.gov/about/origins_mission/energy_star_overview/about_energy_star_industrial_plants [https://perma.cc/7TDM-QMT3] (last visited Mar. 11, 2022).

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *See Inventory of U.S. Greenhouse Gas Emissions and Sinks*, EPA, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks [https://perma.cc/K5G6-7J63] (last updated Oct. 26, 2021).

¹⁹ Brad Plumer, *How Do We Stop Fossil Fuel Emissions?*, N.Y. TIMES, https://www.nytimes.com/interactive/2020/04/19/climate/climate-crash-course-4.html [https://perma.cc/CF2G-LQGN] (last visited Mar. 11, 2022).

²⁰ John Baez, a mathematician and climate scientist, discusses in detail the extreme difficulty of reaching net zero carbon emissions. *See generally* John Baez, *Is Net Zero Emissions an Impossible Goal? What It would Take to Suck More Carbon Dioxide Out of the Air than We Put In.*, NAUTILUS (Nov. 27, 2019), https://nautil.us/issue/78/atmospheres/is-net-zero-emissions-an-impossible-goal [https://perma.cc/62H4-MA2X].

A post-grant environmental challenge might help to address the economic imperative to make profits at the expense of our planet. While cheaper, more profitable products and processes may be seen as innovative in the eyes of the American economy, an environmental challenge to patents might force industry to reevaluate profitability of dirty innovation and implement practices ensuring that their products do not unduly prejudice the environment. A post-grant environmental challenge could take away monetary gains and enhance the value of social and environmental capital for the betterment of the planet.

And the importance of sustainable technology and green innovation extends beyond industry and into the average American's house. The average American creates twenty-three tons of CO₂ annually, thirteen tons more than the average citizen in other industrialized countries.²¹ Personal carbon output is primarily attributed to the consumption of food, use of electricity, and transportation.²² Again, incentives through programs like ENERGY STAR and a general rise in conservation awareness have led to a reduction in personal emissions in recent years.²³

Unfortunately, the Trump administration undid decades of environmental progress.²⁴ Regulatory reforms, like the Safer Affordable Fuel-Efficiency ("SAFE") Vehicle Rule, stunt regulations that guide the automotive industry towards sustainability and encourage the industry to dismantle progress already gained in favor of short-term profitability.²⁵ The SAFE Vehicle Rule allegedly intends to make "newer, safer, and cleaner vehicles more accessible for American families" while saving jobs in the automotive industry.²⁶ However, environmental groups, including

²¹ *One Ton of Carbon Emissions: What Does That Look Like?*, TERRAPASS (Oct. 24, 2017), <https://www.terrapass.com/blog/one-ton-carbon-emissions-look-like> [https://perma.cc/9X2Z-NDHE].

²² *Carbon Footprint Factsheet*, UNIV. MICH. CTR. SUSTAINABLE SYS. (2020), <https://css.umich.edu/factsheets/carbon-footprint-factsheet> [https://perma.cc/8TAM-Y5HK].

²³ *See Impacts*, ENERGY STAR, https://www.energystar.gov/about/origins_mission/impacts [https://perma.cc/7H3D-Q38Q] (last visited Mar. 11, 2022).

²⁴ *See* Nadia Popovich et al., *The Trump Administration Rolled Back More Than 100 Environmental Rules. Here's the Full List.*, N.Y. TIMES, <https://www.nytimes.com/interactive/2020/climate/trump-environment-rollbacks-list.html> [https://perma.cc/WB62-C9ZQ] (last updated Jan. 20, 2021). While the Biden administration has rectified many of these changes, many remain and the president's ability to drastically impact climate change regulation through executive order has become clear.

²⁵ *See* Nathan Rott & Jennifer Ludden, *Trump Administration Weakens Auto Emissions Standards*, NPR (Mar. 31, 2020, 12:22 PM), <https://www.npr.org/2020/03/31/824431240/trump-administration-weakens-auto-emissions-rolling-back-key-climate-policy> [https://perma.cc/SVV7-785U].

²⁶ *Id.*

the EPA's own scientific advisory board, argue that the administration's logic is flawed; "weakened standards will lead to dirtier air and cost consumers at the gas pump long-term."²⁷

A closer look at the American automotive industry demonstrates a reluctance to address climate change concerns. American auto makers have, to the perplexation of the rest of the world,²⁸ focused on profitable SUVs.²⁹ Not long ago, the Great Recession caused a panic for American manufacturers who were ultimately bailed out by the federal government—a bailout that came with a mandate for more efficient vehicles.³⁰ And while there has been a steep increase in patent filings in the automotive space, U.S. companies' share of sustainable automotive patents continually decreases.³¹ In particular, the United States' early lead in the area of electric propulsion has evaporated.³² Many American electric carmakers and promising battery innovators were bought by Chinese interests with significant backing from their government.³³ Therefore, it is possible that the future could bring an automotive industry dominated by Chinese design and manufacturing.

The majority of American automotive applications linger in the quickly ageing field of internal combustion engines ("ICE").³⁴ Because denying ICE patents to automotive manufacturers does not prevent the manufacturers from creating or selling ICE cars and trucks,³⁵ the ratio

²⁷ *Id.*

²⁸ Tom Voelk, *Europe and the U.S. Share a Lot, Except When It Comes to Cars: Why you will not see the new Seat Leon or the Skoda Octavia in Kansas driveways, nor many big S.U.V.s in French ones*, N.Y. TIMES (Mar. 4, 2020), <https://www.nytimes.com/2020/03/04/automobiles/european-us-cars-automakers.html> [https://perma.cc/PXY8-5XU4].

²⁹ Thomas Franklin & Kate Gaudry, *Patent Trends Study Part Five: Automotive Industry*, IPWATCHDOG (May 7, 2019), <https://www.ipwatchdog.com/2019/05/07/patent-trends-study-part-five-automotive/id=108960/> [https://perma.cc/JXK4-8LCQ].

³⁰ *Id.*

³¹ *Id.*

³² *Id.*; but see Steven Mufson, *General Motors to Eliminate Gasoline and Diesel Light Duty Cars and SUVs by 2035*, WASH. POST (Jan. 28, 2021), <https://www.washingtonpost.com/climate-environment/2021/01/28/general-motors-electric/> [https://perma.cc/86D9-KVDV] (showing a historic turning point for American carmakers).

³³ *Id.*

³⁴ While GM made strong promises to move entirely away from the internal combustion engine by 2035, Sierra Club's Jim Motavalli is skeptical. See Jim Motavalli, *Can GM Keep Its Promise to Abandon the Internal Combustion Engine?*, SIERRA CLUB (Feb. 15, 2021), <https://www.sierraclub.org/sierra/can-gm-keep-its-promise-abandon-internal-combustion-engine> [https://perma.cc/8CD6-AS4R].

³⁵ See Carolyn Abbot & David Booton, *Using Patent Law's Teaching Function to Introduce an Environmental Ethic into the Process of Technical Innovation*, 21 GEO. INT'L ENV'T L. REV. 219, 227–28 (2009).

of ICE and sustainable automotive patents cannot be used as a direct indication of what is being made and sold by manufactures. However, the ratio of ICE patents as compared to Electric Vehicle patents does measure where companies are investing their time and money and can possibly be extrapolated to predict the future of the industry. The method of using patent trends to show the future of an industry is underdeveloped. While there is little literature on the topic, patents arising out of companies demonstrate where the companies are allocating research and development resources.³⁶ Then, with an average patenting cost of ten thousand dollars,³⁷ it is acceptable to presume that a company pursuing a patent saw at least some potential in the innovation. Consequently, despite the vows of some American automotive manufacturers, patent filings would indicate that the future of American automotive manufacturing still appears to remain in the hands of combustion engines.

It is not feasible, nor is it appropriate, to categorically ban ICE patents. Many ICE patent applications may be furthering the efficiency of combustion engines.³⁸ However, a carefully crafted post-grant environmental challenge process could weigh incentives in favor of environmentally neutral innovation. This industrial greening will then rattle down the chain to the consumer of the products and reduce personal pollution. The American patent system should only reward true innovation, and sustainability must become part of that definition.

II. PATENTS FOSTERING INNOVATION

The patent system is intended to, and has proven successful at, encouraging innovation by granting to inventors exclusive rights for a limited time in exchange for public disclosure of their innovation.³⁹ The

³⁶ It is assumed that patents are used to recoup research costs, and, therefore, outline research bearing fruit. However, there are other ways to fund research that may diminish the ability to track research through patents, such as public funding. See Nuno Pires de Carvalho, *The Primary Function of Patents*, 2001 U. ILL. J.L. TECH. & POL'Y 25, 50–51 (2001).

³⁷ Figure based on IPWatchdog's calculation of a minimally complex patent. See Gene Quinn, *The Cost of Obtaining a Patent in the US*, IPWATCHDOG (Apr. 4, 2015), <https://www.ipwatchdog.com/2015/04/04/the-cost-of-obtaining-a-patent-in-the-us/id=56485/> [<https://perma.cc/Z67E-ZFM9>].

³⁸ See, e.g., U.S. Patent No. 2016/0230696 A1 (granted Oct. 10, 2018) (Ford patent for a hybrid composite cylinder head aimed at increasing efficiency).

³⁹ The USPTO granted 354,430 patents in 2019, more than any previous year. U.S. PATENT & TRADEMARK OFF., U.S. PATENT STATISTICS CHART, https://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm [<https://perma.cc/59JM-2LEB>] (last modified Jan. 29, 2022, 11:05 AM).

bundle of rights bestowed by an American patent grant include the right to exclude others from making, using, offering for sale, or selling a protected invention in the United States.⁴⁰ Therefore, assuming a patent describes an invention desired by the market, inventors may recoup their research and development costs, and often much more.⁴¹ In exchange for the exclusive rights granted by a patent, the inventor publicly discloses the function and form of the invention to effectively progress the field and inform the public of the advancement.⁴² At the end of the patent term, the published invention will enter the public domain and be competitively produced.⁴³

The power in a patent grant is not in giving a patent holder the right to make, use, or sell an invention, but in allowing them to prevent others from doing so.⁴⁴ Therefore, the patent system does not have the power to directly stop the production of products that degrade the environment,⁴⁵ but it does have the power to indirectly stop the emergence of environmentally negligent innovation by refusing to grant exclusive rights to inventors. An environmental challenge to patent grants encourages the implementation and consideration of sustainable practices within innovation without directly banning dirty innovation. An environmental challenge encourages industry leaders to invest their time and research in desirable sustainable products, or face market-share battles with competitors that reverse-engineer the most profitable products.⁴⁶ A powerful patent can give a company a foothold within an industry, and the absence of patent protection can shape the very nature of an industry within the global market.⁴⁷

⁴⁰ See 35 U.S.C. § 271(a).

⁴¹ Pires de Carvalho, *supra* note 36, at 50–51.

⁴² 35 U.S.C. § 154.

⁴³ See *id.*

⁴⁴ Patent grants do not guarantee that the holder can make and sell their innovation, they must still comply with all of the other applicable laws and regulations governing their industry. However, it does allow them to stop others from utilizing or selling their innovation. See *id.*

⁴⁵ Abbot & Booton, *supra* note 35, at 227–28.

⁴⁶ See James Pooley, *The Art of Reverse Engineering*, IPWATCHDOG (Dec. 4, 2017), <https://www.ipwatchdog.com/2017/12/04/art-reverse-engineering/id=90439/#:~:text=You%20can't%20use%20the,and%20duplicate%20a%20patented%20invention.&text=Finally%20C%20you%20can't%20through,be%20confused%20about%20its%20source> [<https://perma.cc/TZ3X-GCRJ>].

⁴⁷ See generally Suma Athreye et al., *Small Firms and Patenting Revisited*, SMALL BUS. ECON. (2020), <https://doi.org/10.1007/s11187-020-00323-1> [<https://perma.cc/S7TX-5DB8>].

A. *Pharmaceuticals in India: The Power of Patent Laws*

Not all industries are equally affected by changes in patent law.⁴⁸ Industries that require a large research and development investment (e.g., pharmaceuticals, semiconductors, and the automotive industry)⁴⁹ rely heavily on patents to recuperate their costs before competitors enter the field, while the food industry traditionally does not rely on exclusive rights to the same degree.⁵⁰

India's treatment of pharmaceutical patents demonstrates how patent rights can mold industry.⁵¹ Beginning in 1972, India built a generic drug empire by refusing to give patent protection to pharmaceuticals.⁵² Without Indian protection to pharmaceutical patents, companies had no standing to find infringement against manufactures making and selling generic drugs within Indian borders.⁵³ The pharmaceutical industries' frustration towards India's refusal to grant pharmaceutical patents was one of the catalysts of the Trade-Related Aspects of International Property ("TRIPS") agreement.⁵⁴ While today, India, as a World Trade Organization ("WTO") member, is required to offer patent protection to pharmaceuticals under the TRIPS agreement,⁵⁵ India continues to find space within TRIPS's language to marginalize the protection it gives the pharmaceutical industry.⁵⁶ Without consistent patent protection, the generic pharmaceutical

⁴⁸ See Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1581–82 (2003).

⁴⁹ See NAT'L SCI. FOUND., *Industry, Technology, and the Global Marketplace*, in SCIENCE AND ENGINEERING INDICATORS 6-1 (2014), <https://www.nsf.gov/statistics/seind14/index.cfm/chapter-6/c6s4.htm> [<https://perma.cc/E3VW-LH98>] (stating that in 2012, the majority of HT patents were in the field of semiconductors).

⁵⁰ See NAT'L SCI. FOUND., *THREE-QUARTERS OF U.S. BUSINESSES THAT PERFORMED OR FUNDED R&D VIEWED TRADE SECRETS AS IMPORTANT IN 2018* (Sept. 2, 2021), <https://ncses.nsf.gov/pubs/nsf21339> [<https://perma.cc/Q2UK-44M4>] (demonstrating that many industries, like the food and beverage industries, rely on other IP mechanisms like trade secrets that allow them to keep their recipes secret indefinitely).

⁵¹ See generally Mueller, *supra* note 6.

⁵² *Id.* at 495.

⁵³ See, e.g., Gardiner Harris & Katie Thomas, *Low-Cost in Poor Nations Get a Lift in Indian Court*, N.Y. TIMES (Apr. 1, 2013), <https://www.nytimes.com/2013/04/02/business/global/top-court-in-india-rejects-novartis-drug-patent.html> [<https://perma.cc/TR5M-8NLQ>] (covering the Indian court holding that Novartis cannot stop drug manufactures in India from manufacturing and selling Gleevec).

⁵⁴ See Lawrence Gostin et al., *How the US Elevates Corporate Interests Over Global Public Health. And How the World Can Respond*, HEALTHAFFAIRS (Sept. 5, 2018), <https://www.healthaffairs.org/doi/10.1377/hblog20180830.186562/full/> [<https://perma.cc/TE8S-K82H>].

⁵⁵ Mueller, *supra* note 6, at 495.

⁵⁶ *Id.* at 495–96.

industry in India continues to dominate the market and tamper drug prices.⁵⁷ As a result, large pharmaceutical companies innovating within the industry stay out of India.⁵⁸ American pharmaceuticals adamantly argue that if every country followed this model, it would no longer be profitable for pharmaceutical companies to spend on Research and Development.⁵⁹

The pharmaceutical industry in India demonstrates that the implementation of patent laws can foster dramatic growth in one area of industry (generic drugs) while keeping another at bay (large pharmaceutical name brands). For example, keeping with the theme of pharmaceuticals, under a post-grant environmental challenge a third party could potentially prove that byproducts from a pharmaceutical company's process patents that produce an active ingredient in a blockbuster drug endanger the health and safety of humans and prejudice the environment.⁶⁰ With the threat of third parties invalidating the patent, pharmaceutical companies would be forced to consider environmental repercussions of their process and utility patents to ensure that the claims do not cause serious environmental harm when practiced on a large scale. While there are other remedies for such harms in other areas of law, most address the harm after it has occurred.⁶¹ The financial risk of losing even one year of an important patent's term could force industry to consider the environment early in their innovative process, before they begin causing harm.

⁵⁷ MCKINSEY & CO., INDIA PHARMA 2020: PROPELLING ACCESS AND ACCEPTANCE, REALIZING TRUE POTENTIAL 13 (2020), https://www.mckinsey.com/~media/mckinsey/dotcom/client_service/Pharma%20and%20Medical%20Products/PMP%20NEW/PDFs/778886_India_Pharma_2020_Propelling_Access_and_Acceptance_Realising_True_Potential.ashx [<https://perma.cc/ZF7Z-KZVG>].

⁵⁸ *See id.* (showing that seventy to eighty percent of the drug market is dominated by generic drug makers rather than innovators).

⁵⁹ The Congressional Research Service's detailed report showed the importance of patenting to recoup pharmaceutical costs and how pharmaceutical companies are abusing the system to extend the term of their patents beyond what was envisioned. *See generally* CONG. RSCH. SERV., DRUG PRICING & PHARMACEUTICAL PATENTING PRACTICES (Feb. 11, 2020), <https://fas.org/sgp/crs/misc/R46221.pdf> [<https://perma.cc/VQM9-9DHA>].

⁶⁰ *See generally* N. Adler et al., *Environmental Impact Assessment and Control of Pharmaceuticals: The Role of Environmental Agencies*, 57 WATER SCI. TECH. 91 (2008) (highlighting the environmental risks that pharmaceuticals create and the difficulties in regulating the industry).

⁶¹ *See, e.g.*, Nathaniel Rich, *The Lawyer Who Became DuPont's Worst Nightmare*, N.Y. TIMES (Jan. 6, 2016), <https://www.nytimes.com/2016/01/10/magazine/the-lawyer-who-became-duponts-worst-nightmare.html> [<https://perma.cc/M6DB-GJ56>] (highlighting the vast discovery and scientific research that went into Rob Bilott's legendary battle with DuPont which recently was turned into a motion picture).

III. MAKING ROOM FOR AN ENVIRONMENTAL CHALLENGE

Post-grant review (“PGR”) and *inter partes* review (“IPR”) were crafted as speedy, relatively inexpensive, and more specialized alternatives to challenging a patent’s validity in a district court proceeding.⁶² But, an environmental challenge is far outside the scope of the current IPR and PGR regimes. Therefore, it makes more sense to create a new avenue for third parties to challenge the validity of a patent instead of attempting to mutilate IPR or PGR to fit the needs of a successful environmental challenge. This Section explains how PGR and IPR have created a useful infrastructure within the USPTO that could be tapped to incorporate a successful environmental challenge. This Section then explains how the environmental challenge must differ from the PGR and IPR regimes, while substantially borrowing from both, to create progressive change within American patent law.

The 2011 Leahy-Smith America Invents Act (“AIA”) radically changed the American patent system and proved that large scale restructuring of our patent system is feasible and periodically necessary.⁶³ The biggest change introduced by the AIA was the transition from a first-to-invent priority granting scheme to the more common internationally used first-to-file system.⁶⁴ Changes in the issuance of priority for patent registration naturally called for changes in a third parties’ ability to challenge the validity, and specifically priority, of an application.⁶⁵ IPR accompanied the enactment of the first-to-file priority as a counterpart to PGR.⁶⁶ Together, IPR and PGR repealed the obsolete *inter partes* re-examination and have become widely utilized paths for third parties to challenge the validity of patent applications.⁶⁷

A. *Timing*

Indicated by their designation as post-grant challenges, both IPR and PGR challenges take place after the issuance of a patent.⁶⁸ This timing

⁶² See Ryan Kenny, *Which Invalidity Avenue to Take: Inter Partes Review Verses Post-Grant Review*, IPWATCHDOG (July 31, 2018), <https://www.ipwatchdog.com/2018/07/31/which-invalidity-avenue-ipr-verses-post-grant-review/id=99460/> [<https://perma.cc/66VC-B9D5>].

⁶³ The act restructured USPTO at its core—its filing system. See 35 U.S.C. § 102.

⁶⁴ Anything after March 16, 2013, is first-to-file. See *id.*

⁶⁵ Christa Laser, *The Scope of IPR Estoppel: A Statutory, Historical, and Normative Analysis*, 70 FLA. L. REV. 1127, 1129–31 (2018).

⁶⁶ Kenny, *supra* note 62.

⁶⁷ IPR is only available after PGR’s statutory period has run. *Id.*

⁶⁸ See *id.*

is possibly the most important and defining aspect that an environmental challenge must echo. Briefly looking at the nearly extinct doctrine of moral utility will demonstrate why a third-party environmental challenge is preferential to an environmental standard applied by the USPTO during the application review proceedings.⁶⁹

Throughout the history of the American patent system, legal scholars have considered refusing patent grants to inventions that do not have a “moral utility.”⁷⁰ Moral utility arose out of Justice Story’s *Lowell v. Lewis* opinion in 1817, and continued to narrow the scope of patentable innovation for decades.⁷¹ Early American jurisprudence allowed the USPTO to refuse patents for inventions that they deemed “morally controversial.”⁷² During this time, inventions such as “gambling machines and fraudulent articles” were deemed unworthy of exclusionary rights.⁷³ However, by the early twentieth century, courts began narrowing the moral utility doctrine until an invention’s moral utility could be satisfied if it merely had at least one moral purpose.⁷⁴ Today, the courts are very unlikely to uphold a refusal on the grounds of moral utility.⁷⁵ The Court of Appeals for the Federal Circuit held in *Juicy Whip v. Orange Bang* that invalidating patents because one can use the item for deceptive or illegal purposes is no longer good law.⁷⁶ While the USPTO does still claim to consider the moral utility of patents, the grounds for refusal are rarely, if ever, used.⁷⁷

Other patent systems have been equally reluctant to use environmental harm to strike down patent applications.⁷⁸ In Europe, the European Patent Office (“EPO”) has interpreted Article 53(a) of the European Patent Convention (“EPC”) as restricting the grant of a patent to inventions the commercial exploitation of which would be contrary to *ordre public* or morality.⁷⁹ The EPO’s Technical Board of Appeals has enumerated that

⁶⁹ See generally Julien Crockett, *Morality: An Important Consideration at the Patent Office*, 108 CAL. 267 (2020) (presenting an adept history of moral utility in American patent law).

⁷⁰ See Abbot & Booton, *supra* note 35, at 225–27.

⁷¹ *Id.* at 227, n.34.

⁷² *Id.* at 225–27.

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ See, e.g., *Juicy Whip, Inc. v. Orange Bang, Inc.*, 185 F.3d 1364 (Fed. Cir. 1999) (holding that a juice machine has utility even though it deceives the customers into thinking it dispenses out of a holding tank rather than mixing from concentrate).

⁷⁶ *Id.*

⁷⁷ See Abbot & Booton, *supra* note 35, at 227.

⁷⁸ *Id.* at 225–27.

⁷⁹ *Id.* at 225 (citing Convention on the Grant of European Patents (European Patent Convention) art. 53(a), Oct. 5, 1973, 1065 U.N.T.S. 254 (amended in 2000)).

protection of the environment, and consequently inventions that, if exploited, would likely seriously prejudice the environment, were to be excluded from patenting by the doctrine of *ordre public*.⁸⁰ This sentiment is additionally reflected in the Agreement on TRIPS, to which both European nations and the United States belong.⁸¹ However, Article 53(a) has proven ineffective in protecting environmental interests in a variety of suits.⁸² First, in T19/90 Harvard/Onco-Mouse, the EPO determined that Article 53(a) of the EPC's barring ability did not simply hinge on whether the exploited contents of an application prejudiced the environment, but actually was only applicable if the possible risks to the environment outweighed the invention's usefulness to mankind.⁸³ The way this balancing test is implemented makes it entirely unlikely that Article 53(a) will ever bar the grant of a patent under environmental considerations.⁸⁴ In T356/93 Plant Cells/Plant Genetic Systems, the Technical Board elaborated that the balancing exercise is especially important in situations where environmental prejudice existed, but was just one way of assessing the patentability of the invention.⁸⁵ The Board added that the revocation of the patent on the grounds that it caused environmental prejudice required that the threat to the environment be sufficiently substantiated at the time the decision to revoke the patent was made.⁸⁶ Therefore, not only does the EPO have to prove that there is no way to utilize the patent without causing substantial prejudice to the environment, but they must do so *at the time of the denial*.⁸⁷ The difficulty of proving harm during the application period is an almost insurmountable obstacle—an obstacle shared by the doctrine of moral utility in the United States.

Justice Story found moral utility's origin in Section 101 of the Patent Act.⁸⁸ Section 101 requires that a patent promote the progress of "useful" arts.⁸⁹ But the issue with "dirty" innovation is not that it is no longer useful. The utility of "dirty" innovation elevated the United States

⁸⁰ *Id.*

⁸¹ TRIPS: Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, art. 27(2), 1869 U.N.T.S. 299 (1994) [hereinafter TRIPS Agreement].

⁸² *See, e.g.*, T19/90 Harvard/Onco-Mouse, [1990] E.P.O.R., 20–21.

⁸³ *Id.*

⁸⁴ *See* Abbot & Booton, *supra* note 35, at 225–27.

⁸⁵ T356/93 Plant Cells/Plant Genetic Systems, [1995] E.P.O.R. 1, 17–32.

⁸⁶ *Id.*

⁸⁷ *See id.*

⁸⁸ *Lowell v. Lewis*, 15 F. Cas. 1018, 1018–19 (Cir. Ct. 1817).

⁸⁹ 35 U.S.C. § 101.

onto the world stage following the Second World War, however, scientists have proven that this utility has been matched by environmental harm that created the climate change crisis.⁹⁰ Therefore, while the patent system may not be well suited to prevent any innovation that may be harmful during the application process, it may be able to minimize the value of the grants whose industrialization causes environmental prejudice and force industry to reconsider where they invest their resources. Moral utility, and any other grounds for denying patents because of their use, are ill-suited to challenge the validity of a patent during the initial proceedings because it is unclear, and potentially unfair, to determine how an applicant will use a patent grant before the invention has entered the public sphere.⁹¹ However, implementing an environmental challenge administered by the Patent and Trademark Appeals Board (“PTAB”) may enable the patent system to encourage sustainable thinking during the innovation process. The risk of losing even one year on the term of a successful patent may be enough to encourage new levels of sustainable thinking.⁹²

B. *Scope*

PGR and IPR serve slightly different purposes.⁹³ While they both contain similar structures, they balance each other and serve as avenues for specific challenges to the validity of a patent.⁹⁴ Even though it does not make sense to force an environmental challenge into PGR or IPR, an environmental challenge could exist as an additional prong of the post-grant challenges available to third parties.

Both IPRs and PGRs challenge the validity of a patent before the PTAB, the successor of the Board of Patent Appeals and Interferences.⁹⁵ The PTAB primarily contains judges with strong expertise in patent law and technology.⁹⁶ PTAB judges’ technical expertise make them especially

⁹⁰ Steep increase in emissions after the industrial revolution. See EPA, *supra* note 8.

⁹¹ See *Juicy Whip, Inc. v. Orange Bang, Inc.*, 185 F.3d 1364, 1366–68 (Fed. Cir. 1999).

⁹² See generally Neel U. Sukhatme & Judd N.L. Cramer, *Who Cares About Patent Term? Cross-Industry Differences in Term Sensitivity*, 2 Princeton Univ. Dep’t of Econ., Working Paper, 2014 (demonstrating that some industries, like pharmaceuticals, are particularly sensitive to patent term).

⁹³ See Kenny, *supra* note 62.

⁹⁴ See *id.*

⁹⁵ *Id.*

⁹⁶ Janett Gongola, *The Patent Trial and Appeal Board: Who are they and what do they do?*, U.S. PATENT & TRADEMARK OFF. (June 6, 2019, 8:08 AM), <https://www.uspto.gov/learning>

well-suited to untangle the technological intricacies and to digest the scientific arguments expected in an environmental challenge.⁹⁷

The standards to bring a PGR and IPR differ primarily because of the scope of the challenges.⁹⁸ In IPR, a petitioner must establish “a reasonable likelihood that the petitioner would prevail with respect to at least [one] of the claims challenged in the petition.”⁹⁹ This standard is fairly low because IPR challenges are confined to claims that the patent is invalid on the basis of prior art patents or printed publications under Sections 102 and 103 of Title 35.¹⁰⁰ With such a narrow scope, IPRs have relatively low discovery costs, and, therefore, in the eyes of PTAB, only require a low burden to be heard. The standard for granting a PGR is higher than the standard for an IPR.¹⁰¹ In a PGR challenge, the petitioner must establish “that it is more likely than not that at least [one] of the claims challenged in the petition is unpatentable.”¹⁰² The heightened standard, along with PGR’s requirement that it be brought within a nine-month window after the issuance of a patent, counteract PGR’s vast grounds for challenging a patent.¹⁰³

The scope of an environmental challenge would likely be vast. Especially because an environmental challenge should be available for the life of a patent, the standard for granting the review would need to be even more stringent than PGR. Exactly how stringent the proposed standard should be is a conversation that this Note leaves to others, however. Following the trajectory of IPR and PGR’s standards, it should be reasonably burdensome on the suing party to discourage frivolous actions.

Another safeguard against frivolous petitions is the finality of a PTAB decision to accept or to deny a party’s challenge.¹⁰⁴ Once PTAB denies a petition, the petitioner will be barred from asserting additional arguments or information that could have reasonably been incorporated into the first petition.¹⁰⁵ In the context of an environmental challenge, this could preclude multiple challenges from a competitor. While the

-and-resources/newsletter/inventors-eye/patent-trial-and-appeal-board-who-are-they-and-what [https://perma.cc/GQ7C-K2QK].

⁹⁷ *See id.*

⁹⁸ *See* Kenny, *supra* note 62.

⁹⁹ 35 U.S.C. § 314(a).

¹⁰⁰ *See* Kenny, *supra* note 62.

¹⁰¹ *Id.*

¹⁰² *Id.*

¹⁰³ *See id.*

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*

public may be eager to strike at industry with invalidating suits, they must wait until their case is strong enough to warrant risking their sole chance of invalidation.

C. *Discovery*

Discovery is also more expansive, and, therefore, more expensive in PGR than IPR because the available claims cover a much wider scope.¹⁰⁶ However, discovery in both PGR and IPR are less expensive than traditional patent litigation in district courts.¹⁰⁷ IPR has “three stages of discovery: mandatory initial disclosures, routine disclosures, and additional discovery.”¹⁰⁸ Routine discovery encompasses expert depositions and is often the only stage used because mandatory initial disclosures require agreement between parties, and PTAB rarely determines that additional discovery is necessary in the “interest of justice.”¹⁰⁹ Since discovery often acts as a great equalizer between parties in a dispute, this strict discovery procedure puts the petitioner at a disadvantage.¹¹⁰ Consequently, the petitioner is likely to have a strong, well-developed case before filing an IPR.¹¹¹ PGR has a more extensive discovery that allows accesses to relevant evidence that is “directly related to . . . factual assertions advanced by either party.”¹¹² Furthermore, additional discovery is granted significantly more often because the threshold to grant is “good cause,” a lower bar than in the “interest of justice.”¹¹³ This makes PGR a more expensive avenue than IPR, but still cheaper than a district court proceeding.

Environmental suits traditionally require extensive discovery and thorough scientific studies.¹¹⁴ To have a successful environmental challenge, the petitioner’s burden would be proving actual, significant environmental harm. While this harm is something that should be in hand before the petition is filed with PTAB; the data, research, and capital often reside with the defending party. Therefore, an environmental challenge would require reasonably vast discovery to act as the great equalizer between industry and environmental interest groups.

¹⁰⁶ See Kenny, *supra* note 62.

¹⁰⁷ *Id.*

¹⁰⁸ *Id.*

¹⁰⁹ *Id.*

¹¹⁰ See *id.*

¹¹¹ See *id.*

¹¹² Kenny, *supra* note 62.

¹¹³ *Id.*

¹¹⁴ See Rich, *supra* note 61 (showing the massive expense of the DuPont cases).

IV. AUTHORITY

Briefly, this Part discusses the constitutional authority to revoke a patent grant because it unduly prejudices the environment. Beyond constitutional authority, this Part also shows how an environmental challenge would not violate the United States' international obligations, namely the TRIPS agreement.

Scholars disagree as to the origins of the American patent system. While some point to the British crown, others trace it back further to Venetian law.¹¹⁵ Regardless, Article I, Section 8 of the U.S. Constitution specifically enumerates that “Congress shall have Power To . . . 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.”¹¹⁶ Section 101 of the Patent Act sets a low bar for patent eligible subject matter.¹¹⁷ The Supreme Court's decision in *Diamond v. Chakrabarty* is commonly cited as stating that “Congress intended statutory subject matter to ‘include anything under the sun that is made by man.’”¹¹⁸ However, this does not suggest that there are no limits to what patent law embraces as patentable.¹¹⁹ U.S. Code Section 2181 specifically denied and revoked all patents for “any invention or discovery which is useful solely in the utilization of special nuclear material or atomic energy in an atomic weapon.”¹²⁰ While atomic weapons are far from an internal combustion engine, this demonstrates that the harm that some innovation has the potential to cause is significant enough to bar the grant of exclusive patent rights. The potential harm of nuclear weapons is immediate and devastating in a single implementation, while the harm from industries reluctance to address climate change has been gradual and cumulative.¹²¹ Again, this is why any environmental challenge would need to take place post-grant.

The United States also has additional international obligations to address when making changes to patent laws. In particular, Article

¹¹⁵ Stefania Fusco, *Lessons from the Past: The Venetian Republic's Tailoring of Patent Protection*, 17 NW. J. TECH. & INTELL. PROP. 301, 312–14 (2020).

¹¹⁶ U.S. CONST. art. I, § 8.

¹¹⁷ See *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).

¹¹⁸ *Id.*

¹¹⁹ See, e.g., *Bilski v. Kappos*, 561 U.S. 593, 656–57 (2010) (invalidating a business method patent as non-patentable subject matter).

¹²⁰ 42 U.S.C. § 2181(a).

¹²¹ See Andrew Nickischer, *Environmental Impacts of Internal Combustion Engines and Electric Battery Vehicles*, 4 DUQ. UNIV. QUARK 21, 23 (2020).

27(1) of TRIPS requires that “patents shall be available for *any* inventions, whether product or process, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application.”¹²² Additionally, this clause, also known as the non-discrimination clause of Article 27, dictates that all industries be treated similarly. Therefore, some may argue that an environmental challenge in the American patent system discriminates against certain industries, namely those who traditionally have large environmental impacts. However, the parties at the Uruguay Round specifically considered environmental harm as a concern that future patent systems may address. TRIPS 27(2) specifies that members of TRIPS “may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordre public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment”¹²³ An issue with this language has been proving that the prevention of the invention’s commercial exploitation would prevent harm. Here, the design of the environmental challenge addresses this issue.

Patent laws targeting the use of an invention after grant have met opposition within both American and international legal authority. However, the form and function of a post-grant environmental challenge may be able to overcome these obstacles by addressing the real harm caused by patented inventions, rather than potential harm. Consequently, a carefully constructed environmental challenge is feasible on a national and international level.

V. CRITICS

Carolyn Abbot and David Booton argue for the introduction of an environmental disclosure into the patent system in order to force industry to evaluate the environmental impact of their proposed creation and disclose the evaluation to the world.¹²⁴ While the author of this Note believes that this is a brilliant use of the patent system’s teaching function, the patent system may have even more potential to combat climate change. Abbot and Booton shy away from an environmental challenge because “the potential risks in relation to the exploitation of a given invention cannot be anticipated merely on the basis of the disclosure of the invention in a

¹²² See TRIPS Agreement, *supra* note 81, at art. 27(1).

¹²³ See TRIPS Agreement, *supra* note 81, at art. 27(2).

¹²⁴ See generally Abbot & Booton, *supra* note 35 (proposing an environmental impact disclosure requirement for the grant of a potential patent).

patent specification.”¹²⁵ Additionally, Abbot and Booton argue that “patent granting authorities are poorly qualified to judge questions of morality . . . [and] environmental harm,” and that such a bar may “[vest] the patent office with an inappropriate legislative power” that belongs to other authorities.¹²⁶

Abbot and Booton’s concerns that potential risks are prohibitively difficult to prove in a consistently fair system is valid if done during the patent application process. However, the post-grant nature of the environmental challenge discussed in this Note predominately overcomes this obstacle. Furthermore, the author of this Note disagrees that the technical PTAB Court has poor qualifications to judge the scientifically intimate question of environmental harm. Arguably, PTAB is the most technical Court in the country, making it well-equipped to digest and adjudicate environmental issues.¹²⁷

CONCLUSION

In an ideal world, American industry, and the United States generally, would have led a united response against climate change when presented with undisputable evidence. But, change is hard, and people can be stubborn when filled with fear in the face of disaster. This Note discusses the possibility that the American patent system could play a larger role in fighting climate change. But, the disruption such a change would bring to the patent system is severe and warrants further discussion because a worst-case climate induced upheaval of the economy could render the patent system all but irrelevant.

¹²⁵ *Id.* at 228.

¹²⁶ *Id.* at 228–31.

¹²⁷ *See* Gongola, *supra* note 96.